Forum: Youth Assembly

Issue: Creating Sustainable Cities Through Smart Innovation

Student Officer: Stathis Giannis

Position: President

Introduction

Urban infrastructure today faces great levels of pressure due to the rapid growth in population, expanding cities, and aging systems. Transportation networks often struggle to handle daily commutes, leading to traffic, air pollution (therefore safety hazards), and inefficient energy use. Water and energy distribution networks are stretched to their limits, while waste management systems frequently fail to cope with growing demands. In many cities, informal settlements and slums emerge where formal housing is insufficient, limiting access to basic services such as clean water, sanitation, and healthcare. These conditions underscore the urgent need for sustainable alternatives that balance environmental responsibility with the well-being of residents.

Smart innovation has emerged as a vital tool for addressing these challenges. By combining technology with sustainability goals, cities can optimize urban systems, reduce resource waste, and enhance quality of life. Sensors, the Internet of Things (IoT), and predictive analytics enable real-time monitoring of traffic, energy use, water supply, and environmental risks, allowing cities to act proactively rather than reactively. These technologies also help local governments make informed decisions about urban expansion, infrastructure investments, and environmental protection.

If these issues remain unaddressed, cities could face worsening air and water pollution, higher greenhouse gas emissions, and increased vulnerability to climate-related disasters. Social inequality could deepen as marginalized populations bear the brunt of inadequate housing, poor transport, and limited access to services. Economically, inefficient systems can increase costs, reduce productivity, and discourage investment.

Cities are uniquely positioned to lead sustainable innovation because they concentrate resources, talent, and infrastructure in relatively compact areas. By leveraging the intersectionality between technology and sustainability, urban centers can implement scalable solutions that reduce environmental impact, improve social equity, and foster economic growth. In doing so, cities can serve as global models for resilient and inclusive development.

Definition of key terms

<u>Sustainable</u>

“Causing, or made in a way that causes, little or no damage to the environment and therefore able to continue for a long time.”

<u>Smart City</u>

“A smart city is an urban area where technology and data collection help improve quality of life as well as the sustainability and efficiency of city operations. Smart city technologies used by local governments include information and communication technologies (ICT) and the Internet of Things (IoT).”

Green Infrastructure

“A strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity.”

Just Transition

“A just transition, broadly defined as ensuring that no one is left behind or pushed behind in the transition to low-carbon and environmentally sustainable economies and societies, can enable more ambitious climate action and provide an impetus to attaining the Sustainable Development Goals.”

Circular Economy

“A circular economy is an economic system where products and services are traded in closed loops or ‘cycles’. It is an economy where growth is not fuelled nor dependent on finite resources.”

Internet of Things

“Internet of things (IoT) describes devices with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communication networks.”

Timeline of events

Date	Description of event
1988 (no precise date recorded)	The UN launched the World Urbanization Prospects
3 May 2002	World Urban Forum I
25 September 2016	Sustainable Development Goals
12 December 2015	Paris Agreement

20-22 October 2016	New Urban Agenda
29 September 2021	The EU's "100 Climate-Neutral and Smart Cities by 2030" mission was launched

Background information

Environmental Impacts of Urbanization

Rapid and unregulated urbanization is a significant threat to the environment. Cities are responsible for more than 70% of the worldwide carbon dioxide (CO_2) emission, mostly because of high energy consumption in buildings, modes of transport, factories and industrial activities. Urban expansion often includes the destruction of natural habitats which leads to the loss of biodiversity and the fragmentation of ecosystems.

Air pollution is of course another dire consequence. Transport and energy systems emit pollutants (ex. nitrogen oxides, particulate matter, and sulfur dioxide) which not only heavily contribute to climate change, but also pose serious health risks to the people living there. Water is similarly stressed as demand increases due to rapidly growing urban populations which often exceeds the capacity of existing infrastructure.

Waste management also becomes a pressing issue with uncollected (or poorly managed) waste polluting rivers, lakes, oceans etc. Overall, without careful planning, urbanization can significantly degrade environmental quality and threaten the well being of cities themselves.

Urban and Social Challenges

Alongside the environmental impacts mentioned above, urbanization creates urban and social challenges. For example, overpopulation in cities often leads to housing shortages, overcrowding, and the proliferation of informal settlements or slums. Residents in these areas may lack access to basic services like clean water, sanitation, reliable electricity sources etc.

