

research article

Transport policies and their everyday impact on mobilities of older adults in Bengaluru

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Background and objectives: Cities in the Global South are simultaneously witnessing wide-scale population ageing and rapid urbanisation. There is overwhelming pressure on policy makers to rapidly envision and provision age-friendly transport environments. In Indian cities, later-age mobilities face unique risks due to traffic congestion and inequities. However, the policy and transport research has treated congestion, equity and age-friendly mobilities as unrelated issues. This article goes a step ahead to understand how the policies to mitigate congestion can impact the provisioning of age-friendly infrastructure.

Research design and methods: Bengaluru, once termed the 'pensioners' paradise', is known for its 'alarming' levels of traffic congestion ([Pucher et al, 2005](#); [Pojani and Stead, 2017](#)). We review Bengaluru's transport policies and peer-reviewed articles concerning these policies to understand the positioning of age-friendly transport within this context.

Results: Our findings recognise a shift from sufficientarianism to utilitarian orientations in Bengaluru's policy making on easing congestion, which narrows the options for later-age transport users in terms of access and affordability. Some of the features not unique to Bengaluru – such as top-down planning, institutional fragmentation and distancing of users from policy making – have resulted in buses being inaccessible for passengers with mobility issues, metro rail being unaffordable for those on low incomes, lack of safe modes of transport and safe access to streets.

Discussion and implications: The article is an initial foray into the ambiguity in the philosophical underpinning of transport policy making, which prioritises solving congestion ahead of providing age-friendly transport. We highlight specific challenges the cities of the Global South experience as they envision age-friendly transport policies amid the ascendance of congestion-solving policies.

Keywords traffic congestion • transport equity • ageing • Bengaluru • India

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Introduction

Developing age-friendly urban environments and enabling inclusive mobility have been on the global social policy agenda in recent decades ([World Health Organization, 2007](#); [Buffel et al, 2012](#)). The United Nations Sustainable Development Goal 11.2, which calls for ‘safe, affordable, accessible and sustainable transport systems for all’, refers specifically to the transport needs of older adults, among other groups ‘in vulnerable situations’ (United Nations, 2015). Such initiatives are essential in the cities of developing countries, which have been experiencing dominant trends of population ageing and urbanisation ([Plouffe and Kalache, 2010](#)). Simultaneously, the megacities are currently witnessing a policy dialogue concerning two significant issues: transport congestion ([Gwilliam, 2010](#); [Li et al, 2019](#); [Bashingi et al, 2020](#)) and transport equity ([Vasconcellos, 2005](#)). Existing literature shows that alongside high congestion levels, cities in developing countries have historically been sites of uneven mobilities ([Kaufmann et al, 2004](#); [Vasconcellos, 2005](#); [Sheller and Urry, 2006](#); [Lucas, 2012](#); [Baindur and Rao, 2016](#); [Lucas et al, 2019](#)). Given that large-scale investments have been directed towards building capital-intensive transport infrastructure, recent literature highlights the dominance of the narrative of congestion over equity ([Vasconcellos, 2005](#); [Klopp, 2011](#); [Lucas, 2012](#); [Watson, 2015](#); [Gopakumar, 2020](#)). The primary argument of the article is that the existing transport policy and research on later-age mobilities have treated equity and congestion as unrelated issues, ignoring their mutual relationship. Hence, the goal of the article is to identify points of impact of congestion-based policies on later-age mobilities.

In India, the ‘older adult population’ (defined as those aged 45 and above) will reach 655 million by 2050 ([International Institute for Population Sciences et al, 2020](#)), with a substantial number living in urban spaces. Weak social security systems exacerbate the inadequate care arrangements in urban spaces ([Bailey et al, 2022](#)). Meanwhile, since the 1990s, the number of motor vehicles has more than quadrupled ([Ministry of Road Transport and Highways, 2019](#)). The National Urban Transport Policy states that leading up to 2031, more than 50 per cent of investment for urban India will be for road building ([Ministry of Urban Development, 2006](#)). Megacities such as Bengaluru, Chennai, Delhi, Kolkata and Mumbai are known for their focus on the ‘crisis of congestion’ and lack of attention to accessibility issues ([Pucher et al, 2007](#); [Pojani and Stead, 2017](#); [Rathi, 2017](#); [Gopakumar, 2020](#)). The explicit focus on mitigating congestion has resulted in quick fixes, including expressway corridors, flyovers and road widening ([Kharola, 2013](#); [Nair, 2015](#); [Rathi, 2017](#)). Meanwhile, there has been little research on the implications for the envisioning of age-friendly cities of ‘building out of congestion’ or rapid road infrastructure provisioning (see [Munshi et al, 2018](#); [Adlakha et al, 2020](#)).

Bengaluru was termed a ‘pensioners’ paradise’ not long ago, and in 2019 it was ranked as the most traffic-congested city globally ([Tom Tom Index, 2020](#)). The following year, Bengaluru’s Comprehensive Mobility Plan report ([Infrastructure Development](#)

Corporation (Karnataka) Limited, 2020) referred to equity as a guiding principle for transport policies. Recent academic literature focused on Bengaluru highlights that policy makers' responses have been in the form of a 'regime of congestion' (Gopakumar, 2020), piecemeal infrastructural solutions (Kharola, 2013; Pojani and Stead, 2017; Rathi, 2017) and corridor urbanism (Nair, 2015). Given this heightened focus on solving congestion, it becomes imperative to understand how cities in the Global South, such as Bengaluru, are engaging with the concept of age-friendly cities. Bengaluru is an illustrative case of a city facing challenges in integrating equity considerations into its transport strategy, as evidenced by the Comprehensive Mobility Plan report (Infrastructure Development Corporation (Karnataka) Limited, 2020). This article argues for a wider framework that suffuses age-friendly mobility with wider debates on congestion and equity issues. This study critically reviews Bengaluru's transport policies to map the policy discourse, contestations between approaches prioritising congestion and those focusing on equity, and the implications for later-age mobilities.

Conceptualising later-age mobilities within congestion–equity discourse

Research on later-age mobilities has focused on the importance of embodied movements through physical space (Burnett and Lucas, 2010; Schwanen et al, 2012). Within this growing literature on geographical gerontology (Curl and Musselwhite, 2018), the focus has primarily been on understanding barriers (Webber et al, 2010) across spaces (Meijering, 2021) and their impact on the quality of later life (Metz, 2000; Walsh et al, 2017). However, the existing literature on later-age mobilities is notably deficient in its failure to establish connections with the wider discussions surrounding equity and congestion. Transport equity broadly refers to fairness (justice) in distributing costs and benefits among different social groups and places (Litman, 2002; Golub and Martens, 2014; Lucas et al, 2019). Karner et al (2020) point to fundamental concerns related to transport equity: what equity should be distributed; the means of distribution; and the ideological justification for approaches (Manaugh and El-Geneidy, 2012; Karner, 2016). The choices necessitate a more comprehensive examination of the philosophical underpinning of transport policy, specifically in the Global South's already stratified and rapidly ageing cities.

