Inequalities in Everyday Urban Mobility

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In particular, the present paper has contributed to Chapter 6 on 'Connecting', which focuses on the multiple interventions and programmes that increase the linkages between and within cities and citizens, and the role of local and regional governments in the governance and planning of more equitable transport, infrastructure and digital connectivity.

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Abstract

Inequalities in everyday mobility of people and transport poverty can be analysed effectively using the Capability Approach. Five main conclusions about urban mobility capabilities are drawn in this Working Paper based on a synthesis of academic literature. First, the effects of policy interventions on mobility capabilities tend to depend on their geographical and historical context. This implies that those effects need to be understood in relation to existing policies, which may cancel out, intensify, or diffract the direct impacts of a given policy measure. At the same time, the effects of policy measures can be intensified if interventions are combined into smart packages. Second, enabling command-and-control and economic measures, such as *ciclovias* and fare-free public transport, will often reduce inequalities in mobility capabilities. Third, the prospects of widely popular planning and design interventions such as the development of BRT systems and cycling infrastructures reducing inequalities in mobility capabilities seem to be limited. This is because these interventions are likely to resort the greatest effects in the middle ranges of the mobility capability distribution. Fourth, the information and education measure of personalised travel planning (PTP) can enhance mobility capabilities for everyone, especially if it is combined with incentives such as temporarily fare-free public transport. Finally, measures that lift up the bottom of the capability distribution in a city, such as *ciclovias* and fare-free public transport, densification around public transport stops, and personalised travel planning, must be complemented by measures that constrain the top end of that distribution. Such measures are important because the everyday mobility enjoyed by the minority at the top end is achieved to a considerable extent at the expense of the opportunities enjoyed by those who are (much) less privileged.

1. Introduction

Cities and the everyday mobility of people are interwoven. The connections that such mobility makes possible allow urban housing, labour and other markets to function; services such as healthcare and retail to be offered and consumed; ideas, knowledge and innovations to diffuse; and shared identities, belongingness and a sense community to be reinforced, fostered or created.[1] Everyday urban mobility is also critical to the flourishing of individuals as it allows them to access employment, education, friends and family and all kinds of activities and places they value with relative ease and efficiency.[2]

Nonetheless, the agglomeration of people and activities in cities means that the demand for mobility can easily exceed the capacity of available infrastructures, resulting in congestion and productivity loss, diminishing quality of life and population health, and causing undue damage to the environment. This situation is especially likely if mobility is reliant on inefficient modes of transport, such as privately owned vehicles.[3] Parked and driven around, these consume much more space per user than any other mode for surface transport.

Strong reliance on private vehicle use also tends to exacerbate inequalities in individuals' opportunities to become mobile and derive benefits from mobility across social groups and places within urban areas.[4] Car-centric urban development, characterized by sprawling and low-density building patterns and segregation of land uses, privileges individuals able to drive while disadvantaging and marginalizing those who can hardly or not at all use cars. The benefits are perhaps largest to middle- and upper-class households who can afford one or more sports utility vehicles (SUVs) or light trucks, which ensure the comfort and (perceived) safety of passengers at the expense of more vulnerable road users, such as pedestrians and cyclists.[5] However, public transport or cycling oriented development is no panacea.

1. Urry, *Mobilities*; Banister, *Unsustainable Transport: City Transport in the New Century.*

2. Nordbakke, and Schwanen, "Well-being and mobility".

3. Sheller, and Urry, "The city and the car"; Mattioli, Roberts, Steinberger, and Brown, "The political economy of car dependence".

4. Sheller, and Urry, "The city and the car"; Sheller, *Mobility Justice*.

5. Schwanen, "Urban transport and wellbeing".

Across the planet, there are many instances where such development has been accompanied by speculative urban regeneration and gentrification processes that displace lower-class households with limited resources for everyday mobility into parts of the city with low accessibility by public transport, cycling and walking.[6]

It is clear, then, that **transport and urban development policies can enhance existing, and create new, inequalities in both realized everyday mobility and opportunities for such mobility.** While often an unintended consequence of policy and planning, these inequalities are particularly problematic if they reinforce and/or exacerbate 'transport poverty'. This is a condition whereby potentially large numbers of people:[7]

→ lack access to forms (motorized) transport;

→ experience difficulties to reach activities at a destination;

→ struggle to afford transport; and/or

→ are disproportionally exposed to the negative effects of mobility systems such as traffic injury and air pollution.

The existence of transport poverty is a manifestation of transport injustice.[8]

Given these observations, this Working Paper has a dual aim. It will assess a series of policy measures that local and regional authorities in urban areas worldwide can deploy to address transport problems such as road congestion, air pollution and social exclusion regarding their impact on social inequalities in everyday mobility. Yet the paper will first explain why this assessment is best centred on capabilities – real opportunities – regarding mobility in a manner that draws on the Capability Approach (CA) as originally introduced by development economist Amartya Sen.[9]

In this Working Paper, policy interventions will be classified into four categories, and emphasis will be placed on those measures over which local and regional authorities have some level of discretion:

A) *Command-and-control (regulatory) instruments*: interdictions, orders and standards, such as bans on particular vehicles in specific areas at particular times;

B) *Economic measures*: financial and tax (dis)incentives, such as congestion pricing;

C) *Planning and design interventions:* the expansion and redevelopment of transport infrastructures and services and land use change;

D) *Information and education*: persuasion through information provision and schemes that allow people to try out and experiment with certain modes of transport.

The discussion of these interventions will be informed by relevant, peer-reviewed academic research and distinguish between (potential) effects if a given intervention is implemented on its own or as part of a 'policy package' or 'policy mix'.[10]

2. Mobility capabilities

2.1 Introduction

The Capability Approach (CA) offers a useful framework for understanding inequalities in everyday mobility and transport poverty in cities. The CA first of all understands resources in ways that resonate strongly with their role in everyday mobility. Such mobility can certainly be a goal or end in itself, as the recreational stroll exemplifies.[11] Yet in most instances, mobility is a means to an end and undertaken in order to achieve valuable and valued activities, social interactions or experiences at locations elsewhere in the city. Therefore, resources for mobility such as available vehicles, money, time and connections to potential destinations, function in the manner Sen understands resources more generally – as means that are valued for what they enable.[12]

6. Lung-Amam, Pendall, and Knaap, "Mi casa no es su casa".

7. Lucas, Mattioli, Verlinghieri, and Guzman, "Transport poverty and its adverse social consequences"

8. Martens, Verlinghieri and Schwanen, "Transport and mobility justice: Evolving discussions"

9. Sen, *Commodities and Capabilities*; Sen, *Inequality Re-examined;* Sen, *Development as Freedom;* Nussbaum, *Creating Capabilities;* Robeyns, *Wellbeing, Freedom and Social Justice.*

10. Givoni, MacMillen, Banister, and Feitelson, "From policy measures to policy packages"; Kotilainen, Aalto, Valta, et al., "From path dependence to policy mixes for Nordic electric mobility".