Moreover, urban expansion can strain transport systems creating traffic congression and long commutes. High population density may also lead to pressure on public services such as healthcare and education. These social and infrastructural pressures highlight the urgent need for sustainable, inclusive urban planning that prioritizes both human well-being and environmental health.

Smart Innovation in Urban Planning

To combat these problems, most cities have leveraged smart innovation to increase sustainability and improve the people's quality of life. These include smart sensors in buildings and public infrastructure aid in the reduction of energy and water use by monitoring consumption and automatically changing heating or lighting, real-time systems to manage traffic which optimize traffic flow and public transport (using the Internet of Things), cutting emissions, and improving air quality or similar technologies.

Other innovative solutions include underground vacuum collection systems, as seen in Songdo, South Korea which improve the efficiency in which waste disposal systems work while at the same time minimizing environmental impact. Urban areas are also experimenting with smart grids and meters, which balance energy supply and demand

dynamically, integrate renewable sources, as well as reduce overall CO2 emissions.
However, experts on the matter demand that this type of innovation should be people-centered, and inclusive while at the same time ensuring that this particular technology benefits all residents.

Benefits of Sustainable Cities and the UN's Role

Sustainable cities provide many environmental, economic and social benefits. By integrating this green infrastructure, renewable energy, and efficient transport, cities can reduce greenhouse gas emissions, conserve natural resources and enhance biodiversity. Sustainable urban planning improves the residents' health by reducing pollution, promoting active methods of transport (such as cycling) and ensuring access to "green spots" for everyone.
Economically cities adopt sustainable and smart technologies, can create investing opportunities and attract investors, create green jobs, as well as increase resilience against climate-related disruptions.
Socially, inclusive urban design fosters equity, reduces vulnerability and improves overall quality of life.
The United Nations (particularly through UN-Habitat, and the Environmental Commission) play a great role towards the implementations of these practices. It provides technical assistance, funding, and policy frameworks for sustainable development, such as the New Urban Agenda (launched in 2016) and Sustainable Development Goal 11, which promote inclusive, safe and sustainable infrastructure in cities.
UN-Habitat also facilitates knowledge-sharing and data exchange between cities, helping them adopt the best practices. By acting as a bridge between governments and the private sector, the UN ensures that smart innovation is deployed effectively, equitably and with long-term benefits in mind.

Stakeholders

Kingdom of Denmark

In 2009 Copenhagen set the goal of becoming the first carbon-neutral city in the world by 2025. Although that goal was not reached, and the date was pushed to 2030, it has faced great success, as it has lowered its carbon emission by 80% since 2009. It has used various methods of smart innovation which include investments in renewable energy as well as cycling infrastructure (with an estimate of 60% of residents moving daily via bike).

People's Republic of China

China currently holds the title of the fastest urbanizing country worldwide. This of course comes with some negative consequences, as it has the biggest carbon footprint too. China has recently invested much in electric mobility, which include but are not limited to buses, trains, and metros.

UN Habitat

UN Habitat promotes various practices in sustainable housing, waste management as well as transportation. Its main focus is providing technical assistance to cities on urban planning, governance and infrastructure. It provides funding and promotes data collection and

monitoring of urban growth through tools like the World Urbanization Prospects. It also partners with non-governmental organizations (NGOs) in the private sector to implement innovations for smart cities.

World Bank

The World Bank (WB) is a major financier of sustainable urban infrastructure. In the past years it has supported many projects regarding renewable energy, smart transport etc. It also provides technical expertise and practices to developing countries.

Siemens AG (Aktiengesellschaft)

Siemens is a company in the private sector which specializes in creating sustainable technologies like smart grids, energy-efficient buildings and electric transport systems. It remains active in global pilot projects (ex. Smart grids in the Federal Republic of Germany, mobility solutions in the Republic of Singapore) and bridges the gap between large-scale urban deployment and technological innovation.