Congestion is increasingly used as an overarching concept to describe and tackle various complex issues in urban transport (Gopakumar, 2020). Bengaluru has received recent scholarly attention, yet its transport literature, guided by a utilitarian perspective, has focused on measuring congestion and mitigating it through infrastructure, seldom considering equity or the perspective of users (Manoj and Verma, 2015; Rahul and Verma, 2018; Sridhar et al, 2019). Even in the Indian context, there are cursory references to equity, but there is little mention of the concept of age-friendly transport (Reddy and Balachandra, 2012; Kharola, 2013; Gopakumar, 2020). The role of political economy and its accompanying institutional predicaments have not received adequate attention (Nair, 2005; Baidur and Rao, 2016; Pojani and Stead, 2017). Against this context, a critical review of transport policies in a city such as Bengaluru, which embodies socioeconomic disparities (Sudhira et al, 2007; Pani et al, 2010), inadequate transport infrastructure (Nair, 2005) and institutional challenges (Gopakumar, 2020), is an essential exercise.

The congestion and equity debate in transport policies has been guided primarily by two political philosophies: utilitarianism and sufficientarianism (Lucas et al, 2015; Pereira et al, 2016). The utilitarian framework emphasises individual utility and cost–benefit analysis. In sum, it strives to maximise benefits for all. However, it lacks focus on subpopulations, such as older adults, and their access to key destinations in demographically diverse cities (Pereira et al, 2016; Di Ciommo and Shifan, 2017). In comparison, sufficientarianism, or the distributive justice model, focuses on minimum thresholds or ensuring sufficient transport resources for all (van Wee and Roeser, 2013; Lucas et al, 2015; Pereira et al, 2016). The age-friendly cities framework notes the necessary conditions, designs and facilities for seamless transport in later age – for example, safety, comfort, priority seating and age-friendly vehicle designs. However, the framework seldom acknowledges the importance of the values that transport policies need to adopt to enable age-friendly mobilities. Increasingly, literature analysing transport policies and their social implications refers to the ideological friction between utilitarian and sufficientarianism (for example, Sheller and Urry, 2006; van Wee and Roeser, 2013; Lucas et al, 2015; Pereira et al, 2016; Chikaraishi et al, 2017; Sheller, 2018). This study extends the literature by identifying the philosophical underpinning guiding transport policies of Bengaluru, which has implications for age-friendly transport provision.

Foregrounding ageing and mobilities in Bengaluru

To analyse Bengaluru’s transport policies for ageing, it is necessary to foreground the broader sociopolitical changes faced by the city. Bengaluru’s spatiality and transport scenario is tied to its ‘tale of two cities’: Pete (the market area) and Cantonment (Nair, 2005). Nair (2005: 46), arguing that Pete epitomised poor planning, quotes Lewis Rice’s description of Pete’s infrastructure as ‘narrow and irregular roads’ due to the number of ‘hands through which it had passed’ and R.K.Narayan’s caution as an ‘uphill task for any municipality to straighten its roads’. In contrast, the Cantonment area has broad, well-lit, straight-lined avenues with bungalows and tall churches as milestones. Iyer (2022) notes that Cantonment and parts of Whitefield were considered ideal places for retired colonial officers to reside – hence the sobriquet ‘pensioners’ paradise’. Bengaluru’s ‘pensioners’ paradise’ tag was reinforced in the 20th century due to state-led industrialisation, first with Mysore state (Gowda, 2010) and then under the Nehruvian model. Carlson (2018) argues that this surge of public sector enterprises created a ‘middle class’ in Bengaluru that had access to secure jobs with pensions, residence in townships and access to schools and hospitals. The townships provided residential facilities for workers in public sector enterprises, and since 1962 the Bangalore Transport Service has run public buses with subsidised pricing (see Figure 1).

Thomas Friedman’s famous 2005 book, ‘It’s a flat world, after all’, describes Bangalore’s blurring changes since the 1990s (Friedman, 2005). On the transport front, the rapid in-migration and mushrooming of educated, English-speaking corporate employees coincided with problematising congesting and generating solutions (Gopakumar, 2020). Amid the booming IT sector, Bengaluru’s ‘new service economy’ created jobs with high levels of precarity, instability and informal working conditions (RoyChowdhury and Upadhyya, 2020). The poor and marginalised live in cramped

market areas, ghettos, slums and enclaves, which are segregated based on caste and religion (Vithayathil and Singh, 2012; Susewind, 2017; Bharathi et al, 2018). These areas have become larger (Roy et al, 2018), and essentials such as water, sanitation and roads are inadequate (Benjamin, 2003; Gowda et al, 2015). At the same time, social security has been weak (Government of Karnataka, 2018). It is in this context that one should situate older adults' access to safe and affordable transport infrastructure to connect them to decent jobs, healthcare and education in the so-called 'pensioners' paradise' (Indian Institute for Human Settlements, 2015; Baidur and Rao, 2016).

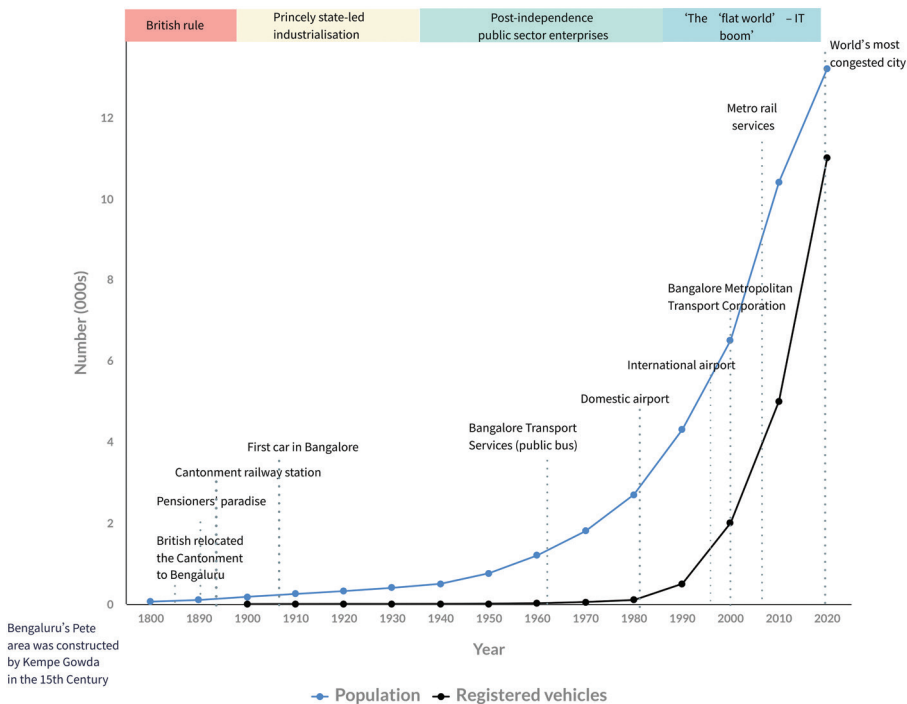
Methods

Study design and data

This article presents findings from a policy review to understand the intricate interdependencies between transport congestion, equity and ageing. To achieve this, we referred to policy documents and peer-reviewed literature pertaining to the policies under study.

