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ARTICLE

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Policy design for sustainable urban transport in the global south

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ABSTRACT

Many urban areas, both in the Global North and South, are becoming increasingly automobile-dominated and less sustainable. The need to take action is well recognized but all too often governance arrangements and the symbolism attached to *auto*-mobility stand in the way. Drawing on international experience, this article summarizes some of the necessary preconditions of urban governance for promoting more sustainable urban transport in the Global South, highlights priority policy areas for action, reviews a range of key policy measures for promoting sustainable urban transport, and discusses the potential for transferring experience and practice from the Global North to the Global South.

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1. Introduction

Urban transport problems are messy (Ney 2009), wicked (Head 2008), and perverse (Pojani and Stead 2017). While education or health care improves as societies grow wealthier, transport problems worsen. Congestion has come to be the defining feature of many cities worldwide. At the same time, transport is crucial to a more sustainable and more human urban future. The need to develop more sustainable urban transport is now more important than ever before (Banister 2008).

Many urban areas, both in the Global North and South, are becoming increasingly automobile-dominated and less sustainable. In recent decades, cities have experienced rapid growth in transport-related externalities, including air pollution, congestion, accidents, noise, climate change, energy depletion, visual intrusion, and lack of accessibility for the poor (Dimitriou and Gakenheimer 2011; Pojani and Stead 2015a, 2017). The need to take action is well recognized but all too often governance arrangements and the symbolism attached to *auto*mobility stand in the way.

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Drawing on a compilation of international experience (Pojani and Stead 2015a, 2017), this article first summarizes some of the necessary preconditions of urban governance for promoting more sustainable urban transport in the Global South. Second, it highlights a number of priority policy areas for action: (i) road-based public transport; (ii) rail-based public transport; (iii) non-motorized transport; and (iv) technological improvement. The third part of the paper considers how different types of policy instruments can be employed to address these policy areas. Attention is focused on four main types of policy instruments: (i) regulations setting technical standards and rules of conduct/operation; (ii) fiscal instruments based on market incentives; (iii) information, awareness, and education provision; and (iv) public infrastructure/service provision.[1,2] In conclusion, the article discusses the potential to transfer experience and practice from the Global North to the Global South.

The article targets two main audiences: (i) urban transport sustainability researchers, who are seeking a review of academic literature and state-of-the-art practice; and (ii) policy-makers (and politicians) in the Global South, seeking an overview of practice that can be used to inform the development of new urban transport strategies. Clearly, there is much variation in policy-making contexts across the Global South, just as there also is in the Global North (Pojani and Stead 2017). The point of this paper is not to highlight the great variation between them but rather to critically assess the potential application of key policy measures beyond the Global North, where many of the measures have a longer history.

2. Key issues of urban governance for promoting sustainable urban transport

Around the world, especially in the Global South, very few examples can be found where the responsibilities for urban transport governance are coordinated effectively. In many cities, a combination of weak administrative arrangements, limited planning capacity, and a lack of coordination between land use and transport policy-making prevails, which together inhibits the development of more innovative, integrated, and sustainable policies (Pojani and Stead 2017). Most often transport tasks are spread across a myriad of agencies, especially in large metropolitan areas which contain several local governments. Where they are granted real decision-making power, these institutions often have differing ideologies and areas of focus. Comprehensive and integrated long-term visions for sustainable transport are rare. In many cases, although transportation planning and management may, in theory, be devolved at the local level, municipalities lack the budget to fulfil their transport-related responsibilities. As a result, cities generally rely on financial help from higher levels of governments, especially for large capital investments, which then leads to political and "turf" struggles.

In larger cities, transport governance is particularly problematic, not only due to the scale of issues, but also because larger cities often include intra-urban as well as inter-urban transport infrastructure and services, which is typically overseen by national and state agencies, leading to conflicts and inefficiencies. In many cases, developments along major road corridors, which fall outside municipal jurisdictions are not subject to strong planning controls. In some countries, traditional land use and development controls remain the responsibility of the architecture and planning

departments, while road construction and public transport operations are carried out separately by infrastructure and transport departments. The activities of these departments are often poorly coordinated, particularly in large municipalities. Disciplinary "silos" are also common where different departments (frequently staffed by different disciplines or professions) make decisions without interdepartmental dialogue. Regional metropolitan bodies exist in some cases which have legal authority over environmental and transportation issues but these often lack professional and financial capacity.

