



ITU Internet Reports 2005:

The Internet of Things

Press Conference

Tunis, 17 November 2005

Lara Srivastava

*Strategy and Policy Unit (SPU),
International Telecommunication Union (ITU)*



Note: The views expressed in this presentation are those of the author and do not necessarily reflect the opinions of the ITU or its membership. Lara Srivastava can be contacted at lara.srivastava@itu.int

***“the most profound technologies are those
that disappear***

...

***they weave themselves into the fabric of
everyday life until they are
indistinguishable from it”***

- Mark Weiser (1991)

The Computer for the 21st Century

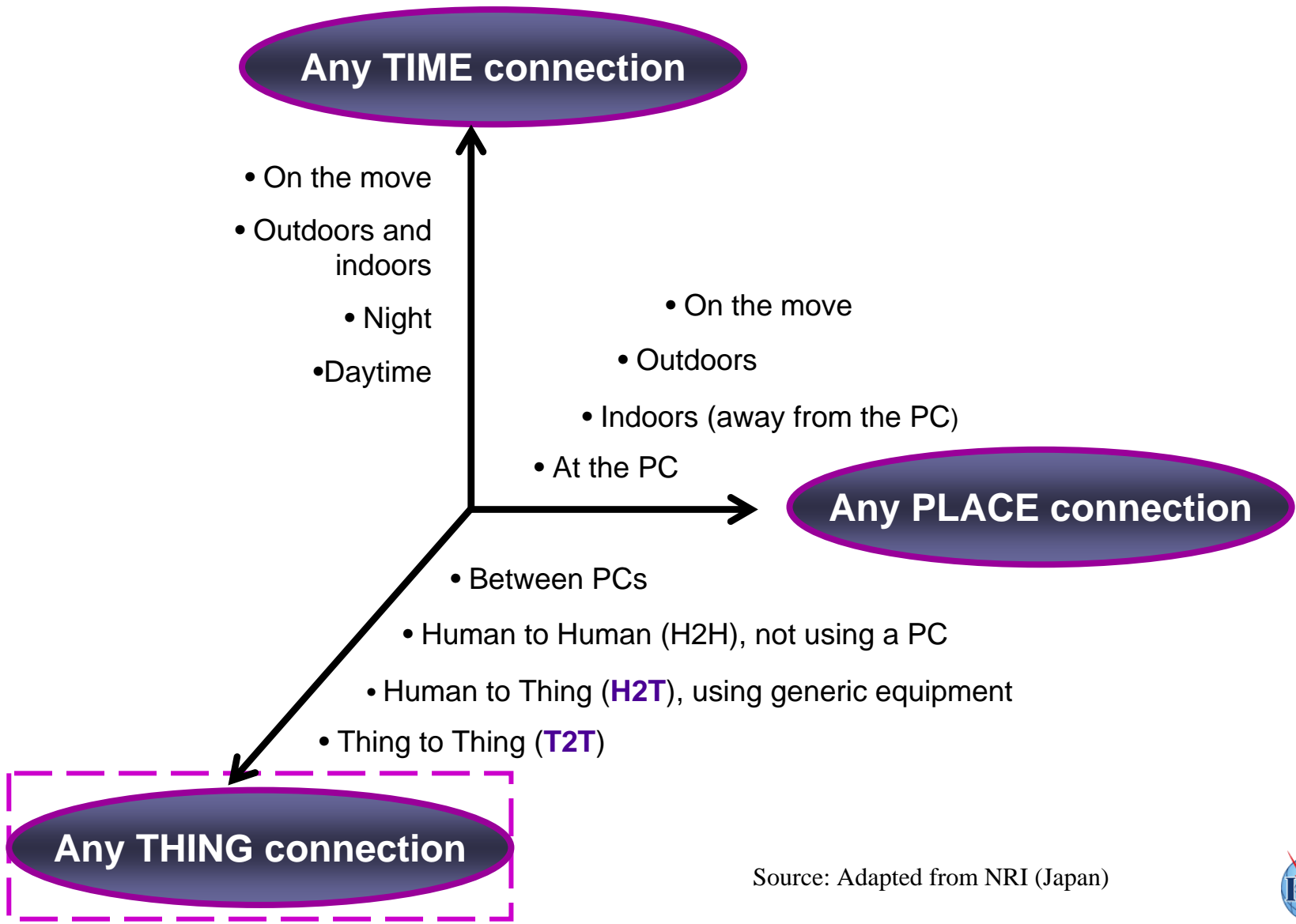
a new ubiquity for technology...

