

Editorial

Car Dependency and Urban Form

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Abstract

In this editorial of the thematic issue on car dependency and urban form, we provide a concise bibliometric overview that examines the prevalence of the concept of car dependency in relation to the built environment. Furthermore, we delve into the prior call for papers and analyse how the various contributions align with the theme. Subsequently, we present an inclusive review of the 11 distinct contributions, employing a classification framework encompassing micro, meso, and macro perspectives. To conclude, we reflect briefly on the utility of the concepts of being car-less versus car-free, and we contemplate the potential ramifications of fleet electrification on the ongoing discourse surrounding car dependency.

Keywords

built environment; car dependency; transport; urban form

Issue

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1. Introduction and Call for Papers

In 1989, Newman and Kenworthy made a groundbreaking contribution to the field of car dependency and urban form with their influential book titled *Cities and Automobile Dependence: An International Sourcebook*. Within its pages, they unveiled a renowned graph that depicted the connection between urban density and transport-related fuel consumption (Newman & Kenworthy, 1989a). While earlier literature had touched upon the term “automobile dependence” or its variations, it is undeniably Newman and Kenworthy who bear the responsibility for the wide distribution of the concept, not only in research, but also in professional circles of urban planners and transport planners.

To gain insight into the origins and use of the concept of car dependency, we investigated its occurrence in the titles, keywords, and abstracts of academic publications registered in the Scopus publication database. Our search strategy involved exploring various combinations of words including “automobile” or “car” with “dependency,” “dependence,” “dependencies,” or “dependent.”

Interestingly, our findings highlight that the earliest frequently referenced publication in this domain dates to 1989. The seminal article titled “Gasoline Consumption and Cities: A Comparison of U.S. Cities With a Global Survey” (Newman & Kenworthy, 1989b) presents the pivotal findings from Newman and Kenworthy’s book of the same year. However, in subsequent years there appears to be a relatively sparse number of publications addressing the topic. Significantly, it is only from 1995 onwards that the term gains more prominence, with its usage growing steadily, in line with the global growth of the body of literature in urban planning and transport planning journals that seem to be the natural habitat for papers on the subject. From 2003 onwards the term has also been used in health sciences, in relation to the lack of basic exercise and related syndromes, and in social exclusion studies (see, e.g., Gray, 2004).

In 1995, Goodwin based his editorial of an early issue of the journal *Transport Policy* on a report for the RAC Foundation for Motoring and the Environment and titled it “Car Dependence.” In this paper, he draws a strict distinction between “car-dependent people” and

“car-dependent trips,” and states that car dependency should rather be regarded as a process than as a state. In doing so, Goodwin paves the way for a range of research lines that in their entirety represent and unravel the complexity of the notion of car dependency. Indeed, we observe that since 1995 the number of publications on the topic has systematically increased. However, in the present thematic issue, we adopt a retrospective approach and revisit the original notion proposed by Newman and Kenworthy, positing the existence of varying degrees of car dependency among urban areas or cities.

But this specific subset within the broader body of literature on car dependency has also developed since then, covering an important share of technical analyses that attempt to measure and establish correlations between the built environment and indicators of car use. To gain insight into this body of literature, we expanded our search string in Scopus with the terms “vehicle miles,” “vehicle kilometers,” “VMT,” “VKT” (all referring to the term “vehicle miles/kilometers travelled”), “modal split,” and “urban form” or “built environment.” One of the earliest, as well as most cited, publications meeting the search criteria mentioned is the article “Travel Demand and the 3Ds: Density, diversity, and design” (Cervero & Kockelman, 1997) and the most cited recent article from the list is “Travel and the Built Environment: A Meta-Analysis” (Ewing & Cervero, 2010).

The call for papers, which preceded the thematic issue, starts from the observation that Newman and Kenworthy’s seminal work has been very influential in the field of urban planning, even though it has evoked important criticism on methodological grounds (Mindali et al., 2004; Saeidizand et al., 2022; Van Eenoo et al., 2022) and their notion of car dependency has been found too narrow (Goodwin, 1995). Mattioli et al. (2016) distinguish between three different understandings, or scales, of car dependency: micro (car dependency as an attribute of individuals), meso (as an attribute of trips, activities, or practices), and macro (as an attribute of society). Moreover, there is growing consensus that car dependency is a problem that is intertwined with all facets of society and therefore cannot simply be reduced to a characteristic of urban form (Urry, 2004). Nonetheless, the question of the impact of urban form on car dependency remains a hot topic among urban planners and transport planners.

