



# IoT Governance in Smart City Implementation



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# About speaker



## Jung-Hoon, Lee

### • Current Status

- Professor & Associate Dean of Graduation School of Information, Yonsei University, Seoul, Korea
- Co-director of Design Factory Korea, Underwood International College, Yonsei University
- Associate Director of Institute of East and West Studies, Yonsei University
- Director of Yonsei Leadership Center
- Professor of Creative Technology Management major at Underwood International College, Yonsei University

### • Academic Qualification

- University of Cambridge, U.K.  
(Ph.D. in Manufacturing Engineering and Management)
- London School of Economics, University of London, U.K.  
(M.Sc. in Analysis, Design and Management of Information Systems, 1998)
- University of Manchester, U.K.  
(M.Sc. in Information Systems Engineering, 1996)
- University of Manchester, U.K.  
(B.Eng. in Electronic Engineering, 1995)

### • Industry Experiences

- Entrue Consulting Partners, LG CNS Co. Ltd., LG Group, Korea  
(Senior Business Consultant/Senior Research Fellow )
- LG-EDS Systems Inc. Korea Manufacturing and Logistics Consultant

## Session 1 – Introduction Smart City

- Background
- Definition
- Global Smart City Trends
- Smart City Services & Technologies
- Smart City Core Elements
- Conclusion

## Session 2 – Global Smart City Case

- Global smart cities' cases

## Session 3 – Debate

- Topic talk and policy suggestions

# Session 1

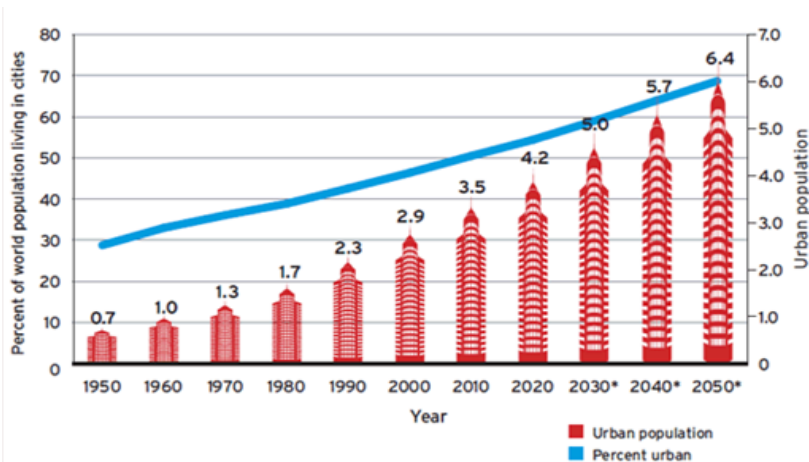
Introduction



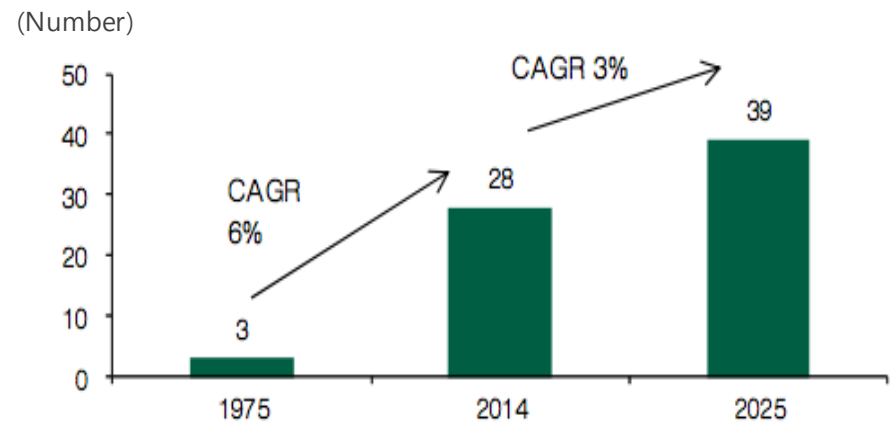
# Background

## Global urbanization phenomenon accelerated by the increase of the urban population

- UN World Urbanization report expects that urban resident population will grow into 66% by 2050 and the number of mega-cities (over ten million resident population) will be 41 by 2030
- Despite the various urban problems, the world's population is consistently centralized to cities
- The number of cities that are more than ten million population are 28 in 2014 and the numbers will be 39 or more by 2030



[Urban population growth rate]



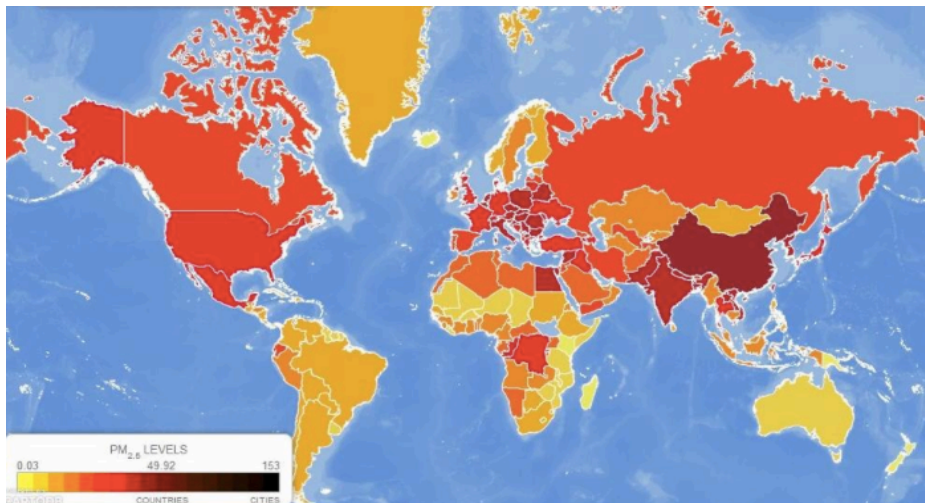
[Annual number of cities with a population of more than ten million]

Sources 1 : UN, Department of Economic & Social Affairs, Population Division  
Sources 2 : UN World Urbanization prospect (The 2014 revision, Hyundai Securities)

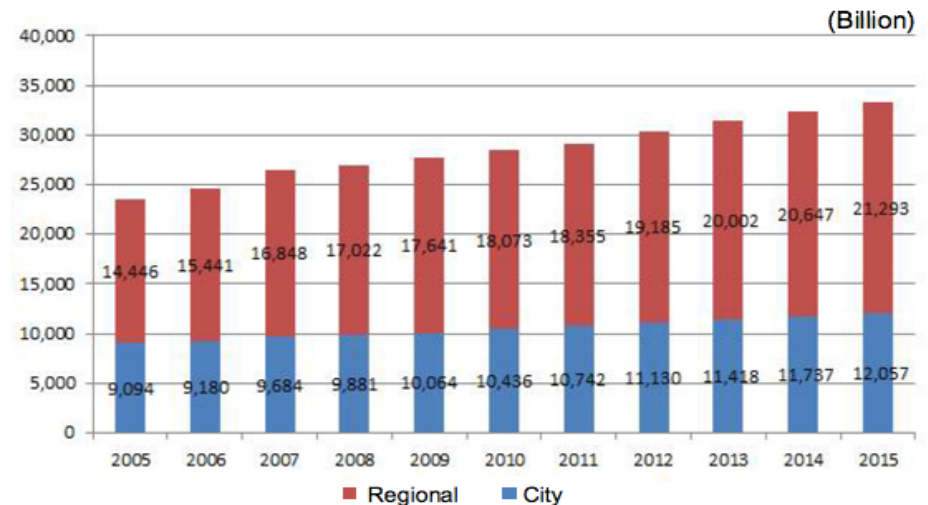
# Background

## Increasing the need for sustainable urban policy as a solution to urban problems

- A massive consumption problem of energies based on powerful economies arises
- The need for efficient resource consumption of megacity due to global environmental problems



[The level of air pollution]



[Traffic congestion costs]

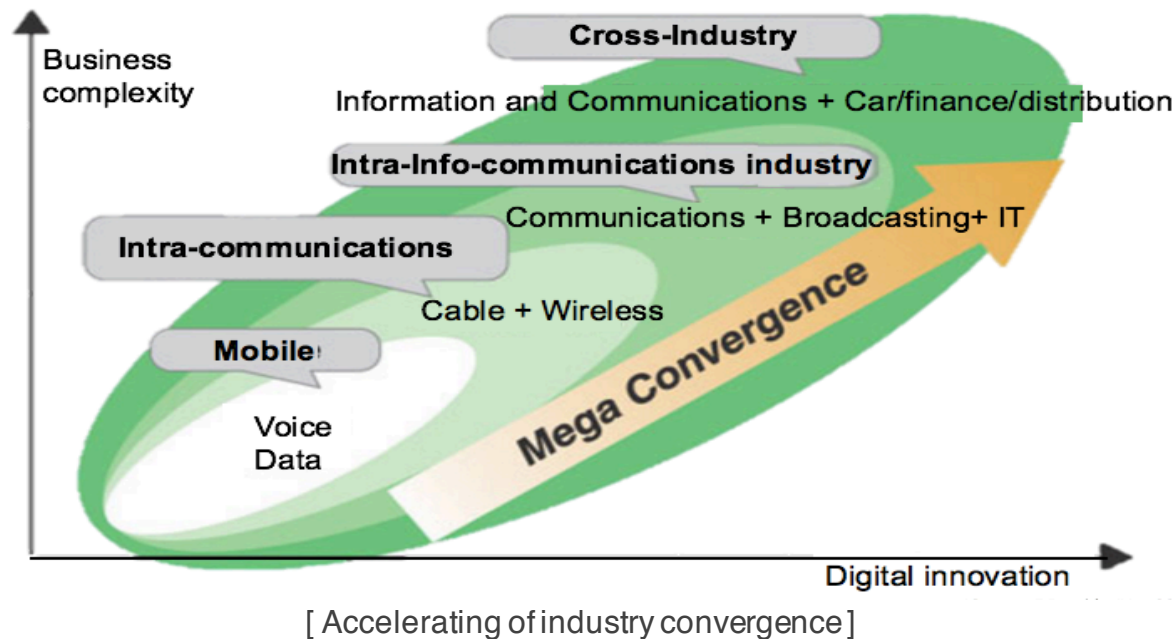
Sources 1: Global sisters report (<http://globalsistersreport.org/blog/three-stats-and-map/environment/air-pollution-global-problem-6331>)

Sources :2: The Korea transport institute

# Background

## Accelerating the industrial convergence trend through technology development

- As the barriers are torn down by ICTs, a new convergence market is being created
- Progress is being made toward an hyper-connected society through a technology paradigm shift led by IoT, Big-data and Cloud



Sources : DB guide (Han,2005)

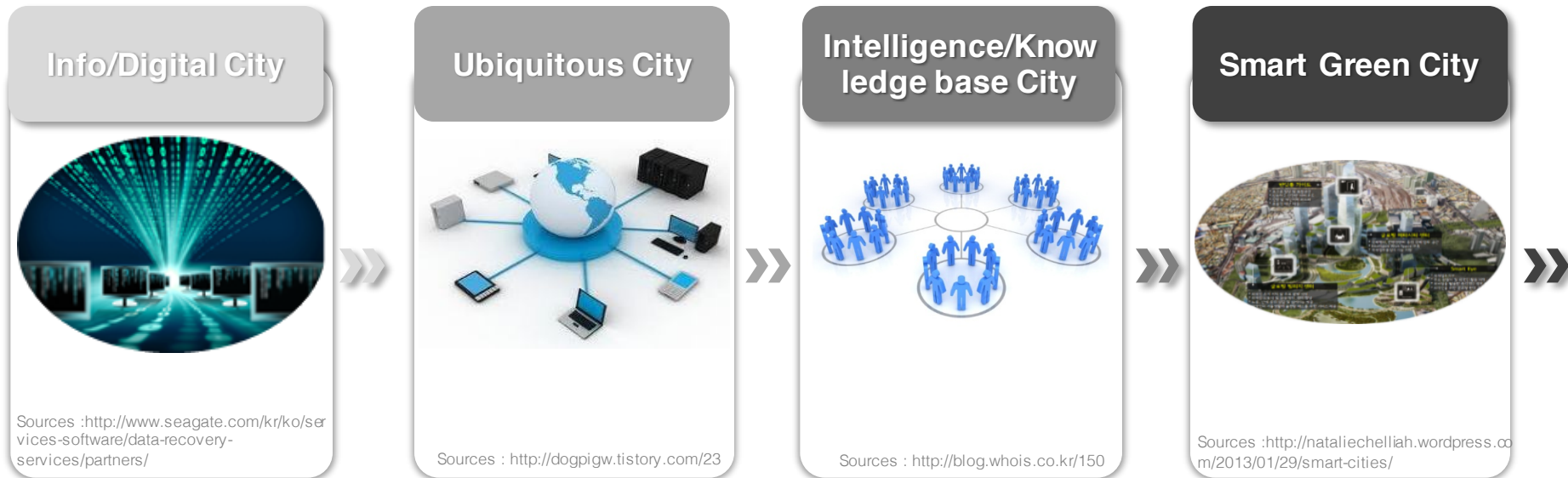
# SmartCity Master Plan & Policy



# Definition

## Evolution of Smart City Concept

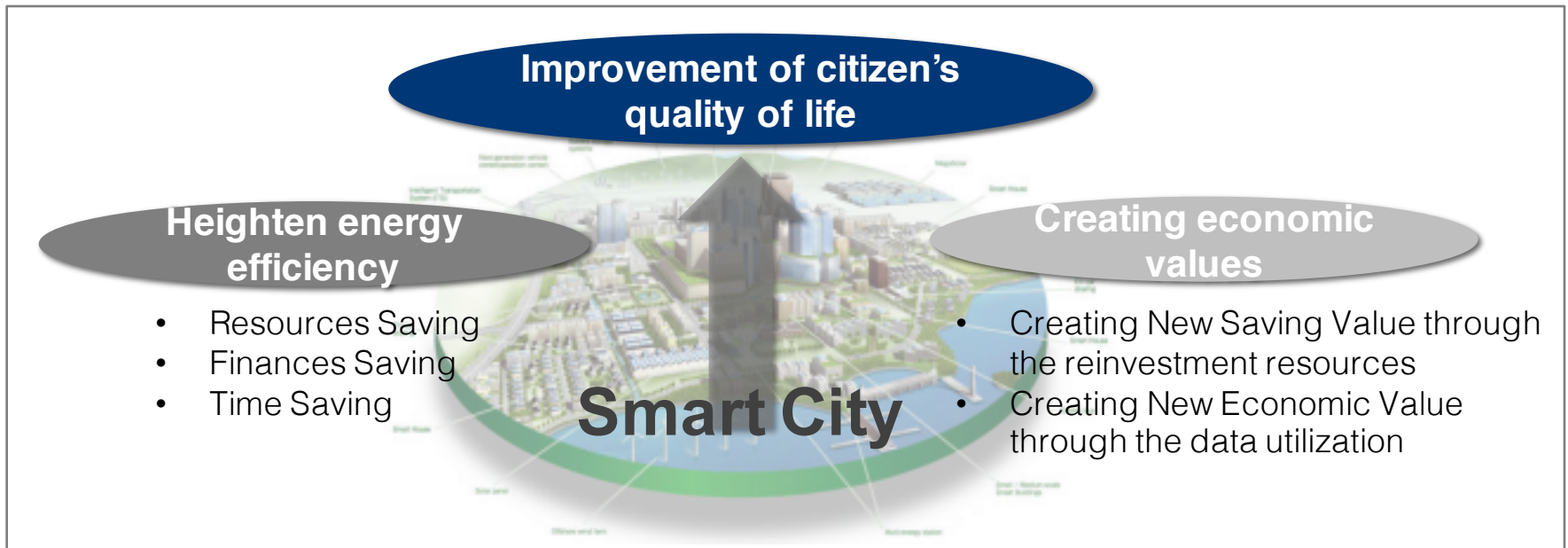
- Smart green city is an regional innovation system in which we can discover and develop new growth power in order to deal with regional issues with citizens, city officials, private companies etc. through intelligent & efficient management of environment, energy, urban infrastructure, and buildings



