

Smart Cities

Supporting an Inclusive, Sustainable, and Resilient Society

28 April 2023
Dakar, Senegal

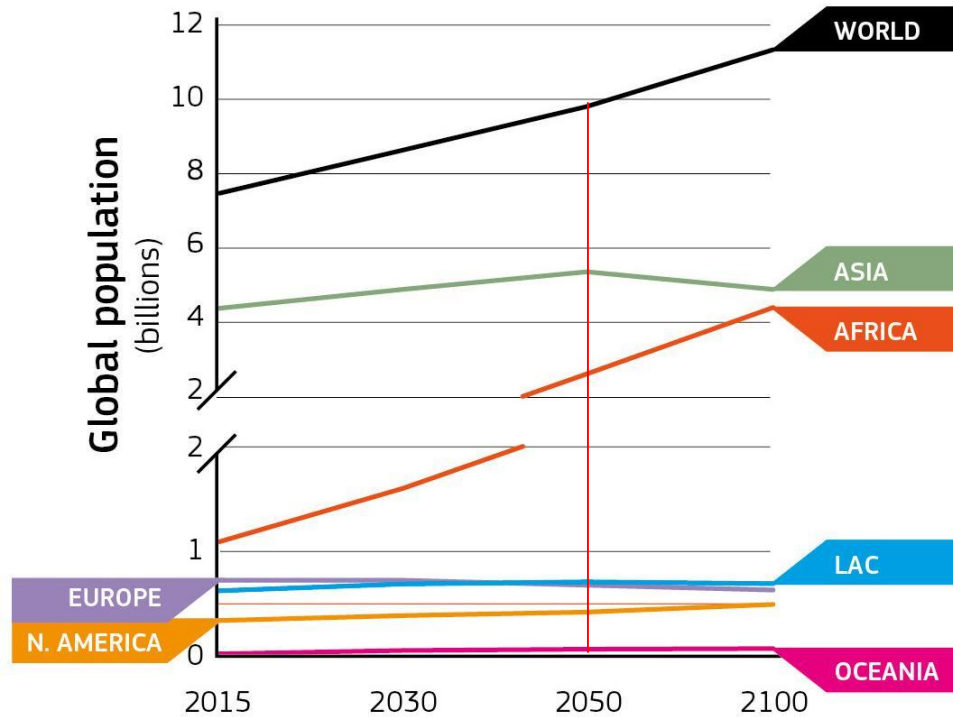
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1. Introduction

Population and Economic Growth



- According to the UN, the global population will reach **8.5 billion by 2030** and **9.7 billion by 2050**.
- **Approx. 68% of the world population** is projected to live in urban areas by 2050.
- World Economic Forum predicted that by 2030 **Asia will have 50% of the global population** with **60 % of global economic growth**.

1. Introduction

Smart Cities, a Global Movement

“Smart city is an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects” .

