

Smart cities and sustainability

Cities worldwide are increasingly embedding smart technology to gather and analyse data, with global 'smart city' revenue expected to grow to \$88.7 billion by 2025. Smart cities have a huge potential for improving sustainability, but are currently limited by market-focused economic models.

About the research

So-called 'smart cities' have the potential to make a significant contribution to urban sustainability, by using information and communication technology (ICT) to gather urban data and improve performance and management. Examples include smart solutions for parking, highway speed controls, refuse collection, water infrastructure and energy grids. However, these approaches are limited by their focus on optimising existing urban systems.

The New Urban Agenda (UN 2017) highlights the role of smart cities in driving a radical shift in city management, but it remains unclear how technological development can be aimed at improving sustainability. Technological transformation is currently driven by a market-led approach – focusing on creating business-friendly environments and citizen-centric service delivery – while urban data's potential for increasing sustainability remains untapped.

The complexity sciences (examining systems, their components and interactions) can be applied to formulate strategic policies that target urban sustainability through the use of new ICTs. Researchers from the ESRC Strategic Network Data and Cities as Complex Adaptive Systems (DACAS) have outlined key issues and policy recommendations for urban data and sustainability.

Developing an ethical framework for the use of urban data will prevent data misuse and build public trust.

Key findings

- 'Smart technology'-based methods for gathering, connecting and utilising urban data can potentially support sustainability, but the majority of 'smart city' initiatives are aimed at finding cost efficiencies within existing systems; they are not developed with the Sustainable Development Goals in mind.
- Smart cities are commonly understood as incorporating the development of new digital markets, efficient urban management systems, and more informed citizens. However, this is too simplistic – ICT development must be understood as an 'emergent system' that's markedly different and more wide-reaching than its individual components.
- Badly planned implementation of smart city initiatives can cause societal harm – including the technological exclusion of people without ICT access, misuse of sensitive data, violation of citizens' privacy rights, and business interests being prioritised above social and environmental issues.
- Large technology companies typically provide data collection and access hubs for smart cities, which increases the risk of private companies controlling the data of governments and citizens.

Key findings - continued

- There are clear limitations to how much efficiency can be gained working in any existing system; optimising the system alone cannot deliver greater improvements and longer-term sustainability.
- Rather than being limited to the role of passive clients for technology companies, cities should be partners and enablers in ICT development, regulation, support and implementation.

FURTHER INFORMATION

- UNU/DACAS policy brief: ***Sustainable Smart Cities: Applying Complexity Science to Achieve Urban Sustainability***
Web: collections.unu.edu/eserv/UNU:6393/UNU-IAS-PB-No12-2017.pdf
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The ESRC Strategic Network Data and Cities as Complex Adaptive Systems (DACAS) is an international network bringing together researchers from a range of different fields, including architecture, environmental economics and theoretical physics.
Web: dacas.complexurban.com

The Economic and Social Research Council (ESRC) is the UK's leading agency for research funding and training in economic and social sciences. ESRC is part of UK Research and Innovation.
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Policy recommendations

- Developing an ethical framework for the collection and use of urban data will prevent data misuse and build public trust.
- Relying solely on new digital technologies creates vulnerability and risks excluding people with limited ICT access. Non-digital services should be retained in parallel with the rollout of new technologies.
- The development of city data platforms should follow international standards (such as ISO and ITU-T telecommunication standards) to ensure systems can operate across country borders and different system providers.
- Establishing new government departments with expertise in urban ICTs can break down existing silos and enable agile governance, using new models of multi-level governance that take into account that governance and technology mutually evolve and affect each other.
- Policymakers should prioritise access to real-time and long-term urban data on energy use, air quality, transport and emissions, to support development of new services.
- Digital developers could be offered support to focus on urban sustainability as a priority area for experimentation. This could include financial incentives, opportunities for knowledge exchange and placements, or support for other collaborative schemes across academia, business and governance.
- The technology could be used to involve the public more actively in governance, with user-friendly digital interfaces providing real-time urban data in areas such as affordable housing, basic services, disaster emergency response, and sustainable transport. In the long term, citizen participation should be encouraged in areas such as city planning, cultural preservation and the creation of public spaces.