# Definition

## The areas of smart city

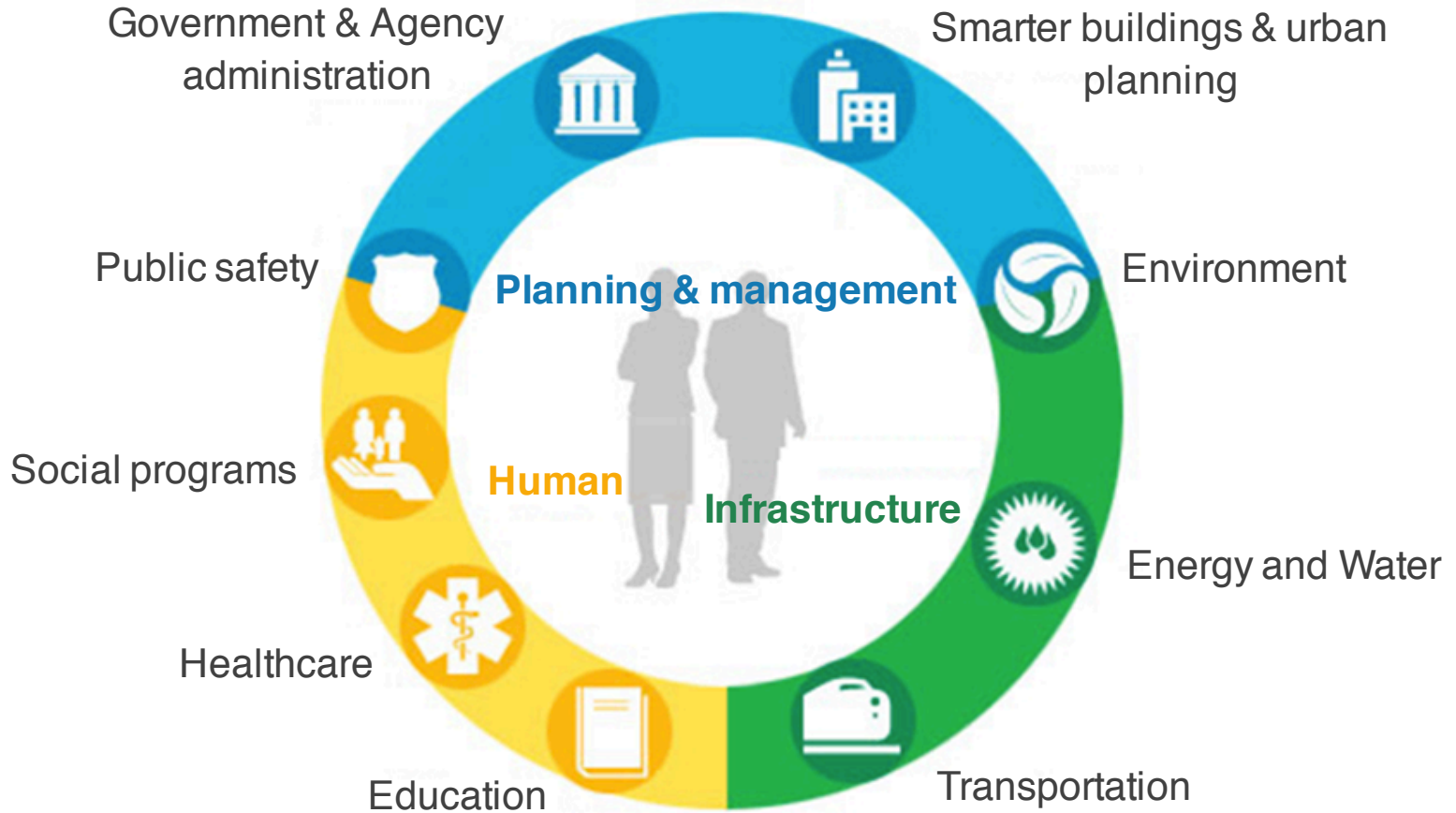
- Smart city as a high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a sustainable, greener city, competitive and innovative commerce and an increased life quality (Journal of Urban Technology, 2015)
- Hard Infrastructure: Intelligent IT infrastructures
- Soft Infrastructure: Services that can improve the lives of citizens





# Definition

## Core areas of smart city



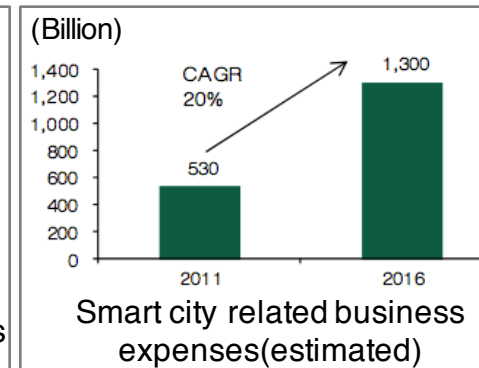
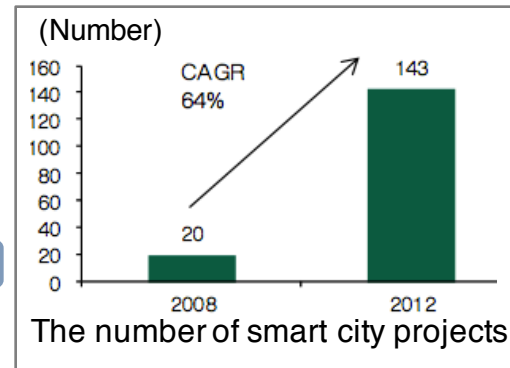
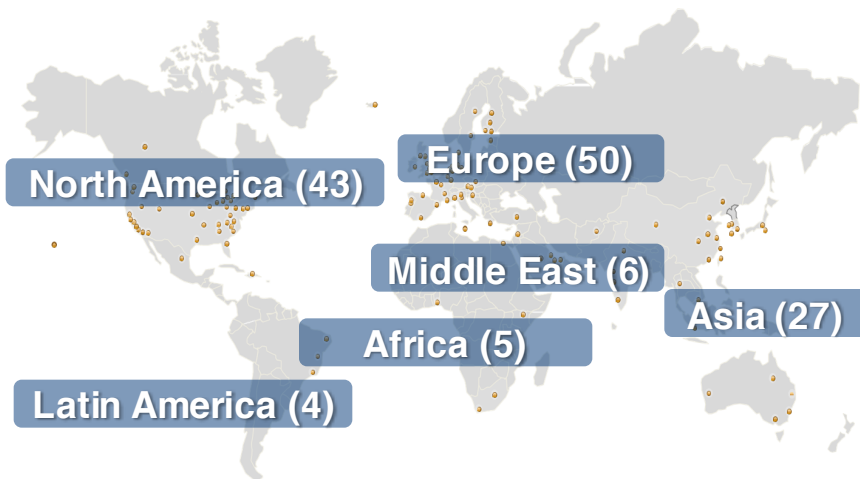
Sources : IBM, 'Ciudades inteligentes([www.ibm.com/smarterplanet/es/es/smarter\\_cities/](http://www.ibm.com/smarterplanet/es/es/smarter_cities/))



# Global Smart City Trends

## Global Smart City Trends

- Smart city projects are currently ongoing more than 150 cities around the globe
- The number of smart city projects is increasing 64% annually & relevant business expenses has increased by 20%
- Smart City related expenses will be 120 billion dollars in 2016
- North America and Europe were the core of smart city in the past, but China and India will be expected to grow as a core smart city, where an explosive economic growth and government's command economy aspects have shown



Sources 1 : <http://www.cityofboston.gov> Smart cities Exposés, Cisco Guide to Smart Cities, GSMA  
Sources 2 : UN World Urbanization prospect : The 2014 revision, Hyundai Securities

# Global Smart City Trends

## Country Trends



**USA**

1. Aim to have 15% market share in smart city industry by 2014
2. Smart city projects where smart meters are smart grid project are centered – provide incentives (deduction of tax, loan, etc.) for energy efficient building

### • National Objectives

1. Systems for energy conservation smart city based on smart mobile technologies – 100 billion dollars in 2012, 450 billion dollars in 2013



**Europe**

### • City Objectives

1. Glasgow, England: high performance CCTV that can help reduce crime, traffic commerce and energy problems
2. Amsterdam, Netherland: Invest 1.4 trillion won in 2009, 15 demonstration projects including smart grid, meters, buildings, electric cars, etc.
3. Niece, France : smart parking, smart light, smart road with IBM



**India**

### • National Objectives

1. India government establishes mega-city as well as smart city
2. 9.815 trillion won will be invested in a smart city project that aims to build a hundred smart cities for 5 years
3. India smart city is equipped with not only the latest ICT technologies but also core infrastructure
4. The objectives of India smart city is that enhancing green energy resources by 10%



**China**

### • National Objectives

1. Invest 90 trillion won (2011-2015)
2. Establish 320 smart cities
3. Xi Jinping administration's a core urbanization project

### • City Objectives

1. Beijing : real time population information system, smart metrics, urban surveillance systems
2. Shanghai : high speed broadband, smart grid
3. Other local regions : smart education, healthcare system, fabrics and design transaction system



**Japan**

### • National Objectives

1. Smart grid based smart city – energy management system, housing battery, electric car batteries, etc.
2. Technology establishment and business model export

### • City Objectives

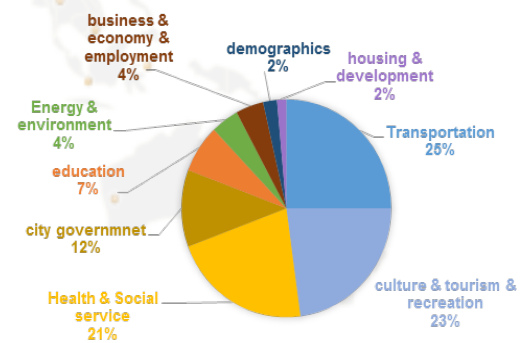
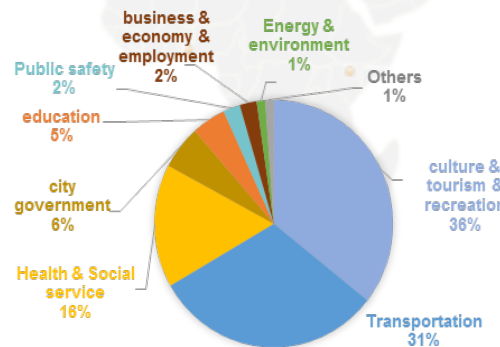
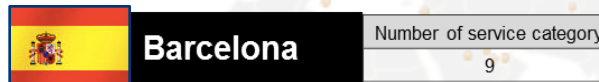
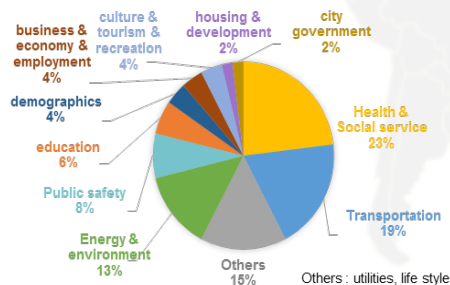
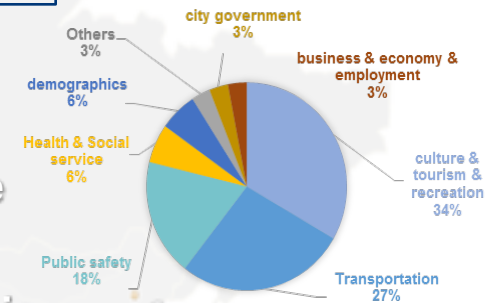
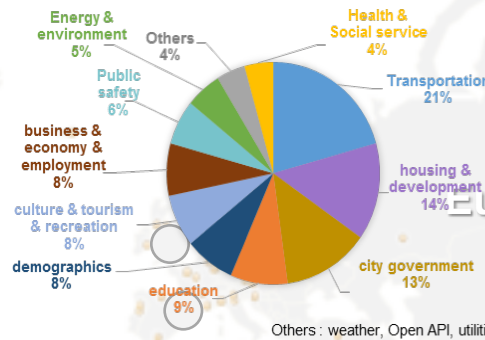
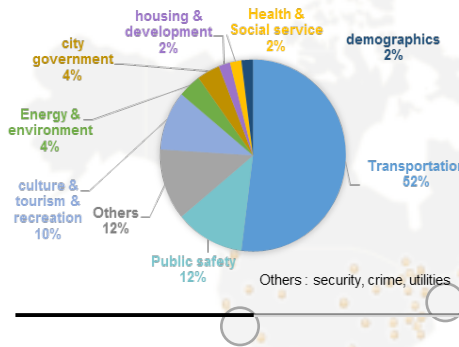
1. Yokohama : energy management system (electric car system, home energy management, building energy management system)
2. Toyota: efficient transportation management system
3. Kitakushu: variable electric charges

Reference : : UN World Urbanization prospect: The 2014 revision, Hyundai Securities