We reviewed transport (city, state and national) policies and analysed their impact on congestion and equity. The policy review involved examining policy documents,

Figure 1: Population and registered vehicles Bengaluru, 1800–2020, with a timeline of Bengaluru's transport milestones



Source: Authors' depiction using data from Infrastructure Development Corporation (Karnataka) Limited (2020), Bangalore Development Authority (2007) and Government of Karnataka (2019).

mobility indicators reports and legislation to identify key objectives, strategies and targets (see [Table 1](#) for documents included in the review). These documents were critically assessed for their treatment of age-friendly transport.

To select policy documents, we used: population-specific terms, such as ‘older adults’, ‘senior citizens’, ‘elderly’ and ‘older persons’; theme-specific terms, such as ‘transport equity’ and ‘traffic congestion’; and terms related to geographic focus, such as ‘urban India’, ‘urban Karnataka’, ‘Bangalore’ and ‘Bengaluru’.

We used this combination of terms to search for relevant policy documents via the following sources:

- websites of government bodies: Ministry of Road Transport and Highways, Karnataka State Transport Department, Bangalore Traffic Police, Bruhat Bengaluru Mahanagara Palike, Bangalore Metropolitan Transport Corporation (BMTCL), Bangalore Metro Rail Corporation Limited (BMRCL) and the Directorate of Urban Land Transport (DULT);
- websites of nongovernmental organisations and research organisations: HelpAge India, the World Resources Institute and the Institute for Transportation and Development Policy;
- academic databases: PubMed, Scopus, JSTOR and Google Scholar.

Non-English documents, policies unrelated to transport (for example, those related to land use and housing) and policies predating the year 2000 were excluded. The temporal exclusion was to keep the review aligned with the contemporary context and current challenges for later-age mobilities.

To supplement the policy review, we reflected on the ontological contribution of peer-reviewed literature that engaged with transport policies for Bengaluru and India more broadly. Drawing on this combination, we mapped the discourse within policy and academia on later-age experience of urban mobilities.

Analysis of data

The policy documents were coded using NVivo 12. The deductive concepts of transport accessibility, availability, affordability and acceptability were used in coding. The documents were also coded axially to allow for inductive development of codes ([Saldaña, 2021](#)). Together, these code families represented important themes for further analysis, such as – bus versus metro rail use, age-friendly infrastructure, and closed and top-down planning. [Table 2](#) provides a summary of the codes used. The major themes from these coding exercises are discussed in the results section, drawing on relevant peer-reviewed articles.

Results

Congestion-based policies: restricting later-age access to transport and streets

Our review suggests that the focus of Bengaluru’s transport policies has been predominantly on issues of congestion, with an equity perspective seldom considered. The rhetoric that sees congestion in Bengaluru as a general issue of lack of road space

Table 1: Policy documents included in the review

Policy document	Year	Author
City-level plans		
Bangalore Mobility Indicators 2008	2009	DULT, Government of Karnataka
Bangalore Mobility Indicators 2010-11	2011	DULT, Government of Karnataka
Comprehensive Traffic and Transport Plan for Bengaluru City	2011	Karnataka Urban Infrastructure Development and Finance Corporation
Annual reports	2013-19	BMTC
Annual reports	2013-19	BMRCL
Bengaluru Transit Oriented Development Policy	2022	Government of Karnataka
Bengaluru Metropolitan Land Transport Authority Bill	2023	DULT, Government of Karnataka
Active Mobility Bill	2021	DULT, Government of Karnataka
Revised Master Plan 2015	2007	Bengaluru Development Authority
Revised Master Plan 2031	2017	Bengaluru Development Authority
Comprehensive Mobility Plan for Bengaluru	2020	BMRCL and DULT, Government of Karnataka
Parking Policy 2.0	2020	DULT, Government of Karnataka
State-level plans		
Guidelines for Road Safety Audit	2013	DULT, Government of Karnataka
Guidelines for Planning and Implementation of Pedestrian Infrastructure	2014	DULT, Government of Karnataka
Karnataka Economic Survey	2013-19	Government of Karnataka
Comprehensive Traffic and Transport Study for Bengaluru Metropolitan Region	2015	Bengaluru Metropolitan Region Development Authority
Transport Demand Forecast Study and Identification of Phase-III Corridors of Bengaluru Metro	2016	BMRCL
National-level plans		
National Urban Transport Policy	2006	Ministry of Urban Development
National Urban Transport Policy	2014	Ministry of Urban Development
Smart City Mission Plans	2015	Ministry of Housing and Urban Affairs
Jawaharlal Nehru Urban Renewal Mission	2005	Ministry of Urban Development
National Urban Transport Policy Review Report	2016	Institute of Urban Transport (India)
Operations Document for Unified Metropolitan Transport Authority	2016	Ministry of Urban Development
National Transit Oriented Development Policy	2017	Ministry of Housing and Urban Affairs
Metro Rail Policy	2017	Ministry of Housing and Urban Affairs

means that developing age-friendly transport infrastructure is not prioritised (Barter, 2000; Ministry of Urban Development, 2006; Gopakumar, 2020). The transport studies literature suggests that the 'regime of congestion' consists of a converging power structure of government, construction firms, financial institutions, consultants and planners, which has been at the core of inequity. According to Gopakumar, 'Bengaluru's

Table 2: Codes and code families used in the policy review

Code families	Codes	Selected quotations
Age-friendly cities	Accountability Local governance	'Urban streets shall be designed to prioritise mobility of people of all ages and abilities over mobility of vehicles.' (Active Mobility Bill; DULT, 2021: 10)
Congestion-based policies	Traffic Road building Pedestrian safety	'One of the primary reasons for traffic congestion is the low capacity of Bangalore roads that are facing the brunt of the ever-bludgeoning traffic growth.' (Comprehensive Mobility Plan report; Infrastructure Development Corporation (Karnataka) Limited, 2020: 2-55-2-56)
Affordable public transport	Travel expenses Bus fares Metro funding	'Those who place a premium on cost are the poorest sections of society and [they] need to be given affordable prices.' (National Urban Transport Policy; Ministry of Urban Development, 2014: 8)
Physical access in public transport	Access barriers Physical debility Coping mechanisms	'Ensuring that 25% of Government owned public transport carriers in the country are converted into fully accessible carriers by June 2022.' (Accessible India Campaign; Department of Empowerment of Persons with Disabilities, nd)
Accepted in policy making	Feedback loop Access to policies	'The Government of India would encourage [a] participatory approach which should be practised at all levels – at city, sub area of the city, and community level.' (Ministry of Urban Development, 2014: 9)

regime of congestion is a techno-political choice that is provoking an unsustainable and inequitable trajectory of change in the city' (2020: 96).

