

# An Analysis of The Role of 15-Minute Cities in Developing Countries

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## Abstract:

Developing countries face a pressing challenge in achieving sustainability as their urban areas rapidly expand and modernize. Central to this challenge is the need for substantial investment in critical infrastructure, particularly in public transport and renewable energy. Sustainable cities are characterized by efficient transportation systems that reduce reliance on private cars, as well as the adoption of renewable energy sources that mitigate environmental impacts. However, cities in developing countries often struggle to make these transitions due to limited financial resources and outdated infrastructure. The result is a growing trend of unsustainable development, marked by congestion, pollution, and energy inefficiency.

**Keywords:** Developing Countries, sustainability, goal, substantial investment

## 1. Introduction

Developing countries face a pressing challenge in achieving sustainability as their urban areas rapidly expand and modernize. Central to this challenge is the need for substantial investment in critical infrastructure, particularly in public transport and renewable energy. Sustainable cities are characterized by efficient transportation systems that reduce reliance on private cars, as well as the adoption of renewable energy sources that mitigate environmental impacts. However, cities in developing countries often struggle to make these transitions due to limited financial resources and outdated infrastructure. The result is a growing trend of unsustainable development, marked by congestion, pollution, and energy inefficiency<sup>[1]</sup>.

One of the primary obstacles faced by cities in developing countries is the lack of adequate public transport infrastructure. Many cities rely heavily on outdated or insufficient public transport systems, leading to overcrowded buses and long commute times for residents. This not only contributes to traffic congestion but also increases emissions and air pollution, exacerbating environmental and public health challenges. Additionally, the dominance of private car usage further strains urban infrastructure and hinders efforts to promote sustainable modes of transportation.

Another significant challenge is the limited availability of renewable energy sources in many developing countries. While renewable energy holds immense potential for reducing carbon emissions and addressing climate change, the high upfront costs of infrastructure development pose barriers to adoption. Without access to affordable and reliable renewable energy options, cities in developing coun-

tries continue to rely on fossil fuels for power generation, perpetuating environmental degradation and resource depletion. The journey towards sustainability for cities in developing countries requires overcoming substantial hurdles, including the need for significant infrastructure investments in public transport and renewable energy<sup>[2]</sup>. Addressing these challenges is crucial for creating urban environments that are not only environmentally friendly but also equitable and economically viable for all residents<sup>[3]</sup>.

## 2. The Concept of 15-Minute Cities

The concept of 15-minute cities has gained traction as a model for sustainable urban living, offering a vision where residents can fulfill their daily needs within a short walking or biking distance from their homes<sup>[4]</sup>. This concept is grounded in the principles of compact, mixed-use development, designed to reduce reliance on cars and promote active transportation modes such as walking and cycling. By creating neighborhoods that are vibrant, accessible, and interconnected, 15-minute cities aim to enhance the quality of life for residents while minimizing environmental impacts. At the heart of 15-minute cities is the idea of mixed land use, where residential, commercial, recreational, and institutional activities are integrated within close proximity<sup>[5]</sup>. This mixed-use approach reduces the need for long commutes and encourages residents to walk or cycle for daily errands, thereby reducing traffic congestion and carbon emissions. Additionally, mixed land use fosters a sense of community and social interaction, as people have easier access to amenities and public spaces within their neighborhoods.

Pedestrian-friendly infrastructure plays a crucial role in

15-minute cities by prioritizing the safety and comfort of pedestrians and cyclists. This includes well-designed sidewalks, dedicated bike lanes, traffic calming measures, and pedestrian-friendly crossings. Creating a safe and inviting environment for walking and cycling not only promotes physical activity but also contributes to cleaner air and reduced noise pollution in urban areas<sup>[6]</sup>.

Efficient public transport is another key component of 15-minute cities, complementing active transportation modes by providing accessible and reliable transit options for longer trips or commuting to areas beyond walking or biking distance. Integrated public transport systems, such as buses, trams, and metro lines, connect neighborhoods and encourage modal shifts away from private car use. By offering convenient and affordable alternatives to driving, efficient public transport supports sustainable mobility patterns and reduces the environmental footprint of urban transportation. Accessible green spaces are integral to the livability of 15-minute cities, providing residents with opportunities for recreation, relaxation, and nature immersion within their immediate surroundings. Parks, green corridors, community gardens, and urban forests not only enhance urban aesthetics but also contribute to biodiversity, air quality improvement, and climate resilience. Incorporating green infrastructure into 15-minute cities fosters a healthy and sustainable urban environment that prioritizes human well-being and ecological balance<sup>[7]</sup>.

### **3. Implementing 15-Minute Cities in Developing Countries**

#### **3.1 Investment in Public Transport and Pedestrian Infrastructure**

Developing countries can allocate resources to enhance their public transport infrastructure, focusing on modes such as bus rapid transit (BRT), light rail transit (LRT), and metro systems. These systems should be designed to provide efficient, affordable, and reliable services to residents, reducing the need for private car usage. For example, cities can invest in dedicated bus lanes, modernize fleets with low-emission vehicles, and implement smart ticketing systems to improve the overall user experience and encourage modal shifts towards sustainable transportation options.

In addition to public transport, investments in pedestrian and cycling infrastructure are crucial for creating walkable and bikeable cities. This includes building and maintaining sidewalks, crosswalks, bike lanes, and safe crossings to facilitate active transportation. By prioritizing pedestrian safety and creating a connected network of cycling routes, cities can encourage residents to choose walking and cycling as viable modes of transport for short-distance

trips, thereby reducing congestion and environmental impact. Developing countries can promote multi-modal transportation, allowing residents to flexibly choose different modes of transport based on their needs and circumstances. This includes developing shared mobility services, encouraging the integration of walking with public transport, and providing bicycle rental and sharing systems. By promoting multi-modal transportation, cities can meet the diverse travel needs of different demographics, reduce reliance on private cars, and mitigate traffic congestion and environmental pollution.