# Global Smart City Trends

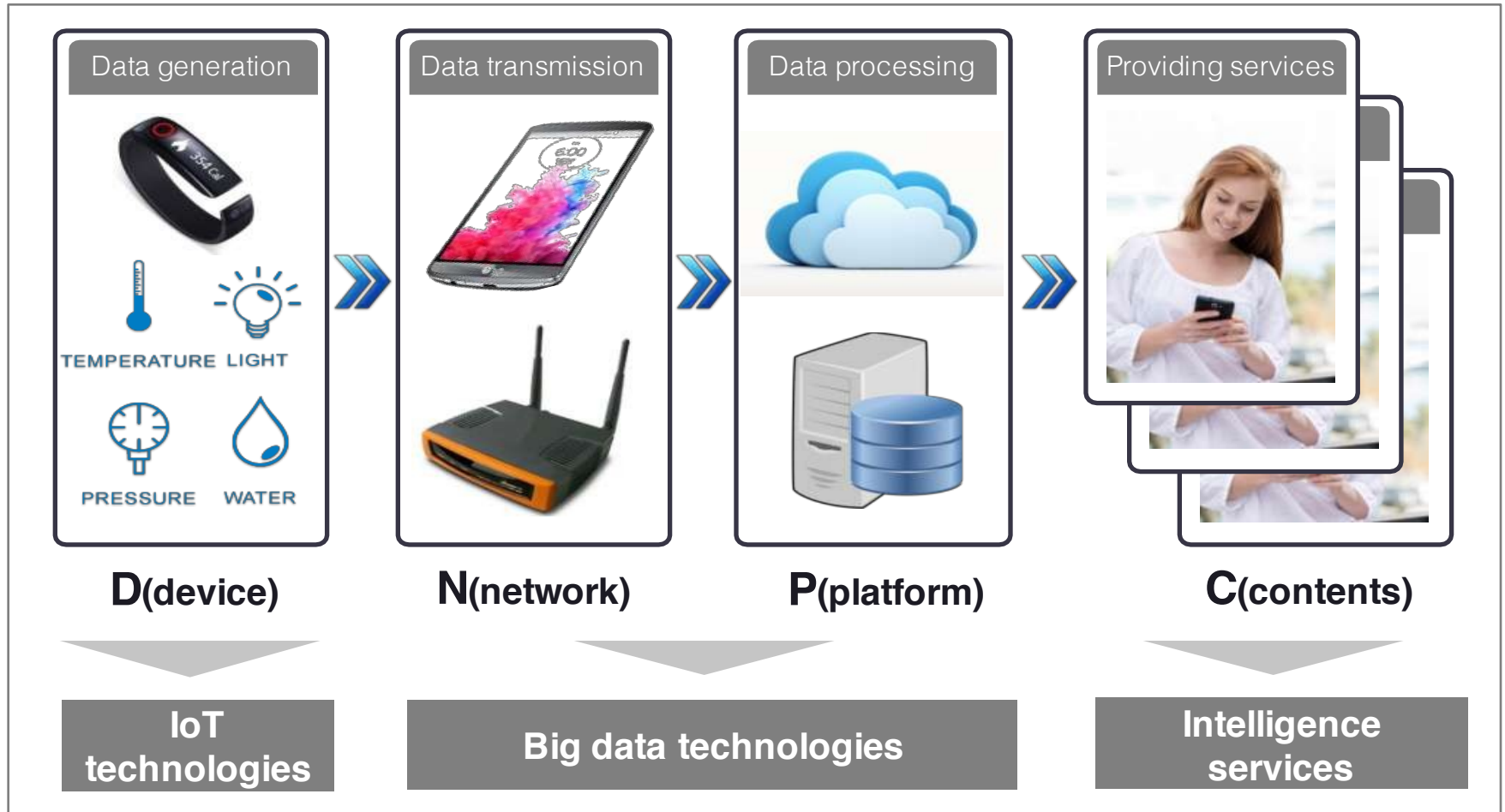
## City Trends

- Service types of global smart cities are various according to its characteristics



# Smart City Services & Technologies

## Core mechanism of providing smart city services



# Smart City Services & Technologies

## IoT | Related video

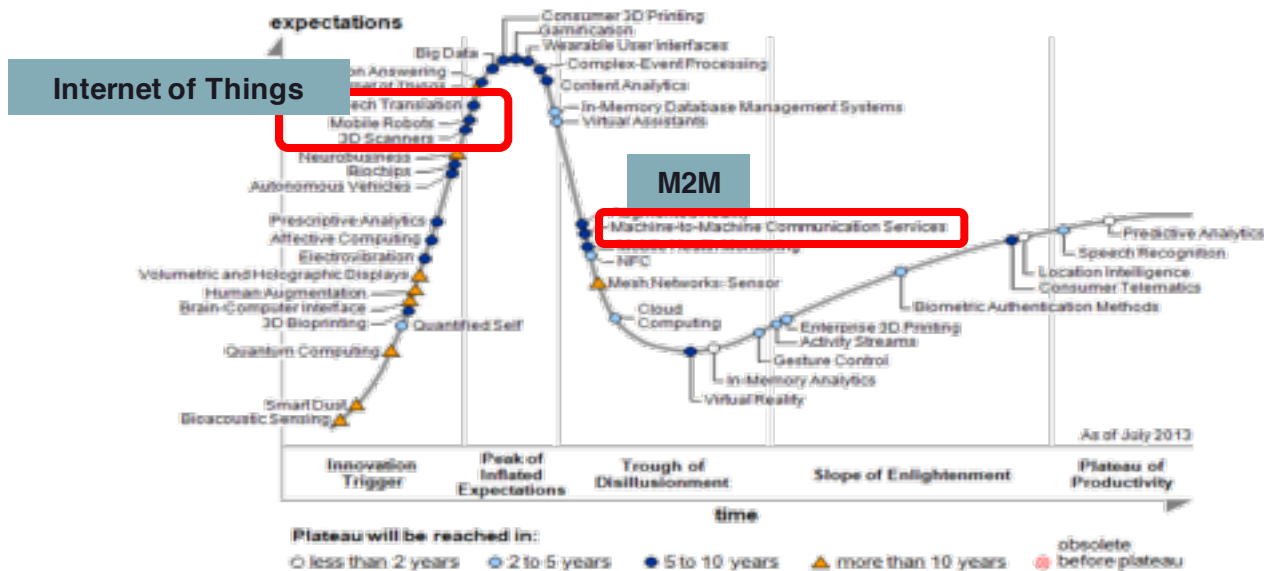




# Smart City Services & Technologies

## IoT(Internet of Things) I General definition

- ITU report in 2005 presents IoT as a promising technology in ICT industry
- ITU definition of IoT, “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.” (ITU, 2005)



[The most fast growing area in IT industries]

Sources : Gartner's 2013 Hype Cycle for Emerging Technologies

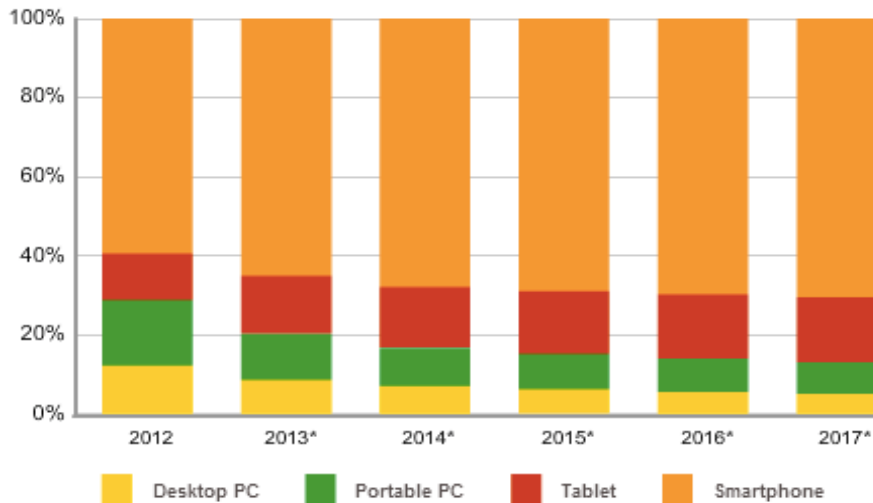
# Smart City Services & Technologies

## IoT(Internet of Things) | New IT Device Technologies

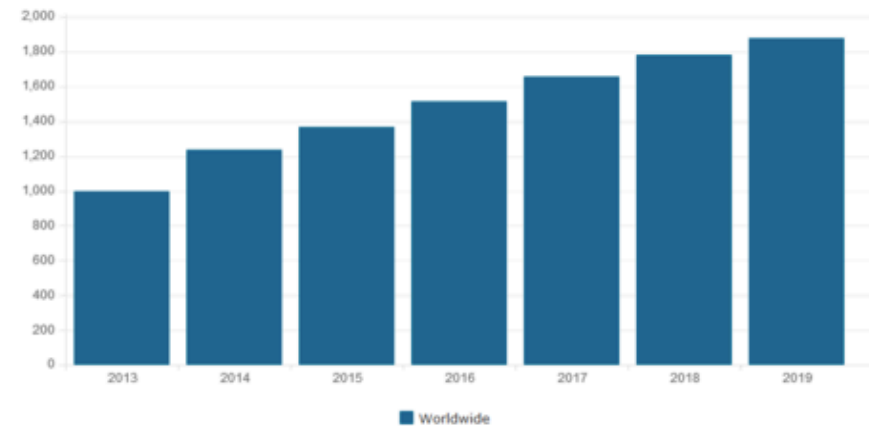


**PC to Mobile ... Change of IT device utilizing patterns**

- Overcome time and place limitation
- Personalization



[Worldwide Smart Connected Device Forecast Market Share by product Category, 2012-2017]



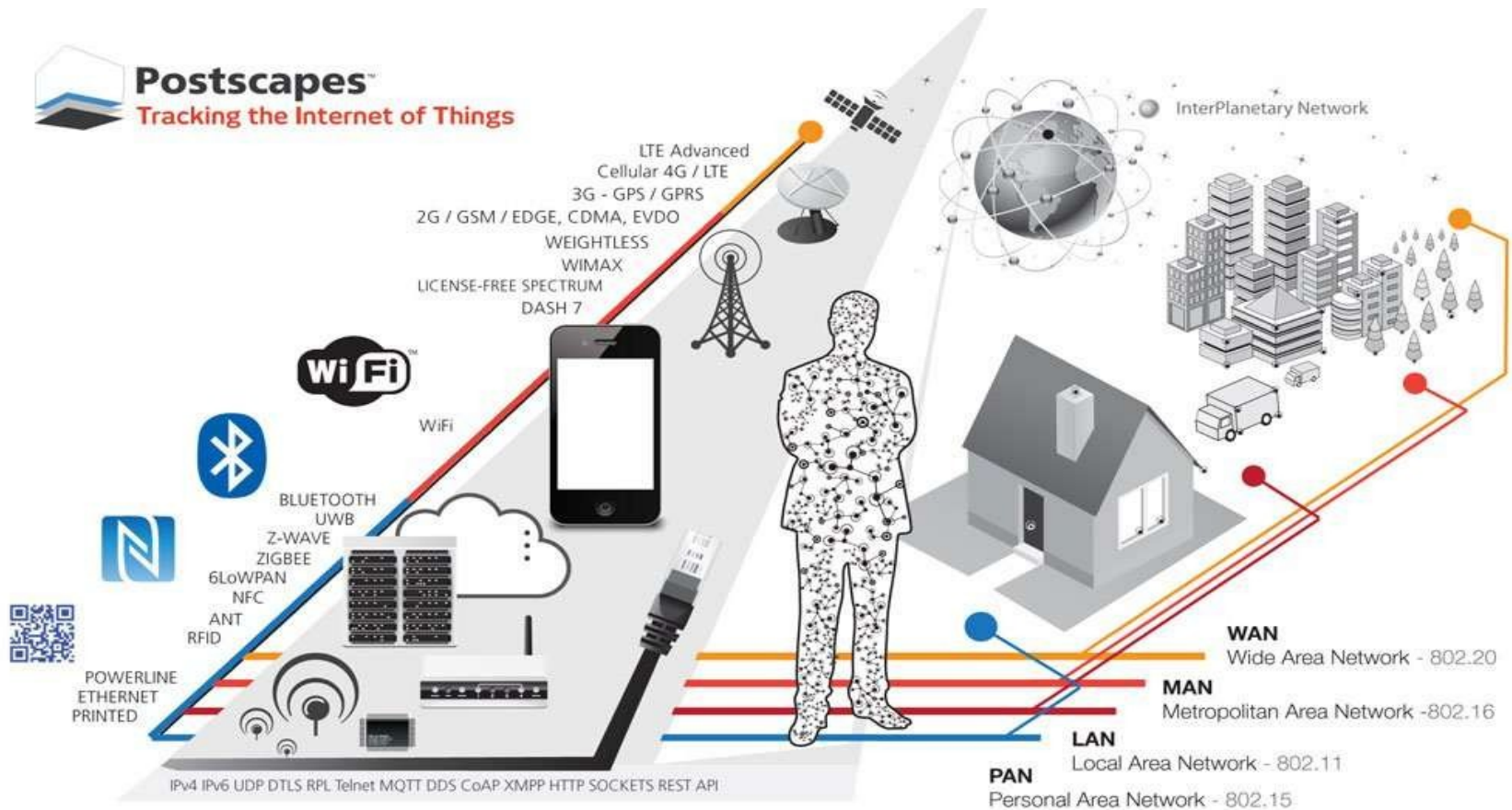
[World wide Smart Phones Growth Rate (millions), 2013-2019]

Sources : IDC, Gather Shipments , Trend spectrum [recomposition (2015,12)]