- Weiser's vision: dedicated IT devices will eventually disappear, while information processing capabilities will be increasingly available
- **U**biquity refers refers to unobtrusive connectivity anytime and anywhere, by anyone
 - Extending connectivity to the underserved
 - Early example: mobile phones (reaching 2 billion subscribers in 2005)
- **b**ut also by *anything*
 - Creating a "network of things"

requiring a paradigm shift...

- **t**his vision requires a paradigm shift in computing...
 - The ability to determine the status of everyday objects or thing in real-time
- ...leading to paradigm shift in the nature of today's cyberspace
 - The complete mapping of the real world by the virtual world
- ...**t**his, combined with developments in miniaturization, will further spur innovation in ubiquitous technologies and drive costs down
 - nanotechnology and the disappearing processor

... enabling a new dimension

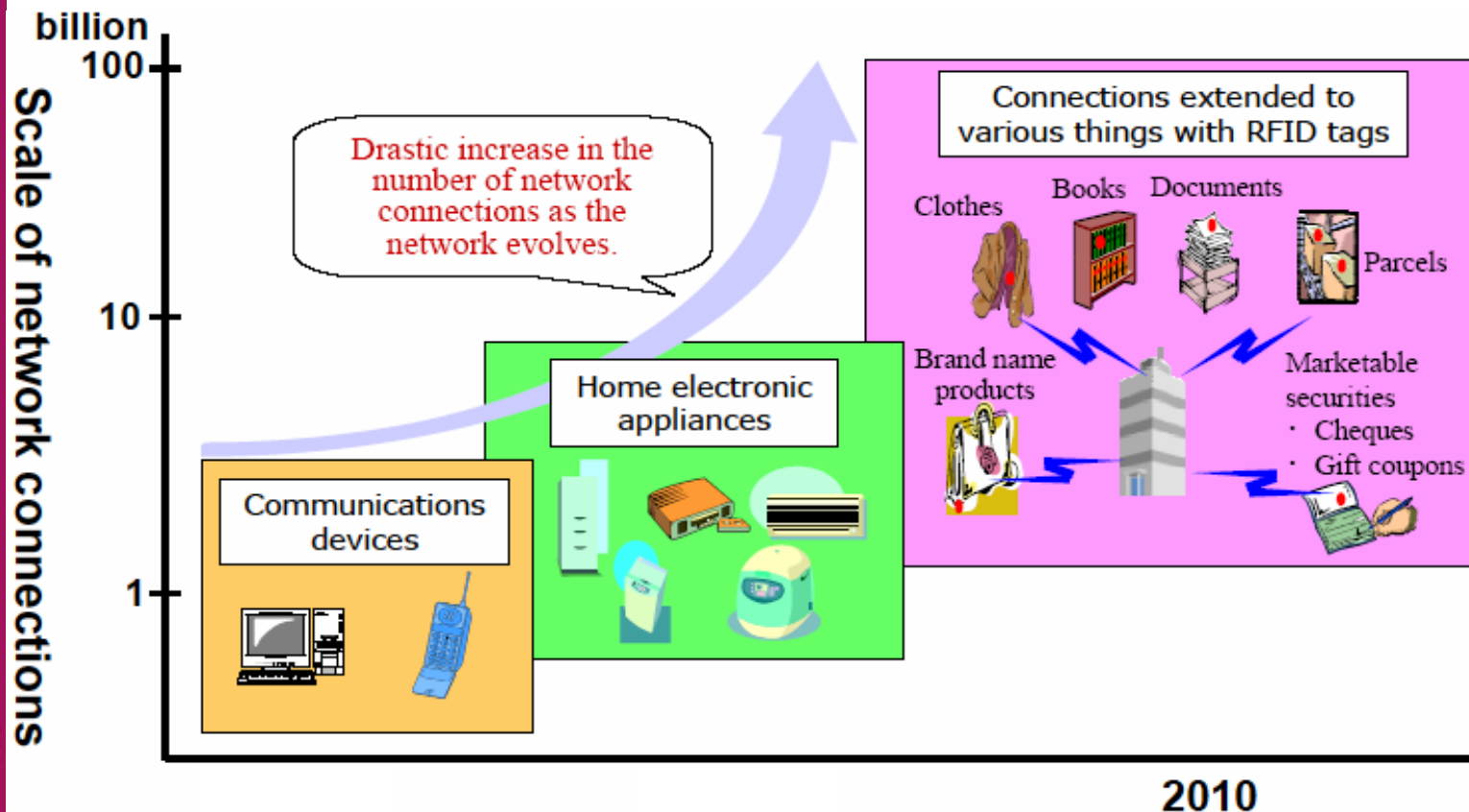


Source: Adapted from NRI (Japan)

4 key technological enablers

- *Tagging* Things: **RFID**
 - enables real-time identification and tracking
- *Sensing* Things: **S**ensor technologies
 - enables detection of environmental status and sensory information
- *Thinking* Things: **S**mart technologies
(e.g. those enabling smart homes, smart vehicles etc.)
 - build intelligence into the edges of the network
- *Shrinking* Things: **N**anotechnology
 - makes possible the “networking” of smaller and smaller objects

RFID multiplies network connections, and helps map the physical and virtual worlds

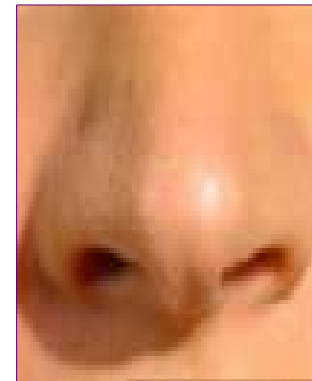
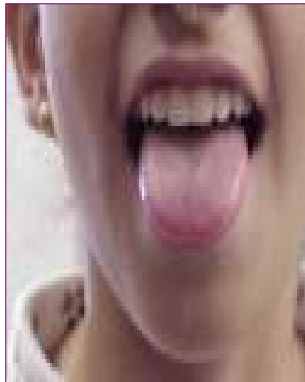


