Smart Cities &
Artificial Intelligence
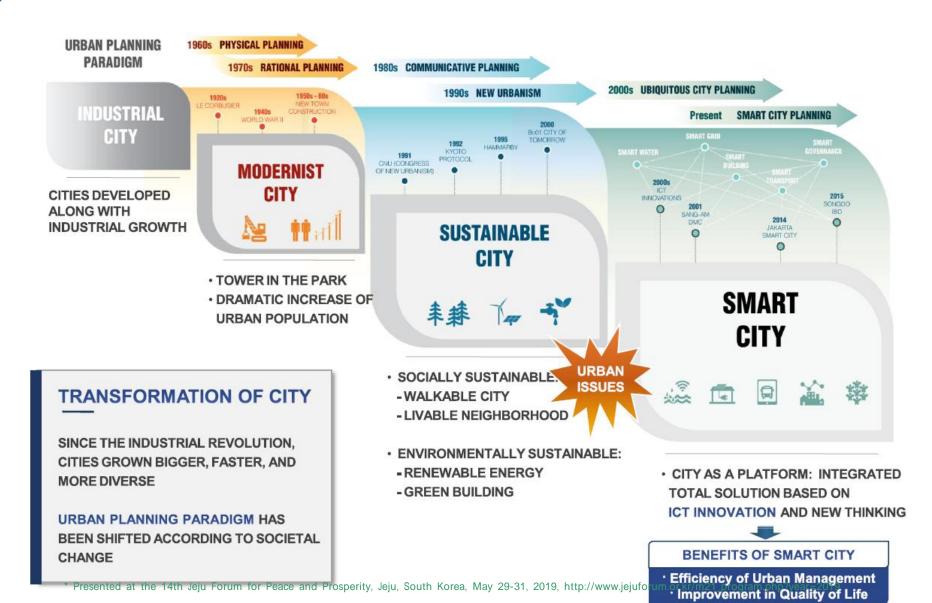
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Urban Development History

URBAN PLANNING PARADIGM

- 1960s PHYSICAL PLANNING
- 1970s RATIONAL PLANNING
- 1980s COMMUNICATIVE PLANNING
- 1990s NEW URBANISM
- 2000s UBIQUITOUS CITY PLANNING
- Present SMART CITY PLANNING

INDUSTRIAL CITY

CITIES DEVELOPED ALONG WITH INDUSTRIAL GROWTH

MODERNIST CITY

- 1920s LE CORBUSIER
- 1940s WORLD WAR II
- 1950s - 60s NEW TOWN CONSTRUCTION

- TOWER IN THE PARK
- DRAMATIC INCREASE OF URBAN POPULATION

SUSTAINABLE CITY

- 1991 CNU (CONGRESS OF NEW URBANISM)
- 1992 KYOTO PROTOCOL
- 1995 HAMMARBY
- 2000 Bo01 CITY OF TOMORROW

- SOCIALLY SUSTAINABLE:
  - WALKABLE CITY
  - LIVABLE NEIGHBORHOOD

- ENVIRONMENTALLY SUSTAINABLE:
  - RENEWABLE ENERGY
  - GREEN BUILDING

URBAN ISSUES

SMART CITY

SMART GRID, SMART WATER, SMART BUILDING, SMART TRANSPORT, SMART GOVERNANCE

- 2000s ICT INNOVATIONS
- 2001 SANG-AM DMC
- 2014 JAKARTA SMART CITY
- 2015 SONGDO IBD

- CITY AS A PLATFORM: INTEGRATED TOTAL SOLUTION BASED ON ICT INNOVATION AND NEW THINKING

BENEFITS OF SMART CITY
- Efficiency of Urban Management
- Improvement in Quality of Life

TRANSFORMATION OF CITY

SINCE THE INDUSTRIAL REVOLUTION, CITIES GROWN BIGGER, FASTER, AND MORE DIVERSE

URBAN PLANNING PARADIGM HAS BEEN SHIFTED ACCORDING TO SOCIETAL CHANGE

Purpose of Smart City

Solution / **Provider**

Data-driven Smart cities can

Solve various problems
I.e. traffic congestions, criminal protection

Sustainable / **Society**

To protect Environment, Energy, Minority

Pursuit the sustainable Society

Digital / **Economy**

By expansion or scaling up

Enhance Digital Economy
Big Data, IoT, AI, Robot

Korean Urban Development & Smart Cities

U-city

IoT Platform

Smart Grid

Korea Demonstrative Project(2018~Now)

Directions

① Technology ☞ Human-Centered
② Efficient Management ☞ Innovative Growth Engine
③ Infra/HW based ☞ Tangible SW based
④ One way Service ☞ Ambidextruous and Customized)
⑤ Temporary Based ☞ Sustainble Development
⑥ Supply-based ☞ Demand First
⑦ Silo Management ☞ Integrated Management

Sejong   Busan

National Strategic Program (2018~2022, USD 110mil.)

