K-Smart City Promotion Direction
- Focusing on LH Cases -

2016. 8

Korea Lang & Housing Corporation
Urban Planning Office
General Director Eungmoon. Han
Prologue

- Cars spend 96% of the time in parking lots
- 30% of urban congestion is due to the lack of parking space
- California Blackout in 2003
- Fine dust rank 173 out of 180 countries

Studies show that roughly 30% of all traffic congestion in urban areas is caused by drivers circling and struggling to find a parking spot.
Phenomenon of Cities

1. Ancient / Medieval Cities
2. Modern Cities
3. Contemporary Cities
4. Modern Technologies
City for Self-sufficiency, Trade and Governance

- Home/workplace undivided, pedestrianism → Urban structure was compact rather than flat
- Urban scale was small enough to control and manage with technologies/regulations of the time → No occurrence of urban problems like in modern societies
Modern Cities(1)

- Rapid increase of urban population due to industrialization → Occurrence of urban problems
  - Industrialization started in Europe and the developed world → Urbanization accelerated
  - Health / sanitation issues raised seriously
  - Problems recognized as threats to citizens’ health such as air/water pollution recognized
  - Birth of urban planning techniques that have been embedded in contemporary cities such as legal system of urban planning / utopian spatial structure

Fumes from factories in industrialized areas

Poor working conditions
Average lifespan: 26 (England in 18C)

Birth of urban planning (E. Howard, 1902)
Efforts to solve urban problems with modernized machineries/technologies → Occurrence of new problems

- Settlements migrated to the outskirts of cities by developed transportation
  → Problems such as traffic congestion / natural resources destruction / community collapse / energy issues


Reference) Seoul City, 1949~1997

Modern Cities (2)
Increased urbanization in emerging nations in the wake of the western urbanization

- **(Developed nations)** Urban sprawl → deterioration of facilities / increased cost of urban management
  Low growth / aging society → urban investment capacity decreased

- **(Emerging nations)** Increased demand for cities → If previous examples of the western urbanization models are applied, the results will be world-wide catastrophes.

  ※ In 40 years, the number of cities of 200,000 and more inhabitants is to be over 13,000 in the world. (UN)

- Current consumption needs 1.5 times resources of the Earth
  / 3 times resources of the Earth in 2050 if the current level continues

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Smart City emerged as the solution to current global issues
Modern Technologies

Quickening factors of Smart City

- Solve urban problems (Traffic/environment/disaster/crime prevention etc)
- Solve energy shortage problem / increase energy efficiency
- Global warming / decrease carbon emission liability
- Recognition of limits (low growth/birthrate) / maximize SOC investment efficiency
- Desire to improve the quality of life (aging/health/leisure/culture etc)

Driving factors of Smart City

Global urbanization
- Rapid urbanization in emerging nations
- Avoid previous urban development patterns
- Cities of 200,000 and more inhabitants to be over 13,000 in 40 years

Technologies (ICT/IoT etc)
- Informatization ⇒ intellectualization (AI)
- Sharing economy / prosumer / platform / big data
- Development of sensing/communication technologies

Properties of capital
- Search for new growth engine and investment
- Involvement of multinational enterprises such as Google/IBM

Smart City driven by Rapid urbanization / ICT advancement / capital properties
ICT converged technologies, unlike previous industries, are expected to contribute to **improved quality of life**

- (1) efficient use of scarce resources (sharing economy)

- **Shared accommodation**
- **Google car sharing**
- **UBER**
- **Smart Grid / Smart Water Grid**
- **Smart Tolling**
- **MOOC** (knowledge sharing)
• (2) Create new industries by converging with other industries (transportation / crime prevention/ medicine/ energy etc.)

- Drone delivery
- ICT + Health care
- Smart Farm
- 3D printing + architecture
- VR + shopping (service industry)
- Energy prosumer
• (3) Optimize the utilization of time and minimize human control/operation (autonomous navigation / AI / IoT technologies)
Current Status of Smart City

1. Smart Cities in Korea
2. Smart Cities in the world
Korea Land & Housing Corporation (LH) has promoted U-City as a Korean unique brand since 2003.

It has been applied to 41 cities including new towns such as Pangyo and Paju.