The Internet of Things

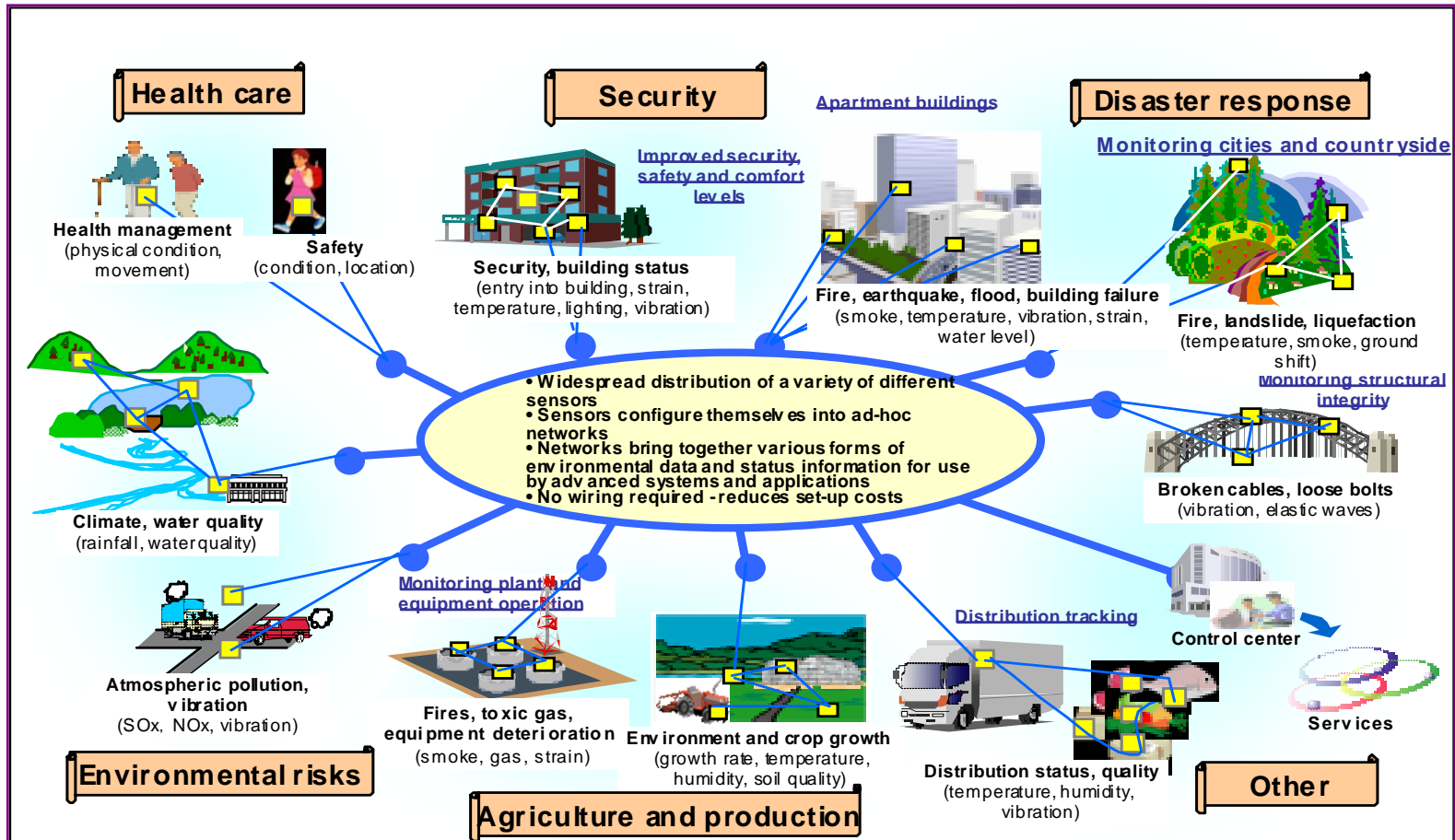
From RFID to sensors

- If RFID answers the question “what and where”, a sensor might answer the question “how”?
- A sensor detects, senses and/or measures physical stimuli, e.g. motion, heat, speed, pressure, presence of bacteria etc...
- RFID combined with sensors enhance the data flow between objects
- Sensors can act as a further bridge between the physical and virtual worlds

Sensors create context awareness and 'humanize' technology



networks of wireless sensors can create environments increasingly sensitive to our needs...

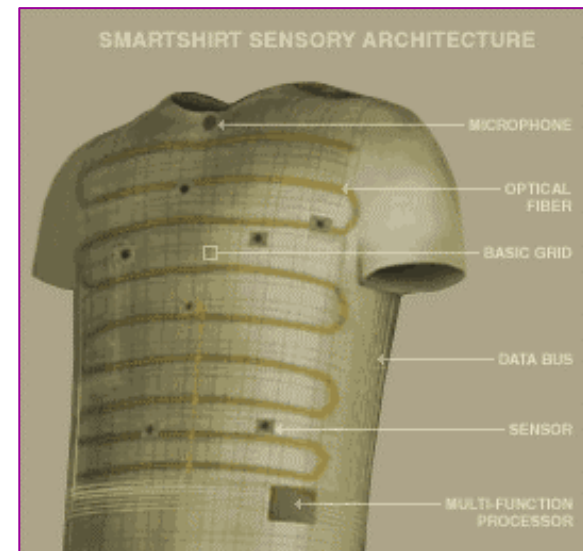


The Internet of Things

...environments as intimate as our own body spaces (BAN)

- A t-shirt might come equipped with sensors (to measure e.g. temperature, respiration, rate, pulse, cardiogram) and forward the collected data through a mobile network
- Such info can be forwarded to other devices like a watch, mobile phone or PDA
- Application areas: sport training, military, chronically ill patients...

