A Perspective of Smart Cities

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Outline

- The concept.
- Opportunities and challenges.
- Applications and requirements.
- Interacting with other sectors.

Smart Cities? (1)

- The concept of Smart Cities can have different definitions, according to the sources that are used as a reference.

- Smart Cities involve quite a number of topics within ICT, but extend to other areas in a transdisciplinary approach.

(*oneness4all, 2010*)

(*artandecology, 2009*)

Smart Cities? (2)

- Several dimensions have been identified:
  - economy (competitiveness),
  - people (social and human capital),
  - governance (participation),
  - mobility (transport and ICT),
  - environment (natural resources),
  - living (quality of life).

SmartCities
(*smartcities, 2010*)

europeansmartcities
(*smart-cities, 2009*)

SmartSantander
(*smartsantander, 2010*)

smart city event 2011
(*smartcityevent, 2011*)

Smart Cities

- Smart Cities are getting a lot of attention lately, encompassing:
  - Public information and training
  - Emergency warnings
  - Health, inclusion and assisted living
  - Intelligent Transportation Systems
  - Environment, Energy Efficiency, and Smart Grids.

(*colourdesign, 2010*)

(*photoaki, 2010*)

A Vision

- Smart Cities aim at:
  - increasing citizens' quality of life, and
  - improving the efficiency and quality of the services provided by governing entities and businesses.

(*foodallergens, 2007*)

- One needs to have an integrated vision of a city and of its infrastructures, in all its components.

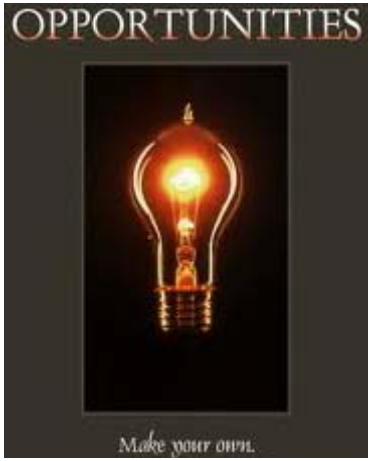
(*articlesbase, 2008*)

Too Many Players

- Many opportunities can be identified, as well as challenges and barriers.

- It extends beyond ICT, needing to incorporate the social and political dimensions.

- It is a very fragmented market, dealing with a high number of stakeholders and a huge variety of systems (interoperability!?).



(*inetgiant, 2010*)

(*LynTopinka, 2006*)

Vast Opportunities

- A large percentage of Europe's population (80%) lives and works in cities of more than 10 000 people.