<table>
<thead>
<tr>
<th>Project type</th>
<th>Number</th>
<th>Construction Cost (Billion KRW)</th>
<th>Ongoing</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td></td>
<td>Number</td>
<td>Cost</td>
</tr>
<tr>
<td>New town</td>
<td>11</td>
<td>3,494</td>
<td>5</td>
<td>428</td>
</tr>
<tr>
<td>Land development</td>
<td>9</td>
<td>633</td>
<td>2</td>
<td>137</td>
</tr>
<tr>
<td>Innovation City</td>
<td>8</td>
<td>511</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Public housing</td>
<td>7</td>
<td>353</td>
<td>5</td>
<td>282</td>
</tr>
<tr>
<td>FEZ</td>
<td>3</td>
<td>601</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administrative City</td>
<td>1</td>
<td>301</td>
<td>1</td>
<td>301</td>
</tr>
<tr>
<td>Industrial park</td>
<td>1</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Urban development</td>
<td>1</td>
<td>45</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>5,952</td>
<td>15</td>
<td>1,194</td>
</tr>
</tbody>
</table>

※ Average cost of each site: 18 billion KRW (Completed projects)
1. Focusing on traffic/safety and public service
   → Lacking reflection of the citizens’ needs
   → Degraded experience

2. Built-up areas are excluded on policy agenda/target
   → Incomplete management system of the entire national land

3. Lack of interconnection between information systems (police/firefighting/municipalities)
   → Lack of interconnection with societal/environmental system

4. Outdated in the mobile environment as it started in early 2000s
   → Services of the technology application level developed in priority

Smart Cities in Korea

65% transportation
15% safety
13% etc
6% management
Many countries are actively applying smart city projects as a solution to various urban problems:

- **(Developed nations)** Redevelopment of old cities in order to improve energy infrastructure/efficiency of urban management

- **(Emerging nations)** New town development with an aim to expand urban infrastructure

- Accelerated investment of global IT enterprises including IBM / CISCO

<table>
<thead>
<tr>
<th>IBM Solutions</th>
<th>CISCO Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Water</td>
<td>Smart Transportaion</td>
</tr>
<tr>
<td>Smart Public Safety</td>
<td>Smart Safety/security</td>
</tr>
<tr>
<td>Smart Traffic</td>
<td>Smart Learning</td>
</tr>
<tr>
<td>Smarter Building</td>
<td>Smart Real Estate</td>
</tr>
<tr>
<td>Smart Energy</td>
<td>Smart utilities/Gov</td>
</tr>
</tbody>
</table>

**Overseas nations**

- **Smart Living, Mobility etc**
- **Smart Lighting, Open Gov**
- **Velib, Electric vehicle Sharing**
- **Health care, Infra, Smart Grid**
- **CCD, Urban control platform**
- **Electric public transportation, Solar power system etc**
- **ICT smart town**
- **Smart city development**
- **IT infra cluster**
2 Smart Cities in the world

Europe
- Apply smart city solutions for old town regeneration
- Aim to develop environmentally sustainable city (carbon emission reduction)

USA
- Improve deteriorated power grid and develop smart grid/healthcare
- Boost economy through smart infrastructure development

Japan
- Energy security / renewable energy issues due to the nuclear accident caused by Great East Japan Earthquake
- Safe city overcoming natural disasters (earthquake/tsunami)
- Smart city as an export industry

China
- Solve urban problems such as energy shortage / air pollution / security due to accelerated urbanization
- Domestic economy growth through smart city development

India
- Respond to the pollution, electricity, traffic congestion, lack of infrastructure (water supply and sewage) caused by urbanization
- Boost economy by solve urban problems and expanding infrastructure
Smart city market is to expand to the scale of 1.1 trillion USD worldwide by 2019. (Marketsandmarkets, 2015)

<table>
<thead>
<tr>
<th>Source</th>
<th>Scale of the market / number of projects</th>
<th>Investment prospects of major countries (~2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frost &amp; Sullivan</td>
<td>Projected to be 3.3 trillion USD by 2025</td>
<td></td>
</tr>
<tr>
<td>GSMA’s</td>
<td>257 model/commercialized projects (2012)</td>
<td></td>
</tr>
<tr>
<td>International Data Corporation</td>
<td>Smart city in China: 10.8 billion USD (2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Growth rate over 10% next five years</td>
<td></td>
</tr>
<tr>
<td>HIS Technology (2014)</td>
<td>Increase more than 4 times from 2013 to 2025</td>
<td></td>
</tr>
<tr>
<td>Navigant Research (2014)</td>
<td>Accumulated investment in smart city technologies is projected to be 174 billion USD (2014~2023)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asia pacific is the biggest market of technology</td>
<td></td>
</tr>
</tbody>
</table>

(Reference) EU Commission recitation source (Software policy research institute, 2014)
K-Smart City Promotion Strategy