There is often no shortage of transport plans for cities in countries in the Global South. However, the lack of funding as well as political will often severely limits their implementation. Another key challenge to the effective implementation of urban transport policies and plans is the political influence of transport operators involved in providing public and private services. The involvement of the private sector in local transport financing is increasing in many countries, and sometimes actively encouraged to fill funding gaps. In India, for example, public-private partnerships (PPPs) have recently been introduced for the construction, operation, and maintenance of urban infrastructure projects. However, rather than easing the financial burden of cities, PPPs have often led to legal and financial disputes to the detriment of transport operations and management (Rathi 2017).

In general, governments in the Global South still face great challenges in terms of building technical capacity, coordinating the transport sector with other government sectors, and employing travel demand management strategies. Addressing issues of traffic management, enforcement, public transport regulation, and related questions requires significant professional capacity. It also demands institutional cooperation and the willingness and the ability of institutions to coordinate the work of professionals within and across public and private organizations, in order to work efficiently toward the common goal of transport sustainability that is convincingly articulated. Identifying effective and appropriate policy measures is a key challenge. The following section highlights a number of priority policy areas for action to promote sustainable urban transport in the Global South.

3. Priority policy areas for promoting sustainable urban transport

3.1. Road-based public transport

For the majority of urban residents in the Global South, road-based public transport (bus and paratransit) is the only means to accessing employment, education, and public services. In larger cities, such destinations are beyond viable walking and cycling distances while vast numbers of individuals have limited access to automobiles.

In recent decades, the creation of bus lanes on existing roads (painting a lane in a different color from the rest of the asphalt) has been a common low-cost strategy for improving the quality of bus systems throughout the world. In some cases, they are shared with high-occupancy vehicles, taxis, and/or non-motorized vehicles, and even with vehicles near turning points. New technologies allow vehicles in bus lanes to gain priority at intersections, with lights automatically turning red for cars and green for buses whenever the later approach shared intersections.

Bus rapid transit (BRT) is a recently developed bus-based mass transit, which emulates the performance and amenities of rail transit. BRT can be developed at substantially lower costs than rail transit (Hensher 2016). Rapid implementation times (1–5 years) and flexibility to adapt to spatially constrained historical centers and business districts with narrow roadway segments are other attractive features (Wright and Hook 2007). "Full BRT" is often more appropriate for large cities as it can transport up to 45,000 passengers per hour per direction, surpassing the capacity of many rail systems.

To date, more than 165 cities worldwide (most of them in Asia, Africa, and Latin America) have implemented BRT systems. Comparative assessments of BRTs throughout the world have found that most systems have greatly improved their local travel conditions and the quality and performance of public transport, especially in travel time savings and enhanced reliability. BRT systems have also reduced energy consumption and emissions. They have generally been well-received by the users leading to large bus ridership increases, especially in combination with urban enhancements schemes (Muñoz and Paget-Seekins 2016).

Despite the advantages, BRT systems in various Global South countries suffer from a range of problems. These include rushed implementation (e.g. several components incomplete at the time of commissioning); very tight financial planning as systems usually do not receive operational subsidies; excessive occupancy levels; early deterioration of infrastructure; fare collection systems requiring very tight supervision; and insufficient user education for initial implementation and system changes. While many of these problems are associated with financial restrictions and institutional constraints, they are not intrinsic BRT issues. Nevertheless, these difficulties affect public perception, which means that BRT is often regarded as a "second-best" mode compared to rail, and that politicians frequently offer rail alternatives as part of their electoral proposals (Muñoz and Paget-Seekins 2016).

3.2. Rail-based public transport

This encompasses light rail (LRT) and heavy rail (metros). LRT ranges from the historical tramways, trolleys, and streetcars of Eastern Europe, which run along other traffic in urban streets, to the sophisticated elevated and completely segregated systems of Kuala Lumpur. LRT vehicles can be developed on urban streets and run alongside urban traffic which is an advantage over metro systems, which require fully segregated rights-of-way. In the Global South, LRTs exist only in larger cities such as Tunis, Alexandria, Manila, Buenos Aires, and São Paulo. The cost of building and operating LRT varies widely but it is considerably higher than the cost of alternative public transport forms, such as busways (Wright and Hook 2007).