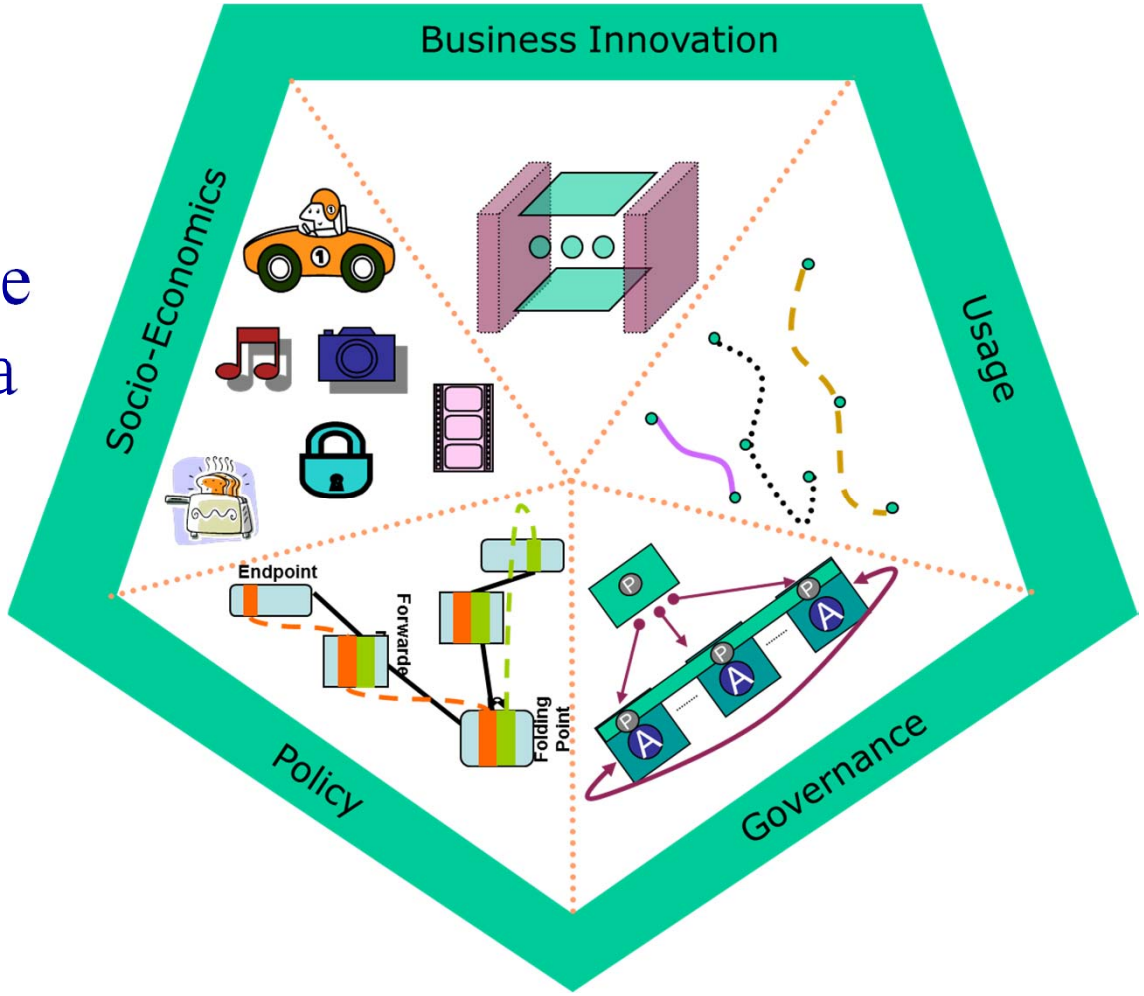
(*TheTelegraph, 2008*)

- Neelie Kroes (2010-May-28): "*cities are absolutely critical units of administration for getting our new Digital Agenda for Europe up and running*".

(*EC, 2006*)

A Broader View

- When dealing with the application of technology, one needs to have a broader view, beyond the technical aspects.



(*4WARD, 2010*)

Health, Inclusion and Assisted Living (1)

- The following key areas were identified:
  - wireless diagnostic and disease management,
  - hospital consultation and emergency scenarios,
  - assistive technologies,
  - well being and personalisation.

(Techshout 2010)

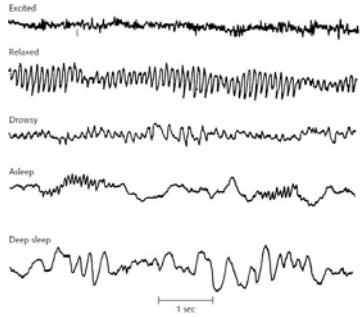
(Medgear 2010)

(Pricein 2010)

(Enno kni 2010)

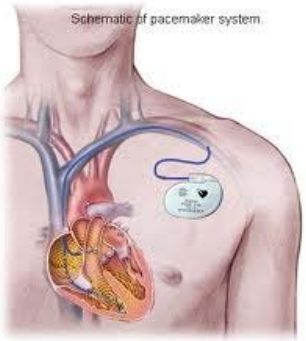
Health, Inclusion and Assisted Living (2)

- Application requirements can vary a lot:
  - wide range in the volume of data,
  - continuous measurement,
  - “error free” data,
  - delivery of alarms,
  - personalised devices,
  - …



(*answers, 2010*)

(*hermes, 2009*)



(*biojoblg, 2008*)

Intelligent Transportation Systems (1)

- These key areas were identified:
  - urban and road traffic management,
  - efficient trip management,
  - communication services (V2V and V2I),
  - mobile prosumer.

