Smart ICT & Standardization
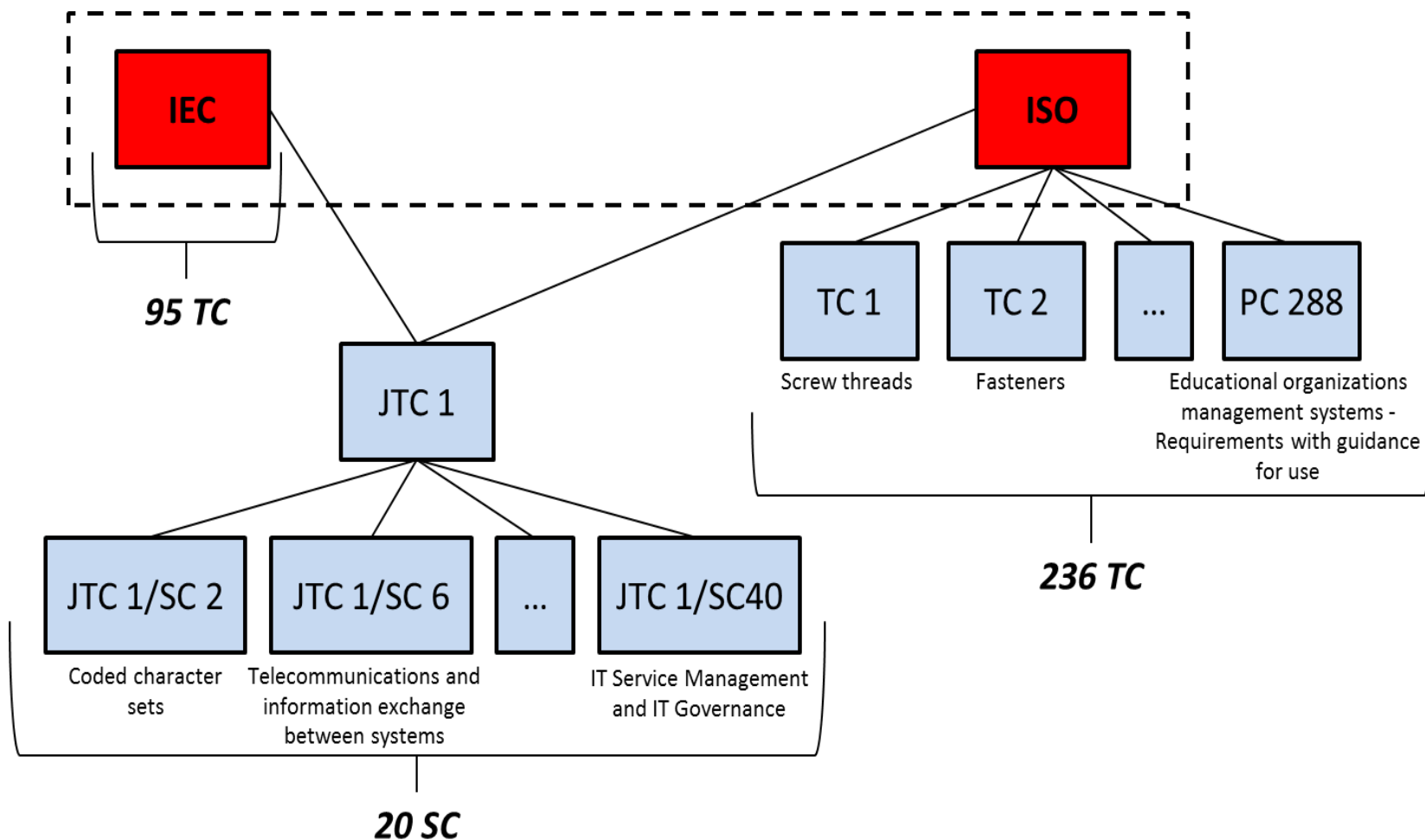
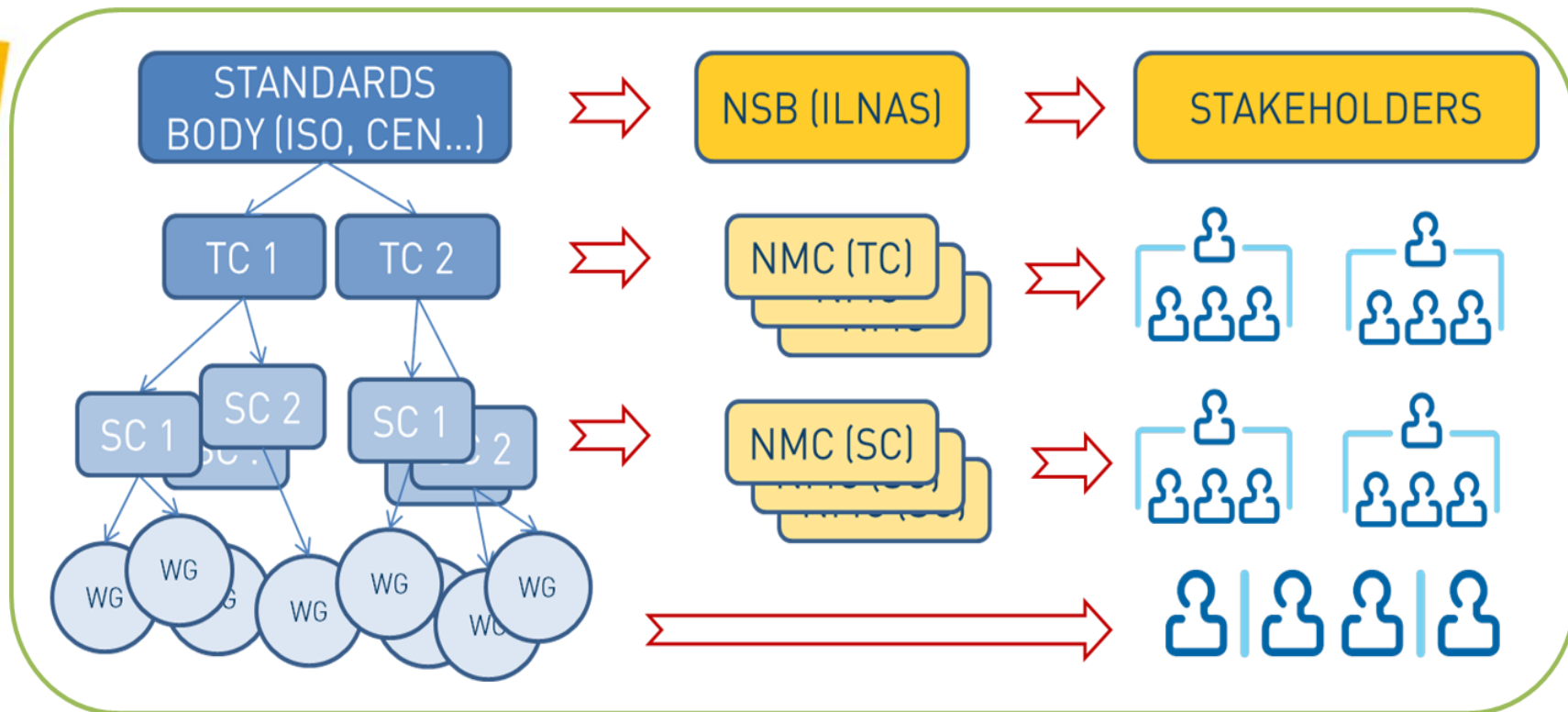**Nicolas Domenjoud**
ANEC GIE