11. Mokhtarian and Salomon, "How derived is the demand for travel?".

12. Sen, *Commodities and Capabilities;* Sen, *Inequality Re-examined*; Sen, *Development as Freedom.*

The CA is also useful owing to its value pluralism: it does not a priori assume certain activities (e.g. paid work), interactions (e.g. with one's family) or experiences (e.g. happiness) to be more valuable than others. This differs from much transport policy where commuting to paid work or education is – often implicitly – valorised over other kinds of mobility. According to Sen and the CA, it is individuals who are best placed to decide the worth of activities, interactions or experiences, and their value attributions may well vary with the specific situation in which they find themselves.

There are additional reasons for the CA's usefulness. It sees each individual as morally equal to any other, a position known as 'ethical individualism'.[13] As a result, it privileges equality of opportunity – here the opportunity to become mobile, undertake mobility and participate in the activities, interactions and experiences this enables – over equality of outcomes, or actually achieved mobility, activities, interactions and experiences (see Section 2.2).[14]

The remainder of this Section introduces some core ideas of the CA before discussing a CA-based understanding of inequality of mobility and transport poverty.

2.2 Capability Approach

There is no single Capability Approach, and it is better to think of different approaches that exist side by side.[15] This Working Paper draws primarily on the CA as elaborated by Nobel Prize laureate Amartya Sen. This is because he has written extensively about the conversion of resources into 'capabilities' and 'functionings'.[16] His work is particularly helpful for understanding why, say, having a bicycle (a resource) available at all times does not automatically constitute a real opportunity to ride it.

Three concepts are key to the CA as used here: functionings, capabilities, and conversion factors. 'Functionings' are actually achieved activities, including trips and everyday activities undertaken at destinations, as well as interactions, experiences and other states of being for human individuals. In contrast, 'capabilities' are the real opportunities or potentials to realize such functionings. Thus, the capability to cycle means that in a particular situation a person is genuinely free to ride a bike even if she decides not to do so. This capability is part of a wider 'capability set', a nexus of interconnected capabilities that represents the freedom that person has to live their life as they value.

There are good reasons for prioritizing capabilities over functionings in relation to inequality of mobility and transport poverty. Consider two groups of, respectively, cis-gendered and trans women in a given city, and the observation that the former take substantially more trips per week than the latter. This does not necessarily mean that the trans women suffer (more) from transport poverty, for the difference may result from (unconstrained) choice between valuable alternatives. Similarly, the observation that both groups drive a similar distance per week on average says little about privilege or disadvantage, in particular if one is forced into that driving because of limited public transport and a low-density, sprawling urban development pattern while the other use their cars in spite of safe, efficient, affordable, enjoyable and dignified alternatives in the form of bus rapid transit and suitably regulated minibuses being available. This is why **equality of opportunities (capabilities) is to be preferred over equality of outcomes (functionings) in policy initiatives to address mobility inequalities.**

An additional reason for privileging capabilities is that a functioning such as contentment with fairly restricted mobility can result from adaptive or conditioned preferences. In that situation, the functioning will reflect that persons have reconciled themselves with their situation, for instance by lowering their expectations and ambitions, or simply be unaware of the possibilities that might be available to them. **An analytical focus on capabilities allows the consequences of adaptive or constrained preferences to be made visible and circumvented.**

13. Robeyns, *Wellbeing, Freedom and Social Justice.*

14. Robeyns, *Wellbeing, Freedom and Social Justice.*

15. Nussbaum, *Creating Capabilities;* Robeyns, *Wellbeing, Freedom and Social Justice.*

16. Sen, *Commodities and Capabilities;* Sen, *Inequality Re-examined;* Sen, *Development as Freedom.*

The final core concept is 'conversion factors', or the conditions and processes that allow resources, such as availability of a bike, to be converted into capabilities and ultimately functionings. There are usually multiple conversion factors at play, and they can be classified into:[17]

1) personal: e.g. attributes and capacities of one's body, skills, learning abilities, and memories;

2) social/institutional: e.g. public policies, social norms, social hierarchies, and power relations; and

3) environmental: e.g. qualities of the built environment and physical transport infrastructures.

This discussion shows that mobility capabilities are narrower than 'accessibility'.[18] A core concept in transport research, accessibility has been understood and defined in many different ways. One common understanding revolves around the relative ease (in terms of effort, time, monetary cost) with which individuals can reach particular sets of possible destinations. This form of accessibility is therefore a function of:

→ the distribution of land uses and qualities of potential destinations;

→ the configuration of transport systems in space and time (e.g. routes, networks, timetables, congestion levels);

→ individual resources (e.g. time, transport mode); and

→ the kind(s) of activity people prefer or need to undertake.

If an appropriately wide range of conversion factors is considered, a focus on mobility capabilities will provide a more nuanced understanding of the potential for mobility than (currently operational) accessibility measures. **Accessibility is perhaps best thought of as a resource that is yet to be converted into capabilities.**

2.3 Inequality in mobility reconsidered

It is well recognized in transport and mobility literature that **mobility capabilities are difficult to measure.**[19] **Different quantitative indicators have been deployed, including the opportunity to undertake particular activities or access specific destinations as perceived by study participants, the self-reported possibility to carry out valued activities or use a given transport mode, and even widely used accessibility measures.**[20] More narrative/qualitative approaches have been used as well.[21]

Analysis of mobility capabilities is complicated further when the entangled and co-evolving nature of capabilities and associated functionings is considered.[22] Doing so is important because enhancing the capabilities enjoyed by person a or group x may diminish those of b or y. If a becomes capable of driving an SUV and x is a population of potential SUV drivers in a city, then b's and y's capabilities to walk or cycle will be diminished if sharing the road with a and (a sample of) x reduces their confidence to participate in traffic or puts their bodily integrity, health and life – three of the 'central capabilities' identified by the CA's other prominent philosopher, Martha Nussbaum.[23] Co-evolution of capabilities can also manifest over larger spatial and temporal scales. For instance, if capabilities to drive oil-powered vehicles are rapidly enhanced and translate into very large numbers of functionings, then people in other places and later times may see their mobility and other capabilities drastically curtailed by extreme weather events triggered in part by the changes to planetary ecosystems to which greenhouse gas emissions linked to those functions have contributed significantly.

Given the complex interconnections of capabilities and associated functionings, a qualitative approach to assessment is useful and appropriate. Such an approach also makes it easier to move from the level of individuals to that of populations in particular areas or jurisdictions, and opens up

17. Robeyns, *Wellbeing, Freedom and Social Justice.*

18. Pirie, "Measuring accessibility"; Kwan, Murray, O'Kelly, and Tiefelsdorf, "Recent advances in accessibility research".

19. Vecchio and Martens, "Accessibility and the Capabilities Approach".

20. Bantis and Haworth, "Assessing transport related social exclusion using a capabilities approach to accessibility framework"; Cao, and Hickman. "Understanding travel and differential capabilities and functionings in Beijing"; Oviedo, and Guzman, "Revisiting accessibility in a context of sustainable transport"; Ryan, Wretstrand, and Schmidt, "Exploring public transport as an element of older persons' mobility".