- International Telecommunication Union, United Nations



Singapore transport network and cityscape

2. Smart City in General

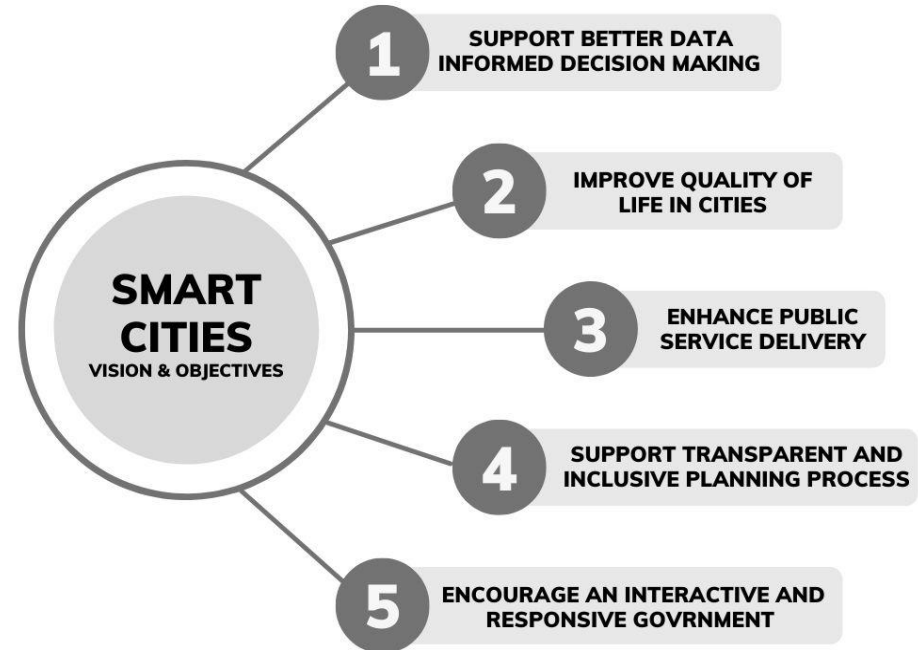
The Smart City concept

Smart cities use smart technologies and smart solutions including Internet of Things (IoT), Information and Communication Technologies (ICT), big data to increase operational efficiency, to monitor, control, and integrate various urban systems.

A major feature of smart city initiatives is to use digital solutions and innovations in technology to improve, upgrade and make urban public service delivery more efficient. However, these solutions must be correctly applied, based on a sound scientific approach and rationale.

A “smart and sustainable city” approach should intrinsically promote human and social capital, as well as environmental protection.

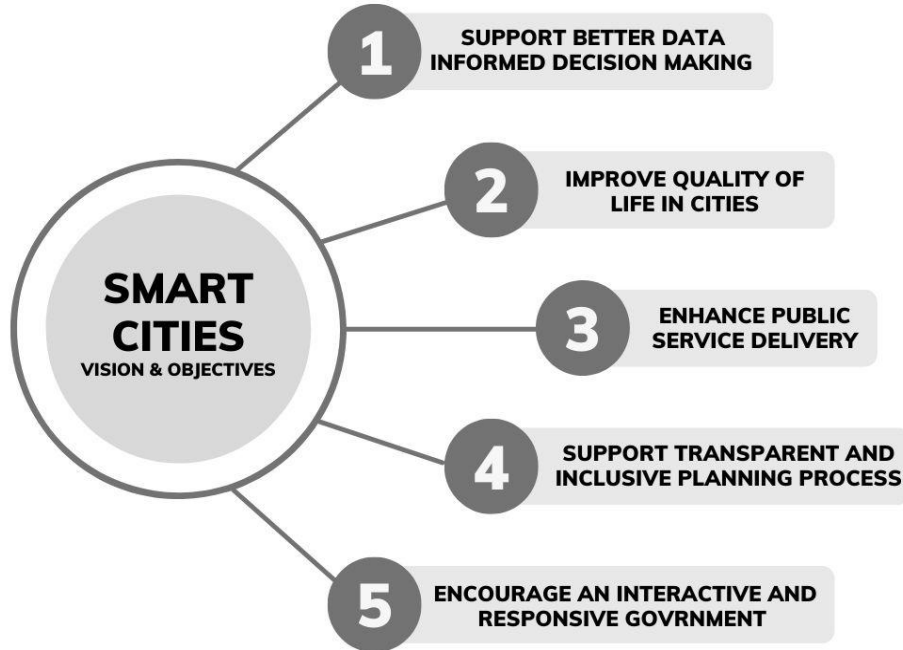
Fig 1 - Smart Cities, Vision & Objectives