Bengaluru's transport stakeholders and policies have responded to congestion with 'corridor urbanism' (Nair, 2015). Corridor urbanism refers to an ideology of 'devour[ing] space to save time' (Nair, 2015: 61), which favours building multi-lane roads, flyovers, underpasses and elevated corridors. The envisioning of high-speed mobilities in these corridors is often oblivious to life course needs. In the unbridled construction of roads, there has been no obligation to enhance later-age mobilities; instead, increased motorisation can further create immobility for older pedestrians.

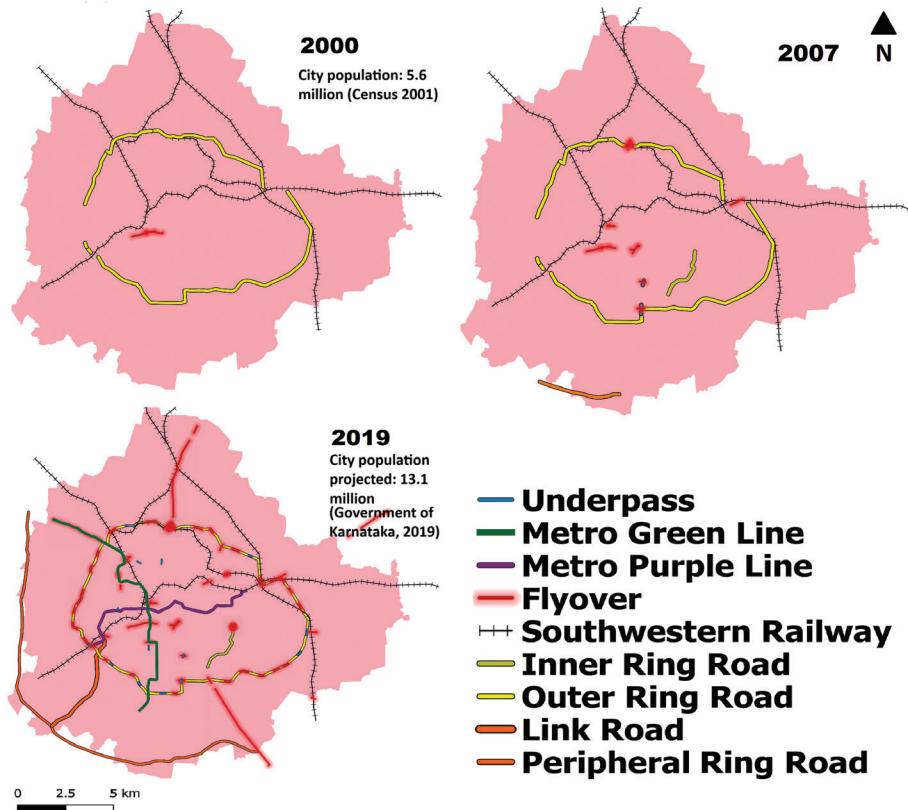
The review suggests that congestion-responsive automobile infrastructure installation is a purely top-down exercise. National infrastructure schemes are skewed towards car users; for example, the Jawaharlal Nehru National Urban Renewal Mission spent 57 per cent of funds constructing outer ring roads, grade separators and flyovers (Venter et al, 2019). In the construction of infrastructure for automobiles, public consultation is often bypassed (Jamwal, 2006). The flyovers and underpasses constructed in Bengaluru in the period from 2000 to 2019, under various schemes as part of congestion governance, are highlighted in [Figure 2](#).

Recognition of road space as an exhaustible public good, as mentioned in the National Urban Transport Policy ([Ministry of Urban Development, 2014](#)), is not evident in Bengaluru's transport policies. Road widening and the creation of express corridors have increased vehicle speeds, thus threatening the movement of non-motorised transport users, particularly older adults. To explain further, according to the Comprehensive Mobility Plan report ([Infrastructure Development Corporation \(Karnataka\) Limited, 2020](#)), more than 53 per cent of the city streets do not have footpaths for pedestrians. It further states that the existing footpaths are narrow, uneven, damaged and taken up by parking vehicles and motorcyclists. With a modal share of 26 per cent for non-motorised transport users, there is a high crash rate for pedestrians. According to the

Footpath Initiative (2019), from 2010 to 2019 nearly 40 per cent of road fatalities in Bengaluru were pedestrian deaths (2,916 pedestrian deaths); in addition, there were 12,213 pedestrian injuries. According to the report, victims of fatal crashes were mostly people from more disadvantaged backgrounds and older adults. Bengaluru has a higher rate of pedestrian deaths per population than other megacities in India (Footpath Initiative, 2019: 3). The risks of commuting in particular modes for older adults from socioeconomically marginalised backgrounds are indicative of the unequal distribution of road space for older individuals’ mobility. However, transport policies seldom recognise older adults’ mobility needs. The Comprehensive Mobility Plan aims to ‘[e]nsure basic transportation related needs of all people, including women, the poor, and the differently abled are met and treated with equal importance’ (Infrastructure Development Corporation (Karnataka) Limited, 2020: 1-2).

Our review further suggests that the city’s policy makers have had a cursory engagement with transport equity and hardly ever mention ‘age-friendly transport’ as a concept. The Comprehensive Mobility Plan report is the only document that

Figure 2: Large-scale transport infrastructures constructed in Bengaluru from 2000 to 2019



Source: Authors' depiction using satellite imagery and OpenStreetMap, with population totals and projections from Office of the Registrar General and Census Commissioner (2001) and Government of Karnataka (2019).