If LRT operates at grade without priority or protection from obstruction by other traffic, it has little or no performance (speed) advantage over busways (Gwilliam 2002). In the past, LRT advantages over busways were the lower local air pollution impact and possibly smother rides for urban travelers. Older LRT vehicles generally had higher carrying capacity than most buses. Evolving technologies (e.g. electric buses) have minimized the differences between bus and rail in terms of emissions, capacity, and comfort (Ben-Akiva and Morikawa 2002). However, LRT is generally more appealing to middle

class passengers, and investment in this mode is seen as a signal of a more permanent commitment to public transport on a government's part (Wright and Hook 2007). In view of the evidence, investments in new LRT systems in Global South cities may have limited economic and practical value. Due their high costs, these cities often can only construct such systems over a few kilometers in a few limited corridors, which do not meet the broader transport needs of the population.

Metro systems are usually the most expensive form of public transport in terms of construction and operation, but, as fully segregated systems, cater for large numbers of passengers and offer relatively high speeds. Since most metros are designed for capacities around 30,000 to 40,000 passengers per hour in the peak direction, usually, only cities with a population of 2–3 million have at least one corridor, which requires this type of facility (UN-Habitat 1993). In the Global South, only some megacities, such Mexico City, Mumbai, Delhi, Cairo, and now many Chinese cities, have metro or suburban rail systems.

Underground metro systems cannot be easily integrated into existing urban physical structures, without disrupting building foundations and utility lines (Flyvbjerg, Bruzelius, and van Wee 2008). In addition to high capital costs, metro systems have high operating costs and usually require operating subsidies; otherwise the price of the tickets would be prohibitive. While in principle public transport operations do not need to be profitable, given the valuable service that they provide to society, the high capital and operation cost of metros makes them less economically viable in smaller cities than in megacities.

3.3. Nonmotorized transport

Nonmotorized transport – walking and cycling, but also pedicabs and other human-operated vehicles – is the dominant transport mode in Global South cities, especially in Asia and Africa. The smaller the city size, the higher the percentage of non-motorized transport use. Moreover, increases in non-motorized transport improve traffic safety in cities: the likelihood of collision between a pedestrian or cyclist and a motor vehicle is inversely related to the amount of foot or bicycle traffic (Jacobsen 2003).

Despite its importance, nonmotorized transport policy and its related infrastructure are often neglected in policy-making in the Global South. On the one hand, the political climate is not favorable to soft modes. Politicians consider walking and cycling as a sign of backwardness and not commensurate with their goals and aspirations of economic growth and competitiveness. As noted, urban elites distort transport planning in favor of motorized modes, which they are more likely to use themselves. The groups which most heavily rely on non-motorized transport are poorly organized and unable to articulate their needs. On the other hand, urban street use in Global South cities often has a conflicting nature, with a complex pattern of coexistence between pedestrians, vehicles, vendors, and even animals, which also makes interventions more difficult (Vasconcellos 2013).

Cycle networks have been developed in several Latin American cities, including Bogotá and Sao Paolo. In Chile, the Vida-Chile is a national program that uses a variety of strategies to promote physical activity (Hoehner et al. 2008). In Chinese

megacities, where distances between destinations are large, electrical bicycles are increasingly popular (Weinert et al. 2007). Bicycle-sharing schemes have been introduced in a growing number of Global South cities, including Rio de Janeiro and several Chinese cities. Evidence to date suggests that bicycle-sharing has led to growing cycling rates but no reductions in car use. The growth of this mode has been concentrated in medium- to small-sized towns with systems of 50 bicycles (Midgley 2011).

3.4. Technological improvement

New technologies may help to tackle certain transport-related problems, such as air and noise pollution, oil dependency, traffic congestion, and accidents. A wide range of vehicles – passenger cars, heavy-duty trucks, garbage trucks, three-wheelers (primarily in Asian countries), and buses – can run on alternative fuels including natural gas, electricity, and biofuels. These fuels, which can be produced from any primary energy source, including biomass, wind and solar energy, nuclear energy, and decarbonized fossil fuels, constitute a cleaner alternative to diesel and gasoline.