2. Smart City in General

Logical Steps for Smart City system

Smart Cities, Vision & Objectives



Efficient service delivery

Better decision-making capability

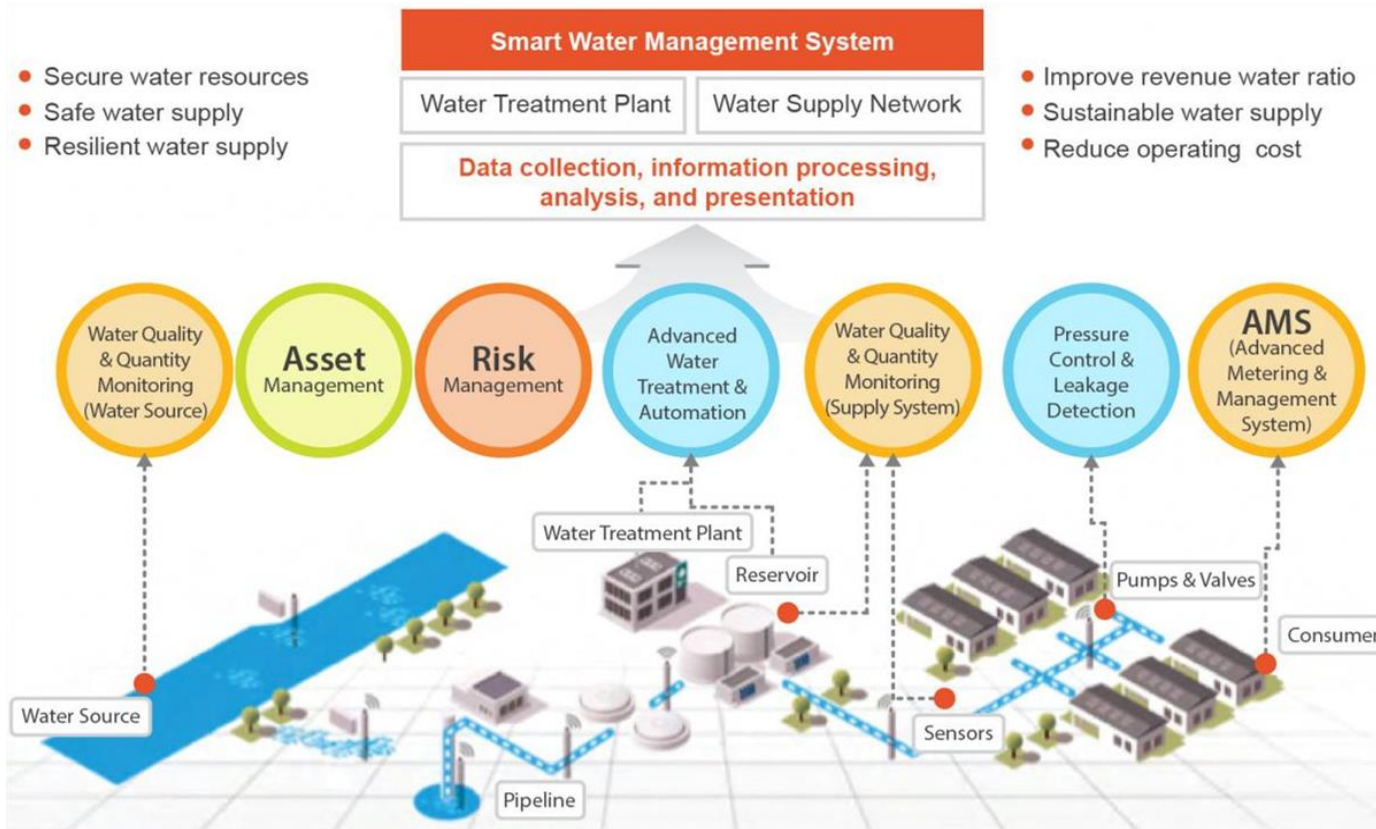
Monitor resource use

Network management

Responsive governance

2. Smart City in General

Example: Smart Water Management



Source: You Kwangtae, CEO, UnU Civil & Environmental Engineering, Republic of Korea.

Smart Cities Supporting an Inclusive, Sustainable and Resilient Society

Smart water management is a system designed to gather meaningful and actionable data on the flow, pressure, and distribution of a city's water.

The infrastructure and energy used to transport water are managed effectively, improving resilience, reducing operational costs, and improving system sustainability.

The most popular smart water solutions are digital meters, sensors, supervisory control and data acquisition (SCADA) systems, and geographic information systems (GIS).