April 3, 2014

- ▶ Standardization in a nutshell

- ▶ Turning technology trends into standardization

- ▶ Smart ICT

  - ■ Internet of Things

  - ■ Big Data

  - ■ Smart Cities

- ▶ Project: University certificate "Smart ICT for Business Innovation"

- **Standardization in a nutshell**

- Turning technology trends into standardization

- Smart ICT

    - Internet of Things

    - Big Data

    - Smart Cities

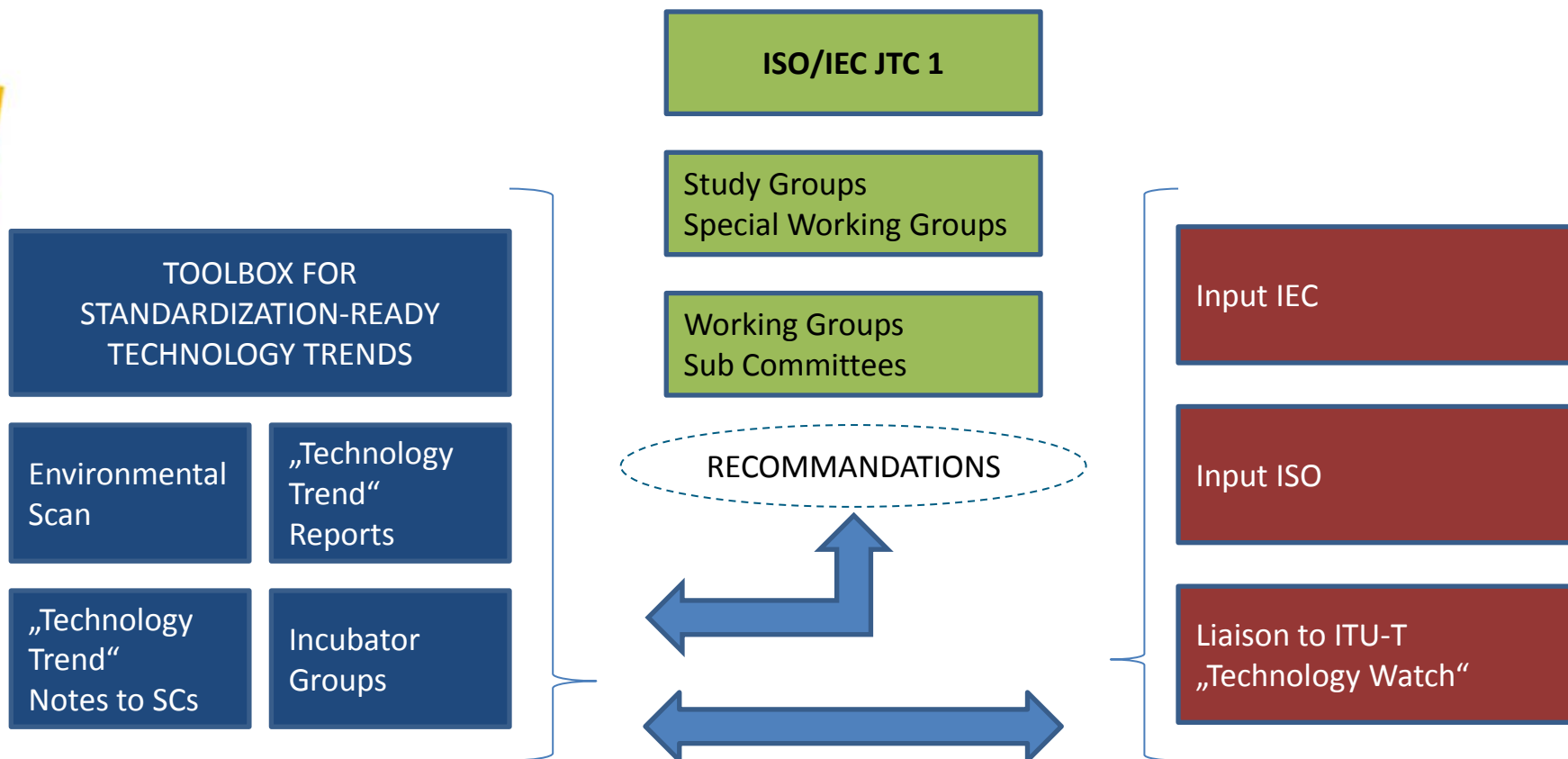- Project: University certificate "Smart ICT for Business Innovation"

- Standardization in a nutshell

- **Turning technology trends into standardization**

- Smart ICT

    - Internet of Things

    - Big Data

    - Smart Cities

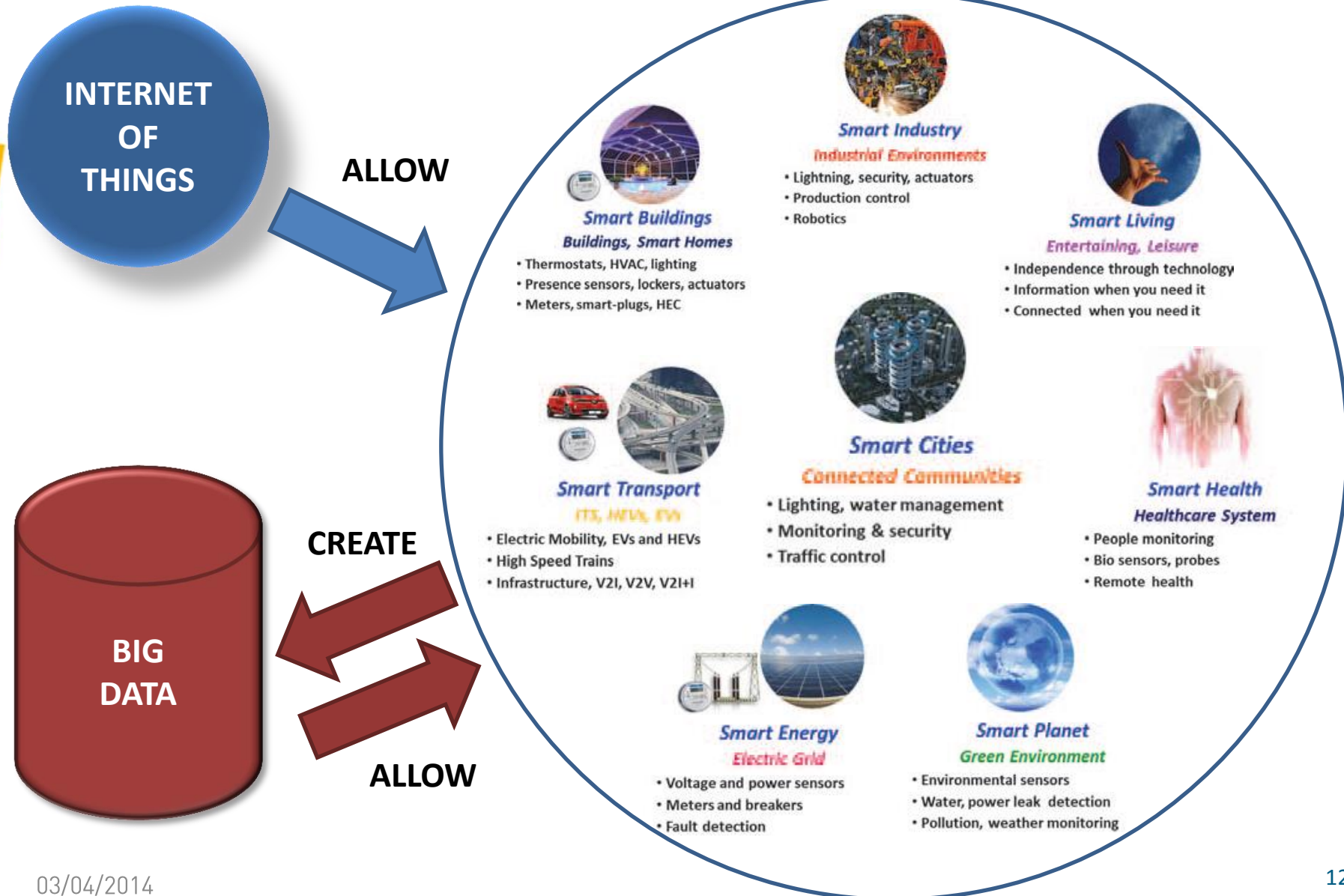- Project: University certificate "Smart ICT for Business Innovation"