Therefore, the call for papers invited scholarly contributions that would take a contemporary look at the problem of car dependency and urban form, both in the Global North and in the Global South, based on a genuine concern about how we can shape future urbanisation and urban redevelopment in a less car-oriented manner. Contributions could focus on, but were not limited to, the following topics: determinants of actual, perceived, and subjective car dependency in urban settings such as the importance of design of public space, walkability, bikeability, or transit-oriented development; forced car own-

ership, forced long-distance commuting, car-dependent passengers; mobility induced social exclusion, transport disadvantage and car dependency; urban form, society, and culture; travel behaviour, residential self-selection, and mode choice; sustainable urban planning and policy in relation to reducing car dependency; spatial and socio-demographic variations of car dependency; and direct and indirect costs of car-dependent built environments.

2. The Contributions

The call for submissions for this thematic issue was initiated in 2021, followed by an online workshop held in June 2022, where all authors could present their proposed contribution. Subsequently, submissions were received in October 2022, initiating the peer-review process. Finally, after peer-review, a total of 11 articles were accepted and published. The contributions are representative of the diversity of research that identifies with issues of car dependency in relation to urban form. Moreover, the contributions are geographically quite diverse. While the epicenter lies in Europe, the inclusion of cases from Asia (China and Mongolia), North America, and Latin America (Suriname) adds a global perspective. Moving forward, we will now provide an overview of the content of the various contributions, along the micro-meso-macro classification proposed by Mattioli et al. (2016).

At the micro-level, the focus is on understanding car dependency on the individual and household scales. Belton Chevallier et al. (2023) delve into the phenomenon of de-motorisation, specifically studying the reduction of car ownership at the household level in four French urban areas. They investigate the factors influencing de-motorisation, such as key life changes, income fluctuations, and the availability of alternative transport options. By interviewing de-motorised households, they reveal the significance of spatial factors and mobility representations and practices in early life stages, of less car-dependent planning policies and providing alternative transport options in lower density areas. Hamiduddin (2023) takes a closer look at the importance of private car access and its impact on mobility and access to opportunities in the ger districts of Ulaanbaatar, the capital city of Mongolia. The ger districts, characterized by informal settlements and limited public transport infrastructure, pose unique challenges for understanding car dependency. Through household questionnaires, Hamiduddin examines the mobility patterns and accessibility levels of car-owning and non-car-owning households in these districts. The study highlights the potential of shared taxis as an alternative mode of transport and underscores the need for improved public transport services to reduce car dependency. Van Eenoo (2023) investigates the characteristics of zero-car households in Flanders, Belgium, and explores their interactions with the residential environment. By analysing data from diverse households, the study reveals that zero-car households are more

likely to be single, have lower incomes, and lack children. Contrary to common assumptions, zero-car households are not confined to urban areas alone. The findings emphasize the transport-related challenges faced by these households and advocate for inclusive urban planning and housing policies to address the vulnerabilities of low-income groups.

Moving beyond the individual and household scales, the meso-level perspectives explore car dependency in relation to trips, activities, and practices. Cao et al. (2023) tackle the intricate relationship between the built environment and car dependency in the Puget Sound area. Through the analysis of travel surveys, they identify nonlinear associations between the built environment characteristics and car use. The study suggests that high-density areas and pedestrian-friendly road networks discourage car use, while an optimal level of road density promotes it. These insights provide valuable guidance for urban planners aiming to design interventions that reduce car dependency. Dashtestaninejad et al. (2023) shift the focus to the Noord-Brabant region in the Netherlands, investigating whether car use primarily reflects car dependency or car-oriented preferences. By analysing data from employee questionnaires, the study explores commute travel times for various modes of transport. The findings highlight the importance of factors such as residential densities and proximity to railway stations in influencing car commuting patterns. Additionally, the study emphasises the significance of mode choice preferences in shaping car use. It concludes that a combination of measures, including both infrastructural and behavioural interventions, is necessary to effectively reduce car use and car dependency in commuting trips. Liu et al. (2023) delve into the role of buses in creating a sustainable transport system in Heze, China. Their research identifies the demographic characteristics associated with bus usage, including older individuals, the unemployed, and those travelling within the city centre. By examining travel distances and times, the study suggests that buses have the potential to replace cars for longer trips. To enhance bus travel, the authors propose strategies such as expanding the bus network, improving bus-related facilities, and ensuring punctuality and reliability. These recommendations contribute to the development of more sustainable transport systems.