Intimate sensors



Source: Sensatex

a host of new uses for both RFID & sensors

- For business

- Transport and Logistics, e.g. SCM
- Medical/Pharmaceutical Applications
- Manufacturing, Agriculture



- For government

- E-government
- Defence and Security
- e-health

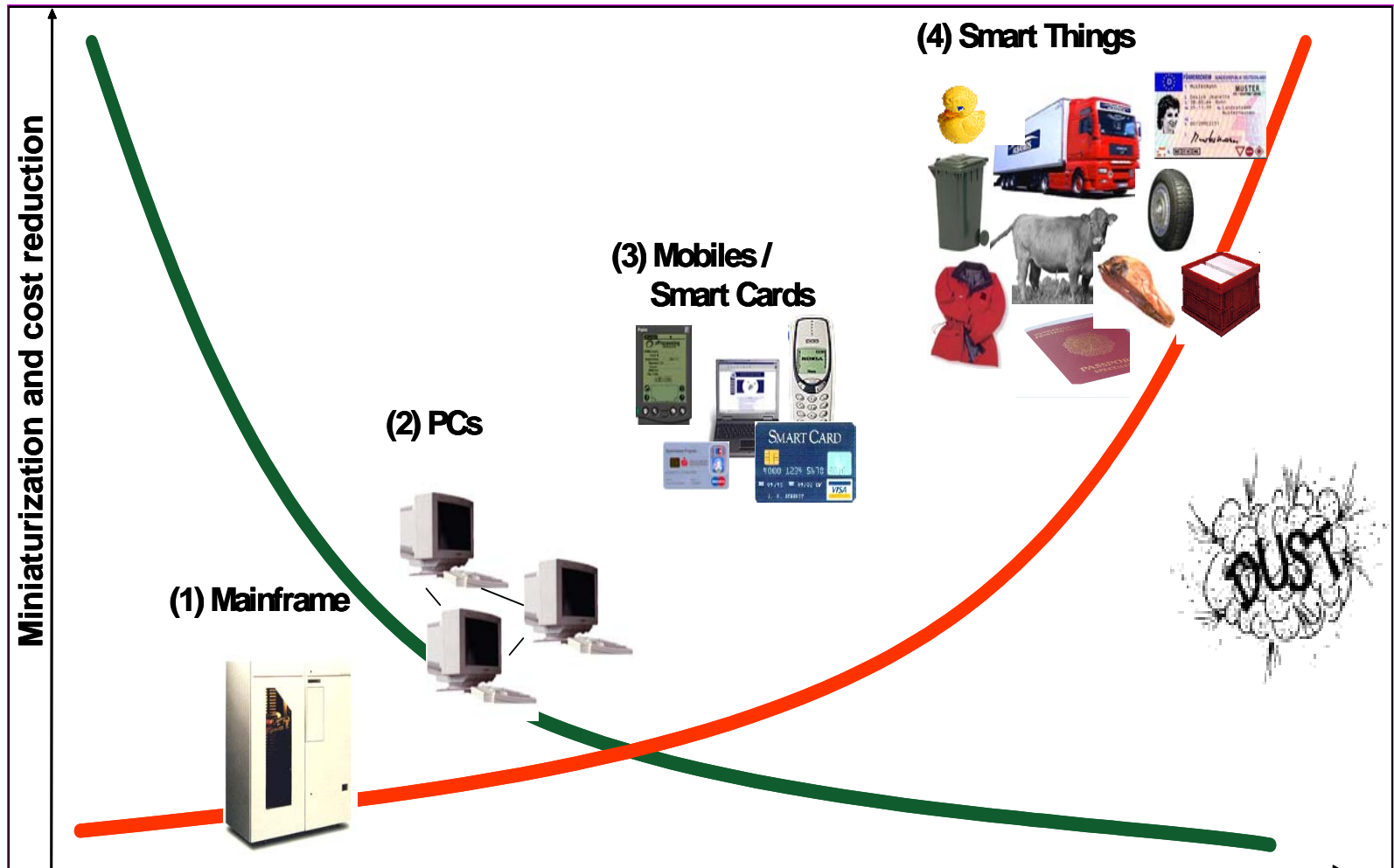


- For the consumer

- Personal welfare and safety, incl. Better access to healthcare and drug delivery
- Sports, leisure and shopping
- Shopping
- Smart Lifestyles



miniaturization and declining prices



Source: ITU, "Ubiquitous Network Societies – Their Impact on the Telecommunication Industry", April 2005, www.itu.int/ubiquitous