#### **3.2 Promotion of Mixed-Use Development and Smart Growth Policies**

Developing countries can adopt land-use policies that promote mixed-use development, where residential, commercial, and recreational activities coexist within neighborhoods. This approach reduces the need for long commutes and fosters vibrant, self-sufficient communities. By incentivizing developers to create mixed-use projects and integrating amenities such as schools, parks, and shops into residential areas, cities can enhance accessibility and quality of life for residents while minimizing urban sprawl and car dependency. Smart growth policies focus on compact, sustainable urban development that prioritizes efficient land use, transit-oriented design, and environmental stewardship. Cities can implement strategies such as compact urban form, higher density development near transit hubs, green building standards, and preservation of green spaces to create more livable and resilient communities. By promoting sustainable land-use practices and reducing reliance on private cars, smart growth policies contribute to mitigating climate change and improving overall urban sustainability.

#### **3.3 Enhanced Connectivity and Access to Amenities**

Investing in vibrant public spaces within neighborhoods is crucial for promoting community engagement and social interaction. Cities can achieve this by developing parks, plazas, community centers, and cultural venues that serve as gathering points for residents. These spaces provide opportunities for socializing, cultural activities, and recreational events, contributing to a sense of belonging and connectedness within the community. By creating accessible and inclusive public spaces, cities can foster social cohesion, support healthy lifestyles, and enhance overall urban vibrancy.

Equitable access to essential services such as healthcare, education, shopping, and recreation is a fundamental aspect of creating 15-minute cities. Cities can strategically plan and locate facilities and amenities within walking

or cycling distance from residential areas. This approach reduces travel times, promotes active living, and enhances convenience for residents. By reducing disparities in access to services based on income or location, cities can foster inclusive and cohesive communities. This not only improves quality of life but also promotes social equity and a sense of belonging among diverse populations. Investing in enhanced connectivity and access to amenities supports active living and addresses social equity within communities. By creating pedestrian-friendly neighborhoods with well-connected infrastructure, cities encourage residents to walk or cycle for daily needs, reducing reliance on cars and promoting a healthier lifestyle. Moreover, strategically locating essential services and facilities ensures that all residents, regardless of income or location, have equitable access to healthcare, education, and recreational opportunities. This approach fosters inclusive communities where everyone can thrive and contribute to the overall well-being and vibrancy of the city<sup>[8]</sup>.

### 3.4 Community Engagement and Participatory Planning

Engaging local communities in the urban planning process through participatory approaches is essential for creating sustainable and inclusive cities. Cities can organize various engagement activities such as community workshops, town hall meetings, and online forums to gather input, feedback, and ideas from residents regarding neighborhood development, infrastructure priorities, and public space enhancements. By involving residents in decision-making processes, cities can ensure that urban development initiatives align with community needs and aspirations, leading to more effective and sustainable outcomes<sup>[9]</sup>.

Empowering residents to actively participate in decision-making processes fosters a sense of ownership and responsibility for their neighborhoods. When communities have a voice in shaping their environment, they are more likely to take pride in their surroundings and actively contribute to their improvement. Additionally, participatory planning builds trust between government authorities and communities by demonstrating transparency, inclusivity, and responsiveness to local concerns. This trust is essential for fostering collaborative relationships and implementing successful urban development projects. Supporting grassroots initiatives and community-led projects is crucial for building resilient and vibrant neighborhoods. Cities can provide resources, funding, and technical assistance to local organizations, nonprofits, and community groups that are driving sustainability initiatives, promoting cultural heritage, or enhancing social cohesion<sup>[10]</sup>. By fostering a culture of collaboration and empowering local initiatives, cities can harness the collective efforts of resi-

dents and stakeholders to create positive change, strengthen social bonds, and build resilient communities from the ground up. This bottom-up approach not only improves community well-being but also enhances the overall sustainability and accessibility of cities.

### 3.5 Challenges and Responses to Urban Sustainable Development

#### Cost Barriers: The Burden of Sustainable Infrastructure Construction

One of the primary challenges facing urban sustainable development is the substantial costs involved in building and maintaining sustainable infrastructure. This includes investments in public transportation systems, green buildings, renewable energy, as well as waste management and water resource management. Especially in developing countries and emerging economies, fiscal resources are limited, making it difficult for governments to bear these costs alone. Additionally, the private sector may be skeptical about investing in sustainable infrastructure projects due to their potentially long investment payback periods and higher risks. To overcome this challenge, collaboration between governments and the private sector is needed. Innovative financing models such as public-private partnerships and sustainable development bonds can be employed to share investment risks and enhance the attractiveness of projects. Furthermore, developing long-term sustainable development strategies and providing incentives and tax benefits for sustainable infrastructure projects can attract more investment and reduce implementation costs.

Another challenge is the pressure brought by high growth rates to cities, which may lead to excessive resource consumption, exacerbated environmental pollution, and unstable urban social structures. With increasing urban populations and economic expansion, growing demands result in over exploitation of land, energy, and water resources, exacerbating environmental issues and social inequalities. To overcome this challenge, cities need to formulate comprehensive development plans that balance economic growth with environmental protection. This includes enhancing resource management, promoting energy efficiency and water conservation measures, encouraging circular economy and green technological innovations to reduce dependence on natural resources and alleviate environmental burdens. Additionally, prioritizing social accessibility and equitable development by providing education, employment, and social security services can promote social stability and equal opportunities, helping to alleviate the pressures from high growth rates and achieve urban sustainable development goals.

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