Smart City and Mobility

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Contents



- The definition of smart city varies greatly from country to country, In general, it is a platform for improving the quality of life for citizens, enhancing the sustainability of cities, and fostering new industries by utilizing the innovative technologies of the Fourth Industrial Revolution. (Korean Smart City Portal)
- A smart city is an urban area that uses different types of electronic methods and sensors to collect data. Insights gained from that data are used to manage assets, resources and services efficiently; in return, that data is used to improve the operations across the city. This includes data collected from citizens, devices, buildings and assets that is then processed and analyzed to monitor and manage traffic and transportation systems, power plants, utilities, water supply networks, waste, crime detection, information systems, schools, libraries, hospitals, and other community services.

• Simply, smart city is a city to improve urban life quality with the help of enhanced ICT (Information and Communication Technology). So there might be no single definition.





McKinsey & Company : Smart Cities : Digital Solutions for a More Livable Future

Smart cities use data and technology to make better decisions.

Smart applications in eight domains affect multiple aspects of the quality of life



McKinsey & Company : Smart Cities : Digital Solutions for a More Livable Future





McKinsey & Company : Smart Cities : Digital Solutions for a More Livable Future

Magok District in Seoul

• Future full smart service map



Sejong smart city

Human-centered and People-oriented City

A Decentralized City that Respects Sharing, Fairness, and Diversity A City that Realizes the Convergence of Services based on Smart Technologies

A City where All of These Improve Resident Happiness									
Post- Lifestyle, Hun + E	materialism Work-life Balance, han-centered Eco-friendly	Decentralization Sharing, Openness, Dispersion, Respect for Diversity, Resident Participation	Smart Technology Data-driven Artificial Intelligence Blockchain, Crea- tive Innovation						
MobilityGradually reducing the number of cars down to the 1/3 the normal level while maintaining economsustainability and convenience.									
Healthcare Response (treatment) preemptively (prevention) and quickly (emergency) to emergency sit through a medical network environment.									
Education and Jobs	Promote critical and	romote critical and creative thinking and provide education for start-ups and employment.							
Energy andDemonstrate a participatory climate change neutral city through urban new renewablethe Environmente-mobility.									
Governance Encourage residents to solve urban issues directly and experiment with basic income using a local currency.									
Culture and Shopping	ulture andProvide various cultural experiences and a convenient shopping environment through personalizehoppingforecasting services.								
Living and Safety	Monitor abnormal si promptly.	gns through an artificial intelligence-base	ed living safety system and respond						