- ISO, IEC and ITU-T have developed processes to guarantee a **successful standardization roadmap in line with the market needs**

- They established working groups intended to identify technology trends defined as "mature" for standardization work

- ISO/IEC JTC 1/SWG-P leads innovative activities:
  - Perform the **Environmental Scanning activity** to identify new work areas of interest to ISO/IEC JTC 1
  - Initiate **"Technology Trend" reports** with regard to dedicated topics to identify standardization environment and gaps
  - Establish and maintain a working relationship with the **ITU-T Technology Watch function**
  - Support the **ISO/IEC JTC 1 Incubator function**

ISO/IEC JTC 1

Study Groups
Special Working Groups

Working Groups
Sub Committees

TOOLBOX FOR STANDARDIZATION-READY TECHNOLOGY TRENDS

Environmental Scan

„Technology Trend" Reports

„Technology Trend" Notes to SCs

Incubator Groups

RECOMMANDATIONS

Input IEC

Input ISO

Liaison to ITU-T „Technology Watch"

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- ▶ **Smart ICT** = combined hardware-software solutions in the frame of intelligent networks

  - ■ Opportunity for ICT to **meet new societal and environmental challenges**

    - ▪ Tackling climate change
    - ▪ Improving sustainable consumption and greener lifestyles
    - ▪ Improving citizens' quality of life
    - ▪ Improving the efficiency and quality of the services provided by governing entities and companies

  - ■ A **horizontal support** to develop many other sectors in the worldwide economy

  - ■ At the **heart of current standardization developments**

03/04/2014

INTERNET OF THINGS

ALLOW

CREATE

ALLOW

BIG DATA

Smart Industry
Industrial Environments
- Lightning, security, actuators
- Production control
- Robotics

Smart Buildings
Buildings, Smart Homes
- Thermostats, HVAC, lighting
- Presence sensors, lockers, actuators
- Meters, smart-plugs, HEC

Smart Living
Entertaining, Leisure
- Independence through technology
- Information when you need it
- Connected when you need it

Smart Transport
ITS, HEVs, EVs
- Electric Mobility, EVs and HEVs
- High Speed Trains
- Infrastructure, V2I, V2V, V2I+I

Smart Cities
Connected Communities
- Lighting, water management
- Monitoring & security
- Traffic control

Smart Health
Healthcare System
- People monitoring
- Bio sensors, probes
- Remote health

Smart Energy
Electric Grid
- Voltage and power sensors
- Meters and breakers
- Fault detection

Smart Planet
Green Environment
- Environmental sensors
- Water, power leak detection
- Pollution, weather monitoring

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- **ITU-T**: "*a global infrastructure for the Information Society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies*
  - *NOTE 1 – Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.*
  - *NOTE 2 – From a broader perspective, the IoT can be perceived as a vision with technological and societal implications.*" (Recommendation ITU-T Y.2060)

- **ETSI**: "*Communication between two or more entities that do not necessarily need any direct human intervention*" (ETSI/TC SmartM2M)

- **IOT-A**: "*The global network connecting any smart object*" (EU FP7 IOT-A)

‣ **Interconnectivity**: anything can be interconnected with the global information and communication infrastructure

‣ **Things-related services**: capability of providing thing-related services within the constraints of things, such as privacy protection and semantic consistency between physical things and their associated virtual things

‣ **Heterogeneity**: devices are heterogeneous as based on different hardware platforms and networks. They can interact with other devices or service platforms through different networks

‣ **Dynamic changes**: the state of devices change dynamically, e.g., sleeping and waking up, connected and/or disconnected as well as the context of devices including location and speed. Moreover, the number of devices can change dynamically

‣ **Enormous scale**: the number of devices that need to be managed and that communicate with each other will be at least an order of magnitude larger than the devices connected to the current Internet. The ratio of communication triggered by devices as compared to communication triggered by humans will noticeably shift towards device-triggered communication. Even more critical will be the management of the data generated and their interpretation for application purposes