21. Meijering, Van Hoven, and Yousefzadeh, "I think I'm better at it myself"; Nordbakke, "Capabilities for mobility among urban older women"; Randal, Shaw, Woodward, et al., "Fairness in transport policy"; Vecchio, "Microstories of everyday mobilities and opportunities in Bogotá".

22. Schwanen, "Achieving just transitions to low-carbon urban mobility".

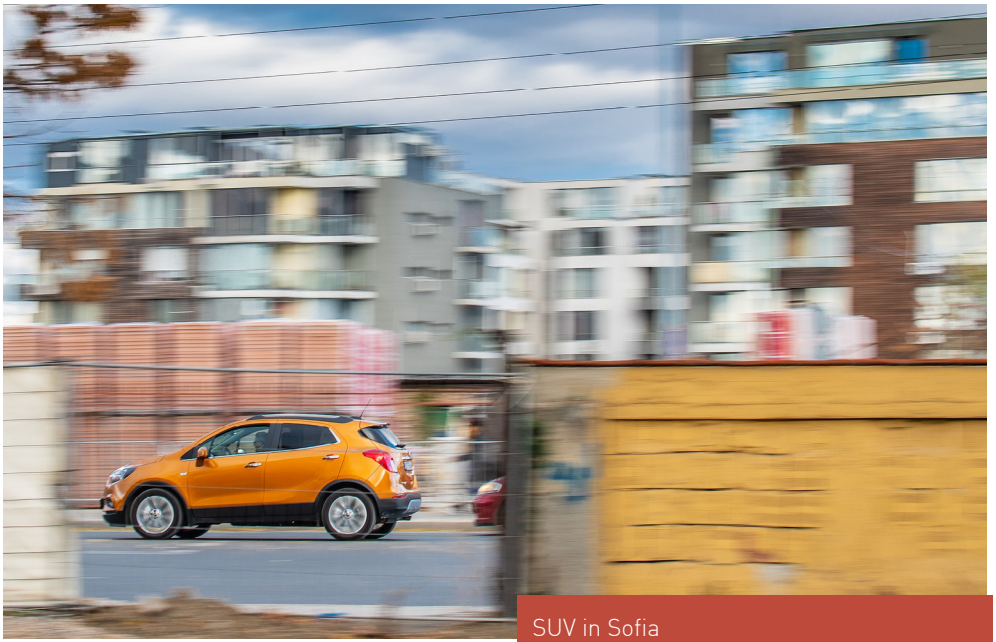
23. Nussbaum, *Creating Capabilities.*

the possibility to rank individuals in a given area, at least approximately, on the basis of their mobility capabilities from large to small. In this context 'very large' stands for having the real opportunity to move in a safe, efficient, affordable, enjoyable, dignified and volitional manner to many destinations across the cities at most or all of the times, and ideally with more than one mode of transport. The other extreme is constituted by the absence of realistic potential for volitional movement (forced immobility). Close to that extreme is the situation where realization of a capability is extremely risky, burdensome and completely dictated by others or the urban environment.

A qualitative approach also allows direct or primary effects of policy interventions to be distinguished from indirect or secondary effects. The importance of the latter follows from the above reflections on the co-evolving nature of mobility capabilities, and is particularly salient if forms of transport poverty that result from the collectively emergent effects of mobility functionings – congestion and overcrowding, air pollution, etcetera – on individuals' capabilities are to be understood. A focus on indirect effects also allows for consideration of the disadvantages and marginalizations that SUV-dominated automobility generate among those who lack the capability of driving a privately owned vehicle.

As a final benefit a qualitative assessment approach can effectively unravel the workings of conversion factors with respect to mobility.[24] This is important because policy interventions do not only work at the level of resources but also reconfigure conversion factors: the development of a Bus Rapid Transit (BRT) system can both create new connections between locations in an urban area – an aspect of accessibility – and generate new collective and personal norms, expectations and valuations regarding mobility and the activities, interactions and experiences it enables. Subsequent functionings (trips) may, especially if repeatedly achieved, generate new competencies and meanings that can make the capability more robust and secure.[25] The former means that its propensity of realization is increased, the latter that the risk of it being lost diminishes.

A diversified literature in transport and sustainability research has indicated that **policy interventions are more forceful and likely to generate changes in behaviour when they are combined into packages.[26] If some function as 'stick' and others as 'carrot', then acceptability may be larger because the loss of certain capabilities become more palatable.** Unexpected effects may also be less likely if carrots steer or 'nudge' the realization of capabilities in the directions that policy intends. This is why the assessment below will concentrate on policy measures as singular interventions and as part of a simplified package of two measures.



SUV in Sofia
(Source: Spas Genev, www.pixabay.com)

24. Randal, Shaw, Woodward, et al., "Fairness in transport policy".

25. Robeyns, *Wellbeing, Freedom and Social Justice;* Wolff, and De-Shalit. *Disadvantage*.

26. Givoni, MacMillen, Banister, and Feitelson, "From policy measures to policy packages"; Kotilainen, Aalto, Valta, et al., "From path dependence to policy mixes for Nordic electric mobility".

3. Policy interventions to reduce inequalities in mobility

3.1 Introduction

The qualitative assessment in this Section will concentrate on expected changes in the overall distribution of mobility capabilities across individuals in an urban area in response to policy interventions. Synthesizing insights form the peer-reviewed academic literature, the assessment considers selected policy interventions across four categories: command and control, economic, planning and design, and information and education. The interventions and the motivation for their selection are outlined in Table 1.

Tables 2-5 summarize the likely effects on the full distribution (FD) of mobility capabilities in an urban area, and consider the effects on the top and bottom quartiles (TQ, BQ) of that distribution separately. As explained above, a distinction is made between direct and indirect effects. The tables, therefore, include four sets of effects:

1) the expected direct effects of a single intervention;

2) the expected indirect effects of that intervention;

3) the expected change in the direct effects when the intervention is combined with the indicated complementary measure; and

4) the expected change in the indirect effects when the intervention is combined with that indicated complementary measure.

For interpretation, the text under **3)** and **4)** needs to be read alongside **1)** and **2)**. Thus, 'even smaller reduction' for the direct effect of the combination of low emission zone (LEZ) and public charging infrastructure for electric vehicles (EV) in Table 2 means that supporting EV adoption tends to reduce the efficacy of LEZs in limiting individuals' capability for mobility by private vehicle.

The effects specified in Tables 2-5 can be interpreted as 'average' effects on mobility capabilities across cities and locations within them, times as well as social groups and individuals. While a small average reduction in car-related mobility capabilities may result from a city-centre LEZ, it is also evident that there will be potentially huge variations across individuals and for one and the same individual across different places and moments in time due to varying configurations of environmental, social/institutional and personal conversion factors. For someone living in a car-oriented suburb, driving everywhere and only rarely visiting the city-centre, capabilities and functionings are unlikely to be affected much by a newly created city-centre LEZ, and certainly much less than for a young person residing close to that centre, whose working and social life are concentrated in that centre and who is keen to cycle if only the air quality was better and there were more cyclists in general. Such variations notwithstanding, a focus on 'average' effects remains valuable because policies target populations of individuals.