Values of the Sejong National Pilot Smart City

Sejong smart city

• Smart City Scheme

Urban Design · Architectur	al Design (Design Competition)		· Urban Public Design					
Digital Twin Collaborati Public Official	on Space Operation and SPC Operation Space / Resident Partic	cipation Space	· Urban Sustainable Simulation Urban Planning / Urban Issue Solution Simulation / Fea	sibility and Effectiveness Verification				
Standard Platform in Connection with Service Data	· Service Linked Integration Function and Linked Standard Data / Protocol		• Management of Linked Integrated Data and (Connection to Payment, etc.)	d Common Function Management				
Innovative Service Mobility Healthcare Education - Cloard Small PM Sharing Service - Integrated Network, of Clinics - Demand-responsive Service - Integrated Network, of Clinics - Integrated Network, of Clinics - Integrated Service - Integrated Service - Integrated Mobility Service - Integrated Network, Service - Integrated Network, of Clinics - Integrated Service - Integrated Service - Smart Signal Control Service - Smart Signal Control Service - Service - Integrated Developm - Integrated Developm - Smart Signal Control Service - Smart Signal Control Service - Service - Unico-cycle - Service - Unico-cycle - Service - Unico-cycle - Service - Smart Signal Control Service - Service - Service - Service - Unico-cycle - Service - Unico-cycle - Service	ation Jobs Energy and Environment Governance Jobs Smart Grid-based Energy Management Umriculum • Reflection in Energy Management Development of an City • Reflection in the Municipal Administration (tote, Opinion Pettion) • Pettion Opinion Pettion of a Resident Umriculum • Pettion (totaging Infrastructure • Pettion of a Resident Umriculum • Pettion of a Resource Recycling of an Contex, Pettion • Pettion of a Resource Recycling • Pettion of a Resource Recycling	Culture and Shopping Living and Safety Customized Patential Audienco Connection Smith Status Paromis Crime Prevention and Emergency Response Services Connection Smith Status Paromis Crime Prevention and Emergency Response Services Development of Variable Performance Status Spaces for Satious Development of a Newa Observation Service for Items Development of Native Conservation Status Forescating Service for Items Development of a Newa Observation Service Interns Particulate Matter Reduction and Fog Forecasting Service Smit Jurn Service Prevention Service Particulate Matter Reduction and Fog Forecasting Service Smit Jurn Service Playground Service	Cloud Sourcing · Hackathon · Grand Challenge · R&D Program Validation Public Safety Stru Earthquake, Disar	CC Traffic raffic Information / Smart Road / Smart Signal / Safety and Security ucture using CPTED and Response to Emergency, ster, and Fire Urban Facilities ure Management / Underground Facilities bad Facilities Management	SPC / Private Company	Regulatory Sandbox	Brand / Advertisement	Smart City Operation Overseas Expor
Blockchain Platform	Creation and Circulation (Payment) o a Local Currency and Rewards (Incen	of tives)	• Smart Contract Management					
Urban Integrated Data Al Center - Data Collectio - Data Map	Big Data) · Artificial Intell on - Data Store - Artificial Intellige - Data Management - Artificial Intellige - Artificial Intellige	ligence Analysis ence Analysis Platform ence Analysis Work Space ence Learning Program	Start-up Incubation · Mo Innovation Gym · Url Training for Start-up Support · Ew Allocation of Walking Space · Op	nitoring & Operation ban Monitoring ent Handling seration of Urban Infrastructure				
Data Infrastructure · Basic Infras	tructure · Wired/Wirele	ss Network	· IoT (Sensor) Network · IoT	Platform				
Urban Planning (Statutory) ·Basic Conce	eption Plan · Development	t Plan (Land Utilization Plan)	Implementation Plan (District Unit Plan)					



- *Smart City 1.0* places a strong emphasis on high-quality technological infrastructure, which seamlessly connects computers, sensors, devices and possibly also people. The use of technology is often justified in retrospect with a reference to the value for tackling urban problems.
- In *Smart City 2.0*, urban problems are the starting points for urban policy and there is an open eye for the use of high-quality technological tools. The priorities are usually different than in the case of *Smart City 1.0*.
- *Smart city 3.0* promotes initiatives of citizens (individually, in a neighborhood or as part of a network), companies, and (knowledge) institutions. The municipality facilitates the use of ICT and creates the necessary infrastructure.

(Herman van den Bosch, Professor at Open University of The Netherlands)

Contents



Mobility vs. Transport

From the Transport era to the Mobility era

Mobility : New norm

- The ability to move freely or be easily moved (Cambridge Dictionary)
- A contemporary paradigm in the social sciences and humanities that explores the movement of people, ideas and things (Wikipedia)

Transport (Transportation in US) : Traditional norm

- The movement of people or goods from one place to another (Cambridge Dictionary)
- A system of vehicles, such as buses, trains, aircraft, etc. for getting from one place to another (Cambridge Dictionary)

교통(交通): Gyo-tong (in Korean), Jiao-tong (in Chinese)

- To be connected, transportation, communication
- Jiao-tong University : University of Communications



- The action of transport is defined as a particular movement of an organism or thing from a **point A (a place in space) to a point B**. Modes of transport include air, land (rail and road), water, cable, pipeline and space.
- The field can be divided into infrastructure, vehicles and operations. Transport enables trade between people, which is essential for the development of civilizations.
- Transport infrastructure consists of the fixed installations, including roads, railways, airways, waterways, canals and pipelines and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals, refueling depots and seaports. Terminals may be used both for interchange of passengers and cargo and for maintenance.



- So, what's the mobility?
- 'The ability to move freely or be easily moved' (Cambridge Dictionary)
- 'Mobility' means movement with more freedom or flexibility. Thus, mobility industry or components should be defined in terms of mover's freedom or flexibility.
- But since railway or maritime transport has limited freedom in terms of operation, we do not mention it as a 'mobility service' right now.