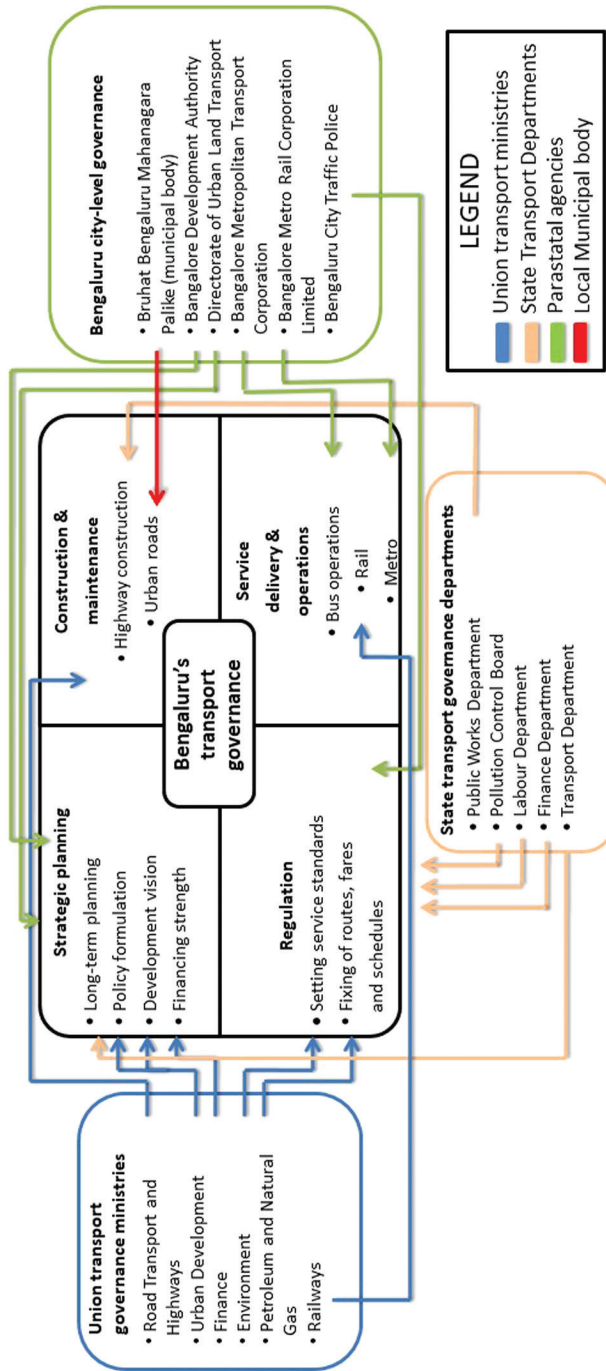
refers to the principle of equity; it mentions an intent to 'ensure basic transportation related needs [are met for] women, the poor and the differently abled' (Infrastructure Development Corporation (Karnataka) Limited, 2020: 1-2). Further, while the Active Mobility Bill (DULT, 2021) uses the term 'all ages', it does not engage with the concept of age or its relatedness to infrastructure. Besides age, intersectional categories such as class, gender, caste and physical abilities, which interact with each other to produce complex transport barriers (Valentine, 2007), are not mentioned in the analysis of accessibility. In addition, basic equity measures, such as physical accessibility and affordability, are absent in all three of Bengaluru's mobility indicators reports (DULT, 2009; 2011; Infrastructure Development Corporation (Karnataka) Limited, 2020). The data analysis presented in these three reports relies on engineering-based measures: congestion levels; service-level benchmarks; future infrastructure investments; and projections. Unlike the user-centred equity analysis in reports such as those by the Social Exclusion Unit (2003) or Litman (2002), Bengaluru's transport plans discredit interlinkages between transport, users and later-age access to employment, healthcare and social life.

Age-friendly cities: a moving target

Our review of policy and research suggests that the fragmentation of Bengaluru's transport infrastructure has led to conflicting aims, which hampers the envisioning of an age-friendly environment. Recent research on Bengaluru's transport institutions draws attention to this nebulous institutional arrangement. Vaidyanathan and Rathi (2018) describe this arrangement as a partial polycentric system with no unified authority, multiple autonomous decision-making centres and overarching legislation. This contrasts with the National Urban Transport Policy's (Ministry of Urban Development, 2006) prescription for a Unified Metropolitan Transport Authority (UMTA) for cities in India with a population of over one million. The Bengaluru Metropolitan Land Transport Authority (BMLTA) was set up as a UMTA by the Government of Karnataka in 2007. The vision for the BMLTA was that it would coordinate land transport, introduce a common ticketing system, prepare master plans, monitor the implementation of transport projects, provide regulatory frameworks and study the transport system (Kharola, 2013). The guidelines for the BMLTA have been in place for over a decade, but the body is not yet operational (DULT, 2022). Instead, many competing forces (covering legislative, planning and corporate factors) claim agency in shaping the city's transport system, which restricts the capacity to envision age-friendly transport systems. The nebulous institutional arrangement is illustrated in Figure 3.

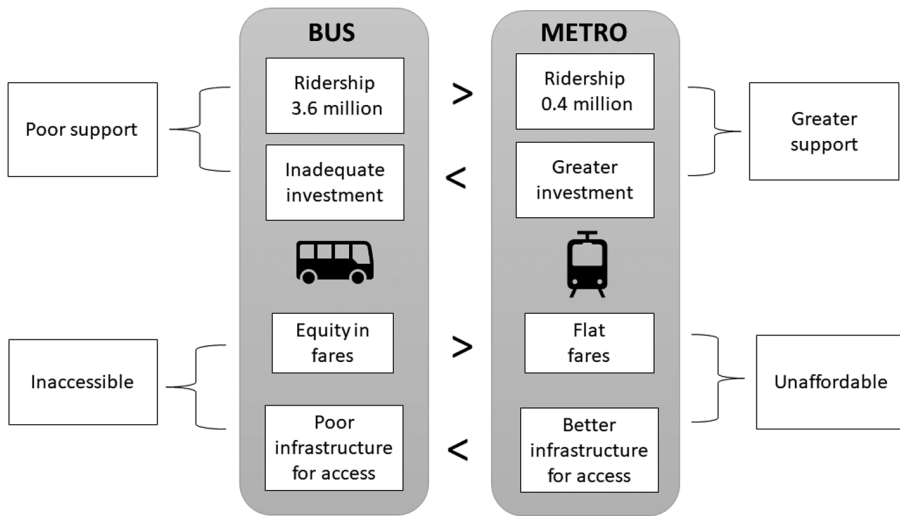
An important example is the institutional conundrum the BMTC is embedded in with respect to age-friendly bus infrastructure. The Government of Karnataka finances the BMTC's capital expenditure and determines fare policy; the BMTC (a corporation under the Government of Karnataka) manages operations (salaries, route rationalisation, schedule preparation, and maintenance); and Bruhat Bengaluru Mahanagara Palike builds and maintains bus stops. The roads are constructed and supported by multiple actors: Bruhat Bengaluru Mahanagara Palike (city streets), the Government of Karnataka (state highways) and the Government of India (national highways). The Government of India legislates the guiding transport policy: the

Figure 3: Institutions and roles concerning transport in Bengaluru



Source: Authors' representation based on documents reviewed.

Figure 4: Graphical representation of equity in Bengaluru's public transport



Source: Authors' representation using data from [BMTC \(2019\)](#) and [BMRC \(2019\)](#).

National Urban Transport Policy ([Ministry of Urban Development, 2006](#)) and the Motor Vehicles (Amendment) Act 2019. The enforcement of road transport rules is carried out by the Bangalore Traffic Police, reporting to the Government of Karnataka. As indicated by [Figure 3](#), the city's multiple transport plans are drawn up in silos with competitive and often conflicting agendas ([Mohan, 2020](#)). Policies emanating from this complex institutional set-up aim to curb congestion but struggle to envision equity for later-age commuters.

Elusive affordability of public transport

The results of our review indicate a transition in focus and funding of public transport policy from the traditional bus system to modern metro rail (see [Figure 4](#)). This transition has implications for the affordability, availability and accessibility of public transport for older adults. First, the bus system, which older adults in Bengaluru use frequently, lacks age-friendly physical infrastructure and has experienced stagnant or occasionally inadequate funding from the state. In parallel, metro rail has garnered unprecedented financial backing and has inclusive physical infrastructure, but does not provide any subsidies based on age.

The affordability of public transport is important for later-age mobility, particularly for older adults from low-income households who are working in the informal sector or depend on passive modes of transport. India's National Urban Transport Policy advises as follows regarding the pricing of public transport: 'Those who place a premium on cost are the poorest sections of society and [they] need to be given affordable prices. The cost of providing public transport for them needs to be subsidized by other sections of society' ([Ministry of Urban Development, 2006: 8](#)).