Service UseCase Type for Daegue, Business Creation Living Labs for Siheung
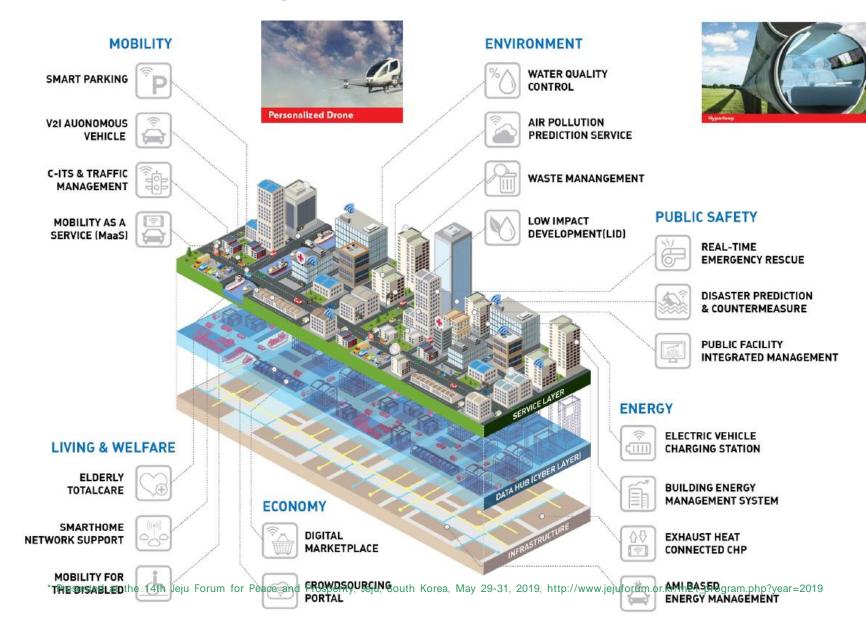
UseCase Type

Business Creation Type

Korean Smart City Model

MOBILITY
- SMART PARKING
- V2I AUONOMOUS VEHICLE
- C-ITS & TRAFFIC MANAGEMENT
- MOBILITY AS A SERVICE (MaaS)

Personalized Drone

ENVIRONMENT
- WATER QUALITY CONTROL
- AIR POLLUTION PREDICTION SERVICE
- WASTE MANANGEMENT
- LOW IMPACT DEVELOPMENT(LID)

Hyperloop

PUBLIC SAFETY
- REAL-TIME EMERGENCY RESCUE
- DISASTER PREDICTION & COUNTERMEASURE
- PUBLIC FACILITY INTEGRATED MANAGEMENT

LIVING & WELFARE
- ELDERLY TOTALCARE
- SMARTHOME NETWORK SUPPORT
- MOBILITY FOR THE DISABLED

ECONOMY
- DIGITAL MARKETPLACE
- CROWDSOURCING PORTAL

ENERGY
- ELECTRIC VEHICLE CHARGING STATION
- BUILDING ENERGY MANAGEMENT SYSTEM
- EXHAUST HEAT CONNECTED CHP
- AMI BASED ENERGY MANAGEMENT

SERVICE LAYER

DATA HUB (CYBER LAYER)

INFRASTRUCTURE

Top Ten Technologies for Urban Transformation

Top Ten Technologies

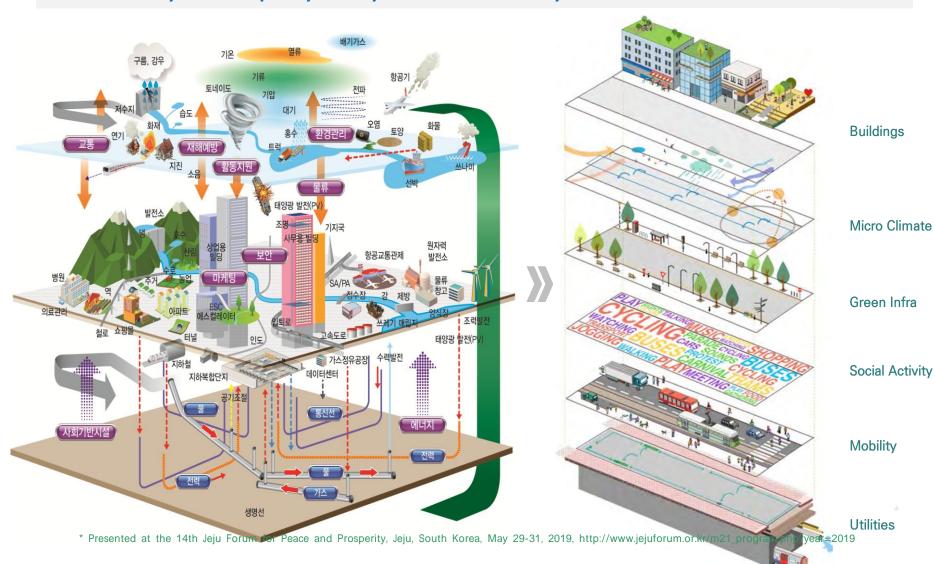| Open Data in Government	Internet of Things	Mobile device based sensing	Intelligent Transport	Smart Grid
Location & Condition Sensing Technologies	Citizen e-ID	Mobile Health Monitoring	Big Data	Data Analytics Predictive & Prescriptive