UNCRD, 2023

2. Smart City in General

Basic Approaches

- **Use data to increase operational efficiency** of urban services
- **Increase data accessibility and transparency**, within and outside governance systems
- Encourage **research-oriented planning** – collaborate with research communities, institutions (educational and private), by enabling data sharing and transparency
- **Develop smart technologies and smart solutions** to monitor, control, and improve government services.
- Improve **integration of urban systems**, and **promote effective collaboration** among different stakeholders, to foster business and innovation for a sustainable future.

“Smartness” is not just about installing digital interfaces in traditional infrastructure or streamlining city operations. It is also about using technology and data purposefully to make better decisions and deliver a better quality of life.” - McKinsey

Limitations of a Smart City

- **For cities in developing countries**, where basic infrastructure and service needs are not yet met, **the full scale implementation and benefits of smart solutions may not be viable.**
- Smart City solutions need to be **respectful of local traditions**, and local contexts. The end goal of smart city initiatives **should not be to replicate another city’s success**, but to **integrate these** into the local environment.
- The level of connectivity and applied smart solutions should be locally determined through citizen awareness and consent.

2. Smart City in General

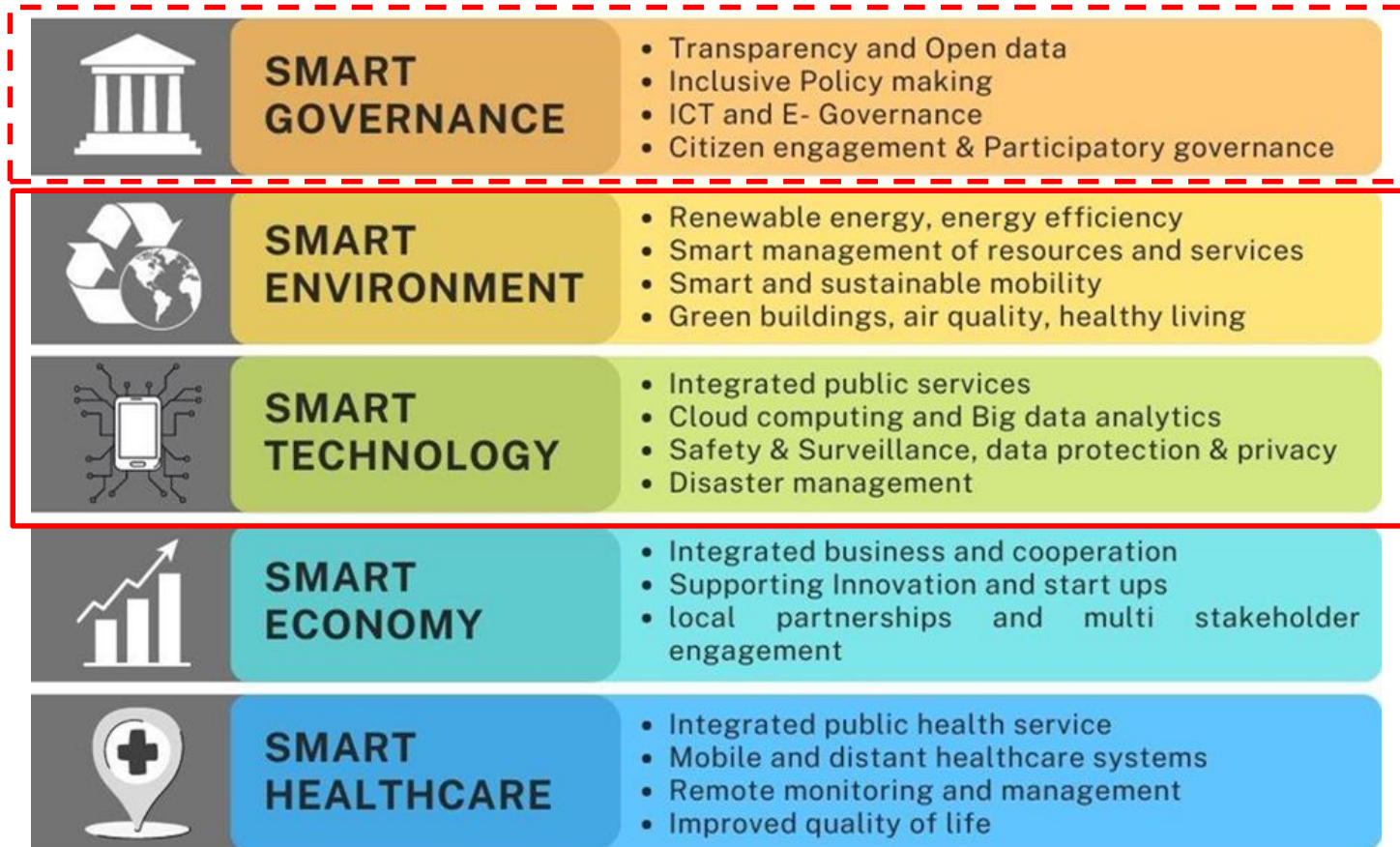
The Key for Success is Cooperation, Involvement, and Management