The National Urban Transport Policy (Ministry of Urban Development, 2006) further states that since socioeconomically disadvantaged households have smaller budgets for transport expenses, socioeconomic stratification should prod public transport pricing towards affordability and subsidised fares. Bengaluru, predominantly a bus city since the early 1950s, has continually given concessions for older adults on state-run buses, offering daily, monthly and annual passes (BMTC, 2019). The use of senior citizen cards to obtain concessions on bus fares has been prevalent among older commuters in Bengaluru.

In contrast, the BMRCL has not adopted an age- or income-based pricing regime or one related to users' socioeconomic background (see Figure 4). The Metro Rail Policy advises that travel pricing may 'incentivise modal shift from private vehicles' to other mass rapid transit systems (Ministry of Housing and Urban Affairs, 2017). The policy aims to incentivise public transport for an already-vehicle-owning class and not necessarily for users who are dependent on public transport, such as older adults. In 2017, the BMRCL refuted the Communist Party of India's argument that the flat fares were unfair, citing that concessions already exist for those using smart cards (Ray, 2017).

Transport funding has larger implications for the availability of public transport resources for later-age mobility. In Bengaluru, the state has consistently prioritised investments in metro rail infrastructure over that for buses. Comparing two important mobility reports for Bengaluru – the mobility indicators report for 2008 (DULT, 2009) and the Comprehensive Mobility Plan report (Infrastructure Development Corporation (Karnataka) Limited, 2020) – it is clear that buses are being replaced by metro rail, which sits at the epicentre of transport in the city. The change in rhetoric between the mobility indicators report for 2008 (DULT, 2009) and the Comprehensive Mobility Plan report (Infrastructure Development Corporation (Karnataka) Limited, 2020) is symbolic of the positioning of metro rail within the vision for Bengaluru's transport policy. According to the Comprehensive Mobility Plan report (Infrastructure Development Corporation (Karnataka) Limited, 2020), the BMTC experienced a decrease in its bus fleet from 6,473 in 2012 to 6,203 in 2018, representing a fall of 4 per cent. Bengaluru's bus-to-passenger ratio of 0.5 buses per 1,000 population is low for a bus-dependent city. In addition, Bengaluru Bus Prayanikara Vedike (2018) reports that the BMTC has been charging higher bus fares compared to other Indian megacities. The corporation hiked bus fares by 70–80 per cent in 2011–14, affecting low-income users (Baindur and Rao, 2016: 46). Kharola (2013) notes that of the total operating costs of the BMTC, 19.02 per cent represents taxes paid to the government, higher than the 17 per cent annual tax burden for cars. The BMTC has not received viability gap funding, a government measure intended to cover transport corporation operation losses (Deccan Herald, 2020).

Meanwhile, under the public–private partnership model, international agencies and the Government of India have a newfound interest and influence in promoting modern rail projects. The 26-mile metro rail route, when finally completed in 2017, had missed nine deadlines, and the project cost had quadrupled (Ramachandran, 2012). The estimated daily ridership for Metro Rail Phase 1 was projected to be 1.6 million by 2021 (Ramachandran, 2012), but in 2020 the average per-day ridership was only 0.5 million (BMTC, 2020). Amid evidence of metro rail not catering to passenger demand and being financially unsustainable, the recent Comprehensive Mobility Plan report, drafted by the BMRCL and the DULT, puts forth a projected

budgeted allocation of \$8.5 billion for new metro rail lines to 2035 ([Infrastructure Development Corporation \(Karnataka\) Limited, 2020](#)). The presence of contradictory organisational structures raises questions about the institutional factors that influence age-based equity in Bengaluru's public transport system.

Physical access issues in public transport

Infrastructure design for public transport is vital for the accessibility of older adults ([World Health Organization, 2007](#)). The [United Nations \(2008\)](#) Convention on the Rights of Persons with Disabilities mandates that transport services, environments, products and programmes need to be accessible for all without retrofitting. India is a signatory to all the significant conventions regarding universal access to public places and has pledged to the SDG for inclusive transport set out in 2015 ([United Nations, 2015](#)). The Accessible India Campaign ([Department of Empowerment of Persons with Disabilities, nd](#)), a nationwide programme, was launched in 2015 to improve access to railways, public transport and airports for persons with disabilities. Despite these commitments, the BMTC fares poorly compared to the BMRCL when it comes to providing equitable access to transport infrastructure.

Multiple audit reports from the Accessible India Campaign point to inaccessible bus infrastructure design. For example, the [Department of Empowerment of Persons with Disabilities \(2023\)](#) reported, via a Ministry of Road Transport and Highways report, that less than 5.76 per cent of buses are fully accessible. The buses lack ramp facilities for wheelchairs to enter. Even the low-floor buses introduced as part of the Jawaharlal Nehru National Urban Renewal Mission have been withdrawn, making it difficult for older adults to climb the steps into buses. Persons with disabilities and older adults find other aspects of the bus infrastructure inaccessible too ([Morrison et al, 2020](#)). Though seats are reserved for people with mobility issues and pricing is equitable, the fixtures in buses have still been restrictive for persons with varied abilities ([Morrison et al, 2020](#)). The problem is further complicated as bus stops are built and maintained by the municipal body, not the BMTC, which runs the bus service (see [Figure 4](#)). Thus, misaligned interests and responsibilities have exacerbated the problems.

Compared with BMTC buses, the metro rail system has relatively user-friendly infrastructure for older adults and persons with disabilities. There are entrance ramps and hand railings to help those with mobility issues, ticket booths at a height to accommodate persons with disabilities, and grooved tiles, audio announcements and lifts with Braille buttons to help people who are visually challenged. However, older commuters from low-income settlements or those with less exposure to digital technologies fear using unfamiliar facilities available in metro rail stations.

Along with this fear of unknown technologies, the unaffordable fares further distances older users from metro rail. Moreover, according to press reports ([Dayanand, 2019](#); [Menezes, 2019](#)), the metro rail infrastructure falls short on toilet facilities, provision of drinking water and availability of vehicle parking areas, though it fares better in terms of accessibility compared to the bus system.

On panning out, two fundamental implications for equity emerge alongside the shift from the traditional bus system to modern metro rail. First, the bus system

remains relatively affordable but infrastructurally exclusionary. Second, metro rail provides age-friendly infrastructure but lacks equitable pricing and acclimatisation. Collectively, it can be observed that public transport users experience the elusive nature of equity in two ways: buses have the majority modal share (96 per cent), but inadequate infrastructure and decreasing investment, affecting accessibility; metro rail has a low modal share and inequitable pricing, but increasing investment. With this backdrop of shifting priorities, policy makers need to address the elusive nature of equity for older adults in public transport in terms of affordability and accessibility.

Older commuters are not accommodated in transport policy making

Bengaluru is a significant example of how a city's transport policies can increase obstacles for older adults and other groups, exacerbating intersectional inequalities.