# Smart City Services & Technologies

## IoT(Internet of Things) | New IT Device Technologies



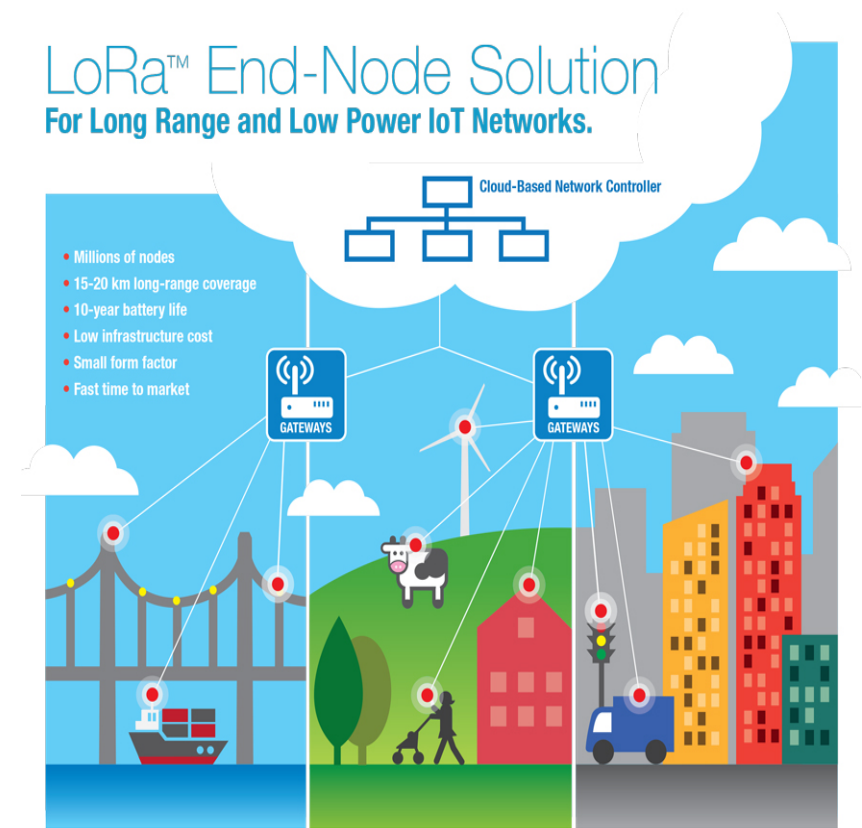
Improvement of telecommunication technologies

Sources :<http://www.slideshare.net/>

# Smart City Services & Technologies

## IoT(Internet of Things) | LoRa Network

- LoRa is an abbreviation of Long Range, meaning low power wide range wireless communication technology
- LoRa provides low-priced communications services about a third of existing communication charges
- LoRaWAN or Long Range Wide Area Network specifically designed and **optimized to provide low-power WANs with features to support low-cost mobile secure two-way communication in IoT**



Sources :Open Sensors Ltd. Supported by the Open Data Institute

# Smart City Services & Technologies

## IoT(Internet of Things) | LoRa Network

- **LoRa WAN is quickly gaining traction with IoT businesses due to its low cost with a number of initiatives and hardware companies adopting it**

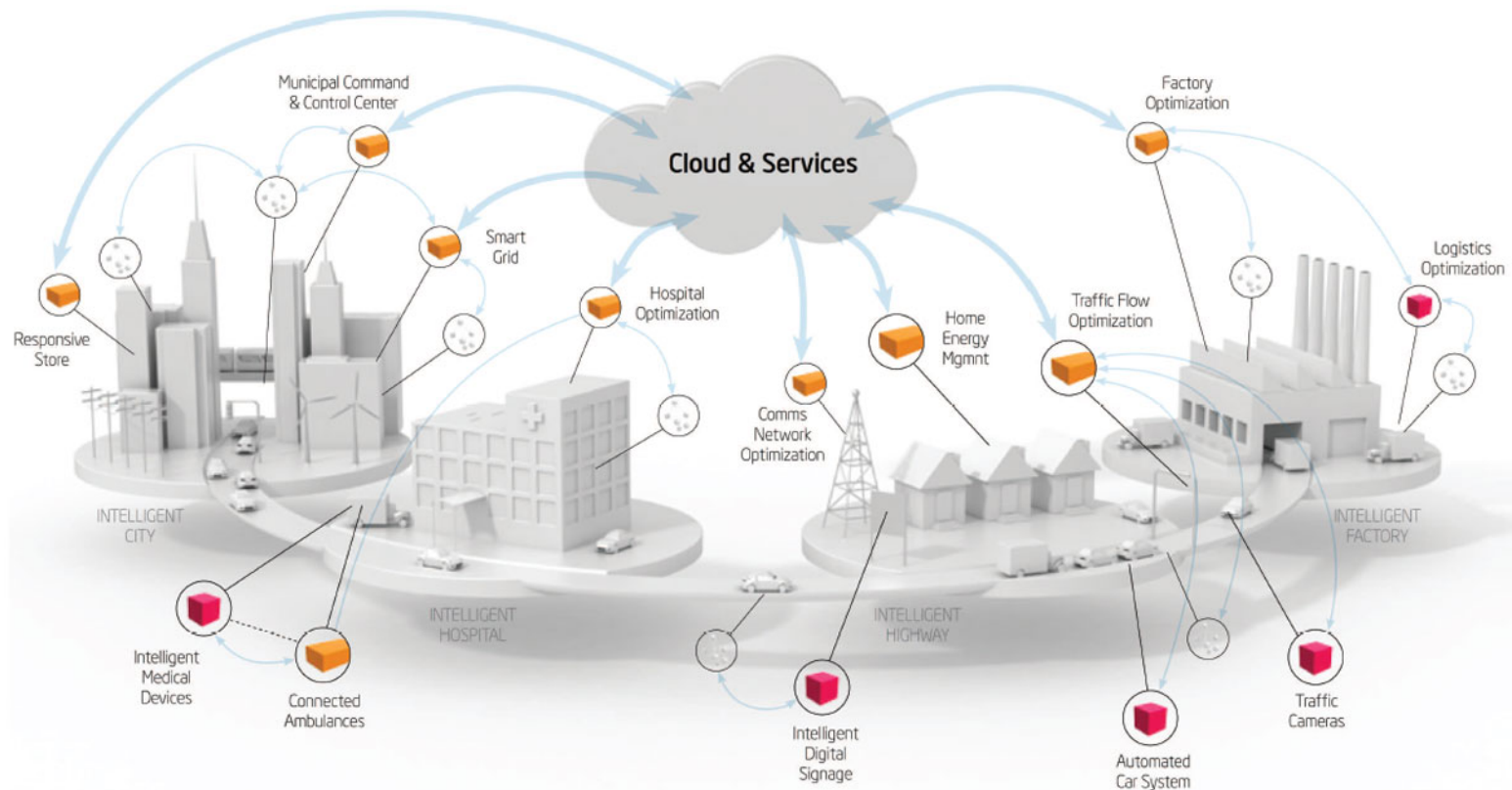
Types	Power	Speed	Range	Applications	Cost
RFID	Very low	400Kbps	<3m	Tag	Low
Bluetooth	Low	700Kbps	<30m	Data transaction	Low
Zigbee	Very low	250Kbps	10-300m	Sensing	Medium
Wi-Fi	Low-High	11-100Mbps	4-20m	Internet	Medium
WirelessHart	Very Low	250Kbps	200m	Industrial sensing	Medium
<b>LoRa</b>	<b>Low</b>	<b>300Kbps</b>	<b>&lt;21km</b>	<b>Industrial sensing</b>	<b>Low</b>
Wi-Max	High	11-100Mbps	50km	Broadband	High
3G/4G	High	1.7-7.2Mbps	Cell range	Cellular phone	High

Sources :Open Sensors Ltd. Supported by the Open Data Institute

# Smart City Services & Technologies

## IoT(Internet of Things) | The beginning of hyper-connected society

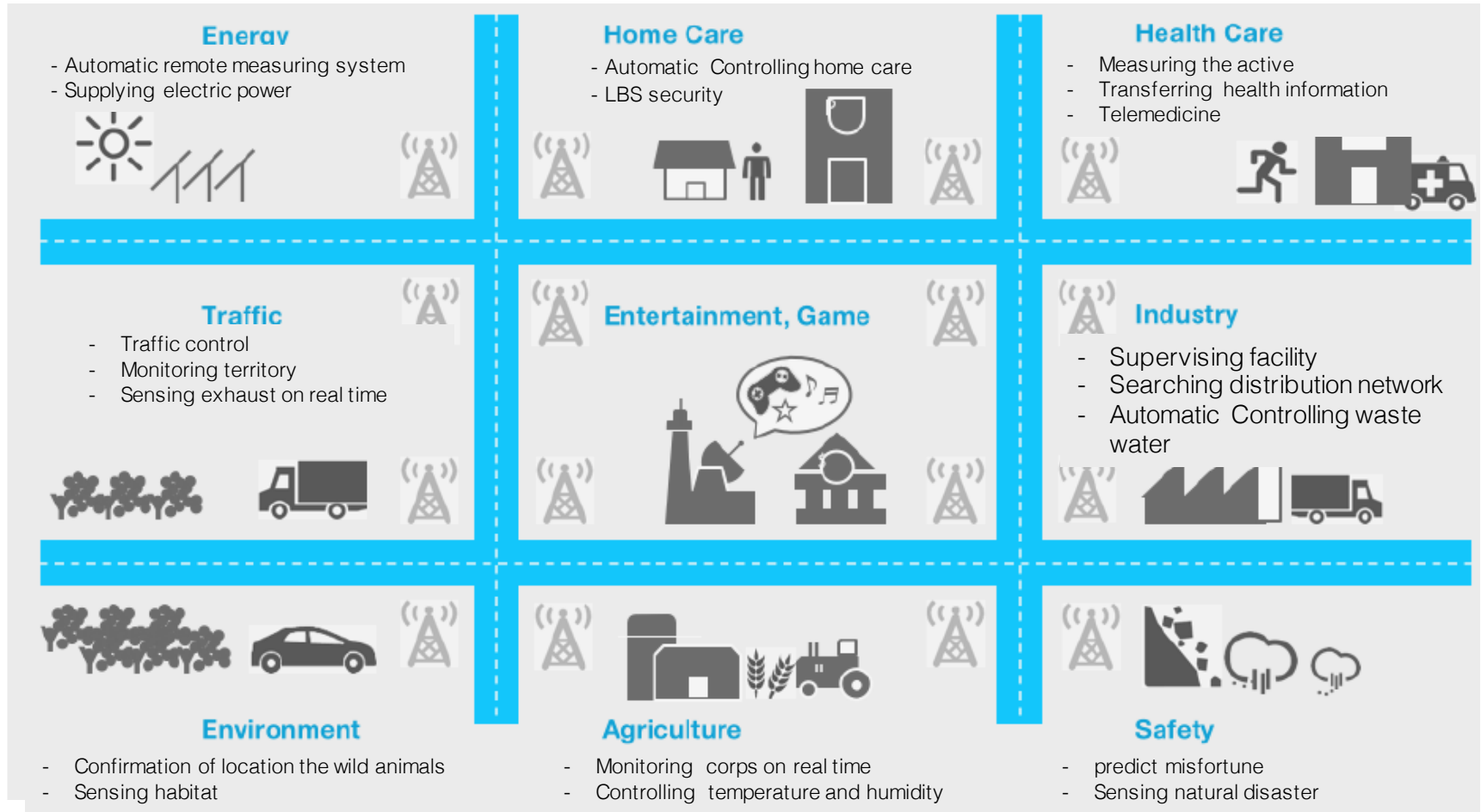
- According to Cisco, 60 billion internet of things will be connected by 2020



Sources : [teachermatch.org](http://teachermatch.org)



# Smart City Services & Technologies

## IoT Application | Domains



# Smart City Services & Technologies

## IoT Application | Domain examples

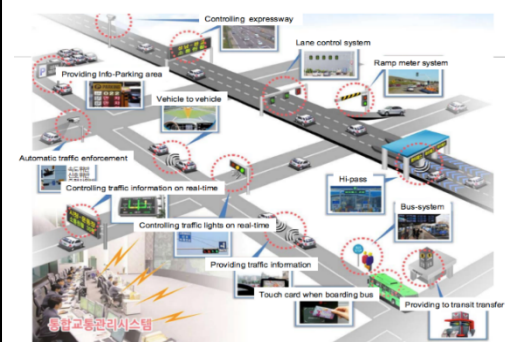
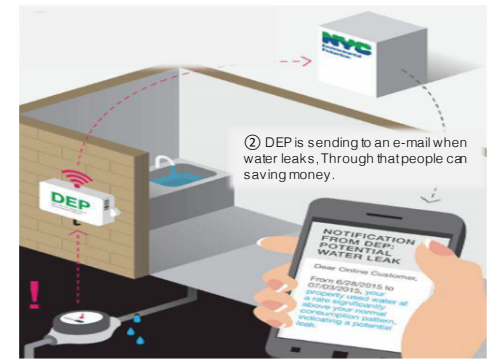
IoT Application Domain	Smart city project	Country	Description	
Energy	Smart Building	USA	12,000 sensors are installed. The sensors check the temperature, humidity, the movement of person, carbon dioxide emissions, etc	 <p>The diagram shows a multi-story building with various IoT sensors and services indicated by colored icons and text:</p> <ul style="list-style-type: none"> <li><b>Energy:</b> Smart meters, demand response</li> <li><b>Lighting:</b> Emergency sensing</li> <li><b>Fire:</b> Fire/smoke detection, detector service</li> <li><b>24/7 monitoring:</b> Condition monitoring, parking lot utilization</li> <li><b>EV charging:</b> Charging of hybrid and electric vehicles</li> <li><b>Water:</b> Smart meters, use and flow sensing</li> <li><b>HVAC:</b> Fans, variable air returns, air quality</li> <li><b>Devices:</b> Maintenance, performance</li> <li><b>Access and security:</b> Badge in, cameras, integration palmrest, doors</li> </ul>
	Smart Meter	USA	The smart meters, installed in every households, collect the data and send this to a central device of SMUD* via the communication system	 <p>A man in a white polo shirt is holding a small white smart meter device. He is standing in a room filled with many smart meters mounted on a rack. The meters are arranged in rows and columns, with some having digital displays and others having analog dials.</p>



# Smart City Services & Technologies

## IoT Application | Domains examples

IoT Application Domain	Smart city project	Country	Description
<b>Environment</b>	Water quality management	USA	<p>Using a wireless water meters saves on \$100,000 in New York</p> <p>The network communication center where the water meter transmits data will manage the water quality via the transmitted data</p>
<b>Transportation</b>	Smart Meter	USA	<p>Intelligent Transportation System , which is known as ITS, provides a high quality traffic information and enhances mobility, safety and usability of transportation system</p>

