Reclaiming Public Space: Traffic Areas as a Game Changer for Future-Oriented Urban Planning

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1 ABSTRACT

This paper investigates the transformative potential of reclaiming urban traffic areas for sustainable urban planning. It examines the historical dominance of car-centric planning since the mid-20th century and its impact on mobility, urban spaces, and environmental sustainability. Addressing challenges such as mobility poverty and greenhouse gas emissions, the study highlights the critical role of reallocating public spaces from vehicles to human-centered uses to promote social cohesion, inclusivity, and ecological resilience.

Case studies, including Barcelona's "superblocks" and Copenhagen's cycling infrastructure, illustrate successful interventions that improve public health, reduce emissions, and support biodiversity. The findings emphasize the necessity of integrated policies – such as compact urban development, congestion pricing, and multimodal mobility – combined with community engagement to create resilient, inclusive, and sustainable cities, aligned with the United Nations Sustainable Development Goal 11.

Keywords: Sustainable Urban Planning, Mobility Poverty, Car-Centric Infrastructure, Human-Centered Design, Environmental Resilience

2 INTRODUCTION

2.1 The car's victory lap

Cities and towns are built environments where individuals live, interact, and engage in social activities. For centuries, the city center was the focal point of these interactions. However, since the 1960s, this dynamic has shifted. Economic prosperity in the Western world enabled widespread car ownership, and the automobile gradually became the dominant mode of transport (Newman, 2015). Urban spatial planning adapted to accommodate this transition. Cars, requiring significantly more space than walking, cycling, or public transportation, created spatial constraints within cities. The built environment, particularly building facades, could not easily be altered to accommodate new mobility demands. Consequently, public spaces were redesigned, prioritizing cars over pedestrians and cyclists. This reallocation diminished urban attractiveness and degraded the social quality of cities, transforming public spaces into traffic spaces (Gehl, 2010).

2.2 The research question

This critical analysis culminates in the formulation of the central research question that underpins this paper: "How can urban planning be reimagined to transform public spaces from car-oriented infrastructure into social interaction spaces that prioritize the needs of pedestrians, cyclists, and community engagement, and what are the social, environmental, and political benefits of such a transformation?"

This research question is designed to address both the practical and theoretical dimensions of urban reconfiguration. It seeks to explore innovative strategies and frameworks that can enable a paradigm shift in urban planning, transitioning from a focus on vehicular-centric infrastructure to the creation of inclusive, human-centered public spaces. The question further aims to evaluate the multifaceted benefits of this transformation, with a particular focus on its social, environmental, and political implications.

2.3 Historical Context of Mobility and Urban Development

Human mobility has historically shaped urban development. The invention of the wheel expanded transportation possibilities, allowing goods and people to traverse distances beyond walking (Mumford, 1961). The industrial revolution and the advent of steam engines and electricity introduced trams and trains, enabling urban expansion along transportation corridors (Hall, 2002). The automobile, however, facilitated unrestricted mobility, leading to urban sprawl in all directions (Newman et al., 2017).

Mobility, while essential for accessing basic functions, is not a primary human need as defined by Maslow's hierarchy. It supports foundational functions identified in Dieter Partzsch's Daseinsgrundfunktionen, which

include living, working, provisioning, education, and recreation (Partzsch, 1961). These categories outline the essential demands on human habitats. Since spatial planning cannot concentrate all basic functions within a single area, mobility becomes a necessity, connecting individuals with locations where their needs can be met, such as workplaces, educational institutions, or recreational facilities. Therefore, it can be concluded that mobility is not a direct need in itself – almost no one travels just for the sake of traveling; it is always connected to one of the basic needs.

2.4 Mobility Poverty: An Overlooked Challenge

Mobility poverty, defined as the lack of access to adequate transportation, represents a critical barrier to societal participation, particularly for vulnerable populations. It arises from various factors, including physical disabilities, economic constraints, and infrastructural inadequacies such as limited availability of public transit during off-peak hours (Lucas, 2012). The effective application of urban planning is essential to mitigate mobility poverty and ensure equitable access to transportation.

In Austria, low-income households are disproportionately affected by traffic-related externalities, such as air and noise pollution, despite being less likely to own or use cars. For example, 44% of households in the lowest income quartile do not own a car, compared to just 9% in the highest income quartile (VCÖ, 2023), as illustrated in Figure 1. This disparity underscores the intersection of economic vulnerability and mobility poverty. Approximately 17.3% of individuals in private households – equivalent to 1.5 million people – were classified as being at risk of poverty or social exclusion in 2021 according to EU definitions (Klima- und Energiefonds, 2024).