- Considering models of existing, cooperation, **Public-Private Partnerships (PPPs)** could be a vital mechanism to increase efficiency, know-how and financing in smart city projects
- In tandem with technology, further crucial components include **nature-based solutions, pro- social and community values**, the leveraging of **local and indigenous knowledge**, and fostering **innovation and research**, and promoting **young talent**.
- In the spirit of innovation, **experimentation can be the way forward. This may involve launching a pilot project**, where users and the general public are able to try out and experience new infrastructure, services, and situations in real life situations.

2. Smart City in General

The main pillars of the smart city are all about meaningful impact and positive change.

UNCRD's
focus areas



3. Smart City in Transport Sector

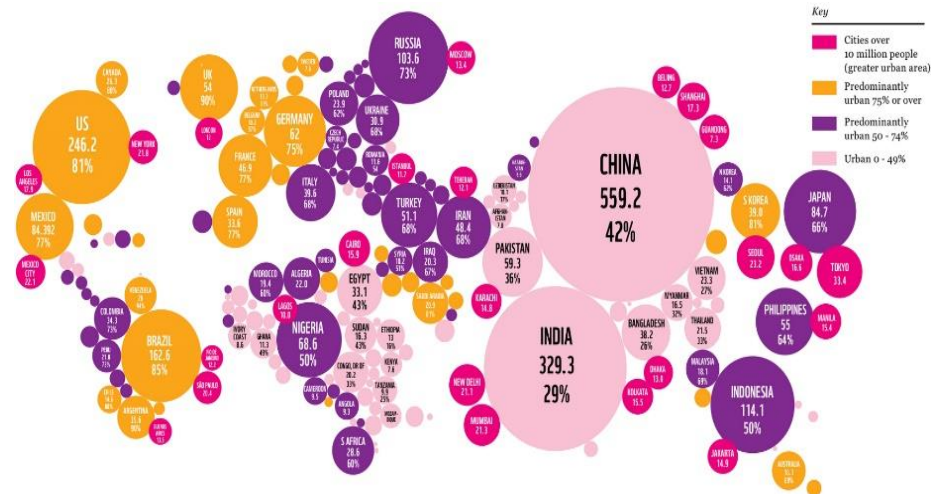
Urbanization and Motorization

Asia is the most urbanizing region in the world, with an average annual urbanization rate of 3 %.

New and Existing
Megacities Globally in 2025

 GlobalData.

95 % of urban expansion in the next decades will take place in the developing world.



Source: <https://www.businessinsider.com/small-cities-population-growth-by-2050-2012-5>

More than two-thirds of the world's megacities will be located in Asia by 2025.