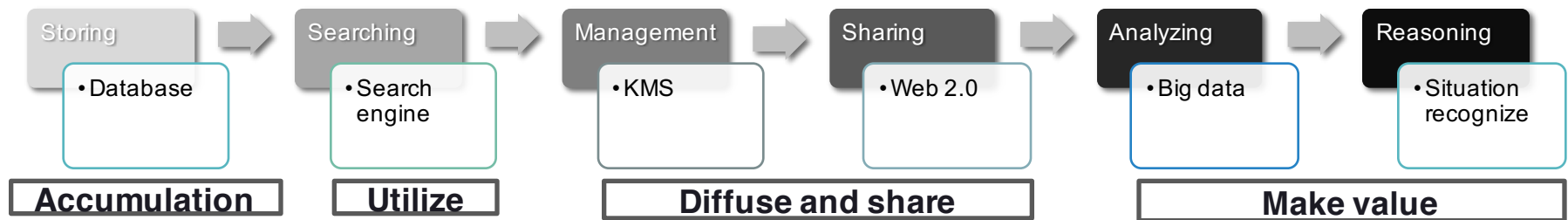




# Smart City Services & Technologies

## Big data | Data Analytic driven IoT based Smart Services

- Due to the appearance of mobile, cloud and SNS, the types of infrastructure and data changes fundamentally and this leads to data perspective shifts
- IT initiative shifts from infrastructure, technology, SW to data. According to the phenomenon, data becomes independent entity apart from IT
- The role of data evolves in 'analysis and reasoning' direction
- IT paradigm shift brings quantitative expansion of data and data outflow begins to create new opportunities and benefit



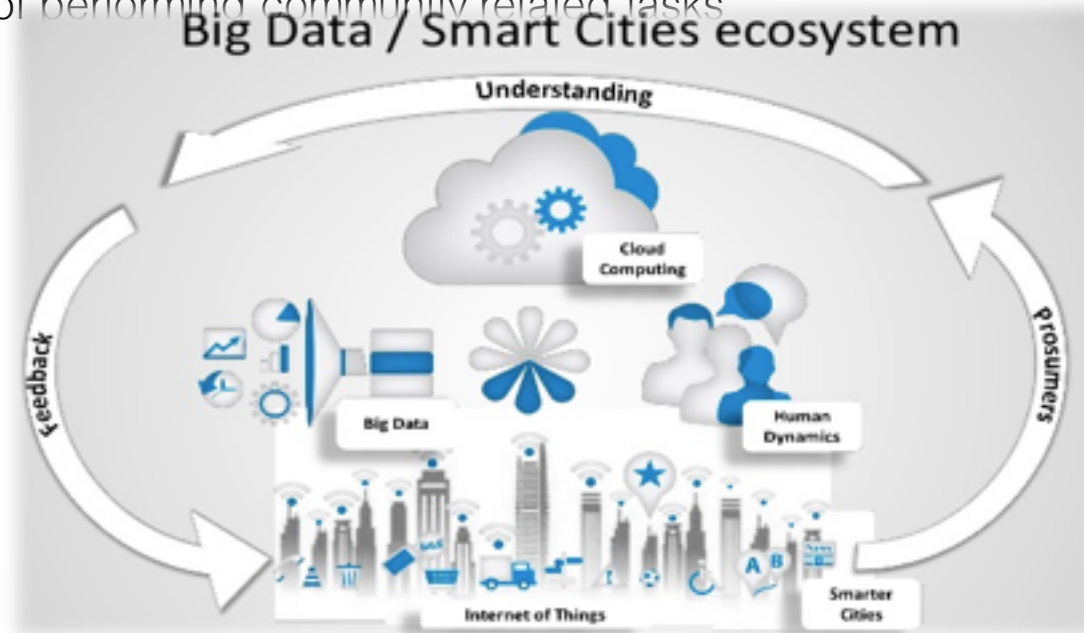
[Past, present and future of big data]

Sources : Bigdata Center for Strategic Studies (2013)

# Smart City Services & Technologies

## Big data | The importance of data management in smart city

- Data ecosystem is a core component for smart city, which is essential for urban improvement of living by storing, refining, analyzing and sharing data
- Well-managed information management can provide high quality information resources to citizens, and based on this resources, citizens are able to accumulate knowledge and enhance understandings, which finally lead to improvement of performing community related tasks



Sources : Internet of things the world (2014)

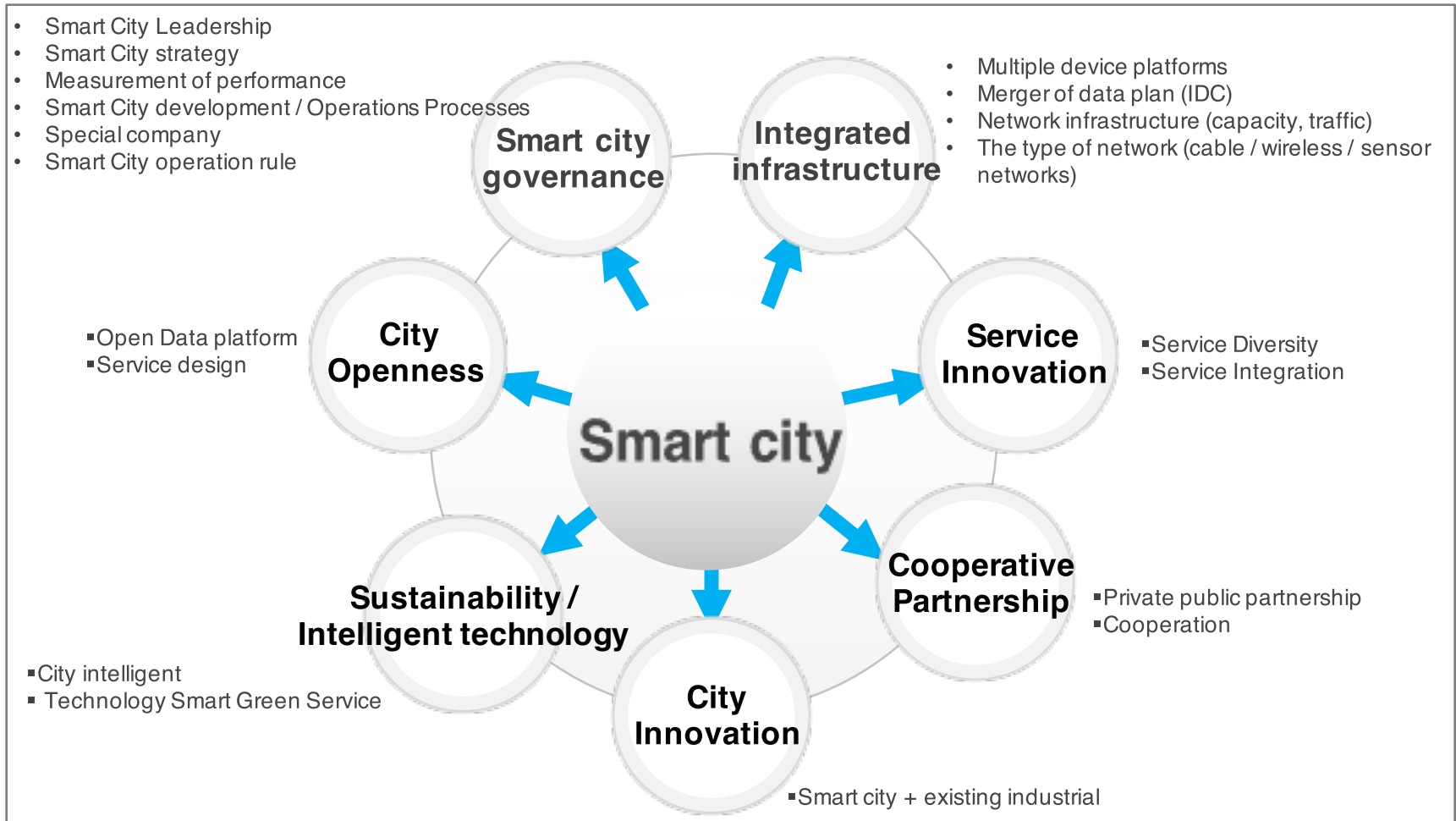
# Smart City Services & Technologies

Big data | The importance of data management in smart city



# Smart City Core Elements

## Smart City Core Elements



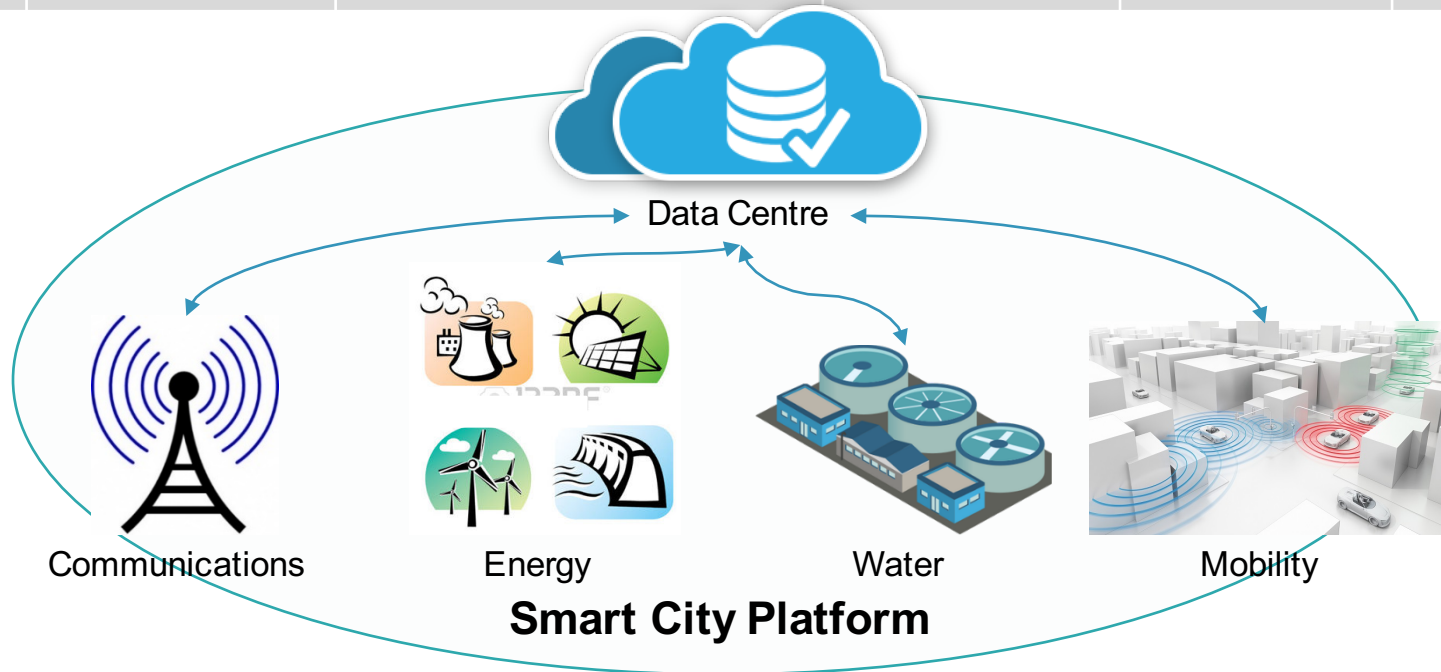


# Smart City Core Elements

## Integrated Infrastructure | Infrastructure

- Establishment of fundamental city infrastructure is essential for smart city

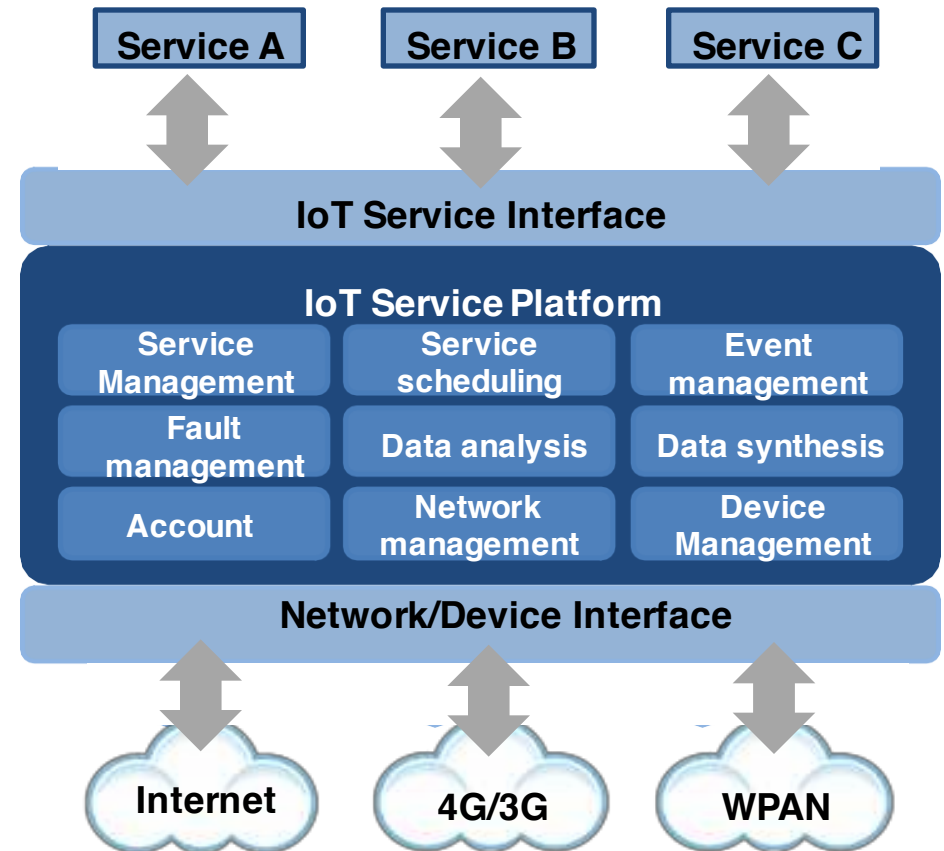
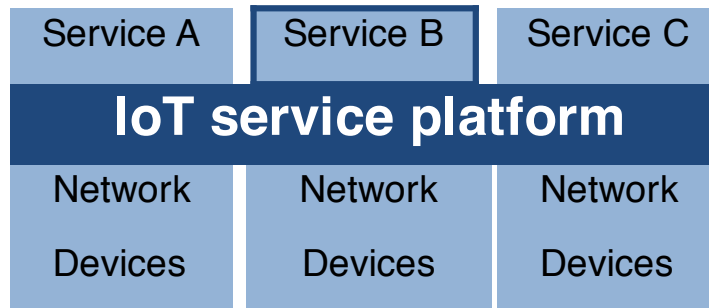
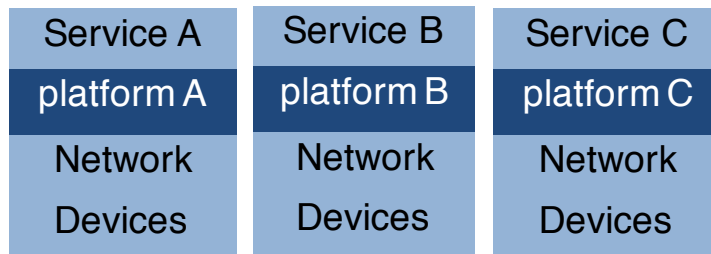
	Data	Communication	Energy	Water	Traffic
Key words	<ul style="list-style-type: none"> <li>data center (Integration / Cloud)</li> </ul>	<ul style="list-style-type: none"> <li>High-speed cable / wireless</li> <li>Low-power networks</li> </ul>	<ul style="list-style-type: none"> <li>Smart Grid</li> <li>Green Energy</li> </ul>	<ul style="list-style-type: none"> <li>Smart Water Grid</li> </ul>	<ul style="list-style-type: none"> <li>connected car</li> </ul>