IoT
Standardization areas examples
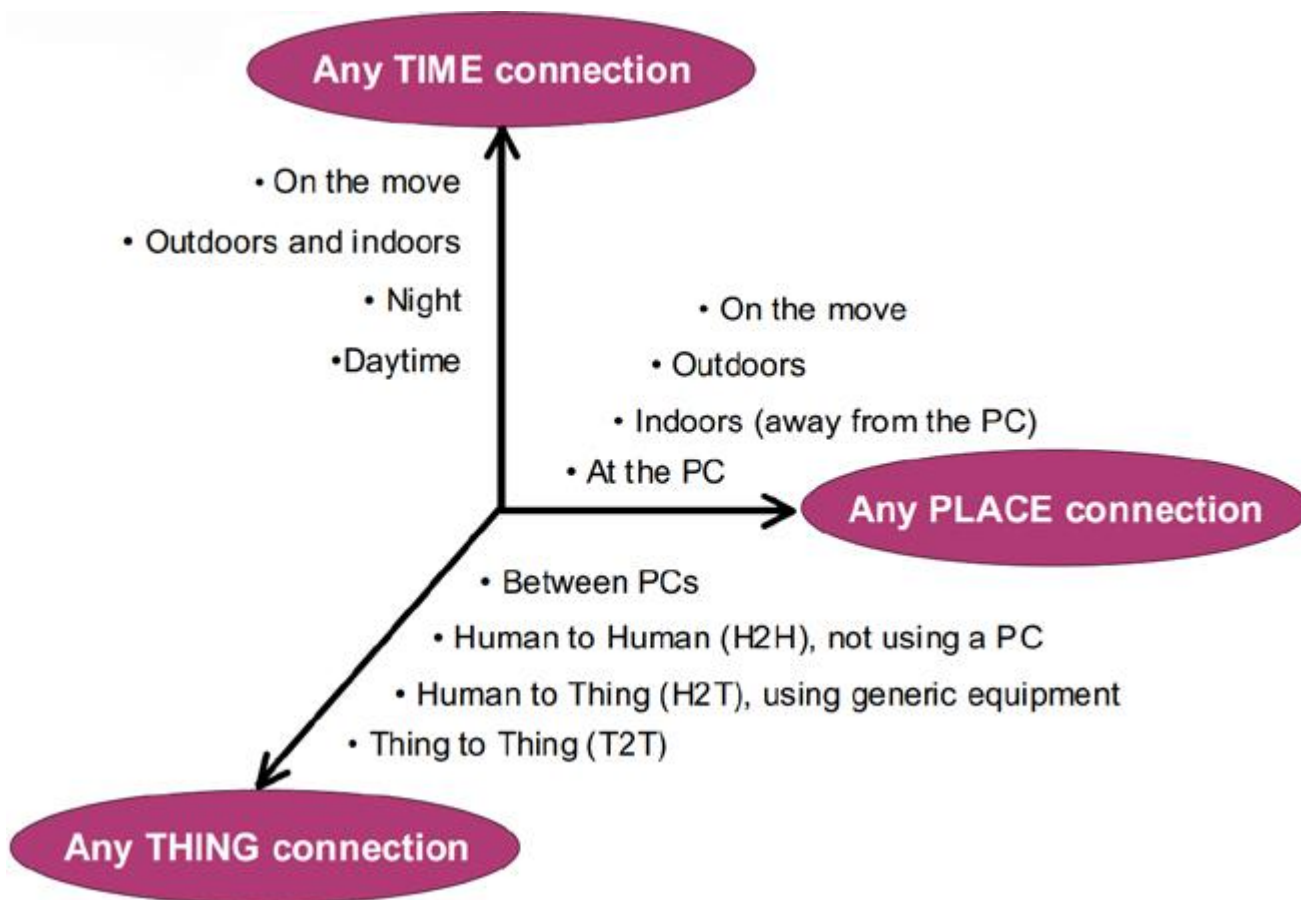
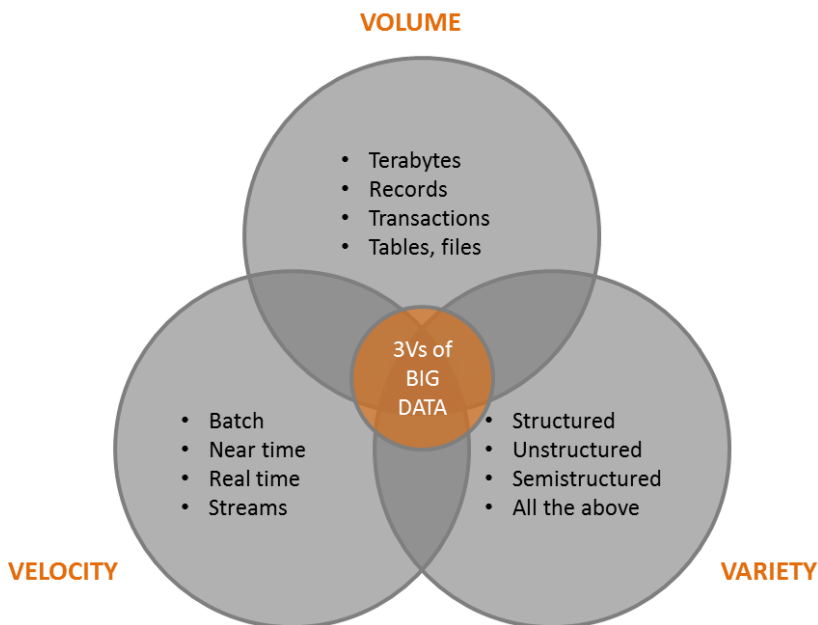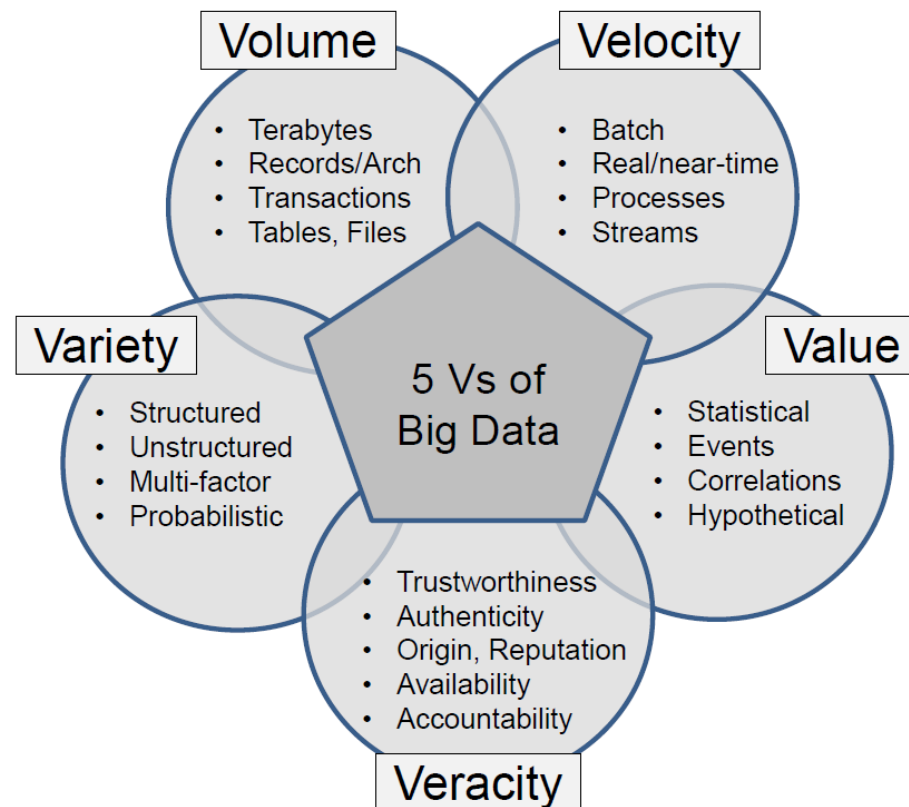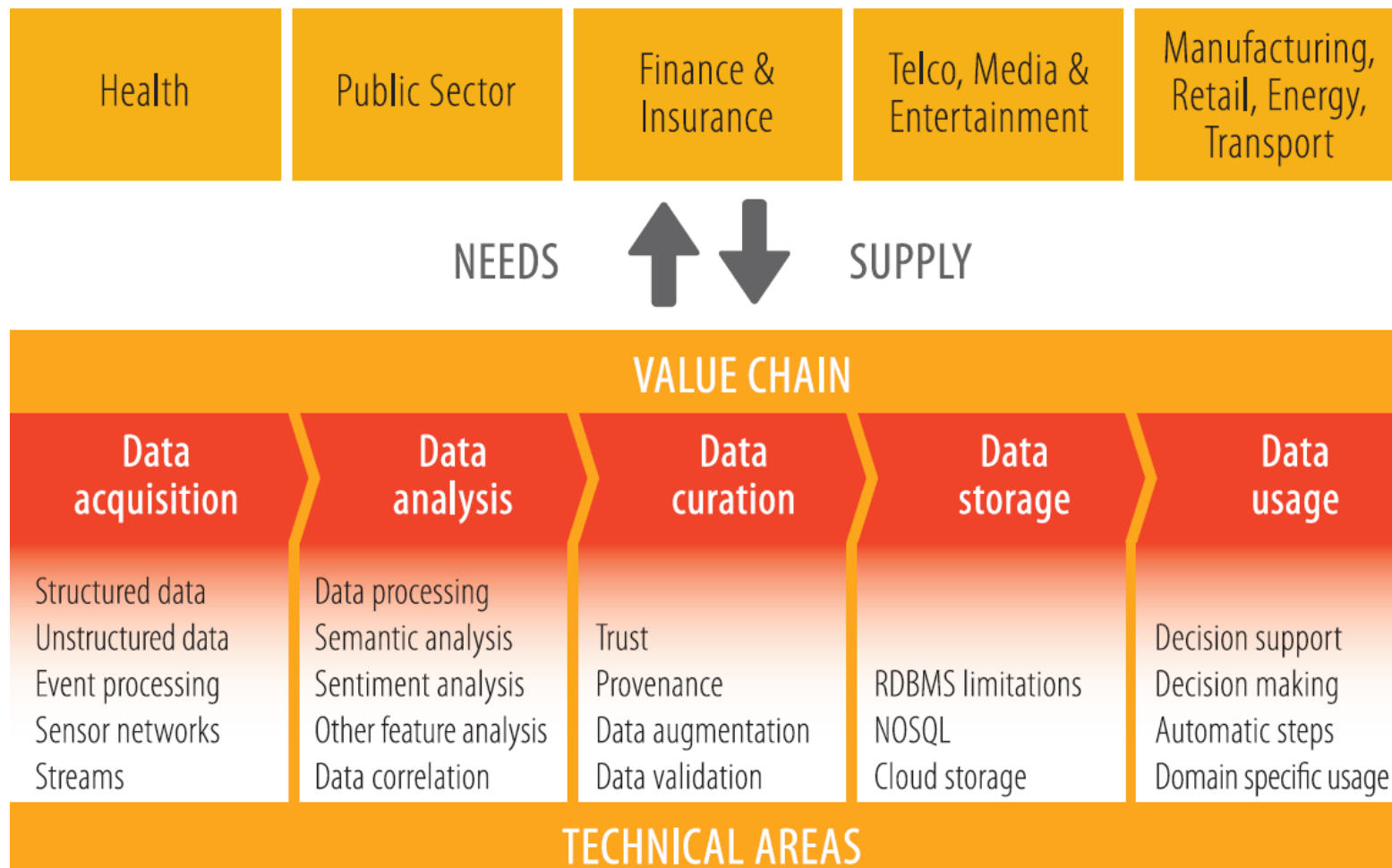| Area/Topic	Standardization technical committees/*Fora* & *Consortia*
Identification	ISO/IEC JTC 1/SC 17 - Cards and personal identification ISO/IEC JTC 1/SC 31 - Automatic identification and data capture techniques CEN/TC 225 – AIDC technologies GS1
Architecture	ISO/IEC JTC 1/SWG 5 - Special Working Group on Internet of Things ITU-T/SG 13 - Future networks including mobile and NGN ETSI/Smart M2M - Smart Machine-to-Machine Communication IETF, W3C, NIST
Network	ISO/IEC JTC 1/SC 6 - Telecommunications and information exchange between systems ITU-T/ JCA-IoT - Joint Coordination Activity on Internet of Things ETSI/Smart M2M - Smart Machine-to-Machine Communication 3GPP