First, since the liberalisation of the Indian economy in the 1990s, external actors such as international funding agencies and infrastructure firms have increasingly influenced and shaped Bengaluru's transport policy. India's economic reforms coincided with the shrinking of the North American markets, which prompted the shift of international funding agencies' interest from regional to global urban economies (Banerjee-Guha, 2009; Watson, 2015). Simultaneously, the disciplinarian fiscal regime of international funding agencies in the 1990s mandated the establishment of local parastatal agencies to prevent political interference in high-cost infrastructure projects (Mohan and Rajagopal, 2010). Consequently, parastatal organisations and departments have taken precedence in transport policy making, surpassing the democratically elected urban local bodies (ULBs) (see Figure 4).

Second, Bengaluru's transport planning has historically exhibited a hegemonic allegiance to large corporations, which we argue has created landscapes for younger populations. The promise of public-private partnership and romanticisation of 'youth' is deeply embedded in the 'task force' model of transport policy making in Bengaluru, such as the Bangalore Agenda Task Force set up in 1999, the Agenda for Bengaluru Infrastructure and Development Task Force set up in 2010, the Bangalore Vision Group set up in 2014 and the Bengaluru Blue Print Action Group set up in 2015. Each task force has emphasised the growing influence of privileged, male, upper-caste, educated tech CEOs and architects in envisioning transport systems that tie in with Bengaluru's position as a technology hub, and the resulting focus on solving congestion. The Bangalore Agenda Task Force Chairperson has noted the benefits for the city of the many 'young professionals who are very successful in their successive fields and feel a need to contribute to civil society', some of whom volunteer to solve transport issues (Nilekani, 2003: 2).

The first of many initiatives by the Bangalore Agenda Task Force to increase transport efficiency was filling potholes in the road – this was identified, via representative survey, as a priority among citizens. As noted by the Chairperson, following this initiative, 94 per cent of people in the city 'believed things had improved' (Nilekani, 2003: 4). With the flourishing economy and the exuberance of corporate success, an air of invincibility was attached to the city's corporate work ethic (Nair, 2005). This meant that corporations got involved directly in urban transport planning, with no representatives of ULBs in the planning process. The corporate interests moved Bengaluru towards congestion-solving exercises, with increased investment in corridor

urbanism and modern rail projects, which proved to be both financially unsustainable for the city and inequitable (Kamath, 2007; Mohan, 2008; Nair, 2015; Gopakumar, 2020). The Bangalore Agenda Task Force, like the multiple other task forces, included neither users (especially older adults) nor ward councillors. This marked a growing asymmetry of influence between later-age users and policy making bodies in the city's transport planning.

Moreover, despite legislative provisions for decentralisation, urban schemes at the federal level, such as the Jawaharlal Nehru National Urban Renewal Mission and Smart Cities, and policies, such as the national Metro Rail Policy, have further centralised transport planning and decision making (Idiculla, 2020). Such schemes have systematically empowered Union and state governments to produce overarching legislation that bypasses ULBs (Jamwal, 2006). A simultaneous weakening of local governance has accompanied centralised planning. The lack of direct elections and the minimal role of city councillors and mayors in urban transport planning have further complicated the process. Kumar (2017) explains that in Latin American cities, a mayoral system significantly incentivises local leaders to nurture public participation in transport plans. However, in Bengaluru's case, the Bangalore Development Authority, which prepared the master plans, and the BMRCL, which initiated the 2020 Comprehensive Mobility Plan (see Infrastructure Development Corporation (Karnataka) Limited, 2020), are not accountable to older adults through elections. This centralisation and political disconnection mean that there is no feedback loop for older commuters to engage with policy makers.

Discussion

This study employed age as an important intersection to critically evaluate Bengaluru's transport policies. In a demographically transforming and highly stratified city such as Bengaluru, it is essential to capture differential mobility through an equity perspective.

Treating congestion as a homogenous problem

Our results suggest that though traffic congestion does affect later-age mobilities, the congestion-solving infrastructure further amplifies the barriers they face in relation to mobility. In line with extant literature, we explain how, over time, Bengaluru's transport policies have been framed in response to traffic congestion (Gopakumar, 2020). As an initial foray, this research provides evidence highlighting congestion-based policy interventions and their implications for later-age mobilities. Our policy review shows how Bengaluru's transport planners treat congestion as a homogenous transport issue that impacts travel speeds. Across Indian cities, treating congestion as 'alarming' or at 'crisis' levels (Pucher et al, 2005; Pojani and Stead, 2017) has resulted in shallow reading and speed-enhancing transport installations. Speed provisioning further immobilised older adults living on the peripheries, who were previously unaccustomed to the high levels of traffic this resulted in. There have been similar findings in other cities, such as Istanbul, Turkey (Bayar and Yilmaz, 2023), and in countries of the Global South, such as Nigeria (Oyeyemi et al, 2023). The risks of high-speed traffic for older pedestrians with diminishing physical capacities need broader discussion in policy making.

Equity challenges in provisioning age-friendly public transport

Transport and gerontological research have emphasised the importance of public transport for independence and better quality of life in later ages (Metz, 2000; World Health Organization, 2007; Walsh et al, 2017; Curl and Musselwhite, 2018). Our results indicate the elusive nature of age-friendly access in Bengaluru's public transport scenario. On the policy front, our results show India is a signatory to all the significant conventions regarding universal access to public places and has pledged to the SDG for inclusive transport (United Nations, 2015). In addition, the Accessible India Campaign (Department of Empowerment of Persons with Disabilities, nd) was launched as a nationwide programme aiming to enhance access to railways, public transport and airports for persons with disabilities. However, the user experience indicates that Bengaluru's prioritisation of a capital-intensive modern rail project can indirectly affect older commuters.

Our findings highlight the need for more equitable pricing in the transition from bus to metro rail. Given the predominant role metro rail is expected to play in the megacities of the Global South, the absence of fare concessions for older commuters means their transport exclusion is likely to increase. Simultaneously, the dense bus network predominantly sustains older adults' transport demands but lacks accessible infrastructure. Poorly lit bus stops, high-floor buses and poor bus frequency, not helped by the unstable fundraising infrastructure, have further curtailed access to public buses. The results of our review highlight the complex network of later-age transport inequities emerging at multiple levels due to diverging philosophies.

Furthermore, the review demonstrates that the two transport bodies – the BMTC and the BMRCL – take different approaches to equity. At the same time, the utilitarian approach of public metro rail contrasts sharply with the sufficientarianism approach of public buses. Given these conceptual differences, and the move towards metro rail, there is a critical connection between the literature on the bus system and the literature on metro rail systems. Considering that 50 other Indian cities are about to switch from being a 'bus city' to a 'rail city', a change is needed in the dynamics of their transportation scenarios in order to ensure there is infrastructure that is age-friendly. There has been increased research focus on the political economy of provisioning such capital-intensive transport systems in cities in the Global South. Nair (2005), focusing on Bangalore, states that this shift from bus to rail is an ambitious move by politicians to secure political gain in the short term, positioning the plans as 'modern', 'visionary' and beneficial for all. Klopp (2011) and Watson (2015) identify similar political economy forces shaping large-scale infrastructure projects in African cities. In this study, we show that utilitarian transport planning and analysis restricts age-friendly transport interventions in developing countries.