The Internet of Things

examples of the Internet of Things for the developing world

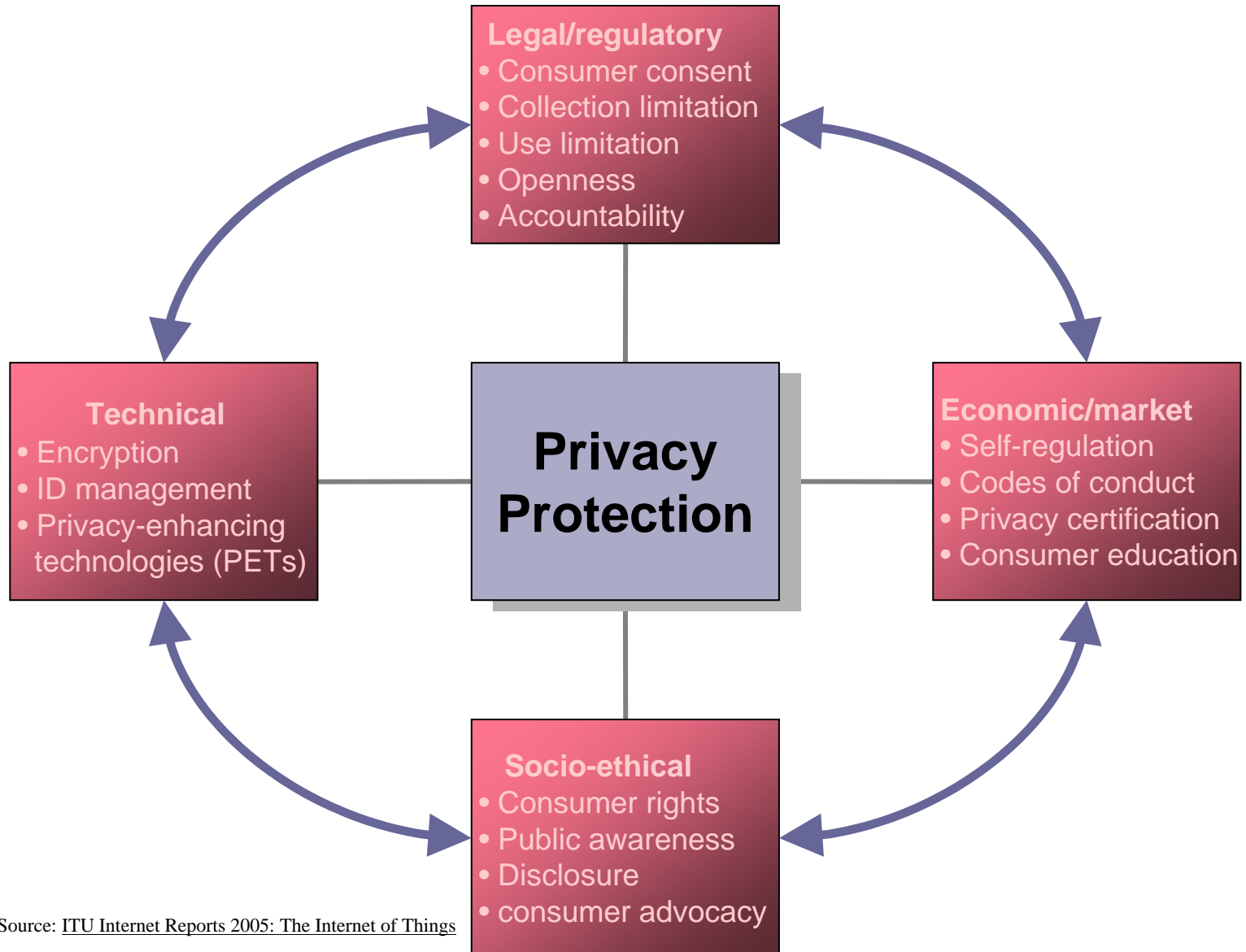
- **Nanotechnology**
 - Water treatment, energy, agricultural productivity, pest control, drug delivery systems etc...
- **RFID**
 - Tracking items for export, e.g. beef tracking in Namibia
 - health care applications for remote/rural areas
 - Facilitating trade and facilitating innovation within the developing world (e.g. China & Wal-Mart)
- **Sensors**
 - preventing natural disasters
 - Improving health care delivery