(IDRC 2010)

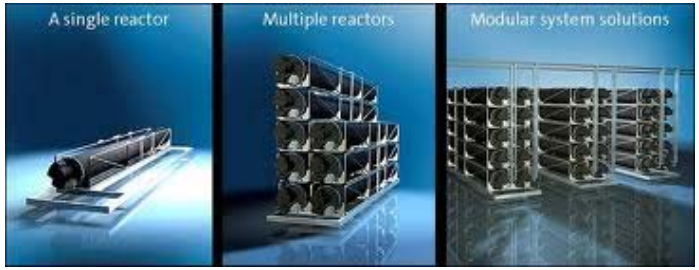
(vehicletrack 2010)

(automk 2010)

(*webcredible, 2010*)

Intelligent Transportation Systems (2)

- Requirements include:
  - scalability of solutions,
  - heterogeneity of devices,
  - availability of accurate location information,
  - real-time exchange of data,
  - …



(*grundfos, 2009*)

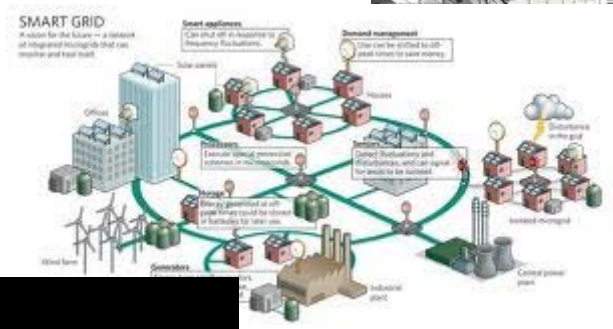
(*USurrey, 2008*)

(*Apple, 2010*)

Environment and Energy Efficiency (1)

- Several key areas were identified:
  - integration into infrastructures,
  - smart grids,
  - smart processes,
  - smart devices.

(best buildings 2010)



(consumer energy 2010)

(solar street 2010)

(*allthingsgreen, 2010*)

Environment and Energy Efficiency (2)

- Requirements encompass:
  - reliable real-time communications,
  - existence of standards,
  - specific sensor and actuator networks,
  - redundant communication channels,
  - …

(*masternewmedia, 2009*)

(*digikey, 2009*)

(*headway, 2010*)

Regulation & Standardisation

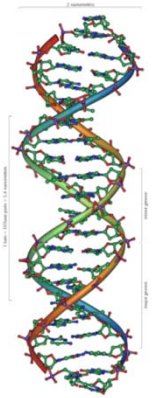
- Traditionally, Europe has had an approach to standardisation/regulation different from the US one.

- Concerning the Future Internet, which bodies should be addressed?

- Standardisation does not influence basic R&D, but it definitely guides its results.

Policy (1)

- Research on the Future Internet needs to interact with other areas (biology, sociology, psychology, construction, cars, ...).



(*Wikipedia, 2008*)

(*RICS, 2008*)

- This interaction will increase the complexity concerning regulation and policy.

(*PBASE, 2008*)

- Will there be ethical barriers, like those existing today in biology/medicine?

(*Amazon, 2008*)

National Ethics Committee on Assisted Human Reproduction

Policy (2)

- Whether we like it, or not, some policy aspects do need to be taken into consideration, e.g., the possibility of Governments having access to data.

- How to comply with the interests of so many players (telecom operators and vendors, service and content providers, banks, goods distribution, ...), with different development cycles?

(*Tecnotrekos, 2008*)

(*Swissbank, 2008*)

(*GeeAyBee, 2007*)

Conclusions

- Technology development in the Networks of the Future and Future Internet is allowing for a “new world” in telecommunications.

- This area continues to present key challenges that need to be addressed in R&D, in order to have solutions for the problems of the future.

- Smart Cities appear as an excellent opportunity to integrate technologies, within and with other sectors.

The End

- "*I think there is a world market for maybe 5 computers*", Thomas Watson (IBM), 1943.

- "*There is no reason anyone would want a computer in their home*", Keneth Olsen (DEC), 1977.

- "*The best way to predict the future is to invent it*", Alan Kay (UCLA), 1971.