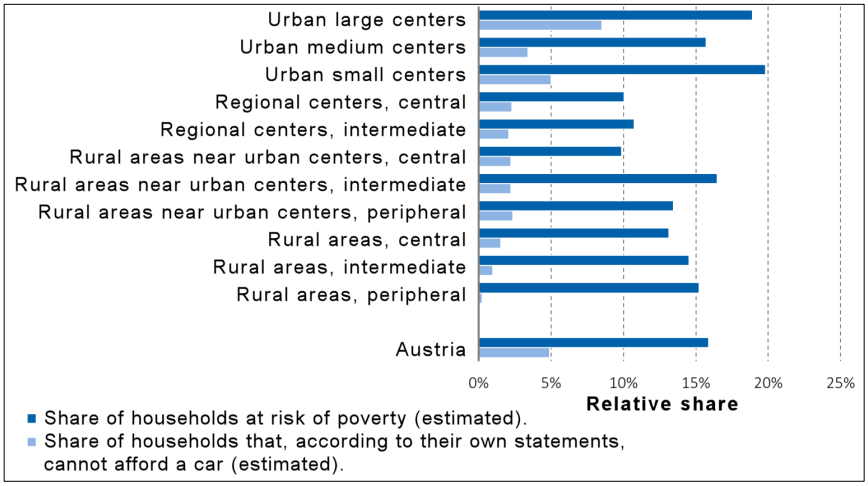

Fig. 1: Share of households at risk of poverty and share of households that, according to their own statements, cannot afford a car. Source: Modified based on (Klima- Und Energiefonds, 2024).

The lack of affordable and sustainable transportation options intensifies the challenges faced by economically disadvantaged groups, exacerbating existing inequalities. Urban sprawl, driven in part by the relocation of essential services such as supermarkets to suburban or peripheral areas, plays a significant role in perpetuating mobility poverty. These developments not only alter shopping behaviors and increase greenhouse gas emissions but also degrade the social fabric and reduce the quality of life in affected communities. The peripheral placement of services weakens the functionality and appeal of city centers, particularly in terms of local provisioning. Low-income households are disproportionately impacted by this shift, as alternative transportation modes such as walking and cycling become less viable due to extended distances and insufficient infrastructure. Consequently, these groups become increasingly dependent on motorized transport, which imposes additional financial burdens and further restricts their ability to participate in social and economic activities.

Thus, people cannot fulfill their basic functions if travel is required and transportation is unavailable. Rural areas are particularly vulnerable, given their sparse transportation infrastructure. While realized mobility – quantified through transport data – is well-documented, unmet mobility needs are harder to measure and require comprehensive surveys (Pyrialakou et al., 2016) and is therefore, most often not paid attention to in traffic planning. Addressing mobility poverty demands inclusive Sustainable spatial planning and equitable mobility solutions.

3 SUSTAINABLE URBAN DEVELOPMENT

3.1 The Role of Mobility

Sustainable Urban Development is the process of designing and managing urban, rural, or organizational development in a way that meets present needs without compromising the ability of future generations to meet their own (United Nations, 1987). Sustainable development must be pursued in urban planning and is often framed through the "three Ps" – people, planet, and profit – first articulated by (Elkington, 1997). Nowadays it is known as environmental conservation, social equity, and economic viability as its core principles. Sustainable planning emphasizes efficient resource use, renewable energy integration, biodiversity preservation, and inclusive community engagement. (Campbell, 1996) Therefore, urban sprawl should be minimized in favor of compact, mixed-use developments, to reduce commuting distances, the promotion of public transit over car dependency, and the integration of green spaces to enhance quality of life and mitigate climate change. The Paris's "15-minute city" model aligns with this principle, which promotes local accessibility and reduces car dependency (Moreno et al., 2021).

For mobility, the three Ps mean that mobility should only be offered if it is economically viable. Public transport often struggles to operate cost-effectively or profitably, so it is partially funded by society. How much of the general budget can and should a state contribute here? Furthermore, it is important for society to have a choice of transportation modes that minimizes mobility poverty without creating excessive costs. Currently, the most important P is the environment. The environmental implications of transportation are significant. In Austria, the mobility sector accounted for 28% (20.62 million tons of greenhouse gases) of greenhouse gas emissions in 2022, predominantly from passenger cars and freight transport. Emissions are mainly caused by cars and road freight transport (vehicles weighing 3.5 to 38 tons), 11.98 and 6.56 million tons of CO_2 equivalents, respectively. Car emissions increased by 4.9% from 2021 to 2022, while freight transport emissions decreased by 15.8%. (Federal Ministry for Climate Action, 2023). A modal shift toward sustainable transportation, such as walking, cycling, and public transit, is essential. Although public transit has higher total emissions compared to individual cars, its per-person emissions are substantially lower due to higher passenger capacity (International Energy Agency, 2021).

