Smart Cities for Sustainable Development

KPOK Virtual Event: Session 4 Future of Smart Cities

How can smart cities contribute to a common vision?

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May 4th, 2021 / KPOK Virtual Event – The Future of Smart Cities
Context

Smart Cities for Sustainable Development

Governance

ESG

Value

Ecosystem

Cities

Technology

Convergence & Integration
Cogitatum ergo sumus

It is important to have a strong social capacity in building and sharing socially-agreed semantics of major communal initiatives such as sustainability, climate resilience, inclusiveness, disaster prevention, economic equity and others.
What is sustainability?

The quality of being able to continue over a period of time: the quality of causing little or no damage to the environment and therefore able to continue for a long time

Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. In addition to natural resources, we also need social and economic resources. Sustainability is not just environmentalism. Embedded in most definitions of sustainability we also find concerns for social equity and economic development.

Where does the term come from? While the concept of sustainability is a relatively new idea, the movement as a whole has roots in social justice, conservationism, internationalism and other past movements with rich histories. By the end of the twentieth centuries, many of these ideas had come together in the call for ‘sustainable development.’

Sustainability means that a perpetual flow of a set of meaningful values worth protected, maintained, and further enhanced is kept flowing through a system or a domain(“ecosystem”)
What is sustainability?

A perpetual flow of a set of meaningful values

Without a value, sustainability has no meaning.

Economic value

Human value

Environmental value

Cultural value

Technological value

Scientific value
Value-centered Sustainability

For the success and efficiency of social initiatives for sustainability, it is critical to have a strong social consensus on which values should be sustained and which aren’t chosen to be; and then building actions based on that social agreement.
In current time, technologies play the most powerful stake in social initiatives. But before we rush to technology labs, factories and bank accounts, to build and use technological solutions for social issues, we should think about the exact values that we are trying to protect, sustain and enhance and their true actual meaning.
Do cities need be protected, sustained and further enhanced?
If we build Smart Cities, will they be intrinsically sustainable?
Consideration Points for “City Sustainability”

Pursuit of the Life of Value for Every Citizen
## Framework of Thinking for “City Sustainability”

### City Governance & Citizen Values
- City Vision & Values
- City Management Policy Framework
- City Management Laws and Regulations
- City Economics and Finance
- Infrastructure /Building Management
- Land-use/Ecosystem Management
- ESG Consideration
- Environmental Resilience
- Citizen Values

### City Services & Systems
- Urban Management
- Civic Administration Services
- Education
- Mobility
- Safety and Security
- Disaster Prevention and Recovery
- Culture, Leisure and Diversity
- Welfare & Inclusiveness
- Jobs and Opportunities
- Business Services

### City Infrastructures
- Energy Systems
  - Generation
  - Distribution
  - Storage
- Mobility Infrastructure
  - Road, Corridor, Railway, Stations and Terminals
- Ecosystems & Natural Life
- Buildings & Habitations
- Natural Space
  - Parks, Waters, Forests and Open Spaces
- Industrial Environment
- Agricultural Environment
- Maritime Environment
- Education Environment

### Urban Technologies
- City Intelligence
- City Information Integration
- Industrial Technologies
- Digital Technologies
- FinTech
- Health/Medical Technologies
- Logistics Technologies
- Agricultural Technologies
- Building Technologies
- Water Technologies
- Energy Technologies
- Waste Management Technologies
The Wholeness of Urban Life
Holistic Citizen Experience

Urban Environment, Infrastructure & Ecosystem
- Education & Learning
- Housing, Residence & Inhabitance
- Urban Technologies

Urban Policy Framework & Governance
- Economic Prosperity
- Inclusiveness
- Safety
- Life-long Education
- Global Connectivity
- Health
- Job Security
- Information Ownership
- Energy Systems and Grids

Urban Services Efficiency
- Environmental Resilience
- Mobility & Transportation Systems
- City Services and Systems

Cultural Diversity & Richness
- Health and Medical Systems
- Industries & Businesses
- Personal Value Realization

Cultural Diversity & Richness
- Land, Building, Forest, Park & Waters

Economic Equity
- Knowledgeability
- Serviceability
- Inclusiveness
- Integrity and Transparency
- Culturality & Diversity
- Health, Security & Safety
- Biodiversity and Environmental Protection
Making cities “smart” to enable and sustain holistic city life of integrative values
Smart Cities for Sustainable Development