III

1. Background and Progress
2. Goals and Components
3. Model Site Development
4. Foster Industrial Ecosystem
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008. 3</td>
<td>Legislation of ‘Act on the Construction of Ubiquitous Cities’</td>
</tr>
<tr>
<td>2009. 10</td>
<td>Establishment of the 1st Ubiquitous Masterplan</td>
</tr>
<tr>
<td>~2015</td>
<td>Application of U-city services in new towns (41 LH projects)</td>
</tr>
<tr>
<td>2016. 7</td>
<td>The 10th Meeting Promoting Trade and Investment</td>
</tr>
<tr>
<td></td>
<td>“Promotion strategy for smart city export”</td>
</tr>
<tr>
<td>2016. 8</td>
<td>The 2nd Meeting Promoting National Science &amp; Technology</td>
</tr>
<tr>
<td></td>
<td>“Promotion of Smart City R&amp;D Projects”</td>
</tr>
<tr>
<td></td>
<td>By the end of 2016</td>
</tr>
<tr>
<td></td>
<td>Current U-city laws ⇒ (law reform) expanding to smart city</td>
</tr>
<tr>
<td></td>
<td>※ Old town expansion / compulsory smart city planning / integrated monitoring and operation center / overseas export support</td>
</tr>
</tbody>
</table>
Goals and Components

"K-Smart City" promotion strategy (Meeting Promoting Trade and Investment, 2016. 7)

Urban development system + competitive element technology / regulations

Integrated Urban development
- Plan-Design-Construct-Operate-Manage
- Korean City export team (Gov't-Public entities-Enterprises-Finance)
- Localized urban infra development

Competitive element technology
- Energy
- Transportation
- Water industry
- ICT

Law / regulation / culture
- Policies on land development / housing provision
- Public companies (LH)
- Community development (New Village Movement)
- K-Culture / style

Apply diverse smart city models according to local characteristics / development types
- Smart new town model / New energy industry / Eco-friendly water industry / Smart transportation / ICT solution

5 Models of K-Smart City

Smart new town
New energy industry
Eco-friendly water industry
Smart transportation
ICT solution
2

Goals and Components

Model Sites

Specialized model sites in new town / expansion of old towns
- In consideration with export possibility / promotion effect / publicness / expansion possibility to private markets

- Administrative City: Smart City Full package providing urban total solution
- Dongtan 2: Smart Energy Energy-saving model with micro-grid, solar power etc
- Pangyo Alpha Dome: Smart Entertainment Augmented Reality(AR), public Wifi, culture/shopping
- Pyeongtaek Godeok: Smart Safety intensifying safety with smart streetlights, speed-detection

Interactive Promotion

“K-Smart City Tour Program” package of the sites with smart technologies
“K-Smart City Hub (Promotion center)” to introduce smart technologies

- Tour program:
  - 25 zone/site/building/center (courses of various theme/period)
  - Tour guidebook (Korean/English)

- Promotion center:
  - to be built in Dongtan 2 new town
  - Introduce integrated smart technologies Including ICT / water management / energy

Smart City Industrial Ecosystem

“Incubating Zone” in Dongtan 2 Techno Valley
Provide ICT-related startups / venture companies with space for business establishing/trade/sales/residence/culture
3 Model Site Development (Overview)

Specialized sites planned in Administrative City, Dongtan 2, Pangyo Alpha Dome, Pyeongtaek Godeok

Theme / Purpose of City(Site)

Pangyo Alpha Dome
- Integrated urban center (Alpha Dome) near Pangyo Station
- Smart city solution of leisure/shopping/culture to improve citizens’ quality of life

Dongtan 2
- Renewable energy reduces housing expenses
- Incubating Zone for startups - convergence model of city and ICT

Admin. City
- The widest application of smart city solution(15) in Korea
- Efficient urban management

Pyeongtaek Godeok
- Smart city solution for transportation safety and crime prevention
- Smart safe city with Spatial plan converged with ICT

Selection of Smart City Solution

Commercial / Culture
- VR/AR
- Public Wi-fi
- Smart parking
- Smart streetlights

Energy / Job creation
- Micro-grid
- Zero-energy building
- Solar energy (new transportation)
- Smart R&D parks

Total package
- Public bicycle, BRT oriented traffic lights, parking info system
- 3D underground utilities info
- Smart city experience zone

Safety
- Speed detection (DFS)
- Smart streetlights
- Smart crosswalks
- Smart CCTV