Urban Domains

Innovative Public Services Outsourcing
- Power/energy
- Transportation
- e-government services
- Water
- Waste

Integrated City & CityOpps
- Transportation
- e-government services
- Citizen engagement
- Urban planning
- Power/energy

Urban domains expected to undergo transformation

City Advisory Services
- Transportation
- Urban planning
- e-government services
- Innovation and entrepreneurship
- Power/energy

Sharing & Circular Economy
- Transportation
- Power/energy
- Waste
- Water
- Education

Source : World Economic Forum,
Shaping the Future of Urban Development & Services Initiative(2015)

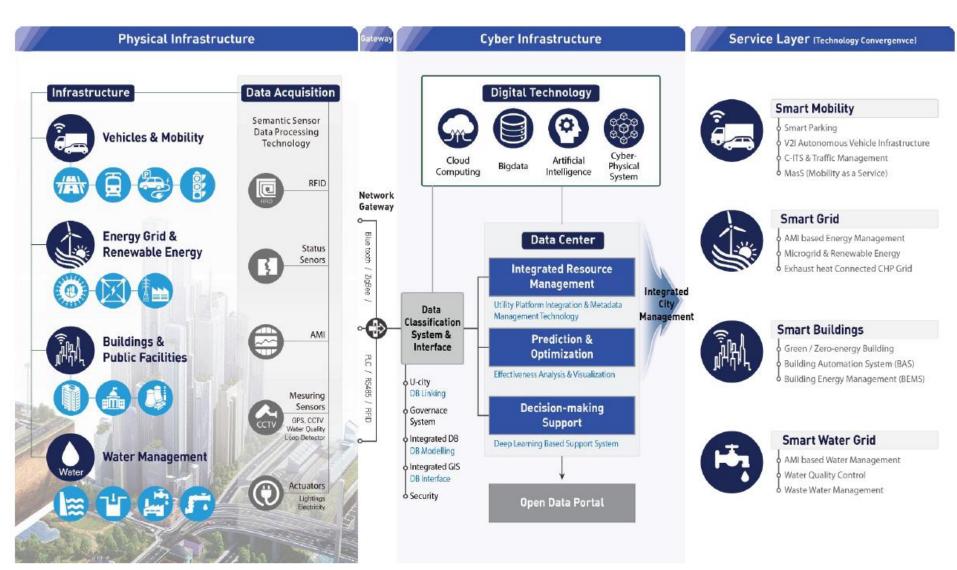# City is a complex system as System of Systems

City is a multiple layered system where each system interact and connected

Buildings

Micro Climate

Green Infra

Social Activity

Mobility

Utilities

* Presented at the 14th Jeju Forum for Peace and Prosperity, Jeju, South Korea, May 29-31, 2019, http://www.jejuforum.or.kr/m21_program.php?year=2019

Korean Smart Cities

AI in Smart Cities

AI and Automation Technologies

- AI Using Natural Language
- AI Using Computer Vision
- Rule-Based Automation Technologies
- AI Technology Foundations

Robotic Process Automation · IT Process Automation · Natural Language Generation · Context Aware Computing · Chat Bots and Voice Bots · Speech Recognition · Biometrics · Image and Video Analysis · Machine Learning · Deep Learning · Swarm Intelligence

City Dashboard

Predictive Analysis

Real Time Monitoring

* Presented at the 14th Jeju Forum for Peace and Prosperity, Jeju, South Korea, May 29-31, 2019, http://www.jejuforum.or.kr/m21_program.php?year=2019
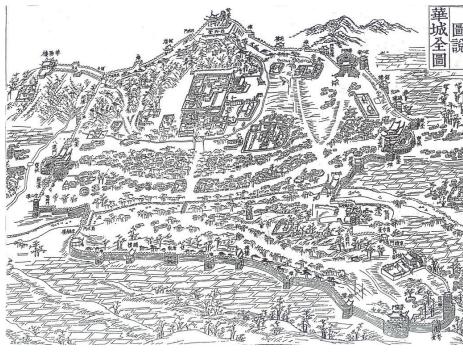
Suwon Hwasong City(1794)