Security and privacy	ISO/IEC JTC 1/SC 27 - IT Security techniques NIST, ENISA
Hardware	ISO/IEC JTC 1/SC 25 - Interconnection of information technology equipment
Data and Signal processing	IEEE
Power and Energy efficiency	ISO/IEC JTC 1/SC 39 - Sustainability for and by Information Technology
Software, services and algorithms	ISO/IEC JTC 1/SC 22 - Programming languages, their environments and system software interfaces ISO/IEC JTC 1/SC 7 - Software and systems engineering
Communication	ETSI/Smart M2M - Smart Machine-to-Machine Communication ISO/IEC JTC 1/WG 7 - Sensor networks
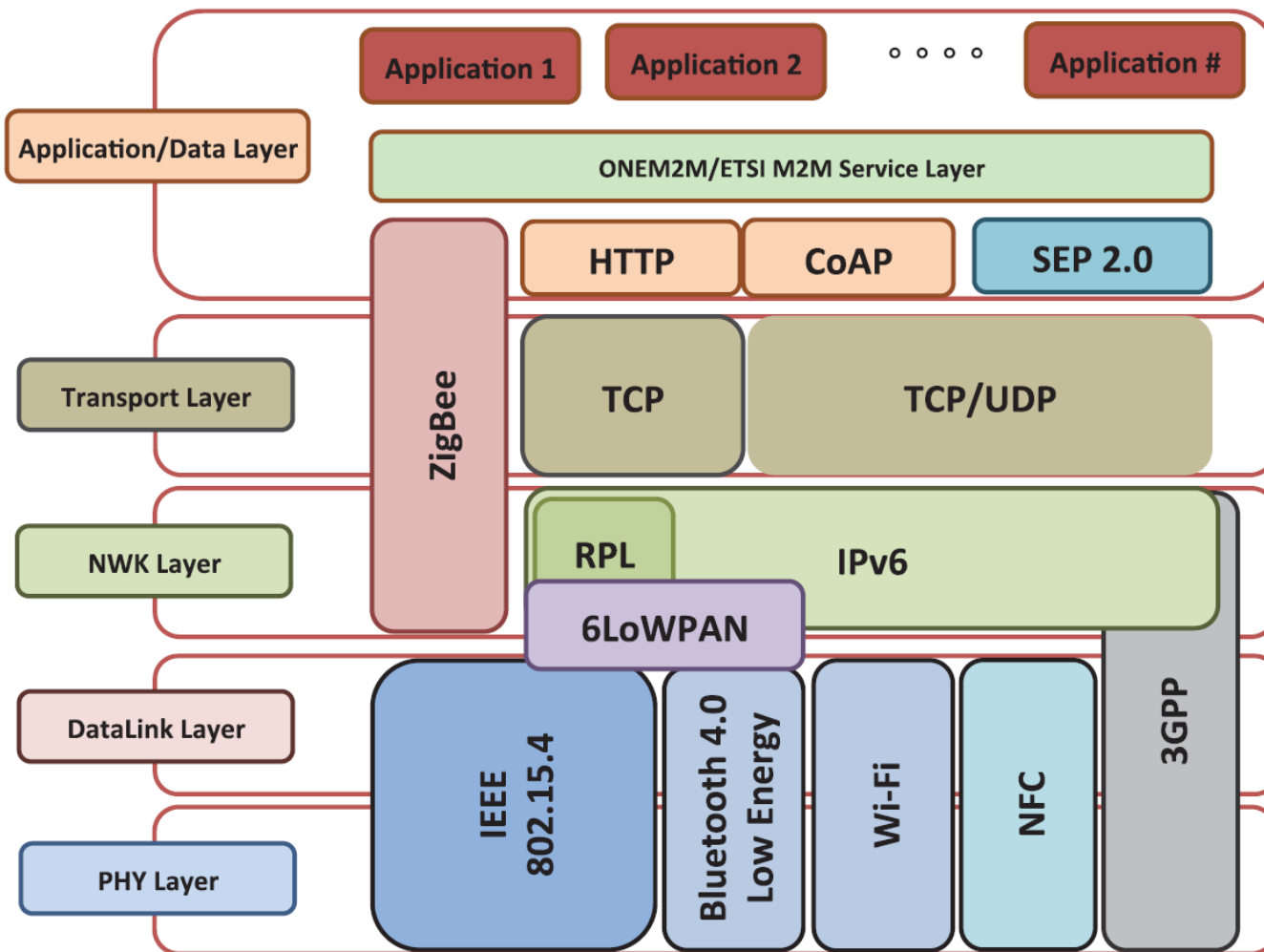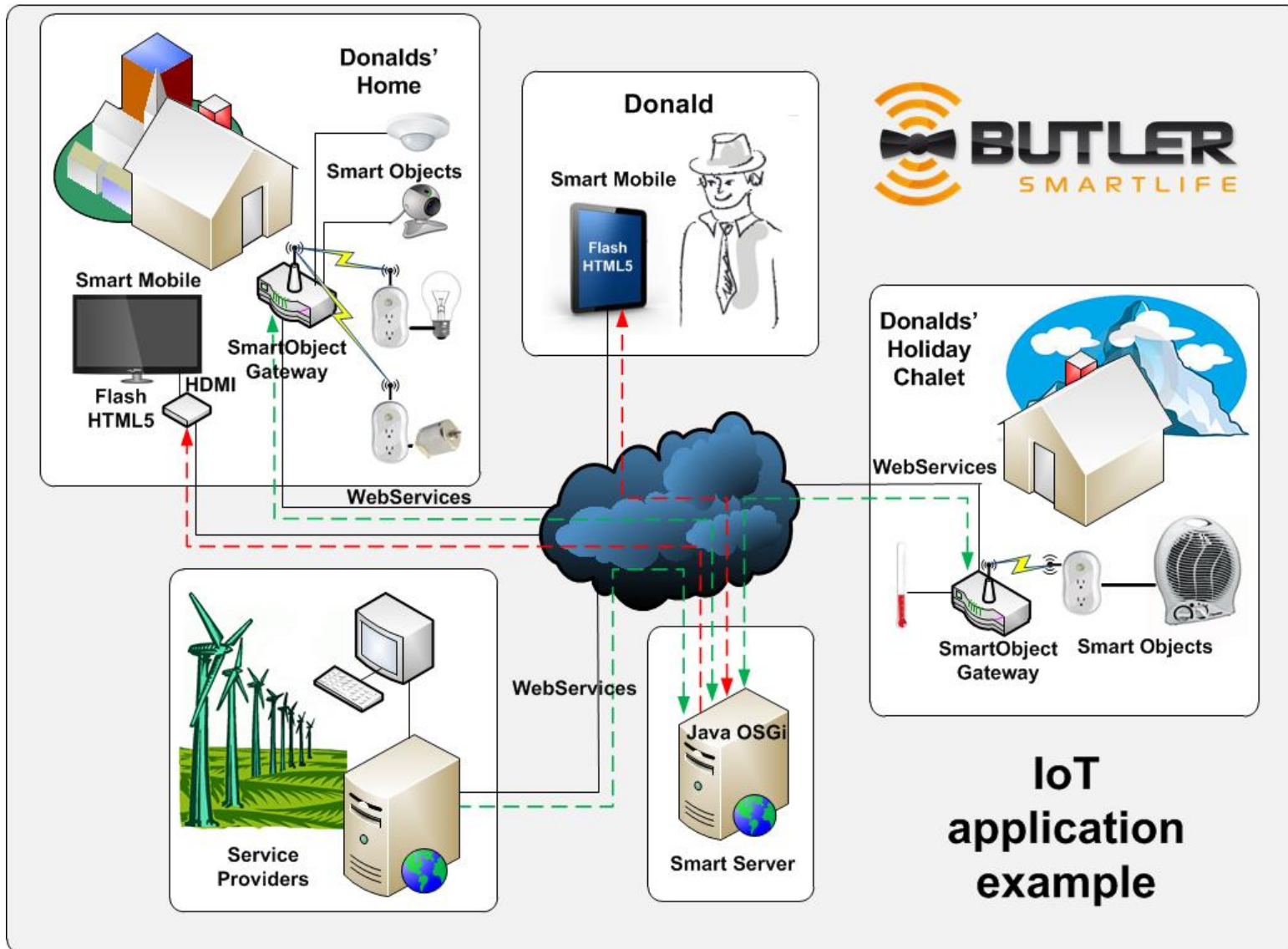
IoT application example