Electric cars (fuel-cell, battery, or plug-in) have a low range (e.g. 100 km on a full charge in city traffic conditions), and are therefore attractive for urban use. The Chinese government has recently announced that it is working on a timetable to end production and sales of traditional energy vehicles (The Guardian 2017). However, at present the capital costs of electric vehicles are still significantly higher than the costs of conventional cars. In order to amortize the acquisition costs through energy savings, an electric car has to be used to travel significant distances, typically more than 20,000 km a year (Leurent and Windish 2011).

In addition to alternative fuels, intelligent transportation systems (ITS) have the potential to address urban transport problems in a variety of applications. In the Global South, the adoption of ITS has proceeded at a slow pace. In East Asia, Eastern Europe/Central Asia, and Latin America, the most common forms of ITS to date include traffic signal systems, traffic surveillance systems using CCTV, commercial vehicle (e.g. taxi) tracking systems using GPS, electronic ticketing services, electronic toll collection and fare payment systems, bus management systems, and traveler information systems. Further ITS deployment is needed in these settings to improve road safety conditions and mitigate traffic congestion, especially in large, polluted, and congested cities and in harsh climates with hazardous driving conditions (Shah and Dal 2007).

On the positive side, Global South cities are not generally burdened with outdated IT infrastructure that has to be updated. They can take advantage of ITS products and applications, which have already been tested and deployed in developed cities and which are now mature and stable. In theory, they can then leapfrog to an ITS-enabled transportation infrastructure far more rapidly and far less expensively than developed countries (Akhtar, Shah, and Ahn 2006).

Recent reports show that in short- to medium-term future, autonomous vehicles or self-driving cars will be on roads of Global North cities. Much speculation is currently taking place on how driverless cars will transform cities – by modifying land-use or even making car ownership and parking obsolete although no significant work has been carried out to date on the potential deployment of autonomous vehicles in

Global South – even in countries such as India and China in which local companies are currently developing autonomous vehicles. Few available studies suggest that user perceptions of automation might be similar in the Global North and South (Sanaullah et al. 2016). Also, driverless cars have the potential to make deadly urban roads in the Global South much safer.

On the other hand, autonomous driving requires understanding the intent and trajectory of everyone and everything on the road. Compared to Global North cities, driving environments in many Global South cities have organic structures and few formal rules. In some larger countries, signage and traffic signaling are not standardized among regions in terms of design and language. Moreover, self-driving cars require detailed and real-time mapping data that does not yet exist in much of the Global South. While humans can cope with unpredictability, this can be a major challenge for automated vehicles (Waddell 2017).

4. Key policy instruments for promoting sustainable urban transport

4.1. Regulation (including control of development)

Generally, public transport and non-motorized modes require high densities and mixed uses in order to be practically and financially feasible. Compact urban development is also often associated with shorter distances and lower use of motorized transport. Therefore, land-use controls have important implications for travel behavior. In smaller cities in particular, the manipulation of urban form (shape, size, density, compactness, intensification, decentralization, land-use type and mix, building layout and type, and green and open spaces) can help to overcome city problems. Climate variations, as well as cultural factors, play a role in the level of acceptable space consumption and proximity. However, densification is a very contentious issue in both overcrowded inner-city shanty towns and low-density peri-urban squatter settlements with large plot sizes but with maximum lot coverage (Jenks and Burgess 2000).

Transit-oriented development (TOD) – urban development that maximizes the amount of residential, business, and leisure space within short distances from public transport services – has been successful in a variety of settings, including some Global South cities (Curtis, Renne, and Bertolini 2009). If an overall dense and compact development cannot be achieved or if densification is not desirable in a given context (i.e. already hyper-dense inner city areas), densification and intensification of land uses can be encouraged around transport nodes and along transport corridors (the transit-oriented development or TOD model at a regional scale) in order to increase access for larger portions of the population. In some cases, small yet significant interventions, either through planning discourse or symbolic development on the ground, can help change public perceptions of sustainable urban form (Jenks and Burgess 2000).

While pricing mechanisms are often considered to be more effective than regulatory approaches (because they offer car users more choice, raise revenues, and can be adjusted according to different conditions–see below), regulation has an important role to play in promoting more sustainable urban transport. Laws and regulations related to driving include limits on car use based on certain criteria, such as emission

levels, noise levels, vehicle weight, fuel consumption, occupancy (i.e. bans of single-occupancy vehicles), days of the week, time of the day, area (usually a city center), and license plate number (in pollution-emergency days or permanently), and quotas for distance travelled or number of motorized trips within a given urban area. Other regulatory options include parking restrictions and speed limits.