Green Smart Citizen Life Environment Map

Smart City Data Corridor
- Smart Green Connected Mobility
  - EV/AV Passenger Vehicles
  - EV/AV Bus
  - Drone Taxi
- Smart Road Sensor and Controller N/W
- Digital Twin
  - Building/Road/Infrastructure Information
  - Real-Time Infrastructure Status Information
  - Disaster Detection and Prevention Information
  - Emergency Rescue Operation
  - City Service Improvement
- Smart Robot Service
  - Pedestrian Guide
  - Pedestrian Safety
  - Navigation Service
  - Administration Service
  - City Information Service
- Digital Education
- Wind Mill Electricity Generation N/W
- Solar Electricity Generation N/W
- Smart Green Building
- Smart Green Park and Ecosystem
- Smart City Data Center
- Road Safety Drone
  - Road Risk Monitoring
  - Road Status Monitoring
  - Accident Detection and Monitoring
  - Pedestrian Safety Service
  - Road Information Service
- Environmental Management Service
  - Micro Fine Dust Capture
  - CO2 Capture
  - Water Quality Management
  - Land Use and Quality Management
- Environmental Sensor Drone
  - Micro Fine Dust
  - Air Quality
  - CO2
  - Solar Status
  - Water Quality
  - Land Use and Quality
- City Lab
  - Data Service
  - Business Start-Up
  - Citizen Education
- Integrated Smart City Service Platform
- Smart City Service App
- Digital Logistics Platform
- Global Data Corridor
  - Environmental
  - Business
  - Logistics
  - Education
  - Culture
- Smart Global Logistics N/W
- Autonomous/ Electric Vessel
- EV/AV Truck
- Autonomous/ Electric Train
- Smart Green Industry Cluster
- Green Electricity Charge N/W
- Hydrogen Charge N/W
- Green Hydrogen Production and Electricity Generation Plant
The Roles of Advanced Technologies for Sustainability Values

Smart Cities for Sustainable Development

5G & Beyond

IoT/Big Data

Robots/Drones/Intelligent Machines

AI/SW/AR/VR

Blockchain

Cloud Computing

Economic Equity

Knowledgeability

Serviceability

Inclusiveness

Integrity and Transparency

Culturality & Diversity

Health, Security & Safety

Biodiversity and Environmental Protection

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Technological Integration to Accelerate Sustainability

Smart Cities for Sustainable Development

Key Implementation Themes
- Green Smart Cities and Regions
- Green Smart Agriculture and Farming
- Sustainable Ecosystems and Green Recovery
- Green Smart Education
- Blue Economies
- Food and Water Security
- Forest & Land Use
- Building and Habitation
- Urban Infrastructures
- Maritime, Coast and Fisheries
- Weather Intelligence
- Air Quality Management
- Water Management
- Energy
  - New Energy
  - Renewables
  - Transmission, Storage & Distribution
- Efficiency
- Energy Grids
- Industrial Processes, Materials & Facilities
- Transportation & Mobility
- Energy
- Agriculture and Farming
- Energy
- Transport & Mobility

Open Dynamic Integration

Data & Software
- IoT
- Big Data
- AI
- AR/VR
- Blockchain
- Robotics
- Drone
- Autonomous Vehicle
- Cloud
- Mobile Network (xG)
- Digital Identity
- Financial Platforms
- Digital Currency
- Financial Instruments
- Social Platforms

Digital/4IR Technology

FinTech

Softwarization
Intelligentification
Modularization
Contextualization
Electrification
Regionalization
Ecosystemization
Platformization

Technology Integration
Architecting, structuring, and composing technological components, functions and features for dynamic and versatile applications to maximize the whole efficiency of technology application for greater results
Smart Cities for Sustainable Development

Pathways of Technological Integration; Mobility Case

Intelligentification

Softwarization

Regionalization

Contextualization

Modularization

Electrification

Platformization

Ecosystemization

1. Energy Supply Part
2. Power Part
3. Control Part
4. Data

Front Traction Motor
Battery System
Bi-directional Charging Plug
Rear Traction Motor

ICCU
* ICCU: Integrated Charging Contact Unit

Softwarization

Intelligentification

Modularization

Electrification

Regionalization

Contextualization

Ecosystemization

Platformization

1. Energy Supply Part
2. Power Part
3. Control Part
4. Data
Pathways of Technological Integration; Mobility Case

Economic Equity
Knowledgeability
Serviceability
Inclusiveness
Integrity and Transparency
Culturality & Diversity
Health, Security & Safety
Biodiversity and Environmental Protection
Cities can be smart when we are smart; when cities are smart, sustainability increases.

Cogitatum ergo sumus