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- **NIST Big Data Public Working Group (NBD-WG)**: "*Advanced techniques that harness independent resources for building scalable data systems when the characteristics of the datasets require new architectures for efficient storage, manipulation, and analysis*"

- **Gartner**: "*Big data is high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making*"

- **IDC**: "*A new generation of technologies and architectures designed to economically extract value from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and/or analysis*"

- Several models
  - Commonly accepted 3Vs
  - New Vs
    - Value
    - Veracity
    - Variability
    - Etc.

Volume
- Terabytes
- Records/Arch
- Transactions
- Tables, Files

Velocity
- Batch
- Real/near-time
- Processes
- Streams

Variety
- Structured
- Unstructured
- Multi-factor
- Probabilistic

**5 Vs of
Big Data**

Value
- Statistical
- Events
- Correlations
- Hypothetical

Veracity
- Trustworthiness
- Authenticity
- Origin, Reputation
- Availability
- Accountability

VOLUME
- Terabytes
- Records
- Transactions
- Tables, files

VELOCITY
- Batch
- Near time
- Real time
- Streams

3Vs of
BIG
DATA

VARIETY
- Structured
- Unstructured
- Semistructured
- All the above

Health	Public Sector	Finance & Insurance	Telco, Media & Entertainment	Manufacturing, Retail, Energy, Transport

NEEDS ⬆ ⬇ SUPPLY

VALUE CHAIN

Data acquisition	Data analysis	Data curation	Data storage	Data usage
Structured data	Data processing			
Unstructured data	Semantic analysis	Trust		Decision support
Event processing	Sentiment analysis	Provenance	RDBMS limitations	Decision making
Sensor networks	Other feature analysis	Data augmentation	NOSQL	Automatic steps
Streams	Data correlation	Data validation	Cloud storage	Domain specific usage

TECHNICAL AREAS

Area/Topic	Standardization technical committees/*Fora* & *Consortia*
Architecture	NIST Big Data Public Working Group (NBD-WG) ISO/IEC JTC 1/SG 2 - Study Group on Big Data
Data acquisition	ISO/IEC JTC 1/WG 7 - Sensor networks ISO/IEC JTC 1/SC 32 - Data management and interchange W3C, OASIS
Data storage and retrieval	ISO/IEC JTC 1/SC 32 - Data management and interchange ISO/IEC JTC 1/SC 38 - Distributed Application Platforms and Services (DAPS)
Security and privacy	ISO/IEC JTC 1/SC 27 - IT Security techniques ISO/IEC JTC 1/SC 32 - Data management and interchange NIST, ENISA, CSA

- **Privacy**
  - ISO/IEC 15944-8:2012, Information technology –– Business Operational View –– Part 8: Identification of privacy protection requirements as external constraints on business transactions
- **Data Storage and Retrieval**
  - ISO/IEC 9075 series concerning "Information technology –– Database languages –– SQL"
  - ISO/IEC 17826:2012 Information technology –– Cloud Data Management Interface (CDMI)
- **Support for Complex Data Types**
  - ISO/IEC 13249 series concerning "Information technology –– Database languages –– SQL multimedia and application packages"

BANKING

- Optimize Offers and Cross Sell
- Contact Center Efficiency and Problem Resolution
- Payment Fraud Detection & Investigation

ENERGY & UTILITIES

- Smart Meter Analytics
- Distribution Load Forecasting/Scheduling
- Condition Based Maintenance
- Create & Target Customer Offerings

HEALTHCARE

- Measure & Act on Population Health
- Engage Consumers in their Healthcare

MEDIA & ENTERTAINMENT

- Business process transformation
- Audience & Marketing Optimization
- Multi-Channel Enablement
- Digital commerce optimization