"The Hwasong Fortress is an outstanding example of early modern military architecture, incorporating the most highly developmed features of that science from both east and west."
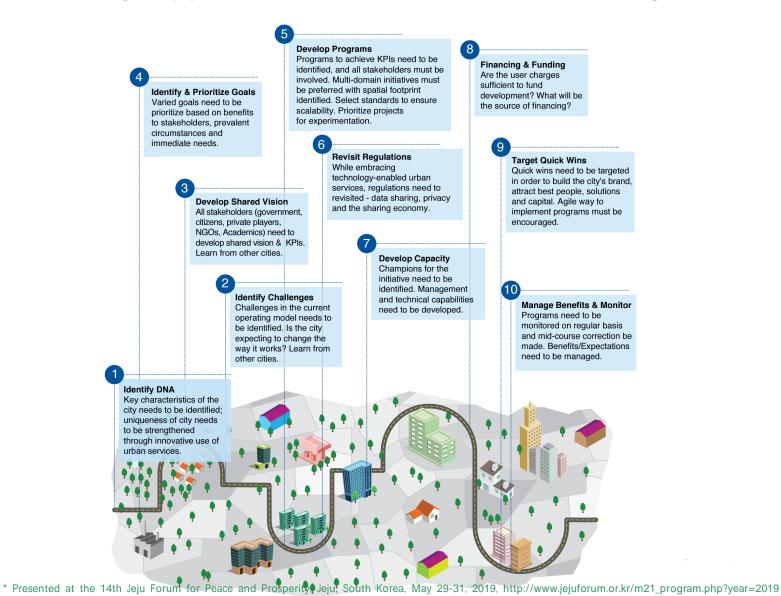
- UNESCO, World Heritage(1997)

Smart City Approach for Sustainable Heriatage

5 Develop Programs
Programs to achieve KPIs need to be identified, and all stakeholders must be involved. Multi-domain initiatives must be preferred with spatial footprint identified. Select standards to ensure scalability. Prioritize projects for experimentation.

8 Financing & Funding
Are the user charges sufficient to fund development? What will be the source of financing?

4 Identify & Prioritize Goals
Varied goals need to be prioritize based on benefits to stakeholders, prevalent circumstances and immediate needs.

6 Revisit Regulations
While embracing technology-enabled urban services, regulations need to revisited - data sharing, privacy and the sharing economy.

9 Target Quick Wins
Quick wins need to be targeted in order to build the city's brand, attract best people, solutions and capital. Agile way to implement programs must be encouraged.

3 Develop Shared Vision
All stakeholders (government, citizens, private players, NGOs, Academics) need to develop shared vision & KPIs. Learn from other cities.

7 Develop Capacity
Champions for the initiative need to be identified. Management and technical capabilities need to be developed.

2 Identify Challenges
Challenges in the current operating model needs to be identified. Is the city expecting to change the way it works? Learn from other cities.

10 Manage Benefits & Monitor
Programs need to be monitored on regular basis and mid-course correction be made. Benefits/Expectations need to be managed.

1 Identify DNA
Key characteristics of the city needs to be identified; uniqueness of city needs to be strengthened through innovative use of urban services.

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Maturity of Smart Sustainable City

	Rudimentary	**Functional**	**Integrated**	**Scalable**
Urban services	Basic survival needs met in terms of water, waste & sanitation, and shelter	Power, transportation, healthcare and education needs met	Scalable infrastructure for quality of life, green space, culture & elderly care	Mass transit, advanced education, etc. for economic competiveness
Sustainable development	Access to basic services Urban poverty alleviation	Energy efficiency, Social cohesion, reuse and recycling	Social safety, prepare for climate change, address ageing	Renewables, green development, address climate change
Technology and business models	Limited adoption of technology and few public-private partnerships	Adoption of technology for critical function and enterprise management; Public-private partnership frameworks adopted	Truly digital delivery, preemptive services, prescriptive analytics; Public-private partnerships pipeline available and limited acceptance of disruptive business models for urban services	Process optimized, situation awareness, data-driven decisions; Smart regulations to accommodate disruptive business models
Planning	Unplanned development within administrative areas	Planned development, with siloed planning approach	Metropolitan plans in conjunction with adjoining areas	Integrated planning for administrative areas
Collaboration and engagement	No/few linkages between people, processes and systems	Linkages between people, with few linkages in processes and systems	Digital collaboration (government, citizens, private sectcor, NGOs, academia)	Extensive linkages (people, system, processes) and stakeholder collaboration
Organization structures	Structures exist, cites are not empowered or equipped	Structures exist, empowered (in silos) but not equipped	Agile governance structure, adaptive to new operating models	Integrated structures with adequate capacity

Thank You

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