important emerging challenges

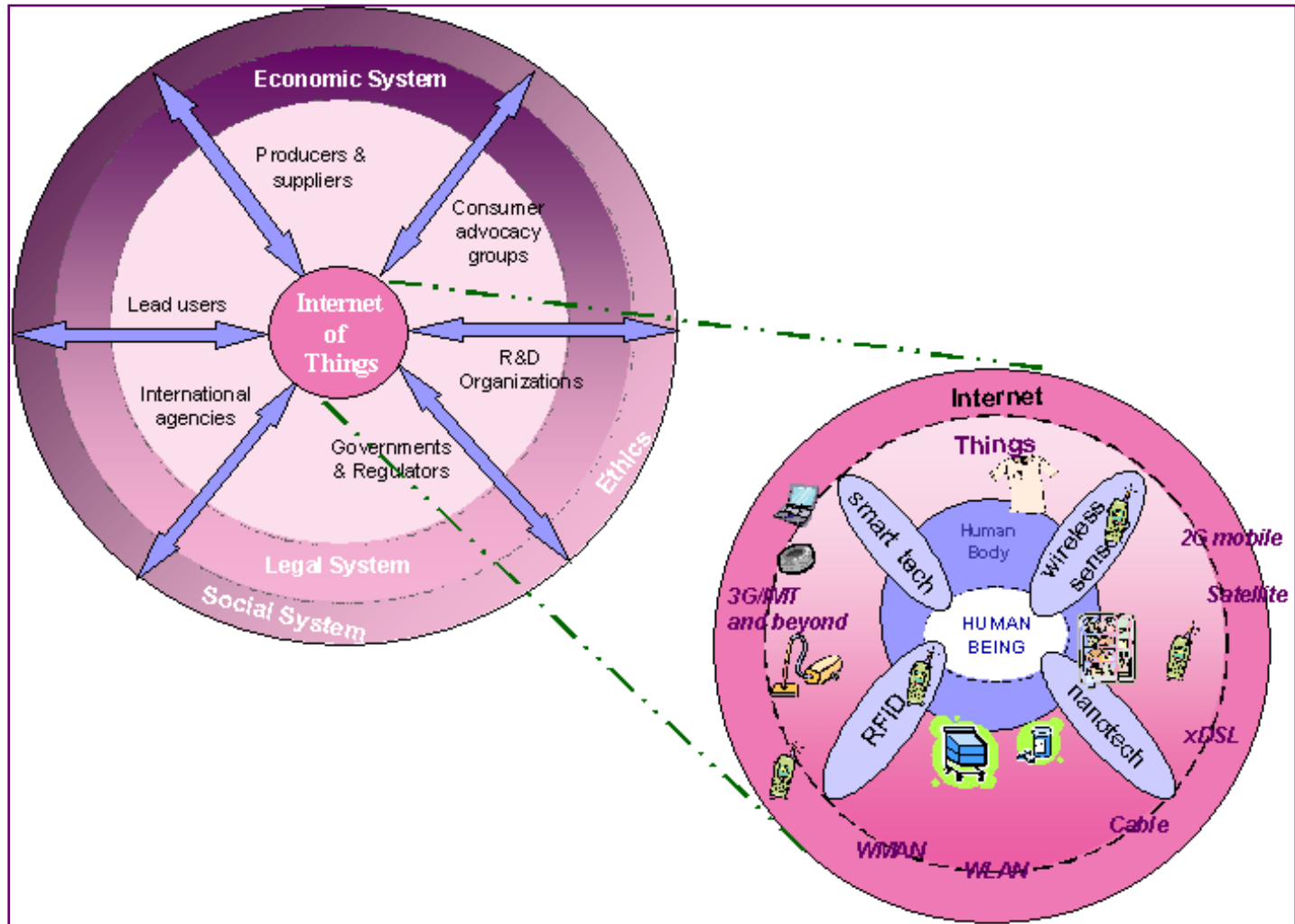
- **Standards-setting and interoperability**
 - Harmonization required particularly in the area of transmission protocols
 - Tag formats have *de facto* standard “EPC”
- **Governance of resources**
 - Who controls the unique identifiers?
 - More commercial value at stake than DNS...
- **data protection and consumer privacy**
 - Information contained on tags should appropriately managed and controlled

facets of privacy protection



Source: [ITU Internet Reports 2005: The Internet of Things](#)

the ecosystem of the Internet of Things



The Internet of Things

“new communication technologies are always introduced into a pattern of tension created by the co-existence of old and new”



www.itu.int/internetofthings

Helping the world communicate