# Smart City Core Elements

## Integrated Infrastructure | Infrastructure

- It is important to secure interoperability between heterogeneous platform and services in order to provide combined smart city services



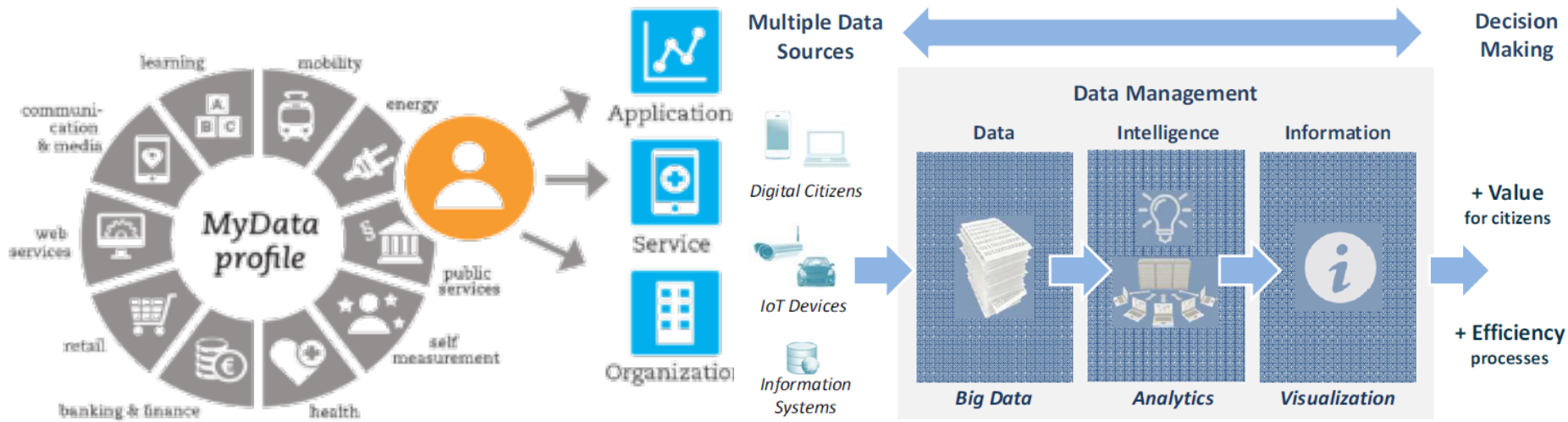
Sources : Book ( IoT : Kim, Heungryong Science Publishers)



# Smart City Core Elements

## City Openness | Open data

- An idea that data should be freely available to everyone to use and allow creating value-added services

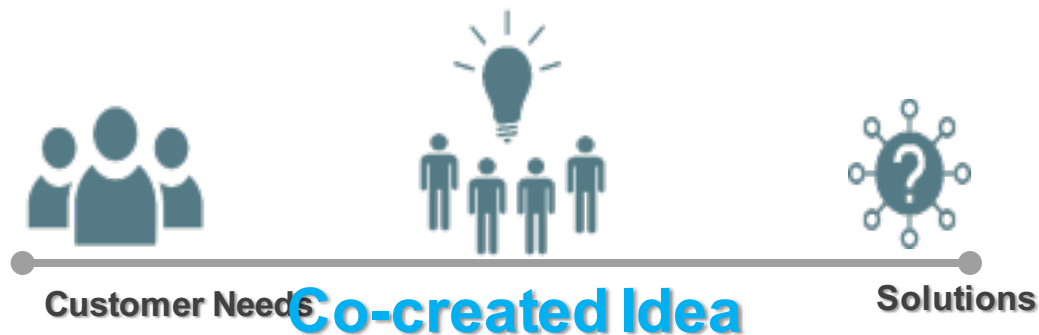


Sources : Book ( IoT : Kim, Heungryong Science Publishers)

# Smart City Core Elements

## Civic Engagement

- In the case of Europe, Citizens Participatory role is a crucial factor in process of the Smart city Project mainly forwarded by the European Commission
- Citizens should be in the central of the city problems due to increase expectations of quality of life, intricate composition of population, endless urbanization
- Various of region projects are in progress to solve city problems through the Living Lab which citizens are directly involved
- Living Lab means open innovation User-driven eco-system which users actively participate in the innovative process and its essential is to make innovation with users and creator in real life



# Smart City Core Elements

## Civic Engagement I Amsterdam, Netherland

- Every region projects in Amsterdam has a Living-Lab where local resident, experts and labs are involved to solve community issues
- Living-Lab provides diversity of ideas using for Smart city projects, and makes ICT service sustainable
- In the case of Smart Student program, local college students with local residents act as main actors in the process to solve local issues using ICT Technology



Gathered to solve local issues  
by Amsterdam citizens



Netherlands 'Smart Student Program'

# Smart City Core Elements

## IoT related Laws & policies

- Smart city promotion policy vs. institutional laws & regulations



# Smart City Core Elements

## Laws and policies | Main issues | Drone



South Korea



### Haeundae Busan Drone marine safety

- Drone marine safety service started at April 2015,
- Part of Global Smart City Test-bed Project
- Smart Marine safety, Port Surveillance, Emergency Supply in Littoral sea



China

### Sharing 70% of world Private Drone industry

- The First to build Test-fly indoor facilities
- Big Governance support



Japan



### Significant Progress in Deregulation

- Targets on expansion 2020
- Deregulate 6 main laws
- (December 2015)



USA



### Drone, Google pioneers in commercial drones

- Approvals from FAA
- Already started Test-fly 2-years ago
- Testing in various field
- Expects service effectiveness

Sources Strategic technology development and overseas trends of drones - Focused on Smart Materials Management System Support, Korea Regional Development 2016



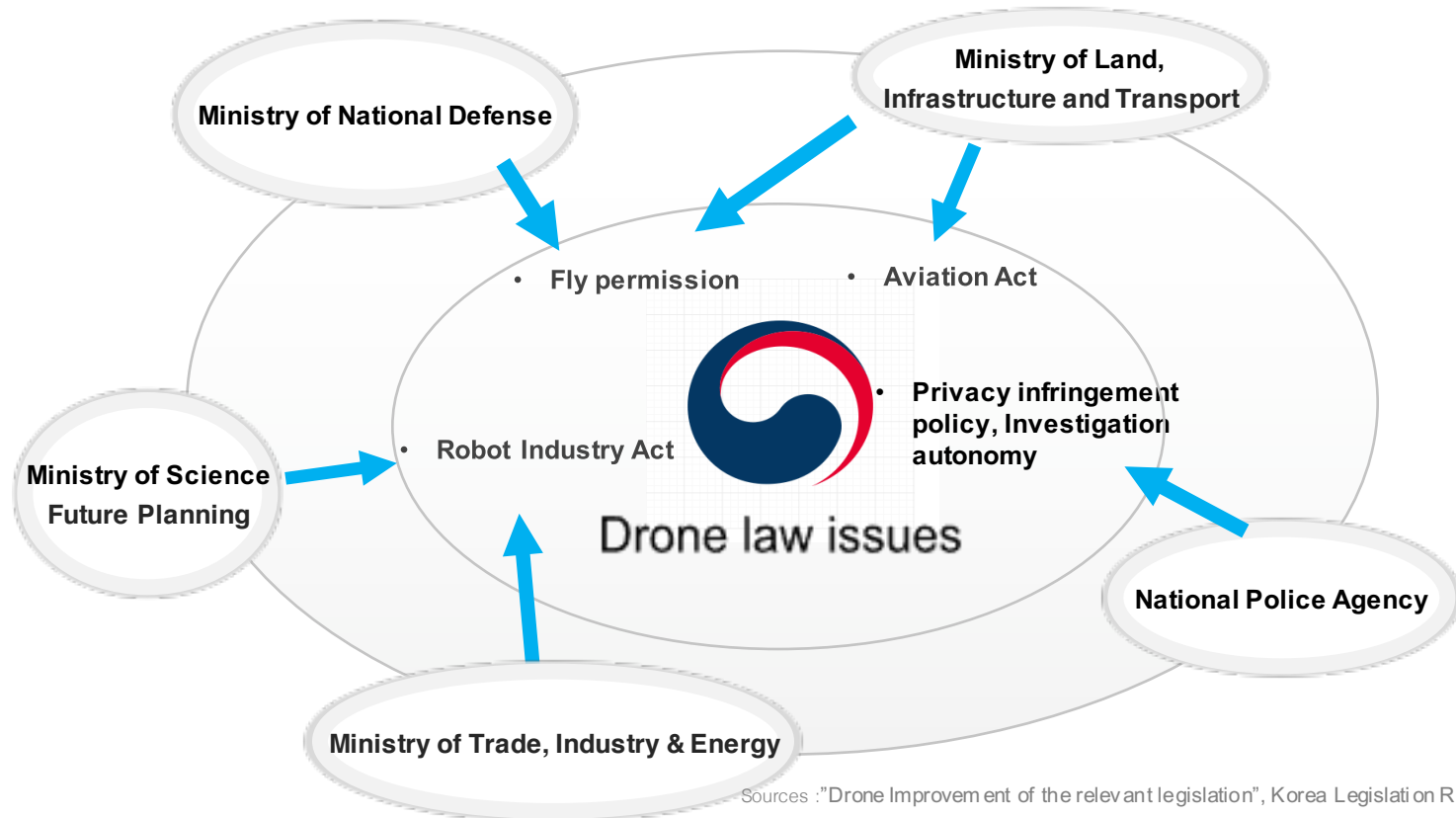
# Smart City Core Elements

## Drone commercialization governance

- Siloed partners Involved in Drone laws

*“Needs unification in administrative procedures”*

*“See drone as different perspective”*





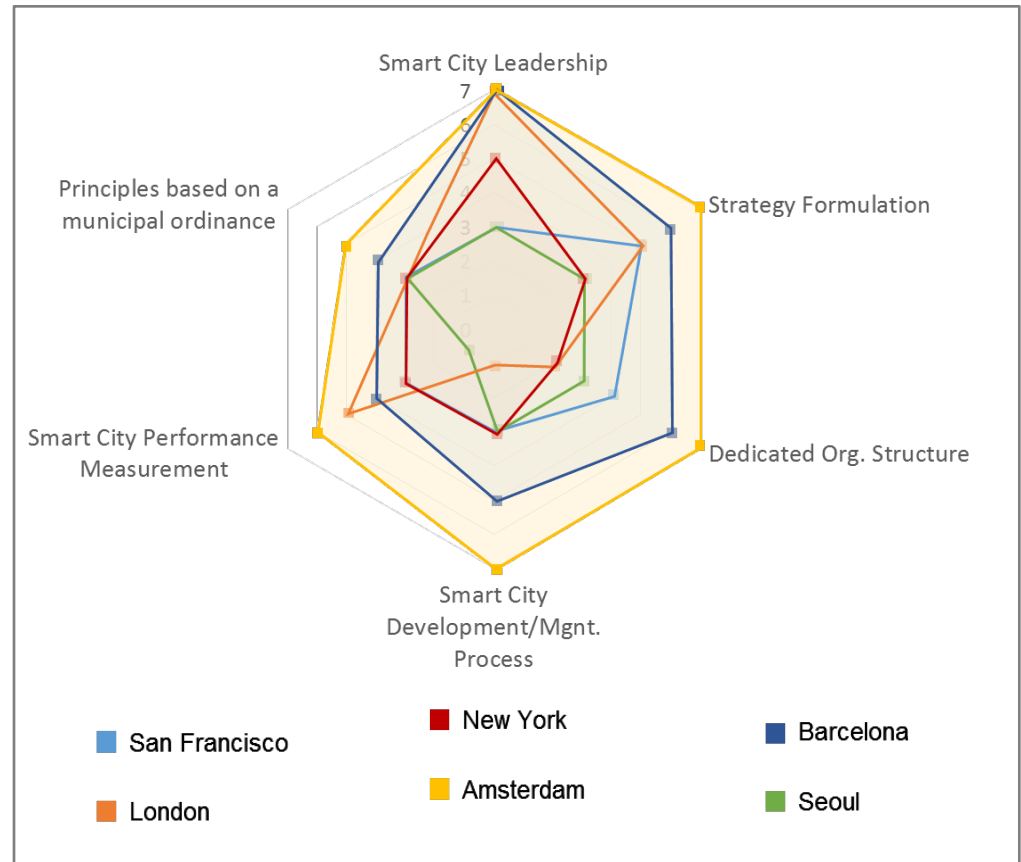
# Smart City Core Elements

## Governance

- Leadership, organization, policy-making and planning strategies of city can be a core factor in smart city governance

### Smart City Governance

- Smart City Leadership
- Smart City Strategy
- Performance Measurement
- Smart City Development/ Management Processes
- Dedicated Organization
- Smart City Principles



# Conclusion

## 1. Inevitability of smart cities' appearance

- Smart city appearance of using ICT Technology to solve city problems

## 2. Entering hyper-connected society

- Each of the Smart city construction goals may appear different depending on the urban characteristics, but ultimately connecting people, things, cities, countries into hyper-connected society

## 3. Collapse of industrial boundary by integration (continued)

- Collapse of the boundaries due to ICT technologies & diverse industry convergence mainly with the city (ex. Google, Apple etc. has already been in development on self-driving car project)