CONSUMER PRODUCTS

- Optimized Promotions Effectiveness
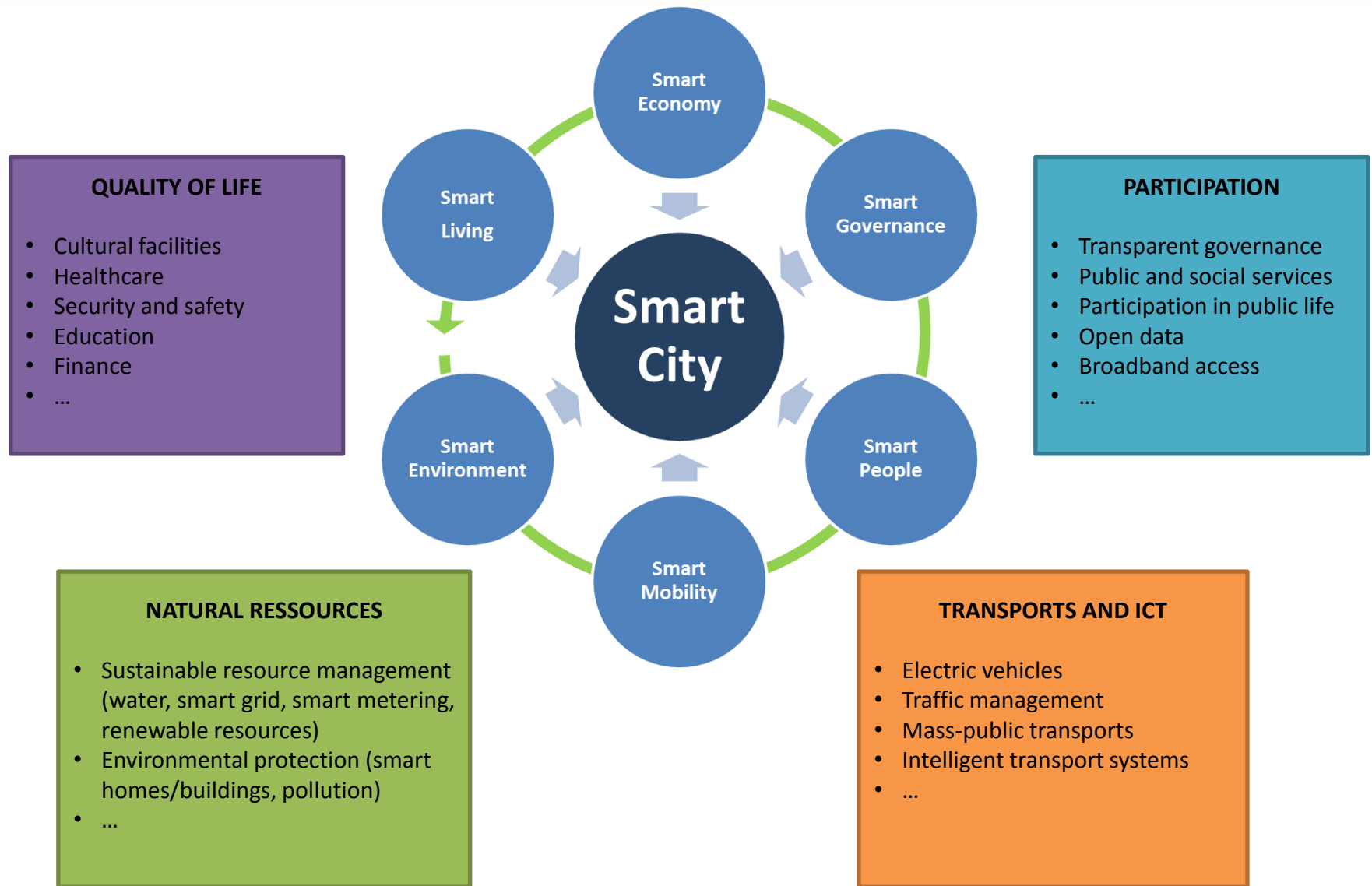- Micro-Market Campaign Management
- Real Time Demand Forecast

GOVERNMENT

- Threat Prediction and Prevention
- Detect and Prevent Improper Payments

03/04/2014

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▶ **ISO/IEC JTC 1/SWG-P**: *"A Smart Cities is more than a digital city. A Smart Cities is one that is able to link physical capital with social one, and to develop better services and infrastructures. It is able to bring together technology, information, and political vision, into a coherent program of urban and service improvements"*

▶ *"A 'knowledge', 'digital', 'cyber' or 'eco' city ; representing a concept open to a variety of interpretations, depending on the goals set out by a smart city's planners. We might refer to a smart city as an improvement on today's city both functionally and structurally, using information and communication technology (ICT) as an infrastructure"* (A. Murray, M. Minevich, and A. Abdoullaev, "Being smart about smart cities," KM World, October 2011)

ILNAS

ANEC

QUALITY OF LIFE

- Cultural facilities
- Healthcare
- Security and safety
- Education
- Finance
- …

PARTICIPATION

- Transparent governance
- Public and social services
- Participation in public life
- Open data
- Broadband access
- …

NATURAL RESSOURCES

- Sustainable resource management (water, smart grid, smart metering, renewable resources)
- Environmental protection (smart homes/buildings, pollution)
- …

TRANSPORTS AND ICT

- Electric vehicles
- Traffic management
- Mass-public transports
- Intelligent transport systems
- …

Smart Economy

Smart Living

Smart Governance

Smart City

Smart Environment

Smart People

Smart Mobility

03/04/2014

Area/Topic	Standardization technical committees/*Fora* & *Consortia*
Smart cities in a broad view	ISO/IEC JTC 1/SG 1 - Study Group on Smart Cities IEC System Evaluation Group on Smart Sustainable Cities ITU-T//FG-SSC - Focus Group on Smart Sustainable Cities CEN-CENELEC Coordination Group "Smart Sustainable Cities and Communities" (SSCC-CG)
Smart grids	IEC/SG 3 – Strategic Group on Smart Grid ISO/IEC JTC 1/WG 7 – Sensor Networks CEN/CENELEC/ETSI JWG Smart Grids
Smart Buildings	CEN/TC 247 – Building Automation, Controls and Building Management
Smart payments	ISO/IEC JTC 1/SC 17 - Cards and personal identification ISO/TC 68 – Financial services CEN/TC 263 – Secure storage of cash, valuables and data media
Smart transports	ISO/TC 204 - Intelligent transport systems ETSI/TC ITS - Intelligent Transport Systems
E-health	ISO/TC 215 – Health informatics CEN/TC 251 – Health informatics
Governance	ISO/IEC JTC 1/SC 40 - IT Service Management and IT Governance
Networks	ETSI/TC Smart M2M - Smart Machine-to-Machine Communications ITU-T/SG 13 – Future networks including cloud computing, mobile and next-generation networks
Sustainability	ISO/TC 268 - Sustainable Development in communities ISO/IEC JTC 1/SC 39 - Sustainability for and by Information Technology