Competitive exhibition of Smart City

Specialized Model Sites

Smart Entertainment
Leisure
Culture
Shopping
Smart Energy
Energy
Job creation (ICT/IoT)
Smart City Full package
Transportation / crime prevention
SG/SWG
Security / Management
Smart Safety
Transportation safety
Crime prevention
Model Site Development (1)

Administrative city

- 15 smart city solutions applied (transportation 7, crime prevention 2, disaster prevention 3 etc.)
- Smart city experience zone for citizens (experience test-bed project)
- TFT composed of National Agency for Admin. City Construction, Sejong City, LH
- Model projects for smart grid, smart water grid, zero-energy town
Model Site Development (2)

Dongtan 2

**Major features**

- **Smart solution**: transportation 5, crime prevention (CCTV), energy, safety, smart home
- Promote usage of renewable energy in energy self-sufficient town
- Foster industrial ecosystem by planning Incubating Zone for startups
- Smart home solution applied in public housing (MOU signed between LH and SKT)

**Energy Self-sufficient Town**

**Smart Underground Roadway**

- Water spray installation in the entire area
- Concentrated exhaust system
- Automatic fire detection system
- CCTV + accident detection system
- VMS facilities
- LCS facilities
Pangyo Alpha Dome

**Major features**

- **Smart Entertainment** of the mixed-use area in the center of Pangyo new town
- **Augmented Reality (AR), smart parking, smart streetlights**
- Space for startups to demonstrate their new technologies

### AR / VR in urban spaces

1. Smart Signage media service
2. AR service
3. Experience zone (AR/VR)
4. New technology demonstration

### Components of smart parking

- Parking info sign
- Model Site Development (3)
- Smart Phone App Download - Map & MF
- 주차장 계수현황(3단) 주차장 계수현황(1단)
Pyeongtaek Godeok

**Major features**

- **Smart Safety solution with the theme of safe city**
- 18 services applied (smart CCTV, smart streetlights, intersection notification etc.)

<table>
<thead>
<tr>
<th>Service (18 in total)</th>
<th>Pyeongtaek Godeok</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transportation</strong></td>
<td>Traffic control, incident detection, illegal parking control, vehicle tracking, smart streetlights, school zone service, intersection notification, smart crosswalk</td>
</tr>
<tr>
<td><strong>Crime</strong></td>
<td>smart streetlights, household crime/disaster prevention, AR, protection of the socially weak</td>
</tr>
<tr>
<td><strong>Disaster</strong></td>
<td>Air pollution management, fire detection, fire fighting, riverside flooding management, integrated management service</td>
</tr>
</tbody>
</table>

- **Driver reaction speed detection device**
- **Smart streetlights**
- **Nighttime intersection notification service**
Foster Industrial Ecosystem

(House/workplace combination model)
- Solve unemployment/housing problems of the young generation due to low birthrate, aging society, low growth
- High price of new town housing/ self-sufficient land

Platform Chang-dong 61
Understand Avenue (Seoul Forest)
Common ground (Konkuk Univ)

- Youth business startup support center
  - built by LH → provided to startups in knowledge industry such as ICT → with mixed-use space for culture/leisure/residential → One-stop space model that tests new solutions developed by startups and help them become mainstreamed
Long-term Projects

1. LH Smart City Projects
2. LH Smart City Goals
LH Smart City Long-term Projects

**Long-term Projects**

**ICT plan/design/manager**
- Develop / utilize spatial geographic info
- Big data analysis (evidence-based plan)
- Application of BIM design

**Smart City Industrial Ecosystem**
- Foster startups / commercialize technologies
- Convergence model of ICT and city/housing

**City of low cost and high efficiency**
- Urban problem solving/management using big data
- Minimize transport/residential expenses
- Improve efficiency of urban management applying ICT

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**Usage of drones for management / investigation**

**Convergence of ICT industry and City/housing**

**Integrated facilities**
- Industrial
- Commercial
- Residential
- Logistics

**Smart City Industrial Ecosystem**

**Sales/architecture/needs analysis using analysis big data**

**Urban management**
- Using 3D geographic info

**Reduced housing expenses utilizing renewable energy**

**Optimized infrastructure investment by big data analysis**
LH Smart City Long-term Goals

Promotion Goals

Improved sustainability of Korean cities by building competitive urban environment

Short-term projects

- Promotion of model project
- Strategic promotion/contents development
- Establish overseas export model

Long-term projects (Model of future city)

- Plan/design/manage with ICT
- Foster Smart City Ecosystem
- Build cities of low cost and high efficiency
Thank you..