Cars are thus one of the largest contributors to greenhouse gas emissions, which must be minimized. To reduce these emissions, the following recommendations apply to mobility: avoid mobility, shift mobility to environmentally friendly modes, and, if the first two are not feasible, improve or clean the car – shared cars or new types of propulsion, such as electric driving.

Avoiding mobility is often not possible. As mentioned earlier, mobility is not a need in itself but ensures that basic human needs can be satisfied. Information technology allows certain functions to be decoupled from a location, such as streaming services that enable people to watch movies at home instead of going to the cinema. The same applies to home office work. You no longer need to travel to work but can work from home. Direct mobility in public space is thus avoided. However, this does not mean that people are not mobile. Mobility occurs through data transmission, where data is moved instead of people. Consequently, fewer people are physically on the move, but infrastructure (internet cables) and energy are still consumed.

The best option is to change the choice of transportation modes away from cars to more sustainable modes, such as walking, cycling, or public transport, which have higher emissions than cars but lower emissions per person and kilometer due to higher occupancy rates. According to (VCÖ.b 2023), every tenth car trip covers a distance that can be walked, and four out of ten car trips are shorter than 5 kilometers and can be easily covered by bike. Active urban planning can increase the number of short trips and the attractiveness of sustainable transportation modes. In urban planning, this means counteracting urban sprawl – building on greenfields – and promoting the densification of urban structures. Increasing functional diversity is extremely important, meaning that in addition to living, other basic needs can be met within a short distance, such as working, education, green and recreational opportunities, and local supply structures.

3.2 Optimizing Urban Design for Sustainable Mobility

For a city, this means that vertical urban planning – building upwards – becomes more important than horizontal urban planning – large-scale built areas with low density. However, the goal is always to create as much functional diversity locally as possible. In some Asian cities, there is high-density urban sprawl defined by residential blocks for monofunctional use of largely identical units clustered in isolated

superblocks. Other life needs are not locally available, and people must travel to other locations to satisfy them. (Calthorpe, 2025) Offering a mix of functions within walking or cycling distance can ensure that sustainable transportation modes are chosen.

Walter Christaller's central place theory provides a framework for structuring urban areas. Functions catering to daily and weekly needs should be localized, while less frequent needs, such as cultural or administrative services, can be accessed through efficient public transit systems (Christaller, 1933). This hierarchy encourages multimodal mobility, combining walking, cycling, and transit as primary modes, with cars reserved for secondary roles, such as shared or electric vehicles.

4 RECLAIMING PUBLIC SPACE: SOCIAL AND ENVIRONMENTAL BENEFITS

The reallocation of urban spaces from vehicles to pedestrians, cyclists, and other human-centered uses has profound implications for both social cohesion and environmental sustainability. Public spaces, once dominated by traffic, are increasingly recognized as vital for urban life, offering opportunities for social interactions, recreation, and cultural activities as well as enhance urban resilience, public health, and environmental quality.

4.1 Social Benefits

Reclaimed public spaces contribute to fostering social connections and community engagement. Spaces previously occupied by vehicles can be redesigned into plazas, pedestrian promenades, or parks, creating environments where people can meet, interact, and build relationships. Jan Gehl (2010) emphasizes that lively public spaces encourage "staying" activities – such as sitting, dining, and conversing – essential for urban vitality and cultural exchange. For instance, Barcelona's "superblocks" initiative, which limits traffic in certain urban areas, has led to increased pedestrian activity, reduced noise pollution, and enhanced neighbourhood cohesion (Mueller.a, 2020). The implementation of Superblocks in Barcelona is estimated to lead to an average increase in life expectancy of approximately 200 days for the adult population. Additionally, this intervention is projected to generate an annual economic benefit of €1.7 billion (Mueller.b, 2020). Public spaces also provide a platform for inclusivity, enabling marginalized groups to participate in urban life. Accessibility improvements, such as barrier-free designs and multimodal connections, ensure that individuals with disabilities, the elderly, and families with young children can benefit equally. Furthermore, well-designed public spaces support cultural events, markets, and artistic performances, enriching community life and promoting local economies.

Inclusive public spaces also ensure equitable access for marginalized groups, such as individuals with disabilities, the elderly, and families with young children. Barrier-free designs and multimodal connections expand accessibility while supporting cultural events, markets, and artistic performances, which enrich community life and promote local economies. Active community involvement is a critical factor in ensuring public spaces meet the diverse needs of their users. Studies demonstrate that public participation enhances the acceptance and sustainability of urban development initiatives (Deutscher Städtetag, 2024). For example, the "Help Shape Graz" (Graz mitgestalten) project in Austria enables citizens to participate actively in urban planning and decision-making processes (Stadt Graz, n.d.).