Drawing inferences about capabilities from functionings – oftentimes the focus in the peer-reviewed academic literature – is difficult. Uncertainties increase when evidence on changes in functionings in that literature is (much) weaker and when policy interventions are combined in packages. This is why the tables include a confidence level for each specified effect on an ordinal scale from 1=very low to 5=very high.

Category	Instrument	Motivation
Command and control	City-centre low emission zone	Popular, esp. in Europe A feasible intervention over which many local governments have discretion, esp. in Europe and Asia
	City-wide ban on rickshaw and moto taxis	Popular in Asia and Africa
	City-centre *ciclovia*/open street programme	Popular in the Americas and a 'positive' because enabling interdiction
	Strict standards for availability of public parking across the city [policy package only]	One of the most effective interventions to reduce car use when combined with other measures, but low acceptability if implemented on its own[27]
Economic instruments	City-wide congestion pricing (time-invariant rate/km)	Popular among planners and academics but low public and political acceptability Capable of generating substantial change in functionings
	City-wide SUV purchase tax (25% of purchase price)	A thought experiment included because of the marginalisation of non-users and the damage to the environment and social life in cities by SUVs
	City-wide fare-free public transport	Popular in intermediate cities in Europe, the USA and Brazil[28] A 'positive' because enabling economic instrument
	Temporary fare-free public transport [policy package only]	Commonly coupled to personalized travel planning, as incentive to make 'trying out' public transport more attractive A 'positive' because enabling economic instrument with time-limited consequences for government budgets
Planning and design	Cycle lane network	Popular across the global North
	BRT construction (1 line)	Popular across the planet and widely seen as particularly apt when institutional capabilities are constrained
	Densification at public transport nodes	Popular across the planet, harnessing the accessibility advantage that stops in public transport networks generate, and offering opportunities for land value capture
	Formalisation of rickshaw and moto/minibus taxi services [policy package only]	Popular across the global South Often justified with reference to the role these services could play in access/egress for BRT or urban rail systems
	Public bike sharing scheme [policy package only]	Popular across the planet
Information and education	Personalised travel planning	Widely used in Europe and effective in triggering behaviour change

Table 1: Motivation for selection of instruments

27. Buehler, Pucher, Gerike, et al., "Reducing car dependence in the heart of Europe"; Yin, Shao, and Xiaoquan Wang, "Built environment and parking availability".

28. Kębłowski, "Why (not) abolish fares?".

3.2 Command-and-control instruments

Three interventions in this category are considered in Table 2. Low Emission Zones (LEZs) have become a popular intervention in European cities since the 1990s, although the specific restrictions they impose on which vehicles types and exhaust emission levels differ widely from city to city. **While LEZ efficacy is difficult to ascertain, LEZs tend to be much more effective in reducing air pollution than vehicle use because they (also) trigger shifts to cleaner vehicles.**[29] It is, therefore, reasonable to expect only a small impact of the implementation of a city-centre LEZ on the city-wide distribution of mobility capabilities. Car-related capabilities may diminish somewhat at the lower end of the distribution, but only for 'car captives' – those individuals for whom car use is the only real opportunity. This group may struggle to switch to cleaner cars, which are usually more expensive. Combining the 'stick' of an LEZ with the 'carrot' of a public infrastructure for electric vehicles (EVs) may also make little difference to them because EVs have so far remained more expensive than (older) oil-powered cars.

The biggest impacts of LEZs on mobility capabilities may well be indirect: the cleaner air and slightly lower congestion may reconfigure conversion factors such that capabilities to cycle, walk and perhaps public transport are enhanced. **Yet, given that the impacts of LEZs on functionings tend to depend on other policies that are in place, the effects on mobility capabilities will likely depend on the complementary intervention(s).** If the LEZ is accompanied by the roll-out of a public infrastructure for charging EVs, the average direct and indirect impacts are – all else equal – likely to be dampened.

Where LEZs do little to reduce inequalities in mobility capabilities, bans on rickshaws and mototaxis are on balance regressive. Rickshaws come in many shapes: they can be propelled by a human puller, pedalling chauffeur or a small engine. The last form comes close to a mototaxi, although this is usually a service where the customer-passenger sits behind the rider. Across Africa and Asia, rickshaws and mototaxis are often portrayed as backward, dangerous, driven recklessly by irresponsible drivers, and causing road congestion. This portrayal legitimizes bans on their operation, which have a long history in some cities but have become more widespread Africa more recently.

Rickshaws and mototaxis are hired for many different trips – commuting, shopping, social visits – because they are widely available, flexible and fairly cheap, and used most by low- and medium-income groups, women and disabled people.[30] It can reasonably be expected that impacts of city-wide bans on rickshaw and mototaxi services will diminish as individuals' position in the mobility capability distribution is higher. The bottom end of that distribution, where lack of affordability will prohibit patronage, constitutes the exception in this regard. Most lower-ranked individuals will only use rickshaws and mototaxis for highly valued trips and when alternatives take (significantly) more time and incur greater out-of-pocket costs. **New and 'fast' bus services such as BRT can dampen the adverse effects for some groups, although this depends on the routes, timetables and prices levels of such services.** Individuals in the middle ranges of the city-wide distribution of mobility capabilities, for whom a private vehicle taxi or ride-hailing service may also be a real opportunity, are likely to benefit the most from packaging a rickshaw or mototaxi ban with the creation of a new BRT network in a city.

29. Bernardo, Fageda, and Fillol, "Pollution and congestion in urban areas"; Holman, Harrison, and Querol. "Review of the efficacy of low emission zones to improve urban air quality in European cities"

30. Ehebrecht, Heinrichs, and Lenz, "Motorcycle-taxis in sub-Saharan Africa"; Hasan, and Julio D. Dávila, "The politics of (im)mobility"; Hossain, and Susilo. "Rickshaw use and social impacts in Dhaka, Bangladesh".