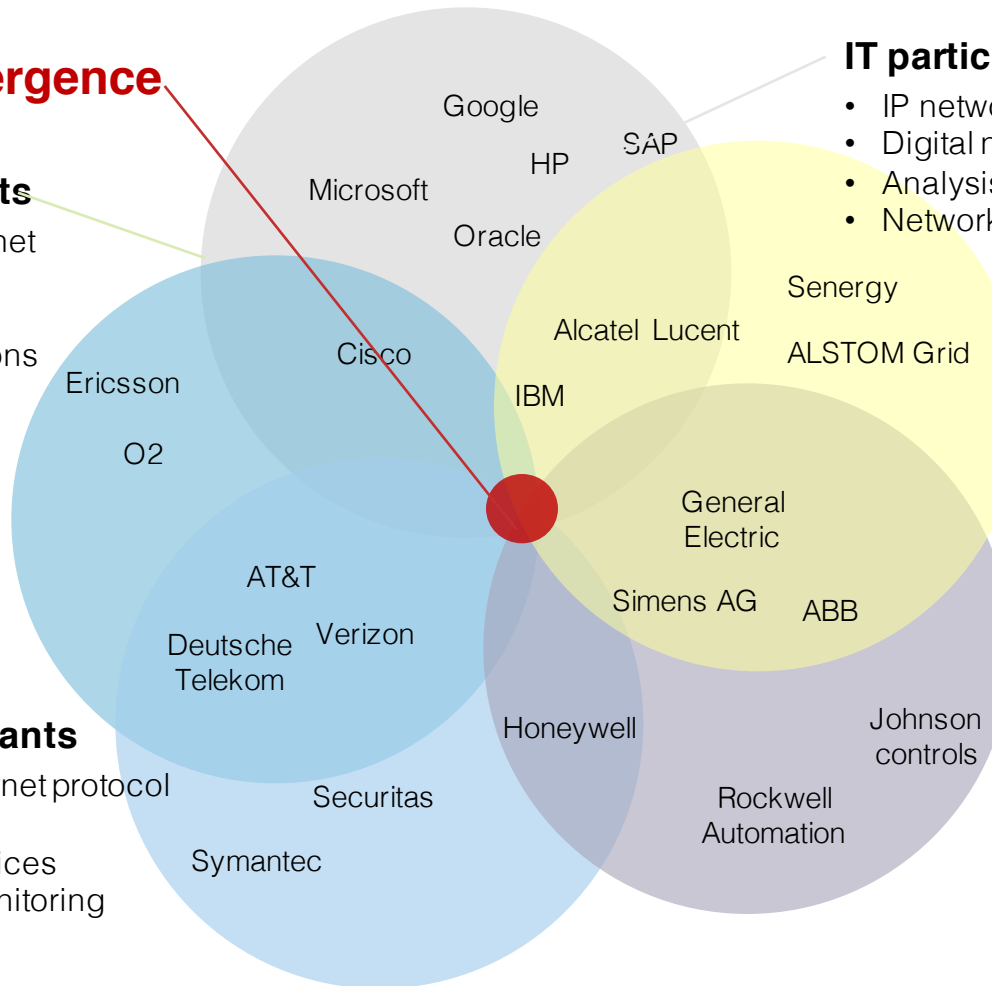
# Conclusion

## 3. Collapse of industrial boundary in smart city

### Point of Convergence

#### Telecom participants

- Broadband and internet service providers
- Phone lines
- Mobile communications



#### Security participants

- Firewalls and internet protocol security
- Cloud-based services
- Managed and monitoring services

#### IT participants

- IP networks
- Digital networks
- Analysis software
- Network security

#### Energy and Infrastructure participants

- Power electronics
- Renewable energy
- AMI-enabled metering
- Substation automation

#### Automation and building control participants

- Broadband and internet service providers
- Phone lines
- Mobile communications

Sources: Frost&Sullivan

# Session 2

Case studies

# Global Smart Cities' cases

## Global Smart City cases



- USA**
- Mission bay (California)
  - Smart Grid (California)
  - Smart streetlight (California)
  - Lower manhattan (New York)
  - Smart water quality management (New York)
  - Smart design building (New York)



- Brazil**
- Sapiens park
  - Central 1746 (Rio de Janeiro's)

- Spain**
- Digital city (Barcelona)
  - Smart parking (Barcelona)
  - Smart streetlight

- UK**
- Urban (London)
  - Tapestries project (London)
  - Glasgow project (London)

- Denmark**
- Crossroads (Copenhagen)

- Finland**
- Virtual village (Helsinki)

- Arab Emirates**
- Dubai internet city (Dic) (Dubai)
  - The palm (Dubai)

- Malaysia**
- MSC (Kuala Lumpur)

- Germany**
- Media park (Köln)

- India**
- Transportation service G-Auto (Rajkot)

- Austria**
- Waste management (Vienna)



The MA48 Waste App

- South Korea**
- U-City
  - Smart transportation

- Japan**
- On-demand Smart transportation system
  - Green innovation

- Hong Kong**
- Cyber port (HK)

- Singapore**
- One-north (Singapore)

Sources : KEPCO Economy & management research institute [2016.03.21]

# Global Smart Cities' cases

## Global Smart City cases



**HELSINKI VIRTUAL VILLAGE** Finland

- Virtual village (Helsinki)



### Energy, Culture of sightseeing

**Crossroads (Copenhagen)** Denmark

- Waste management (Vienna)

**UK**

- Urban (London)
- Tapestries project (London)
- Glasgow project (London)

**Germany**

- Media park (Köln)

- On-demand Smart transportation system
- Green innovation

**USA**

- Mission bay (California)
- Smart Grid (California)
- Smart streetlight (California)
- Lower manhattan (New York)
- Smart water quality management (New York)
- Smart design building (New York)

**Spain**

- Digital city (Barcelona)
- Smart parking (Barcelona)
- Smart streetlight

### Energy, Transportation

- Transportation service G-Auto (Rajkot)

**Japan**

**South Korea**

- U-City
- Smart transportation

**Arab Emirates**

- Dubai internet city (Dic) (Dubai)
- The palm (Dubai)

### Green energy, The city of Art



**Brazil**

- Sapiens park
- Central 1746 (Rio de Janeiro's)

**Malaysia**

- MSC (Kuala Lumpur)

### Business

**Hong Kong**

- Cyber port (HK)

**Singapore**

- One-north (Singapore)

Sources : KEPCO Economy & management research institute [2016.03.21]

# Global smart cities' cases

## Spain | Barcelona | Smart parking

- Barcelona Parking Space Management

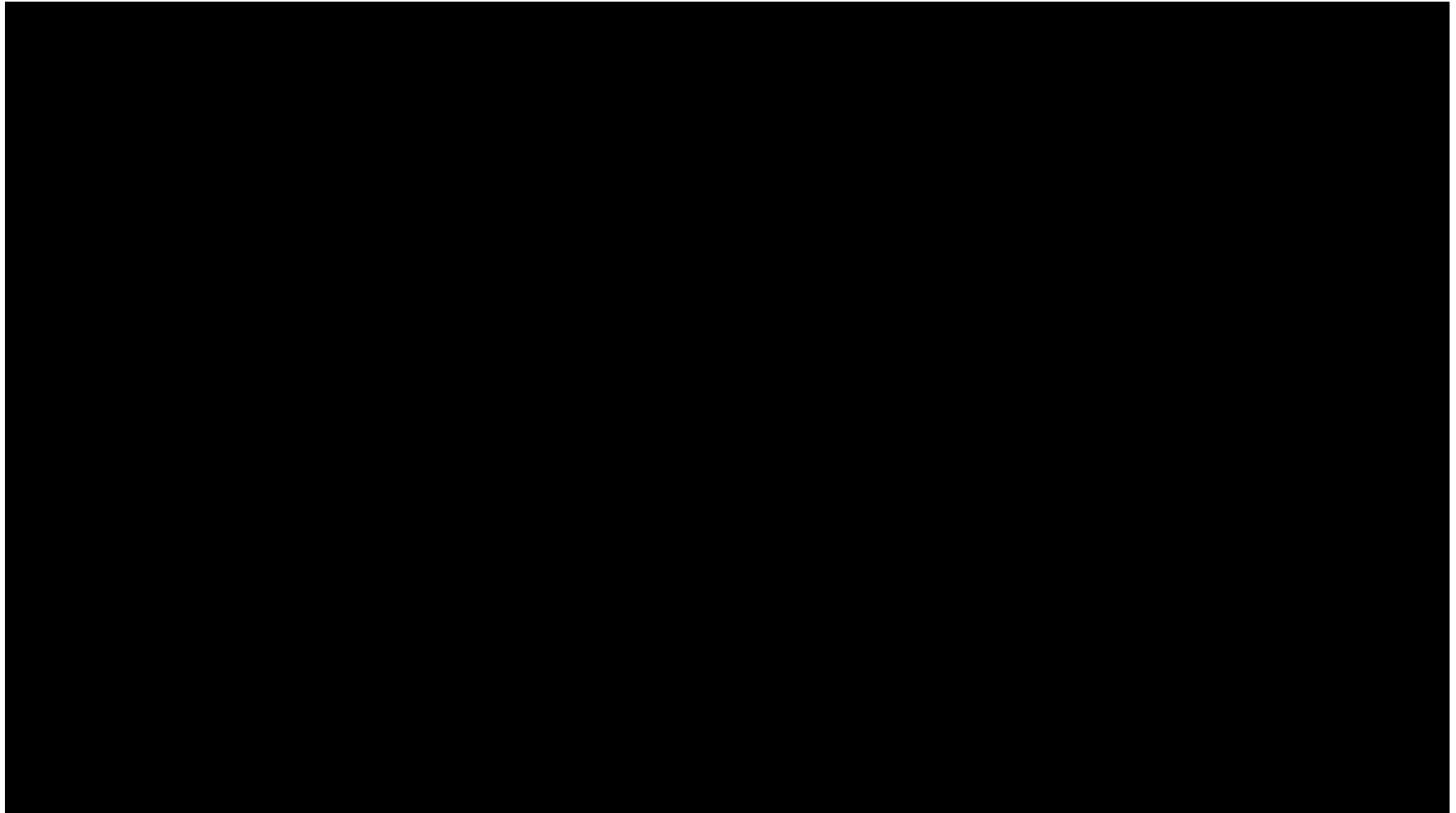
IMPLANTACIÓ DE LA REGULACIÓ INTEGRAL  
DE L'ESTACIONAMENT A BARCELONA (2005)





# Global smart cities' cases

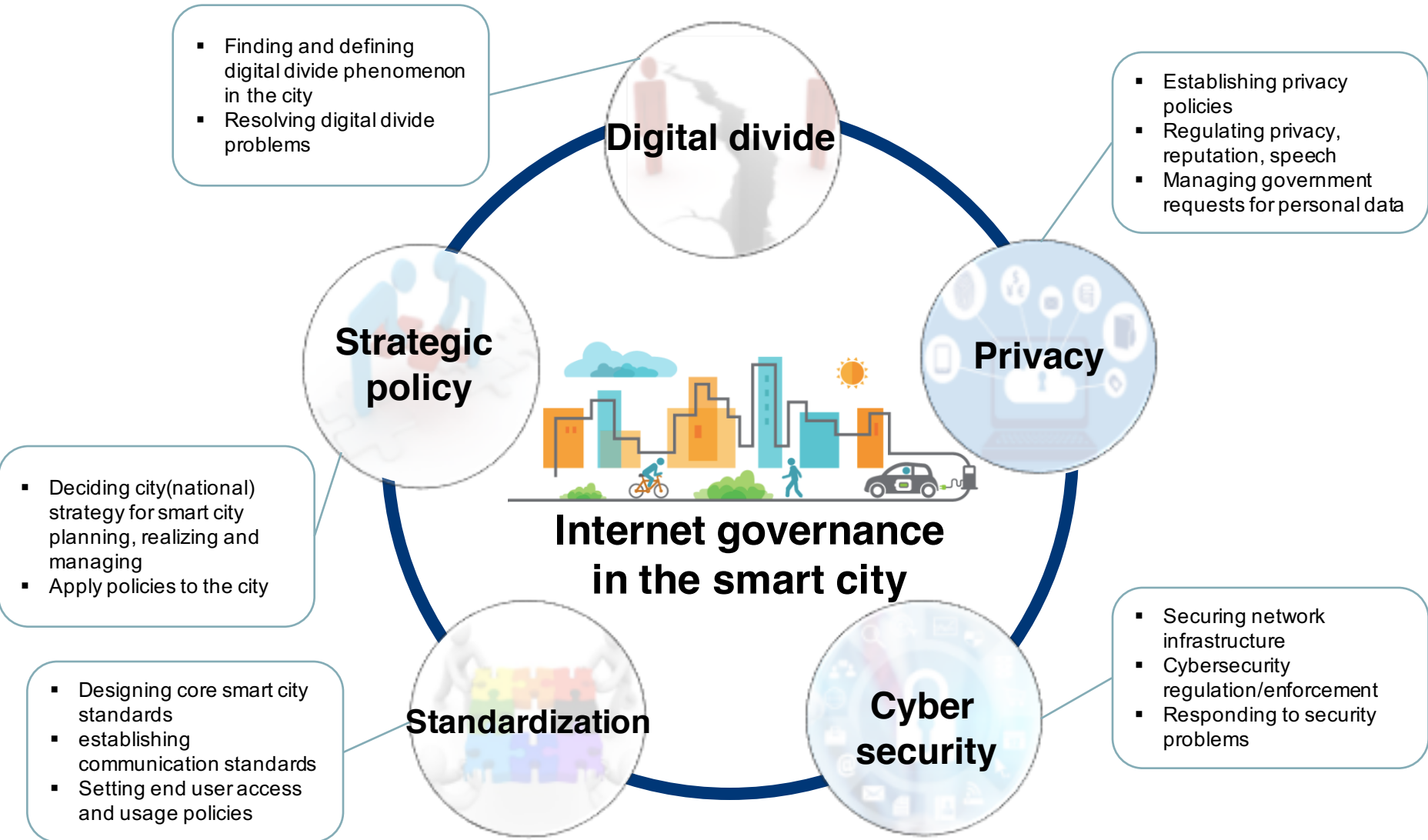
## UK | Glasgow project



# Session 3

**Debates**

# Discussion Topics



# Discussion Topics - 1

## Raising Issues |

### Digital divide cases | Bridging a Digital Divide That Schoolchildren Behind *Bridging a Digital Divide That Leaves Schoolchildren Behind*



- It worries me because it will become more important to have Internet when they have to do more homework.
- With many educators pushing for students to use resources on the Internet with class work, the federal government is now grappling with a stark disparity in access to technology, between students who have high-speed Internet at home
- An estimated five million families who are without it and who are struggling to keep up

Sources : Korea times [http://www.koreatimes.co.kr/www/news/tech/2016/07/133\\_208952.html](http://www.koreatimes.co.kr/www/news/tech/2016/07/133_208952.html) (2016-07-08)

# Discussion Topics - 1

## Discussion Questions |

### Digital divide

- **Does the increase of the end user smart services (e.g. mobile apps, digitalized services) caused the variation of the digital divide?**
- **How to reduce gap between rich and poor region through Internet based technologies and services?**
- **Does the ‘free public Wi-Fi hotspot’ policy valuable? Looking from internet accessibility or commercial perspectives?**