3. Smart City in Transport Sector

Urban Development in Asia and the Pacific



An Asian urban dweller spends in traffic congestion is about 35 hr./year

(Source: The Future of Urban Mobility Report)



https://en.wikipedia.org/wiki/Ranganathan_Street

3. Smart City in Transport Sector

Air Pollution

An estimated **92 % of the world's population is currently exposed to air pollution** greater than the WHO air quality guidelines



WHO data shows air pollution kills 7 million people a year (WHO, 2021). However, a recent study reveals that air pollution kills **more than 10 million people each year (Vohra et al., 2021).**



Exposure to air pollution costs almost **US\$ 5.11 trillion in welfare losses globally (WHO, 2018).**

3. Smart City in Transport Sector

Road accidents and fatalities

- **Approximately 1.3 million people killed annually** due to road traffic crashes (WHO, 2021).
- **Africa has the highest** road crash death rate in the world. **Around 20% of the world's 1.3 million annual road crash deaths** occur in Africa, which holds just 3% of the world's cars. (WHO, 2022).
- It cost countries **3% -5% of their gross domestic product (GDP)**.



Road traffic injuries are the leading cause of death for children & young adults aged 5-29 years.

3. Smart City in Transport Sector

Other Issues Associated with the Public Transport System

- ✓ Safety and security
- ✓ Availability and affordability
- ✓ Connectivity and frequency
- ✓ Reliability and flexibility
- ✓ Integration and inclusiveness
- ✓ Efficient and economical



(Photo by Marie Thynell)



Source: hqdefault



Source: tumblr_inline_mna6q5INnk1qz4rgp



Source: kathmandupost.ekantipur.com



www.gmanetwork.com

3. Smart City in Transport Sector

Smart Mobility Principles

The overarching goal of smart mobility is to provide safe, clean, affordable, efficient, and effective mobility for all with the help of smart technologies and solutions.

1. Safety and Security
2. Improved accessibility and connectivity
3. Encourage non-motorized transport
4. Promoting clean, green, and low-carbon transport solutions
5. Social equity and Inclusiveness
6. Planning dense and human-scale cities
7. Optimizing existing transport infrastructure

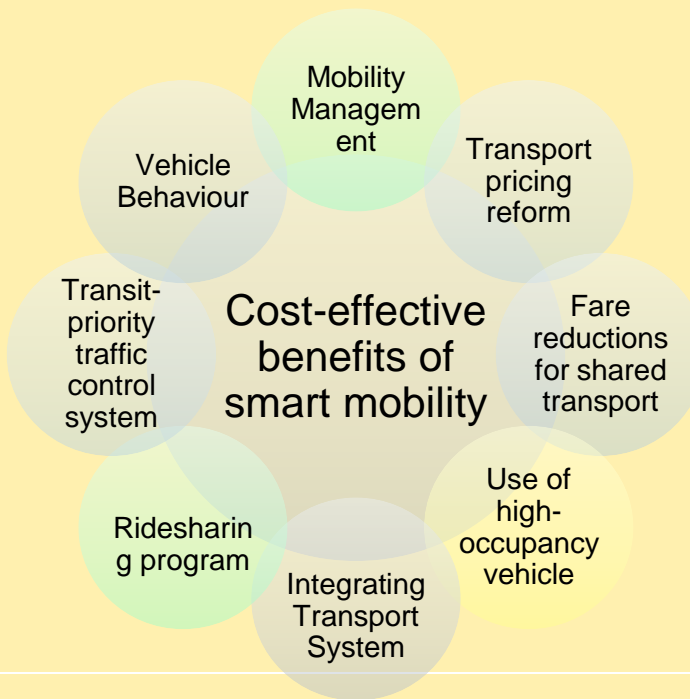
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- An illustration depicting various smart mobility options. On the left, a grey electric bus with a lightning bolt symbol on its side carries several passengers. In the center, a person is riding a yellow bicycle, with a red location pin icon above them. On the right, a blue building features a yellow house icon with a train symbol inside, and a colorful circular graphic below it. The entire scene is set against a light grey background.
8. Discouraging private vehicles
 9. Harnessing technology
 10. Encourage public-private partnership
 11. Data collection, sharing and analytics
 12. Promote community engagement and participation
 13. Providing a healthy environment for all
 14. Protect urban biodiversity and ecology
 15. Encourage innovation, research, and development
 16. Promote economic growth