Rickshaws in India
(Source: Devanath, www.pixabay.com)

Instrument	As single intervention				As part of policy package			
	Direct effects		Indirect effects		Complementary measure	Direct effects (vis-à-vis single intervention)		Indirect effects (vis-à-vis single intervention)	
	Expectation	C.L.[a]	Expectation	C.L.		Expectation	C.L.	Expectation	C.L.
City-centre LEZ[31]	FD: small reduction in car capability BQ: some reduction but only for car captive TQ: no effect	4	FD: small enhancement of cycling, walking and PT capabilities BQ: idem but above average TQ: idem but below average	3	Public EV charging infrastructure	FD: even smaller reduction, esp. in higher middle range BQ: same TQ: no effect	4	FD: same or slightly reduced increase BQ: idem TQ: idem	2
City-wide ban on rickshaws and moto taxis[32]	FD: reduction in lower and middle ranges BQ: large reduction TQ: little or no effect	5	FD: small enhancement of walking and taxi capabilities BQ: idem but below average TQ: no effect	4	New BRT network	FD: dampening of reduction, but only in middle ranges BQ: little change, esp. towards the bottom end TQ: slight increase, but not towards top end	4	FD: less enhancement of taxi capabilities BQ: little or no effect TQ: little or no effect	2
City-centre *ciclovia*/ open street programme[33]	FD: increase in walking & cycling capabilities and reduction in car capabilities at times of event BQ: similar or above-average increase TQ: similar or below-average increase	3	FD: increase in walking & cycling capabilities in other spaces & times BQ: similar or above-average effect TQ: similar or below-average effect	2	Segregated cycle lane network	FD: stronger increase, esp. in cycling capability BQ: somewhat stronger increase, esp. in cycling capability TQ: stronger increase, esp. in cycling capability	3	FD: stronger increase BQ: stronger increase TQ: stronger increase	2

[a]Confidence level: 1=very low, 5=very high

Table 2: Expected effects of selected command-and-control instruments on mobility capabilities

31. Bernardo, Fageda, and Fillol, "Pollution and congestion in urban areas"; Holman, Harrison, and Querol. "Review of the efficacy of low emission zones to improve urban air quality in European cities"; Malina, and Scheffler, "The impact of Low Emission Zones on particulate matter concentration and public health".

32. Ehebrecht, Heinrichs, and Lenz, "Motorcycle-taxis in sub-Saharan Africa"; Fillone, and Mateo-Babiano, "Do I walk or ride the rickshaw?; Hasan, and Julio D. Dávila, "The politics of (im)mobility"; Hossain, and Susilo. "Rickshaw use and social impacts in Dhaka, Bangladesh".

33. Bertolini, "From "streets for traffic" to "streets for people""; Mejia-Arbelaez, Sarmiento, Mora Vega, et al., "Social inclusion and physical activity in ciclovía recreativa programs in Latin America." Sarmiento, Díaz del Castillo, Triana, et al., "Reclaiming the streets for people".

3.3 Economic measures

In Table 3 three economic instruments are considered. **The disincentives of congestion pricing and a tax on sports utility vehicles (SUV) would probably have the greatest direct effects on the mobility capabilities of the middle parts of the full distribution of capabilities.** In both instances, the top end of the distribution would not be affected much, but the measures would work out differently at the bottom end. For individuals with limited financial resources and living in a peripheral location (to reduce housing costs) but heavily dependent on a car for their daily activities,[34] the conversion factor of a city-wide congestion charge would have potentially major consequences and quite possibly reduce the capability to undertake certain discretionary but highly valued trips (e.g. social visits to relatives and friends). However, since those individuals are (highly) unlikely to drive a new SUV, their mobility capabilities would not be affected much by a tax on the purchase of such a vehicle.

For both financial disincentives, the indirect effects manifest as enhancements of public transport, walking and cycling related capabilities, primarily because changes in collective functionings – fewer cars/SUVs on the road and therefore safer traffic conditions and cleaner air – shift social/institutional and environmental conversion factors. It would also seem that individuals on the lower rungs of the city-wide distribution of mobility capabilities benefit the most from these changes. Moreover, the complementary interventions of expanded public transport services (more fine-grained network, higher frequency of service) and fare-free public transport would intensify the effects of a congestion charge and tax on new SUVs, respectively. Moreover, this intensification might well be most articulated in the bottom half of the full distribution of mobility capabilities. **Expanded public transport will not cancel out the affordability issues that congestion pricing imposes on car-captives with restricted mobility capabilities, but may at least somewhat soften the blow of pricing.** This will, of course, depend course on overall price levels of public transport and its reach into the places where those car captives live, work, shop, socialize, and undertake other activities.

The direct effects of fare-free public transport on mobility capabilities are likely to be socially progressive, although this depends on which policy measures complement this incentive. The indirect effects are complex and may cancel out direct benefits to some extent. This is particularly likely when greater passenger volumes, particularly when these exceed official capacity, may create a new conversion factor that deters some potential users. These individuals may be positioned across the full distribution of capabilities, albeit for different reasons. Those at the top end may be put off by the prospect of close physical proximity to people from different class and racial/ethnic backgrounds,[35] while those at the bottom may be discouraged by the large numbers of people on platforms and on board. The latter effects may be particularly intense for women and/or older adults.[36]

34. Baghestani, Tayarani, Allahviranloo, et al., "Evaluating the traffic and emissions impacts of congestion pricing in New York City"

35. Boterman, and Musterd, "Cocooning urban life".

36. Börjesson, and Rubensson, "Satisfaction with crowding and other attributes in public transport"; Wang, and Zacharias, "Noise, odor and passenger density in perceived crowding in public transport"

Instrument	As single intervention				As part of policy package			
	Direct effects		Indirect effects		Complementary measure	Direct effects (vis-à-vis single intervention)		Indirect effects (vis-à-vis single intervention)	
	Expectation	C.L.[a]	Expectation	C.L.		Expectation	C.L.	Expectation	C.L.
City-wide congestion pricing (time-invariant rate per km)[37]	FD: reduction in middle ranges BQ: limited, but (very) large reduction if car captive TQ: limited, esp. at top end	4	FD: increase in PT, cycling and walking BQ: idem but above average TQ: idem but below average	2	Expanded public transport services	FD: dampening of reduction BQ: increase, and slight dampening of reduction for car captives TQ: little or no change	3	FD: starker increase in PT and possibly walking capabilities BQ: starker increase TQ: little or no change	2
City-wide SUV levy (25%)[38]	FD: reduction in higher middle range only BQ: no effect TQ: small reduction	4	FD: small increase in cycling and walking and to lesser extent PT capabilities BQ: similar or above average increase TQ: similar or below-average increase	3	Fare-free public transport	FD: slight dampening of reduction in middle ranges BQ: substantial increase TQ: no effect	4	FD: stronger increase, especially for PT capabilities BQ: stronger increase TQ: little or no effect	3
City-wide fare-free public transport[39]	FD: flatter distribution BQ: significant increase TQ: modest increase	4	FD: slight reduction BQ: more PT functionings may reduce capabilities when in poor health or low in confidence TQ: greater functionings by disadvantaged groups may reduce PT capabilities	3	Reduction in city-wide availability of public parking	FD: less flattening of the distribution BQ: little change TQ: larger increase	3	FD: unclear BQ: slightly stronger reduction TQ: smaller reduction	2

[a]Confidence level: 1=very low, 5=very high

Table 3: Expected effects of selected economic measures on mobility capabilities

37. Baghestani, Tayarani, Allahviranloo, et al., "Evaluating the traffic and emissions Impacts of congestion pricing in New York City"; Börjesson, and Kristoffersson, "The Swedish congestion charges"; Eliasson, "Is congestion pricing fair?"; Levinson, "Equity effects of road pricing";

38. Ashmore, Pojani, Thoreau, et al., "The symbolism of 'eco cars' across national cultures"; Feng, Fullerton, and Gan, "Vehicle choices, miles driven, and pollution policies"; Rith, Lopez, Fillone, and et al., "Determinants of individual vehicle type choice".