Relevant UN resolutions, treaties, and events (Previous attempts)

Sustainable Development Goals (2015, SDG 11)

The most important framework is the Sustainable Development Goals (SDGs) (September 2015). For the first time ever, the UN set a clear worldwide target, the SDG 11, “Sustainable Cities and Communities” with its primary goal being making cities and human settlements inclusive, safe, resilient, and sustainable. The targets include improving the quality of urban housing, reducing environmental footprint (carbon emissions), promoting sustainable transport, and access to green spaces. Although SDG 11 succeeded in raising international awareness about the urban sustainability issue, progress regarding it, has not been that equitable. Some of the wealthier countries and some of the more innovative cities have made rapid strides, but most of the developing world is still struggling with the challenges mentioned in the above sections.

The Paris Agreement (2015)

The Paris Agreement was adopted at the United Nations Climate Change Conference (COP21), during December 2015 and includes a legally binding global agreement on climate change. Even though it does not focus directly on cities, it affects urban sustainability indirectly. The treaty indirectly pushes national and local governments towards green infrastructure, clean energy, and smart city projects. It faced positivity in countries like Denmark, Germany, and Japan, with cities having included national goals within urban climate plans. There have been remiss and backsliding nations, though, slowing overall progress. This happened mostly due to the agreement’s high enforcement.

New Urban Agenda (2016)

Published at the UN Habitat III Conference in Quito in October 2016, the New Urban Agenda is a 20 year plan regarding only sustainable urbanization. It stressed how inclusive housing, expanded mobility, participatory government, and leveraging technology can all improve the quality of life. Compared to the more overarching SDGs, this agenda was specific enough that mayors, planners, and city governments received directives from it. Again, there has been uneven execution as some countries have applied its principles to urban policy (especially in Latin America and Europe), but far too many cities lack the political will or resources to implement it.

World Urban Forum (2002 – present)

The World Urban Forum (WUF) was founded in 2002 in Nairobi, Kenya. It is an annual international conference organized by UN-Habitat to discuss sustainable urbanization. WUF has grown into a significant forum for knowledge sharing between governments, city governments, NGOs, and enterprises. While not being legally binding, WUF sessions have sparked voluntary commitments and the exchange of best practices.

UN-Habitat's City Prosperity Initiative (CPI)

The City Prosperity Initiative (CPI) launched by UN-Habitat in 2012 is a global monitoring system for cities that measures urban prosperity, sustainability, and governance. CPI provides cities with indicators to quantify economic, social, and environmental performance and enables evidence-based policy-making. CPI has contributed to the transformation of cities toward adopting sustainable approaches and monitoring progress, especially in developing countries. Success is city-by-city: some have adopted CPI recommendations far-reaching, but others are constrained by capacity and data collection limitations.

Possible solutions …

Promotion of Green and Sustainable Urban Transport

Investing in cycling lanes, electric buses, and metro upgrades can significantly reduce emissions and traffic. Cities like Copenhagen and Shanghai have shown that by promoting sustainable commuting they have both lowered pollution and CO2 levels and enhanced the people’s mobility.

Implement Renewable Energy and Smart Grids

Integrating solar, wind, and other renewable sources into smart grids allows cities to use energy and minimize carbon emissions. Smart grids balance supply and demand, improving efficiency while supporting sustainable growth, as seen in various projects worldwide.

Smart Waste and Water Management

The Internet of Things has allowed the creation of water meters and underground vacuum waste systems, such as Songdo in South Korea, to improve the efficiency of their urban services. These technologies reduce waste, prevent pollution , destruction of ecosystems and conserve vital resources, creating cleaner and healthier cities.

Expand Affordable and Sustainable Housing

Green building standards, modular construction, and slum upgrading programs ensure access to safe, energy-efficient, and environmentally friendly housing for all. This enhances social equity while reducing the environmental footprint of urban development.

Smart Parking and Congestion Pricing

Digital parking apps and dynamic road pricing optimize urban traffic, reduce emissions, and encourage public transport. Cities like Singapore have successfully applied these measures to improve mobility and lower congestion.

Smart Grids and Meters

Advanced energy meters and grid systems monitor consumption in real time, allowing cities to manage electricity use more efficiently, integrate renewable sources, and reduce overall CO_2 emissions.

Underground Vacuum Waste Systems

Innovative systems transport waste through underground pipelines directly to processing centers. This minimizes trash, lowers emissions from collection vehicles, and enhances sanitation efficiency, while at the same time aiding in the protection of the environment.

…