These measures are considered politically easier to implement than pricing mechanisms because of the perception that all sections of the population are treated equally (Mahendra 2008). To be successful, these types of command-and-control measures must be reinforced by other complementary transport policies and promotional measures. Some types of car restrictions, such as speed limits, are not effective without the traffic law enforcement resources to ensure that limits are followed (Afukaar 2003).

An indirect way to alleviate peak-hour congestion through regulations is to mandate employers to implement telecommuting, flexible work, and staggered work shift programs, so that employees shift their commute at different times of the day. In Global North countries, the evidence suggests that, without supportive policies, telecommuting is unlikely to be enough to affect employee commuting patterns (Cohen-Blankshtain and Rotem-Mindali 2016).

4.2. Fiscal instruments

Even in contexts where drivers are well aware of the adverse impacts of car driving in urban areas, the choice of mode is distorted in favor of road transport, particularly if private car drivers are not charged the full costs of motorization. The idea of financially penalizing drivers by using coercive pricing mechanisms has long been proposed by transport economists as an effective mechanism to contain car use in urban areas. Even in the short-term, most studies find that fuel taxes lead to welfare loss among lower-income drivers, who lack alternative travel options (i.e. in a city where the public transport system is weak).

While megacities with large numbers of private vehicles and severe congestion problems may prefer congestion charges, smaller cities might consider fuel taxes. Generally, in Global South cities with low administrative capacities, instruments with smaller or no monitoring costs (e.g. fuel taxes and emission-based vehicle taxes) are more effective than those requiring large monitoring or administrative and compliance costs. No single policy fits all conditions. The policy options presented in this article can be enacted at the local, regional, or national level, depending on the governance arrangements that are already in place (Timilsina and Dulal 2008).

Pricing mechanisms also include subsidies for public transport fares (e.g. limited to vulnerable groups), tax subsidies (or exemptions) for the purchase of clean vehicles, and incentives for scrapping old vehicles. They have all been implemented in various cities in the Global South but to a more limited extent.

4.3. Information, awareness, and education

Countries in the Global North and South can use information, education, persuasion, and awareness-raising campaigns in favor of sustainable urban transport with various, but often limited, degrees of success. Typically, the more effective a measure is, the

more resistance it evokes (Stead 2008). Social mechanisms and processes, such as status seeking (i.e. the automobile as a status symbol), freedom seeking, or lack of trust in others' cooperativeness, are often at play, especially in the Global South, and perpetuate urban transport problems. Moreover, the publicity generated by the car industry is well ahead of sustainable urban transport promotion. In the collective consciousness, private motorized vehicles have been long associated with pleasure, comfort, speed, convenience, power, protection, superiority, individuality, hedonism, and freedom (Ashmore, Christie, and Tyler 2017).

Various general strategies to raise awareness on sustainable transport policy can be employed (see Pojani and Stead 2015a). A few specific techniques seeking to reduce car use have also been developed and tested but generally only in developed countries. Effective public awareness activities require novel approaches to capture the audience's attention. Moreover, campaigns must advance specific ideas (e.g. the creation of cycle tracks) rather than vague notions (e.g. transport sustainability in general). Experience suggests that public awareness campaigns need to be targeted and "integrated" (presenting all the urgent urban transport concerns as interconnected and interdependent). Parking policy must be correctly framed as not merely a public order issue but as a crucial tool in restricting demand for car travel and in raising revenues. Public awareness activities must encourage shifts in existing paradigms. For example, bicycles must be presented as the healthy vehicles of the future (i.e. a new status symbol rather than a vehicle for the poor); cars as imposers of high costs on the community (i.e. an antisocial mode); buses as modern and comfortable (i.e. a choice mode rather than a mode of last resort); walkways as a measure of democratization (i.e. pedestrians as part of the transport system). Framing the message is of crucial importance (Ashmore et al. 2017).

4.4. Public infrastructure provision

Increasing the size and number of roads (including flyovers and tunnels) was a commonly used approach for addressing congestion and other urban travel issues in the Global North since the middle of the twentieth century. In more recent years an understanding has emerged that increasing capacity can lead to greater demand as a result of "induced travel" (also referred to as "latent demand," or "generated traffic"). Induced travel is due to changes in individual travel behavior including decisions to travel more frequently, or at other times, to other locations or by other modes. The consequence is that congestion levels are soon restored to almost pre-expansion levels and little travel time savings are realized. Road investments also have adverse long-term effects on traffic congestion. They spawn new trips due to the land-use development (and possibly sprawl), which improved car access induces. Moreover, road construction itself is disruptive for densely built urban areas. In many cases, the demolition of buildings and/or open space is necessary (Downs 1992).