39. Cats, Susilo, and Reimal, "The prospects of fare-free public transport"; Hananel, Ravit, and Berechman. "Justice and transportation decision-making"; Kębłowski, "Why (not) abolish fares?"; Straub, "The effects of fare-free public transport"

3.4 Planning and design interventions

Three planning and design measures are considered in Table 4. **All else equal, the construction of a network of segregated cycle lanes, a BRT line and densification at public transport stop all tend to increase mobility capabilities insofar as these relate to public transport, cycling and walking**.

However, the construction of a BRT or cycling infrastructure tends to benefit those at the bottom of the distribution least, especially when BRT is expensive relative to their financial resources and cycling lanes are disproportionally connecting middle- and higher-class neighbourhoods to places elsewhere in the city. Individuals at the bottom of the distribution tend to benefit more from densification around public transport stops, as long as increases in monetary land values and gentrification processes in those locations do not displaces land uses – housing, retail, employment – that cater to their resources and preferences. The creation of a BRT line may similarly diminish their mobility capabilities if it is accompanied by gentrification and rises in monetary land values. **BRT development and densification tend to require government intervention in land and housing markets for these changes to improve the capabilities of individuals at greatest risk of transport poverty.**

The selected complementary measures tend to reinforce direct effects of cycling lanes and BRT construction and densification around public transport stops. A public bike sharing scheme intensifies the positive effects of cycling lanes on mobility capabilities, although especially at the top end of the distribution and hardly or not at the all at the bottom end. This is a consequence of differential affordability and access of public bike sharing schemes, which often require a debit/credit card and mostly found in parts of the city frequented by middle- and higher-income groups.[40] Formalisation of rickshaw and moto/minibus taxi services through driver education, adoption of fixed routes and timetables, and digital payment systems can intensify the positive effects of BRT development on mobility capabilities, because the former services can offer effective and flexible access and egress transport.[41] However, this combination of intervention is again likely to benefit those in the middle ranges of the mobility capability distribution the most.

In contrast, reduced parking availability can intensify the effects of densification on mobility capabilities. This is because this intervention makes car-based functionings and capabilities more cumbersome for those at the top end of the capability distribution and, **if car use overall diminishes, streets are safer and easier to navigate on foot, by bike and public transport. Those at the bottom of the capability distribution may benefit in particular from these indirect benefits.**

Public bike sharing in Barcelona
(Source: Pablo Valerio, www.pixabay.com)

40. Duran-Rodas, Villeneuve, Pereira et al., "How fair is the allocation of bike-sharing infrastructure?"; Goodman, and Cheshire, "Inequalities in the London bicycle sharing system revisited"; Nixon and Schwanen, "Bike sharing beyond the norm"

41. Ehebrecht, Heinrichs, and Lenz, "Motorcycle-taxis in sub-Saharan Africa"; Moyo, Kibangou, and Musakwa, "Societal context-dependent multi-modal transportation network augmentation in Johannesburg, South Africa"; Rahman, Timms, and Montgomery, "Integrating BRT systems with rickshaws in developing cities to promote energy efficient travel"

Instrument	As single intervention				As part of policy package			
	Direct effects		Indirect effects		Complementary measure	Direct effects (vis-à-vis single intervention)		Indirect effects (vis-à-vis single intervention)	
	Expectation	C.L.[a]	Expectation	C.L.		Expectation	C.L.	Expectation	C.L.
Cycle lane network[42]	FD: increase in capabilities, esp. in middle and top ranges BT: below-average increase TQ: above-average increase	4	FD: small decrease in walking capabilities BQ: similar or above- average decrease TQ: similar or below- average decrease	2	Public bike sharing scheme	FD starker increase, esp. in middle and top ranges BQ: no change or below-average increase TQ: above-average increase	2	FD: no change BQ: no change TQ: no change	2
BRT construction (1 line)[43]	FD: increase in capabilities, esp. in middle ranges BQ: below-average increase, esp. at bottom end TQ: increase diminishing towards top end	4	FD: greater inequalities BQ: reduction in capabilities due to displacement TQ: increase in capabilities for those benefitting from gentrification	3	Formalisation of rickshaw and moto/minibus taxi services	FD: starker increase, esp. in middle ranges BQ: below-average increase TQ: no change	3	FD: unclear BQ: unclear TQ: no change	1
Densification at public transport nodes[44]	FD: increase in capabilities, esp. in middle and lower ranges BQ: average or above-average increase TQ: below-average increase, because of reduced car capabilities	4	FD: reduction at bottom end BQ: decrease, especially at lower end TQ: increase in PT, walking and cycling capabilities	3	Reduction in city-wide availability of public parking	FD: starker decrease in car capabilities BQ: no change TQ: above-average decrease in car capabilities	3	FD: increase in PT, cycling and walking capabilities BQ: starker increase TQ: starker increase in PT, walking and cycling capabilities	1

[a]Confidence level: 1=very low, 5=very high

Table 4: Expected effects of selected planning and design measures on mobility capabilities

42. Duran-Rodas, Villeneuve, Pereira, et al., "How fair is the allocation of bike-sharing infrastructure?"; Goodman, and Cheshire, "Inequalities in the London bicycle sharing system revisited"; Mora, Truffello, and Oyarzún. "Equity and accessibility of cycling infrastructure"; Panter, Guell, Humphreys, et al., "Can changing the physical environment promote walking and cycling?"

43. Pereira, Banister, Schwanen, et al., "Distributional effects of transport policies on inequalities in access to opportunities in Rio de Janeiro"; Ryan, and Wretstrand, "What's mode got to do with it?"; Santana Palacios, Cochran, Bell, et al., "Bus rapid transit arrives in Barranquilla, Colombia"; Venter, Jennings, Hidalgo, et al., "The equity impacts of bus rapid transit"; Schalekamp, "Lessons from building paratransit operators' capacity to be partners in Cape Town's public transport reform process"

44. Cao, and Hickman, "Understanding travel and differential capabilities and functionings in Beijing"; Cervero, "Transport infrastructure and the environment in the Global South"; Christiansen, Engebretsen, Fearnley, et al., "Parking facilities and the built environment"; Ryan, Wretstrand, and Schmidt, "Exploring public transport as an element of older persons' mobility".

3.5 Information and education

Methodologically robust research on the effects of information and education on mobility functionings is very limited, and disproportionally informed by experiences in the Western Europe and Australia. There is, however, a substantial number of studies that have analysed the effects of the personalised travel planning (PTP) – the provision of detailed information on non-car mobility that is tailored to individuals' specific situation, such as their residential and employment locations (see Table 5). This literature suggests that **personalised travel planning can, by influencing the interplay of personal and social/institutional conversion factors, enhance mobility capabilities across the full distribution.** These benefits may be slightly smaller in the upper-middle and higher echelons where individuals may be constrained by practical factors (e.g. poor accessibility by public transport or bike because of car-based urban development) and socio-cultural norms that trap them into car reliance.[45]

The literature also suggests that **combining PTP with a temporarily fare-free public transport (e.g. a bus card) can intensify the enhancement of mobility capabilities.** There is little research that has compared groups of different levels of mobility capability but it can be expected that those in the lower half of the distribution gain most from fare-free public transport as it relies any affordability constraints on public transport capabilities they may experience.