3. Smart City in Transport Sector

Benefits of Smart Mobility

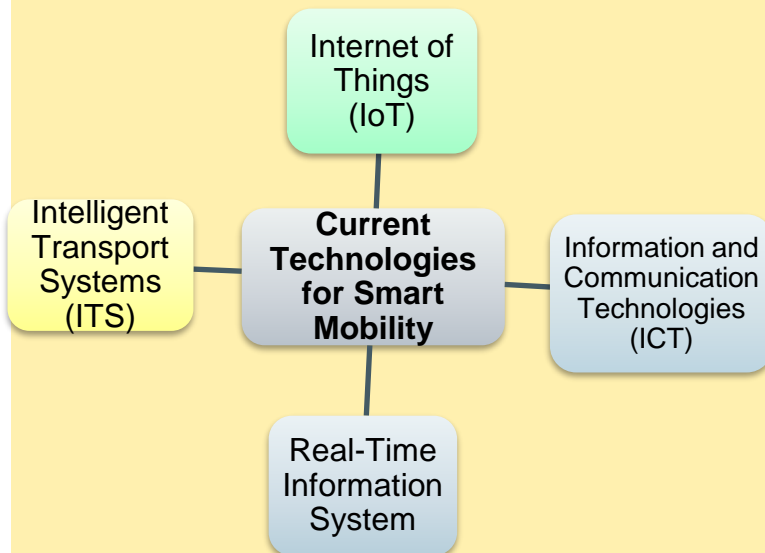
- ✓ Reduce traffic congestion, air and noise pollution
- ✓ Decrease traffic accidents, injuries, and fatalities
- ✓ Enhance greater mobility, connectivity, and access
- ✓ Reduce GHG emissions
- ✓ Reduce household spending on transportation
- ✓ Reduce urban sprawl
- ✓ Improve the natural environment and green growth
- ✓ Active and healthier lifestyle with more walking and cycling
- ✓ Improve the resilience of cities by access to high-quality public transport
- ✓ Businesses grow in the local community
- ✓ Enhance energy security by reducing oil dependency
- ✓ Increase property values
- ✓ Improve the quality of life with a better living and working environment

Cost-effective Benefits of Smart Mobility



3. Smart City in Transport Sector

Current Technologies for Smart Mobility



Emerging Technologies for Smart Mobility

Bike-sharing and Car-sharing: This method enables an occasional use of a vehicle in particular route or the area.

Mobility on Demand (MoD): MoD can significantly contribute towards modal shift to public transport and addresses spatial inefficiencies of private mode of transport.

Mobility-as-a-Service (MaaS): It allows multimodal mobility options by providing user-centric travel information and services including navigation, location, booking and payment methods.

3. Smart City in Transport Sector

Smart Mobility : Best cases



JAPANESE CASE Shinjuku Tokyo, Japan

World's busiest railway station and largest bus terminal where more than 35 railway platforms and 1600 buses operate every day connecting 300 cities in 39 prefectures across

Photo source: dreamstime.com

3. Smart City in Transport Sector

Shinjuku Station, Tokyo

Shinjuku Station opened in 1885 which have a total of 53 platforms, over 200 exits and many department stores and shopping malls which are well connected to the station.



According to Guinness World Records, Shinjuku station used by about **3.59 million people per day (in 2018)** which making it the world's busiest station.



4. Summary

1. The number of cities and urban population is increasing. Using technology and innovation to build smart cities helps to solve issues in urban development and makes cities more resilient, inclusive, and sustainable.
2. Building smart cities in the transport sector can help reduce traffic congestion, alleviate air pollution, and reduce the risk of road traffic accidents.
3. Training materials on smart city can be accessed through <https://uncrd.un.org/content/sc-capacity-building> (UNCRD web > Projects > Smart City- UNCRD Smart City Project: Capacity Building)

Thank You

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United Nations Centre for
Regional Development
(UNCRD)

