

# **Definitions of Smart Cities**



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- Innovation-driven smart cities
- Sharing cities by EU, Amsterdam smart city, National Pilot Smart City in Korea
- Sidewalk in Toronto by Google, Woven city by Toyota, Neom city in Saudi
- The most common definition
- Definitions by ITU, World Bank, Korea, and many others
- The earliest understanding of smart cities
- Masdar city, walkable city, eco-friendly city











## **Digital Transformations by Smart Cities**

① HW-driven development

② Vertical development (Silos by domains)  $\Rightarrow$ 

③ Closed & Controlled system

(4) Economy of scale  $\Rightarrow$  urbanization





⇒ Open & Flexible innovation ecosystem

 $\Rightarrow$  Scale-free  $\Rightarrow$  (counter-urbanization)



4

# **Development of Korea's Smart cities**

Period	Characteristics	Project and Policy	Approaches	Key facts
Stage 1: 2003~2007	<ul> <li>u-City</li> <li>ICT-driven</li> <li>Sensor-based</li> <li>service</li> </ul>	- Songdo & Busan u-City (2003) - Seoul's TOPIS and public transportation smart card (2004) - u-City Forum (2005)	- Bottom-up - municipalities and developer led	<ul> <li>success cases in urban</li> <li>services innovations</li> <li>city as a product led to loss of</li> <li>momentum</li> </ul>
Stage 2: 2008~2010	- Smart city winter 1 - Policy Framework	- Hwaseong-Dongtan u-City (2008) - Special Act on Smart City (2008) - the first national smart city plan(2009)	- Top-down - national government led institutionalization	<ul> <li>national policy framework</li> <li>absence of smart city in</li> <li>urban development</li> <li>smart city plans, but lack of</li> <li>action</li> </ul>
Stage 3: 2011~2016	<ul> <li>Smart city winter 2</li> <li>Data-driven</li> <li>Data-based services</li> </ul>	- Smart Seoul 2015 (2011) - open data and big data for urban innovations (2012~ )	- Middle-up-down - municipalities led innovations - national gov develops institutions	<ul> <li>urban innovations not under the name of smart city</li> <li>disruptive innovations began to be attempted</li> </ul>
Stage 4: 2017~	- New Strategy - Platform-driven	<ul> <li>Special Committee on Smart</li> <li>Cities (2017)</li> <li>new smart city strategy (2018)</li> <li>national pilot smart city (2018)</li> </ul>	- Top-down - national gov redesign smart city strategy	<ul> <li>smart cities for the 4th</li> <li>Industrial Revolution</li> <li>new smart city concept and</li> <li>pilot project</li> </ul>







Number of Greenfield u-City in Korea





# What's wrong with u-City?

# City as a Product

- Separation of build and operation
- Lack of continuous innovations
- Reliance on developer for investment

# Fragmented Approach

- Focus on service without common platform
- Missing the power of architecture and platform





Hwasung-Dongtan, the first greenfield u-city in 2008





# Restart Smart City for the Fourth Industrial Revolution in 2017



# New Smart City Strategy of Korea in 2018

- **1.** Technology-driven  $\Rightarrow$  Human-oriented Smart city
- 2. Urban development  $\Rightarrow$  City as an engine for innovation-based growth
- 3. Investment in infrastructure  $\Rightarrow$  Value for citizen from service
- 4. One-size-fits-all  $\rightarrow$  Customized city
- 5. One-off development 
  Sustainable city as a platform
- 6. Supplier and public led  $\rightarrow$  Customer and private led open city
- 7. Fragmented policy and projects Converged and linked city





# **Decoupling Smart City from Urban Solutions**











The National Government programs since 2018







# Smart City Seoul





# Information on Crowdedness of Public Transportations







14





1

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### Big Data for Midnight Bus Route Planning in 2013, Seoul





# Integrated Platform for Monitoring and Control





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### 안산 U-City 통합관제센터

5 integrated services
112(police call center) video share
112 emergency dispatch support
119(fire call center) dispatch support
Disaster information support
Children & Dementias protection







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# Public Open Data



17





# **Busan National Pilot Smart City**

Deservation in the start and



### Busan EDC National Pilot Smart City

- Area : 2.8Km<sup>2</sup>
- Period : 2018~ (2021~)

Smart City

GSEO-GU

강서구

- Population : 8,500
- Houses : 3,380

Gadeokdo 가덕도

JIANGSU



ngj 家

E

Bac

保

ng

Lia

igq 五市





# Busan Pilot City aims to be the world first Augmented City A City supporting use of robotics, AR/VR, and other 4IR technologies

# Extended Self

Robot -> Physical Augmentation

AR/VR -> Cognitive Augmentation





# Where is the boundary between your phone and your mind?

As our online existences become less distinct from 'real life', experts raise concern about the growing power of big tech







# Augmented City brings smart city benefits to citizen

### **Cognitive Augmentation**



https://pxhere.com/ko/photo/1553941



### **Physical Augmentation**



https://i.insider.com/53e913246da8115b48273a39?width=1100&format=jpeg&auto=webp

21

# Key platforms for smart city

# Digital Platform

# Augmented Reality Platform

# Robot Platform



- (1) City Computing (Super Computer)
- <sup>(2)</sup> Intelligent Communication
- ③ City-wide Cyber Security
- <sup>(4)</sup> Data Hub

### 1 Dynamic Digital Twin

- <sup>(2)</sup> Precision Location
- ③ Data with Geo-context

(1) Robot Management at the City Level <sup>(2)</sup> City Design for Robot Use ③ Robot Risk Management



# **Strategy 1: Platform Interoperability**





From Data-sharing to Resources-sharing



### From Data-sharing to Resources-sharing





https://www.pexels.com/photo/ police-blue-sky-security-surveillance-96612/



https://live.staticflickr.com/ 3159/2625260355\_aa290f37d2\_b.jpg





https://p2.piqsels.com/preview/ 629/455/739/current-petrolstations-current-gas-station-eco.jpg



https://pbs.twimg.com/media/DqXb\_D6XcAAYBV9.png



## Strategy 2: New Data Architecture Protection vs Representation



## System-based → Platform-based Connectivity

(Standardization of Data)





## Rule-based → Algorithm-based Customization (Representation of Data)



# Strategy 3: New CPS (Cyber Physical Society) New Digital Twin & XR Services



### **Urban Infra**

Citizen

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### **Cyber Space**

### **ICT & Data**

**Public Service** 



# Strategy 4: Robot-friendly City





Urban Infrastructure Changes for the Use of Robots



## Smart Village (56 houses, Dec. 2021)







# Thank you



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