Instrument	As single intervention				As part of policy package			
	Direct effects		Indirect effects		Complementary measure	Direct effects (vis-à-vis single intervention)		Indirect effects (vis-à-vis single intervention)	
	Expectation	C.L.[a]	Expectation	C.L.		Expectation	C.L.	Expectation	C.L.
Personalised travel planning[46]	FD: increase, esp. in middle and lower range BQ: similar or above average increase TQ: similar or below-average increase	3	FD: unclear BQ: unclear TQ: unclear	1	Temporary fare-free public transport	FD: Stronger increase BQ: particularly strong increase TQ: somewhat stronger increase	3	FD: unclear BQ: unclear TQ: unclear	1

[a]Confidence level: 1=very low, 5=very high

Table 5: Expected effects of an information and education initiative on mobility capabilities

45. Ashmore, Pojani, Thoreau, et al., "The symbolism of 'eco cars' across national cultures"; Mercer, "Landscapes of extended ruralisation".

46. Basri, and Abdul. *Travel Behaviour Modification (TBM) Program for Adolescents in Penang Island*; Chatterjee, "A comparative evaluation of large-scale personal travel planning projects in England"; Tørnblad, Kallbekken, Korneliussen, et al., "Using mobility management to reduce private car use".

4. Conclusions

Inequalities in everyday mobility of people and transport poverty can be analysed profitably using the Capability Approach originally proposed by Amartya Sen because it privileges equality of opportunity for all individuals in a city over equality of outcomes, and makes no a priori assumptions about how different kind(s) of mobility should be valued by policy-makers and politicians.

The qualitative analysis of mobility capabilities in this Working Paper allows five main conclusions to be drawn. First, **the (likely) effects of policy interventions on mobility capabilities depend on their context.** This implies that those effects need to be understood in relation to existing policies, which may cancel out, intensify, or diffract the direct impacts of a given policy measure. At the same time, the (likely) effects of policy measures can be intensified if interventions are combined into packages in a 'smart' way, for instance by allowing 'sticks' to be reinforced and made more acceptable by 'carrots'. A final implication is that the effects on mobility capabilities generated by policy interventions by city or regional authorities creates will differ – often hugely – across individuals, places and moments. This does not invalidate those interventions, or attempts to analyse their (potential) effects. It does, however, mean that the heterogeneity of effects needs to be monitored and evaluated continuously. It also means that simple narratives about what a given policy intervention effectuates should be avoided. Although professionals and politicians may like to distil research findings into easy-to-understand stories of cause and effect, **there are no silver bullets when inequalities in people's everyday mobility are concerned; complexity and messiness are the base conditions one has to work with.**

That said, and second, **the qualitative assessment suggests that positive – because enabling – command-and-control and economic measures, such as *ciclovias* and fare-free public transport, may well be beneficial in reducing inequalities in mobility capabilities.** Command-and-control and economic interventions are often seen as 'difficult' because of low public and political acceptability and since they require powerful and effective institutions. Fare-free public transport also requires considerable finance resource. At the same time, these 'positive' interventions tend to enlarge mobility capabilities, including those of disadvantaged individuals.

Third, **the prospects of widely popular planning and design interventions such as the development of BRT systems and cycling infrastructures reducing inequalities in mobility capabilities seem to be limited.** These interventions are likely to resort the greatest effects in the middle ranges of the mobility capability distribution. Specific combinations of resources and conversion factors tend to result in limited effects on the mobility capabilities for those at both the bottom and the top of the distribution. The former may lack key resources such as money or availability of a bicycle and/or be constrained by conversion factors related to, for instance, competencies (e.g. knowing how to cycle or read a route map), confidence, limited travel horizons, or patriarchal norms that restrict women's cycling or use of public transport in the absence of male relatives.[47] Those at the top may also be constrained, albeit by different conversion factors; examples might include the social expectation to own and drive expensive cars or a desire to segregate and insulate oneself from other, less privileged individuals and social groups.[48] Both can pre-empt the formation of capabilities centred on bicycles or public transport.

The capability-enhancing effects of densification around public transport nodes may occur across the full distribution of mobility capabilities, but the indirect effects operating through monetary land values can displace individuals at the bottom of the distribution, thus reinforcing if not exacerbating transport poverty in the medium term. This indicates that **government intervention has an important role to play in preventing planning and design interventions to increase inequalities in mobility capabilities, transport poverty, and transport injustices.**

47. Porter, "Transport planning in sub-Saharan Africa II".

48. Ashmore, Pojani, Thoreau, et al., "The symbolism of 'eco cars' across national cultures"; Boterman, and Musterd, "Cocooning urban life".

Fourth, **the information and education measure of personalised travel planning (PTP) can enhance mobility capabilities across the full spectrum from very large to very small.** Such enhancement is particularly likely if PTP is combined with incentives such as temporarily fare-free public transport. Only one information and education intervention could be considered in this study because a robust evidence base in for other such interventions is absent from the peer-reviewed academic literature. Further research on the justice implications of information and education interventions is needed.

Finally, using the CA to identify policy interventions at the level of cities and urban regions is replete with uncertainties. However, it seems that implementing positive command-and control and economic measures such as *ciclovias* and fare-free public transport, densification around public transport stops, and personalised travel planning can reduce inequalities in mobility capabilities and reduce or prevent transport poverty. At the same time, measures that lift up the bottom of the capability distribution must be complemented by measures that constrain the top end, however unacceptable to urban publics and decision makers they might seem and irrespective of the temptation to understand them as an infringement on people's entitlements. A tax on SUVs has been included in the qualitative assessment as a thought experiment but demands further examination. Such work should focus on the extent to which it may become publicly and politically more palatable if embedded in a carefully design policy package with many 'carrots' and suitably tailored to the city or urban area of implementation. **Debate on, and experimentation with, this and other restrictions targeting the top end of the distribution of mobility capabilities are needed in urbans areas across the planet. After all, the everyday mobility enjoyed by the minority at the top end is achieved to a considerable extent at the expense of the opportunities enjoyed by those who are (much) less privileged.**

References

Oviedo, Daniel, and Luis A. Guzman. "Revisiting accessibility in a context of sustainable transport: Capabilities and inequalities in Bogotá." *Sustainability* 12, no. 11 (2020): 4464. https://doi.org/10.3390/su12114464

Panter, Jenna, Cornelia Guell, David Humphreys, and David Ogilvie. "Can changing the physical environment promote walking and cycling? A systematic review of what works and how." *Health & Place* 58 (July 2019): 102161. https://doi.org/10.1016/j.healthplace.2019.102161