However, challenges remain, including ensuring balanced representation of all social groups. Marginalized populations, such as migrants, low-income households, and the elderly, are often underrepresented. Low-threshold and barrier-free participation formats, including hybrid methods combining analog and digital approaches, are crucial for broad engagement. Regular evaluation and adaptation of these processes can help align outcomes with community needs, ensuring the long-term success and acceptance of urban projects.

4.2 Environmental Benefits

The transformation of traffic-dominated areas into green spaces provides numerous environmental advantages. Urban green spaces, such as parks and vegetated corridors, effectively reduce the urban heat island effect by lowering surface temperatures (Bowler et al., 2010). Additionally, trees and vegetation improve air quality by absorbing pollutants like nitrogen dioxide and particulate matter while acting as carbon sinks to mitigate climate change (Baró et al., 2014).

Minimizing vehicle dominance also leads to significant reductions in greenhouse gas emissions. Shifting to sustainable modes of transportation, such as walking, cycling, and public transit, lowers per capita carbon

footprints compared to private car use (International Energy Agency, 2021). Further, the integration of permeable surfaces and green infrastructure improves urban water management, mitigating flood risks during heavy rainfall events (Kazemi et al., 2009).

Ecological redesigns that prioritize native plant species and wildlife habitats contribute to increased biodiversity in urban areas. Native vegetation supports a higher diversity of insects and birds, which are vital for urban ecosystems, and helps improve the microclimate while supporting climate adaptation (Tartaglia, 2024). Research emphasizes the importance of trees in reducing urban heat islands and highlights their role in public perceptions of effective climate adaptation strategies (Doussard, 2023). Policies that advance green infrastructure also enhance resilience to extreme weather events and improve urban quality of life (European Environment Agency, 2015).

These findings demonstrate that reclaiming traffic spaces for green infrastructure and active mobility provides dual benefits: improving environmental sustainability while enhancing urban livability..

4.3 Policy and Planning Considerations

A shift towards sustainable public spaces requires coordinated efforts by urban planners, policymakers, and communities. Effective policies should prioritize reducing car dependency through measures such as congestion pricing, parking restrictions, and incentives for sustainable mobility. For example, cities like London and Stockholm have implemented congestion charges, resulting in a 30% and 20% reduction in private car use, respectively (Vital city, 2024). These measures have improved air quality, reduced congestion, and encouraged a modal shift toward public transport, cycling, and walking. Revenue from such policies is reinvested into sustainable transport infrastructure, enhancing long-term urban mobility (Leihs, 2014; Environmental Administration Stockholm City, 2024).

Targeted funding programs also play a pivotal role in transforming public spaces. Copenhagen's consistent investment in cycling infrastructure, such as bike lanes and parking, has significantly increased cycling rates while reducing car traffic (C40Cities, 2016). Additionally, funding for electric vehicles and shared mobility solutions, such as car-sharing programs, supports the transition to low-emission transport and boosts public acceptance of sustainable mobility (Umweltbundesamt, 2015). These investments are crucial for achieving climate-neutral transport systems.

Urban planning initiatives must align with broader sustainability frameworks, such as the United Nations Sustainable Development Goal 11, which aims to create inclusive, safe, resilient, and sustainable cities (Bebbington et al., 2018). Evaluating reclaimed spaces through metrics such as foot traffic, air quality, and community feedback ensures projects meet environmental and social goals while allowing for iterative policy adjustments. By integrating these strategies, cities can transform public spaces into sustainable, accessible, and vibrant environments.

5 CONCLUSION

A paradigm shift in mobility patterns, facilitated by sustainable urban planning, is essential for mitigating mobility poverty, reducing environmental impacts, and revitalizing urban social structures. By transforming car-dominated infrastructure into human-centered public spaces, cities can foster social cohesion, inclusivity, and environmental resilience while addressing challenges like mobility poverty and urban degradation. Reimagined spaces for pedestrians, cyclists, and green infrastructure generate substantial social, environmental, and economic benefits, supporting the creation of resilient, inclusive, and sustainable communities.

Achieving these outcomes requires the consistent implementation of effective strategies, including congestion pricing, targeted funding, and community-driven planning, to reduce car dependency, emissions, and congestion. Successful interventions in cities like Barcelona, Copenhagen, and London demonstrate the importance of aligning urban planning with broader sustainability goals, such as the United Nations Sustainable Development Goal 11.

Ultimately, this transformation demands a coordinated, multidimensional approach that integrates policy innovation, environmental stewardship, and active community participation. By adopting these principles, cities can enhance livability, address inequality, and pave the way for a more equitable and sustainable urban future.

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