# Discussion Topics - 1

## Possible Alternatives |

### Digital divide

- The key elements in developing e-governance as a defining factor in bridging the digital divide
  - **International, national and regional cooperation.**
  - Harmonization of the legal framework and regulation.
  - Ensuring a minimal package of interconnected and interoperable e-services.
  - Promoting ICT skills and digital literacy in a non-discriminative manner.
  - **Educating and preparing the population of less-developed regions for the Information Society and encouraging e-readiness.**
  - Running pilot e-services in less-developed regions together with the proper technical assistance.
  - Usage of mobile communication as infrastructure for the dissemination of e-services.
  - Increasing the transparency in decision making and budget spending by implementing e-services.
  - **Involving the citizens in all aspects of local and national public administration processes.**

Sources : UN Chronicle Vol. XLVIII No. 3 2011

# Discussion Topics - 2

## Raising Issues |

### Cyber security case 1/2 | Vulnerability of traffic control system

- In 2009, Texas traffic signs were hacked. Instead of informing real time traffic conditions on the traffic sign, a hacking message, 'ZOMBIES AHEAD', appeared.
- In New York where same traffic control system as Texas was set up, traffic system was hacked once again. This changes an uncrowded road to a busy road which leads to a serious traffic congestion in a rush hour



Sources : Hankyung economy (2016-05-18) <http://www.hankyung.com/news/app/newsview.php?aid=2016051818461>  
[http://www.zdnet.co.kr/news/news\\_view.asp?article\\_id=20160425105705](http://www.zdnet.co.kr/news/news_view.asp?article_id=20160425105705)

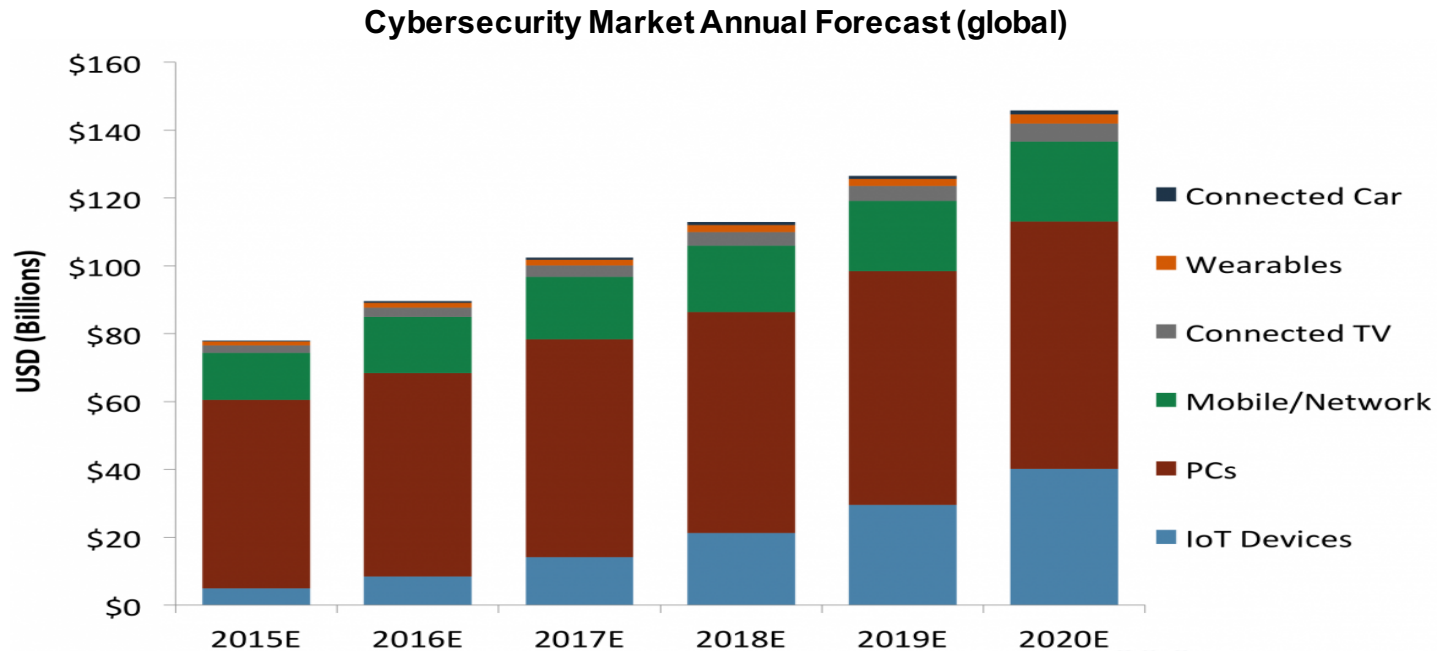


# Discussion Topics - 2

## Raising Issues |

### Cyber security case 2/2 | Vulnerability of traffic control system

- According to a KISA report, worldwide IoT industry will grow into 140 billion dollars but on the other side of it, financial damage by IoT hacking will reach to 1 billion dollars by 2020



Sources : BI Intelligence, 2015

# Discussion Topics - 2

## Discussion Questions |

### Cyber security

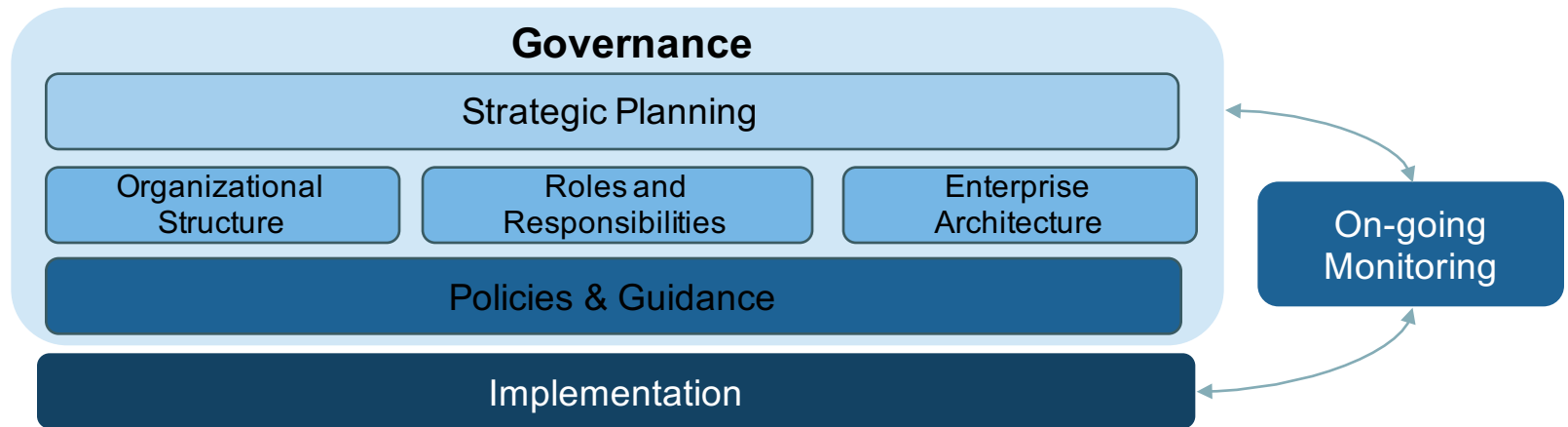
- **How to reduce or avoid damages of the hyper-connected city infra system hack? Is cloud design only way to solve?**
- **How to cultivate individual's cyber security awareness?**

# Discussion Topics - 2

## Possible Alternatives |

### Cyber security

Components of information security governance (U.S)



- The governance process should have life cycle that is renewed every fiscal year
- Security governance can be maintained when consistent renewal is guaranteed

# Discussion Topics - 3

## Raising Issues |

### Strategic policy cases 1/2 | Amsterdam, Netherland

- **Bottom up approach examples: Amsterdam smart city**
  - The Amsterdam Smart City team is composed of municipalities, key partners and residents
  - Every two weeks, key stakeholders and partners come together to discuss the latest concepts, questions and calls for Innovation
  - Since 2009, Amsterdam Smart City has grown into a platform comprising of over 100 partners, who are actively involved in more than 97 innovative projects



[Amsterdam smart city operation process]

Source: <https://amsterdamsmartcity.com/>

# Discussion Topics - 3

## Raising Issues |

### Strategic policy cases 2/2 | China

- **Top down approach examples: Chinese smart cities**
  - The central government has initiated the smart city project as a key national policy
  - At present, there is a little connection between the groups, which apparently exist to improve communications between industry participants and between industry and government and, in the case of at least the MIIT (Ministry of Industry and Information Technology) group, to coordinate investment.



Source: <http://www.chinabusinessreview.com/smart-city-development-in-china>

# Discussion Topics - 3

## Discussion Questions |

### Strategic policy

- Which is more proper policy for the developing countries' smart cities? Most developed countries' smart cities has tendency to choose 'on demand economy'. But is it also effective way for developing countries' smart cities?
- Multistakeholderism or multilateralism?
- Bottom up model or top down model?

# Discussion Topics - 3

## Possible Alternatives |

### Strategic policy

	Multistakeholder model	Multilateral model
Definition	<ul style="list-style-type: none"> <li>- Governance structure where all relevant parties involved is determined by discussing common goals and urban problems</li> <li>- It usually includes government, companies, civil society, professional groups and non-governmental organizations, etc.</li> <li>- More like <b>bottom-up</b> model</li> </ul>	<ul style="list-style-type: none"> <li>- The governance structure led by national governments' makes a core decision</li> <li>- Normally the government is proceeding the decision-making process as a representative. In this process, companies, civil society, professional groups, and non-governmental organizations can participate</li> <li>- More like <b>top-down</b> model</li> </ul>
Pros	<ul style="list-style-type: none"> <li>- Democratic decision-making is possible by listening opinions of all stakeholders</li> <li>- Consistent with spirit of open and share</li> </ul>	<ul style="list-style-type: none"> <li>- If the government has a firm goal, the fastest and most powerful decision-making can be possible</li> </ul>
Cons	<ul style="list-style-type: none"> <li>- If the gap between the opinions of stakeholders is large, excessive delay or non-conforming comments can be made</li> </ul>	<ul style="list-style-type: none"> <li>- Some stakeholders' opinion can be ignored</li> <li>- It can deduce a different result unlike market trend or needs</li> <li>- The political judgments can be made despite of the technical superiority</li> </ul>

Reference: Daeho Kim (2015). Internet Governance from the Perspective of Global Information Society. Korea society for internet information, 16(4), 111-120.



# Discussion Topics - 4

## Raising Issues |

### Privacy cases 1/2 | Traffic Card System

- When using South Korean traffic card (includes mobile NFC), every your steps are stored in online
- Stored information
  - Time
  - Specific type and number of transportation
  - Starting point(stn. or stop) and end point
  - Amount of money
  - Transfer history



# Discussion Topics - 4

## Raising Issues |

### Privacy cases 2/2 | Cloud Storage

- If you choose to use cloud storage service (Google Drive, iCloud, OneDrive, etc), the company can review your own contents.

#### [Google Terms of Service – Privacy & Terms]

Our Services display some content that is not Google's. This content is the sole responsibility of the entity that makes it available. **We may review content to determine whether it is illegal or violates our policies, and we may remove or refuse to display content that we reasonably believe violates our policies or the law.** But that does not necessarily mean that we review content, so please do not assume that we do.



iCloud



OneDrive

Source: <https://www.google.com/intl/en-GB/policies/terms/>

# Discussion Topics - 4

## Discussion Questions |

### Privacy

- How much can I give personal information for the convenient and safety?
- How to connected city services (includes open-data services) satisfy three different goals: public security, convenient and personal privacy?

# Discussion Topics - 4

## Pros & Cons |

### Privacy

- If more personal privacy data are recorded and shared due to the generalization of smart services, expected pros & cons.

	Pros	Cons
Public Security	Easy to prevent or investigate crime	The more connectivity allows to enhance public security, the more privacy is vulnerable to cyber attack
Convenient	Can make more services based on rich information	Possibility of increase the complexity of the service develop process
Personal Privacy	Easy to review own history	Easy to infringe by the others

# Discussion Topics - 5

## Raising Issues I

### Standardization, interconnectivity, interoperability 1/2

- Interconnection and interoperability\* ensure telecommunication systems and equipment in different countries that can connect and work with each other
- Standards-based solutions make it easy for the city to involve new partners and add services not necessarily envisioned at the beginning of the proof of concept

*“The world of IoT is currently characterized by competing technologies and platforms, further complicated by numerous standards development organizations, and this fragmentation is causing a delay in the widespread adoption of IoT,”*

*- Jim Nolan, Executive Vice President, IoT Solutions, at Inter Digital*

\* Interoperability is the capability of multiple networks, systems, devices, applications, or components to exchange and use information securely and effectively

# Discussion Topics - 5

## Raising Issues I

### Standardization, interconnectivity, interoperability 2/2

- Using non-standardized IoT solutions, the cost to implement smart city deployments could reach \$1.12 trillion by 2025;
- Adopting standardized solutions on the other hand would equate to a cost of \$781 billion – **a saving of \$341 billion worldwide by 2025** – 30% of the non-standardized total;
- Cost savings would result from interoperability, freedom from vendor lock-in, and reduced systems integration costs that IoT standardization provides



Sources : Machina Research analysis

# Discussion Topics - 5

## Discussion Questions I

### **Standardization, interconnectivity, interoperability 1/2**

- How to solve interconnectivity / interoperability issues between each M2M devices?
- Is it all right to the disparity of the smart city (virtual)platforms?



# Discussion Topics - 5

## Pros & Cons |

### Standardization, interconnectivity, interoperability

	pros	cons
<b>Global</b>	<ul style="list-style-type: none"><li>• Has the potential to save a lot of money and time in systems development</li><li>• Facilitates easy, cheap integration</li><li>• Facilitates structured management of network over time</li></ul>	<ul style="list-style-type: none"><li>• Viability depends on the business model of all relevant vendors</li><li>• Fairly unlikely to fit either actually available data or integration needs very well</li></ul>
<b>Local</b>	<ul style="list-style-type: none"><li>• Can be tuned for locally available data and to meet local needs</li><li>• Facilitates structured management of network over time</li><li>• Speeds up changes in the network (relative to ad hoc, local)</li></ul>	<ul style="list-style-type: none"><li>• Requires major and continuous governance effort</li><li>• Requires upfront investment</li><li>• Integration of a new system still takes time and effort</li></ul>

Sources: Interoperability: definitions, expectations, and implications

# Thank you

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