Mobility Development



Source : The future of the Mobility 3.0, Arthur D. Little, 2018

Changes

Consumer trends and new mobility solutions



Change of attitudes and behaviors

- Expectations towards personalization of the offering and development of more tailored push offers
- Increasing connectivity associated with internet-access democratization
- Polarized relationship to work between "job out" and entrepreneurs
- Aging population, leading to an increase in dynamic seniors, but with reduced mobility
- Expectations towards seamless journeys and intermodal integration
- Generalization of collaborative practices (sharing economy)
- Increase in environmental concerns
- Increased sense of insecurity, both digital (data protection) and physical (terrorism)

Source : The future of the Mobility 3.0, Arthur D. Little, 2018

Smart Mobility Technologies

	খঁঁঁঁঁ	Smart things	Cheap, small, durable sensor	, Co rs e	onnectivit very prod	y for luct	Near- commu	-field nication	ba	Gigabit bandwidth			Wireless power		
Technology Enabler	1	Smart data	Virtual simul	ation	Data discovery			Dat	ng	Data-context aggregation					
	62	Smart architecture	Blockchain			Software-defined anything (SDx)				Micro-services					
	4	Smart systems	Self-learning systems	Self-learning Artificial systems intelligence		Robots and Auto bots ve		Autono vehic	utonomous 3D vehicles		printing		Multi- dimensional scanning		
	۵	Smart human- machine interaction	Audio visual interaction A		Augr	ugmented reality			Virtual reality		Gesture control				
	*	Smart working & living in the future	Virtual workspace	Intelliger home	^{nt} E-I	learning	Gamifi	ication	Collective intelligence/ crowd sourcing		Handhelds/ wearables		Enterprise social graph		

Source : The future of the Mobility 3.0, Arthur D. Little, 2018

Smart Mobility Solutions

- Connected and Autonomous Vehicles
- Zero Emission Vehicles (ZEVs)
- **Car sharing** : Car sharing, which began in the U.S. in 1994, is one of the most mature forms of shared mobility. We define car sharing business as Peer-to-Peer (P2P) Car sharing and Business-to-Consumer (B2C) Car sharing.
- Bike sharing
- Ride sourcing/Transportation Network Companies (TNCs) : Ride sourcing services (also known as transportation network companies or TNCs) are services that offer on-demand rides by connecting drivers using their personal vehicles with passengers hailing a ride, typically via smartphone. Ride sourcing/TNC services have grown rapidly since the launch of Uber (black cars only) in 2010 and the subsequent launch of Sidecar (June 2012), Lyft (June 2012), and UberX (July 2012) in San Francisco, California with a peer-to-peer service.
- Smart Freight : Platooning

Smart Mobility Solutions

- Alternative Transit Services : While public transit routes remain fixed, other innovative services are implementing technology to increase the flexibility of their operations. Alternative transit services, which include paratransit, employer shuttles, and microtransit, have the potential to supplement/compete with existing bus and rail routes. These services can incorporate flexible routing, flexible scheduling, or both.
- Shared Mobility Public-Private Partnerships and Data Sharing : Shared mobility public-private partnerships (PPPs) involve a public entity, such as a public transit agency or a city, and a private mobility provider entering into a partnership or agreement to operate a mobility service. They are becoming an increasingly popular option for public agencies to potentially lower costs, expand the reach of impacts, or improve the service quality of public transportation services.
- **Block chain** : Blockchain, the underlying structure behind cryptocurrencies like Bitcoin, is a decentralized ledger that allows for financial transactions and smart contracts to be executed without intermediaries. Although the technology has been used thus far mainly for currencies and financial transactions, some experts are speculating that the technology could be used for various mobility service transactions.

Smart Mobility Solutions

- **3D Printing** : 3D printing shortens supply chains, since goods can be manufactured closer to the end consumer. Global transportation needs could therefore be more focused on raw materials and less on moving parts and finished goods. When finished goods must be transported to their final destination, these distances could be much shorter; therefore, it is important to consider 3D printing as a trend that could potentially shorten delivery distances of products.
- **Drones and Unmanned Aerial Vehicles (UAVs)** : The last mile problem refers to the inefficient transport that occurs at the last phase of freight movement when goods are delivered to homes and factories. The last-mile portion of a delivery trip typically is responsible for a significant amount of local pollution and local congestion.
- On-Demand Trucking : Often, shippers and truckers have to pay a large portion around 45 percent of the total revenue to brokers to connect truckers with goods.
 "Uber for freight" can cut down on trip price and delivery time by connecting truckers to shippers on-demand to optimize routing.
- **Hyperloop** : Hyperloop, a high-speed rail train technology that relies on magnets to carry pods in a vacuum tube.



- Data governance
- Open Platform
- Objective of smart things
- Full utilization of existing data and technology

Thank you