The macro-level perspective encompasses a broader societal view of car dependency, considering it as an attribute of society and exploring strategies for addressing it. Aumann et al. (2023) present a comprehensive literature review on car-independent neighbourhood planning strategies for urban sustainability. By examining the implications of implemented car-independent policies in Europe, the study highlights the positive impacts of such interventions on sustainable mobility behaviour. However, it also stresses the need for further research to evaluate the psychological implications and attitudinal changes resulting from these interventions. Rymenants

et al. (2023) tackle the challenges of transitioning from a car-dependent urban environment to a more balanced modal split in Paramaribo, the capital city of Suriname. Their research emphasises the importance of finding suitable governance strategies to improve mobility in the city. Through a design-driven participatory action research initiative, the authors explore the potential of civic engagement and urban tactics in pressuring the government to provide adequate infrastructure and policies that support a more balanced modal split. The study underscores the significance of stakeholder collaboration and innovative governance approaches in addressing car dependency. Krüger and Altrock (2023) contribute to the discourse by analysing the planning of decentralised mobility hubs in German metropolitan areas. These mobility hubs, integrated into alternative modes of transport and existing parking garages, aim to reduce car dependency, and improve pedestrian flows. The study investigates the emergence of mobility hubs in urban design discourses and evaluates their potential effectiveness compared to traditional parking garages. By examining their impact on car use and promoting alternative modes of transport, the authors shed light on the role of these hubs in reshaping urban mobility patterns. Metz (2023) challenges the prevailing notion of reducing car dependency as the primary goal of sustainable transport policies. The author argues that focusing solely on reducing car dependency might overlook the utility and positive aspects associated with car ownership. Instead, the article advocates for a more nuanced approach that emphasises the availability of alternative modes of transport while mitigating the negative aspects of car use. Ye et al. (2023) explore the relationship between urban polycentricity (UP) and particulate matter emissions from vehicles (PMV) in Chinese cities. Their study investigates the complex interplay between urban structure, economic output, and population density. The findings reveal an inverted U-shaped relationship between UP and PMV, suggesting that increasing polycentricity can initially lead to higher PMV levels, but once a threshold is reached, it results in reduced emissions. The research highlights the influence of economic output and population density on PMV and provides valuable insights for policymakers striving to create more sustainable, polycentric urban environments.

3. Conclusions

This thematic issue of *Urban Planning* encompasses a rich collection of research articles that delve into the multifaceted nature of car dependency. The contributions at the micro, meso, and macro levels provide a comprehensive understanding of car dependency from individual behaviours and household dynamics to trip patterns, practices, and societal attributes. By examining different contexts and perspectives, the studies shed light on the complexities of car dependency and offer valuable insights for urban planners, policymakers, and

researchers striving to create sustainable and accessible urban environments.

Apart from the micro-meso-macro classification of Mattioli et al. (2016), there is also a clear difference in perspective between Global Northern regions on the one hand and emerging countries on the other. The conceptualisation of car-less versus car-free (Van Eeno, 2023) has the potential to extend beyond individual households, and apply to regions, countries, or societies. It is worth noting that in emerging countries, where car dependency is rapidly on the rise, the notion that a car-free lifestyle can be virtuous is not yet widely embraced. In the Global North, there is undoubtedly a presence of the idea of organising cities and urban areas into less car-dependent environments. However, it is important to note that translating this ideal into practice is still more of an exception than the norm. Also, we see that in Global Northern areas the alleged virtues of the electric car thwart the debate on car-independent urban planning, even though an electric car takes up as much urban space as its combustion-based pendant and is therefore perhaps primarily a solution for suburban and rural areas, rather than for urban areas. In this respect, it is somehow surprising that the role of fleet electrification in the debate on car dependency has hardly been addressed by any of the contributions to the current thematic issue.

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Conflict of Interests

The authors declare no conflict of interests.

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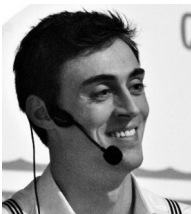
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Kobe Boussauw is associate professor of spatial planning and mobility, affiliated with the Cosmopolis Centre for Urban Research at the Vrije Universiteit Brussel. He holds degrees in engineering-architecture and urban planning, and a PhD in geography. His policy-oriented research focuses on the mutual interaction between mobility and the built environment. Central themes in his work are proximity as a spatial quality, urban liveability, and sustainability, often with a focus on car dependency in relation to the built environment.



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Koos Fransen has a background in industrial engineering and land surveying as well as in urban design and spatial planning. Up until 2022 he was employed as a post-doctoral researcher at the Cosmopolis Centre for Urban Research at the Vrije Universiteit Brussel and at the ISE research group at Ghent University, and is now still affiliated to both universities as a voluntary researcher. His research focuses on accessibility and its link to spatial planning and transport policy, with a primary focus on aspects of social exclusion and transport poverty.