Induced demand claims have elicited strong reactions and polarized political factions. While the degree (i.e. the travel demand elasticity) and the circumstances (a single road facility or a metropolitan area) in which induced travel occurs remain a matter of debate, there is no question that road improvements result in increases in traffic and ultimately provide little congestion relief (see Litman 2001; Cervero 2002;

Noland and Lem 2002). This is certainly the case in Global North with saturated or nearly saturated car ownership markets but also applies to cities in the Global South, where incomes and car ownership are still growing. The prospect of induced travel lends credence to a transportation policy based on alternative modes. The available evidence suggests that, in the Global South, maintenance expenditures have a positive effect on economic output whereas the construction of new highly visible road infrastructure is less beneficial for economic development (Devarajan, Swaroop, and Zou 1996; Rioja 2003).

5. Discussion and conclusion

Caution is needed about the potential for international policy transfer in the urban transport arena. Contrary to a common belief among some development agencies that policy solutions already exist and simply need to be implemented more widely, the search, analysis, and uptake of urban transport policy ideas, concepts, or instruments from elsewhere are subject to a range of different influences, including political, professional, institutional, economic, and social. Research to date indicates that there is little evidence or prospect of "copying" of one policy from one area to another, certainly outside national boundaries. The potential for replication of "best practices" is questionable. Even examples from the Global South may not be very replicable in terms of outcomes if transplanted to different contexts in the Global South (Ashmore et al. 2017).

Cultural penchants and historic trajectories of transport demand and supply (implying path dependence) prevent cities from applying the same solutions to apparently similar problems (Ashmore et al. 2017). Where contexts are quite dissimilar (e.g. North to South), caution is suggested both in terms of the appropriateness and effectiveness of standard policy solutions being exported from one place to another (Stead, de Jong, and Reinholde 2008; Marsden and Stead 2011; Pojani and Stead 2015b). Cities in the Global South are advised to consider examples of transport solutions from both all contexts and to keep in mind that not all innovation originates from the Global North. After all, some of the most efficient and cost-effective public transport systems have been developed in Latin America. Considering local factors, such as costs, feasibility, barriers, and key actors, is the key.

Most of the interventions discussed earlier, if not all, cannot materialize without decisive government involvement. Concerted efforts are required by different levels of government (and non-governmental actors) and different sectors to implement sustainable urban transport policies. Moreover, a paradigm shift is needed in policy-making in order to achieve policy reform: from "mobility" to "accessibility;" from "vehicles" to "people;" from "modal" to "multimodal;" from "speeding up" to "slowing down;" from "segregation" to "integration" (Banister 2008). Limiting private car ownership and use is paramount.

None of the reviewed policy areas or instruments can yield satisfactory results if employed in isolation: combinations (or packages) of priorities and measures are necessary (Givoni et al. 2013; Stead and Pojani 2017). Various combinations of policies can work together and give rise to synergies, leading to impacts greater than the sum of their individual parts. The identification of policy packages is a crucial issue

for promoting more sustainable urban transport: packages should aim to maximize potential synergies and minimize resistance to their introduction (Banister and Stead 2003).

Notes

1. These types are based on a synthesis of two similar but nevertheless different taxonomies proposed by Banister et al. (2000) and Wittneben et al. (2009). The taxonomy of policy instruments proposed by Banister et al. (2000) includes the following four types: (i) market-based instruments; (ii) regulation-based instruments; (iii) lifestyle-based instruments; and (iv) public infrastructure/services. Meanwhile, the taxonomy proposed by Wittneben et al. (2009) includes the following four types: (i) planning (distributive); (ii) regulation (normative); (iii) economic instruments (re-distributive); and (iv) soft instruments (informative).
2. The four types of instruments have broad similarities with more generic policy taxonomies (i.e. those not related to the transport sector), such as the NATO model ("nodality", "authority", "treasure," and "organization") proposed by Hood (1986).

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No potential conflict of interest was reported by the authors.

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