Pereira, Rafael H. M., David Banister, Tim Schwanen, and Nate Wessel. "Distributional effects of transport policies on inequalities in access to opportunities in Rio de Janeiro." *Journal of Transport and Land Use* 12, no. 1 (2019): 741–764. https://www.jstor.org/stable/26911287

Pirie, Gordon. "Measuring accessibility: A review and proposal." *Environment and Planning A* 11, no. 3 (March 1979): 299–312. https://doi.org/10.1068/a110299

Porter, Gina. "Transport planning in sub-Saharan Africa II: Putting gender into mobility and transport planning in Africa." *Progress in Development Studies 8*, no. 3: 281–289. https://doi.org/10.1177/146499340800800306

Rahman, M. Shafiq-Ur, Paul Timms, and Francis Montgomery. "Integrating BRT systems with rickshaws in developing cities to promote energy efficient travel." *Procedia – Social and Behavioral Sciences* 54 (October 2012): 261–274. https://doi.org/10.1016/j.sbspro.2012.09.745

Randal, Edward, Caroline Shaw, Alistair Woodward, Philippa Howden-Chapman, Alex Macmillan, Jamie Hosking, Ralph Chapman, Andrew M. Waa, and Michael Keall. "Fairness in transport policy: A new approach to applying distributive justice theories." *Sustainability* 12, no. 23 (2020): 10102. https://doi.org/10.3390/su122310102

Rith, Monorom, Neil Stephen Lopez, Alexis M. Fillone, and Jose Bienvenido M. Biona. "Determinants of individual vehicle type choice and energy consumption in a heavy traffic metropolis of Southeast Asia featuring the case of Metro Manila." *Engineering and Applied Science Research* 47, no. 1 (January–March 2020): 56–65. https://ph01.tci-thaijo.org/index.php/easr/article/view/194890

Ryan, Jean, and Anders Wretstrand. "What's mode got to do with it? Exploring the links between public transport and car access and opportunities for everyday activities among older people". *Travel Behaviour and Society* 14 (January 2019): 107–118. https://doi.org/10.1016/j.tbs.2018.10.003

Ryan, Jean, Anders Wretstrand, and Steven M. Schmidt. "Exploring public transport as an element of older persons' mobility: A Capability Approach perspective." *Journal of Transport Geography* 48 (October 2015): 105–114. https://doi.org/10.1016/j.jtrangeo.2015.08.016.

Robeyns, Ingrid. *Wellbeing, Freedom and Social Justice: The Capability Approach Re-Examined*. Cambridge: Open Book Publishers, 2017. http://dx.doi.org/10.11647/OBP.0130

Santana Palacios, Manuel, Abigail Cochran, Corwin Bell, Ulises Hernández Jiménez, Eleanor Leshner, Francisco Trejo Morales, and Daniel G. Chatman. "Bus rapid transit arrives in Barranquilla, Colombia: Understanding a changing landscape through residents' travel experiences." *Travel Behaviour and Society* 21 (October 2020): 131–139. https://doi.org/10.1016/j.tbs.2020.06.003

Sarmiento, Olga L., Adriana Díaz del Castillo, Camilo A. Triana, María José Acevedo, Silvia A. Gonzalez, and Michael Pratt. "Reclaiming the streets for people: Insights from Ciclovías Recreativas in Latin America". *Preventive Medicine* 103, Supplement (October 2017): S34–S40. https://doi.org/10.1016/j.ypmed.2016.07.028

Schalekamp, Herrie. "Lessons from building paratransit operators' capacity to be partners in Cape Town's public transport reform process." *Transportation Research Part A: Policy and Practice* 104 (October 2017): 58–66. https://doi.org/10.1016/j.tra.2017.08.002

Schwanen, Tim. "Achieving just transitions to low-carbon urban mobility." *Nature Energy* 6, no. 2 (2021): 685–687. https://doi.org/10.1038/s41560-021-00856-z

Schwanen, Tim. "Urban transport and wellbeing: A critical analysis." In *Transport in Human Scale Cities*, edited by Milos M. Mladenovic, Tuuli Toivonen, Elias Wilberg, and Karst T. Geurs, 14–26. Cheltenham, UK: Edward Elgar, 2021.

Sen, Amartya. *Commodities and Capabilities*. Amsterdam: North Holland, 1985.

Sen, Amartya. *Inequality Re-examined*. Oxford: Clarendon Press, 1922.

Sen, Amartya. *Development as Freedom*. New York: Knopf, 1999.

Sheller, Mimi. *Mobility Justice: The Politics of Movement in an Age of Extremes*. London: Verso, 2018.

Sheller, Mimi, and John Urry. "The city and the car." *International Journal of Urban and Regional Research* 24, no. 4: 737–757. https://doi.org/10.1111/1468-2427.00276

Straub, Daniel. "The effects of fare-free public transport: A lesson from Frydek-Místek (Czechia)." *Sustainability* 12, no. 21 (2020): 9111. https://doi.org/10.3390/su12219111

Tørnblad, Silje H., Steffen Kallbekken, Kristine Korneliussen, and Torben K. Mideksa. "Using mobility management to reduce private car use: Results from a natural field experiment in Norway." *Transport Policy* 32 (March 2014): 9–15. https://doi.org/10.1016/j.tranpol.2013.12.005

Urry, John. *Mobilities*. Cambridge, Polity, 2007.

Vecchio, Giovanni. "Microstories of everyday mobilities and opportunities in Bogotá: A tool for bringing capabilities into urban mobility planning." *Journal of Transport Geography* 83 (February 2020): 102652. https://doi.org/10.1016/j.jtrangeo.2020.102652

References

Vecchio, Giovanni and Karel Martens. "Accessibility and the Capabilities Approach: A review of the literature and proposal for conceptual advancements." *Transport Reviews* 41, no. 6 (2021): 833–854. https://doi.org/10.1080/01441647.2021.1931551

Venter, Christoffel, Gail Jennings, Darío Hidalgo, and Andrés Felipe Valderrama Pineda. "The equity impacts of bus rapid transit: A review of the evidence and implications for sustainable transport." *International Journal of Sustainable Transportation* 12, no. 2 (2018): 140–152. https://doi.org/10.1080/15568318.2017.1340528

Verlinghieri, Ersilia, and Tim Schwanen. "Transport and mobility justice: Evolving discussions." *Journal of Transport Geography* 87 (July 2020): 102798. https://doi.org/10.1016/j.jtrangeo.2020.102798

Wang, Bin, and John Zacharias. "Noise, odor and passenger density in perceived crowding in public transport." *Transportation Research Part A: Policy and Practice* 135 (May 2020): 215–223. https://doi.org/10.1016/j.tra.2020.03.013

Wolff, Jonathan, and Avner De-Shalit. *Disadvantage*. Oxford: Oxford University Press, 2007.

Yin, Chaoying, Chunfu Shao, and Xiaoquan Wang. "Built environment and parking availability: Impacts on car ownership and Use." *Sustainability* 10, no. 7 (2018): 2285. https://doi.org/10.3390/su10072285

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