- Seoul: One of the most tech-savvy cities in the world
  - "**u-Children Safety Service**"
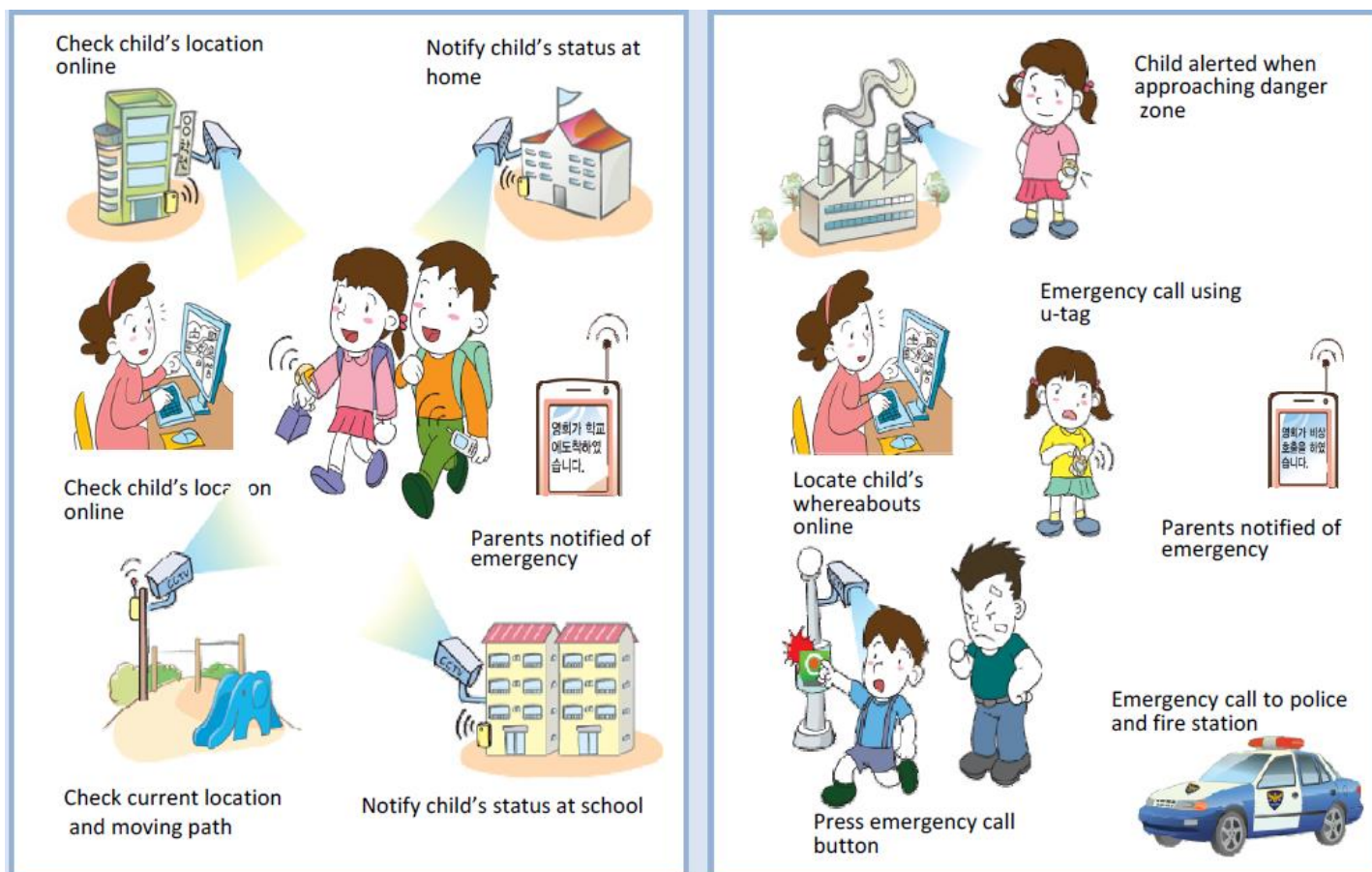
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University certificate
"Smart ICT for business innovation "

Identification of niche markets

Creation of start-ups

Basis of new economic development
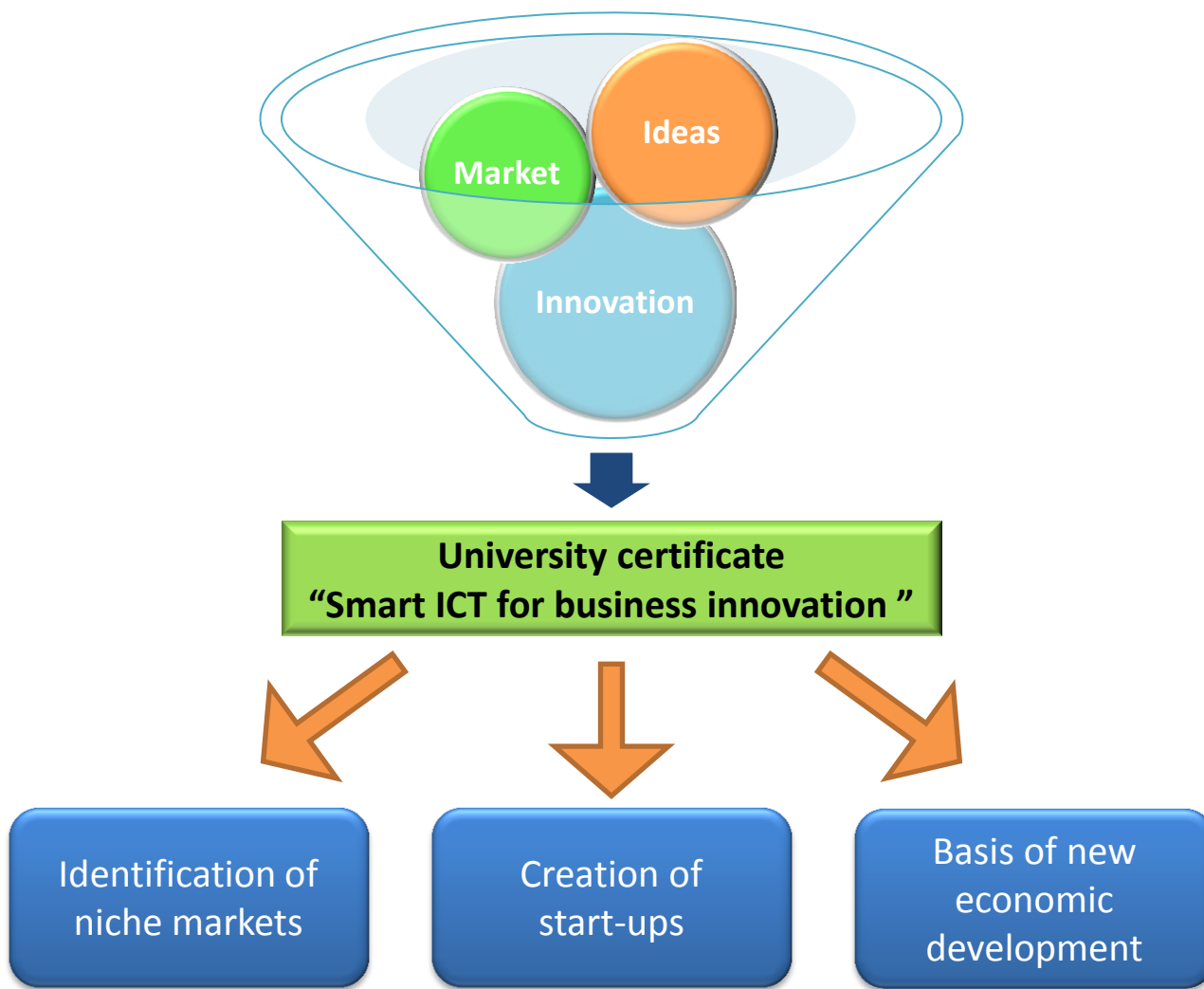
Target audience

- Professionals in the field of ICT
- High-level master students

Objectives

- Understand the smart ICT concepts and the related main issues
- Identify the key principles and technologies to achieve smart ICT projects
- Learn how to identify and use standards relevant to business applications
- Analyze opportunities offered by smart ICT and create value for business

Topics

- Cloud Computing
- Smart Grids
- Sensor Networks
- IT sustainability
- Big Data

- Digital Trust
- IoT
- IT Governance
- ...

Coaching

Analysis

Diagnosis

Integrate standards in your business strategy

Research

Training

Watch

Thank you for your attention

Institut luxembourgeois de la normalisation, de l'accréditation, de la sécurité et qualité des produits et services – Service de la confiance numérique

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