The missing feedback loop

Coordination of transport institutions and planning is necessary to align with user needs and deliver equity (Indian Institute for Human Settlements, 2015). Academic literature (Klopp, 2011; Bhide, 2017; Mahendra and Seto, 2019) demonstrates that where there are multiple autonomous bodies involved in policy making, there is a lack of focus and it becomes difficult to assign accountability. In line with existing literature, our

results demonstrate that exclusion from transport access has gathered greater attention (Church et al, 2000; Lucas, 2011) than exclusion from transport policy making.

Our results suggest that older adults are under-represented in transport policy discourse. Bengaluru's case presents a complex constellation of governing elites influencing policy making. The results show the distorted role of external actors and an openness to corporate hegemony in Bengaluru's transport policy making, and the consequent distancing of transport users from policy making. Findings from the review support the growing body of literature emerging from the Global South highlighting the dynamics of top-down planning, which is closed off to users. Exclusion from the processes of policy making and the implications this has for equity require further empirical study. Such research holds importance for Bengaluru, where subaltern mobilisations in response to transport-related injustices have been scarce. This leads us to another core finding of this article, which is the cursory engagement with equity in Bengaluru's transport policy making. Though touted as the Silicon Valley of India, Bengaluru is a highly stratified city with multiple vulnerabilities related to age, gender, geography, class and physical ability. Neither policy makers nor popular mobilisations engage adequately with the city's stratifications.

Our results highlight systemic challenges that limit the envisioning of age-friendly transport infrastructure. First, Bengaluru's planning has been primarily top-down, often envisioned in silos by special-purpose vehicles and with the involvement corporate elites. Further, the weakening of ULBs, the absence of direct elections and the lack of public consultation have systemically curtailed public involvement in transport policy making. In this context, participatory planning might be a first step in addressing differential mobility. Second, epistemically, Bengaluru's policies have emerged from a traditional engineering perspective that does not take account of user-centred experiences.

Limitations

The study juxtaposes the policy discourse with the peer-reviewed literature. However, the lack of age-related mobility indicators restricts us from directly connecting policy impact and later-age mobilities. Also, transport policies often interact with other policies related to urbanisation or social security to impact the everyday mobilities of older adults. While isolating a policy to understand its effect or shortcomings is challenging, it is important to identify the positioning of age-friendly transport amid the congestion-equity policy debate.

Conclusion

Bengaluru serves as an example of the limited engagement of transport policy with the principle of age-friendly transport. The flows, restrictions and uneven mobilities experienced by older adults have received inadequate attention in policy and research. Inadequate social welfare mechanisms and the absence of feedback mechanisms in urban transport systems make transport inaccessibility an important problem in later age. There remains an urgent need to reimagine transport equity from a life course perspective. Given the absence of this perspective, the resulting transport disadvantage could lead to difficulty accessing healthcare, education and employment and result

in further marginalisation. The results of our review highlight that analysis of equity in transport is not held to the same level of rigour as analysis of other issues in urban governance. It is necessary to reimagine transport equity in relation to the socioeconomic and demographic realities of users so that inclusive urban transport can become a reality. In its absence, the resulting transport disadvantage could lead to inaccessible healthcare, education and employment for multiple generations of older adults across the cities of the Global South.

This research draws attention to the risks of aggravating immobilities in later life when transport policies primarily address traffic congestion. In addition to prioritising metro rail and bolstering automobility, the future of the dense bus network – which has mostly served the mobility needs of older adults from working-class and marginalised communities – is uncertain without a stable financial ecosystem. This study draws the attention of geographical gerontologists and transport researchers to situate later-age mobility within this macroscale of changes in public transport envisioning and funding in the cities of the Global South. The strong political economy supporting reduced travel duration means there is not adequate focus on accessibility, safety and inclusivity. Highlighting these trends, we argue that challenges for planning equity emerge from the complex constellation of governing elites influencing policy making.

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Data availability

Data and materials are archived at Utrecht University’s Yoda repository (<https://geo.yoda.uu.nl/>). The policy documents analysed are available in the public domain. Any additional information will be made available on request.

Research ethics statement

Ethical considerations have been followed at all stages of the research. The research tools were presented and approved by two institutional review boards: first, the Science-Geosciences Ethics Review Board (ERB Review Geo L-19294) at Utrecht University on 17 December 2019; and, second, by the Institutional Ethics Committee at the Institute for Social and Economic Change (DPA/Ethic.Com/2020/343) on 6 February 2020.

Conflict of interest

The authors declare that there is no conflict of interest.

References

- Adlakha, D., Krishna, M., Woolrych, R. and Ellis, G. (2020) Neighbourhood supports for active ageing in urban India, *Psychology and Developing Societies*, 32(2): 254–77. doi: [10.1177/0971333620937497](https://doi.org/10.1177/0971333620937497)
- Bailey, A., Hyde, M. and James, K. (2022) Introduction: living arrangements and care in India, in A. Bailey, M. Hyde and K. James (eds) *Care for Older Adults in India: Living Arrangements and Quality of Life*, Ageing in a Global Context, Bristol: Bristol University Press, pp 1–11.
- Baindur, D. and Rao, P. (2016) Equity in public transport – a case of Bengaluru’s city bus transport, *Journal of Sustainable Urbanization, Planning and Progress*, 1(1): 44–55. doi: [10.18063/JSUPP.2016.01.002](https://doi.org/10.18063/JSUPP.2016.01.002)
- Banerjee–Guha, S. (2009) Neoliberalising the ‘urban’: new geographies of power and injustice in Indian cities, *Economic & Political Weekly*, 44(22): 95–107.
- Bangalore Development Authority (2007) *Bangalore Master Plan - 2015, Volume 1: Vision Document*, https://bdabangalore.org/uploads/files/TPM_Documents/BangaloreMasterPlan2015_VisionDocument.pdf.
- Barter, P. (2000) Urban transport in Asia: problems and prospects for high-density cities, *Asia-Pacific Development Monitor*, 2(1): 33–66.
- Bashingi, N., Mostafa, M. and Kumar Das, D. (2020) The state of congestion in the developing world: the case of Gaborone, Botswana, *Transportation Research Procedia*, 45: 434–42. doi: [10.1016/j.trpro.2020.03.036](https://doi.org/10.1016/j.trpro.2020.03.036)
- Bayar, R. and Yilmaz, M. (2023) Measuring age-friendliness based on the walkability indices of older people to urban facilities, *Urban Design International*, 28(1): 35–51. doi: [10.1057/s41289-022-00194-w](https://doi.org/10.1057/s41289-022-00194-w)
- Bengaluru Bus Prayanikara Vedike (2018) Bus fare comparison across Indian Cities, 27 October, <https://bbpvedike.wordpress.com/2018/10/27/bus-fare-comparison-across-indian-cities/#more-283>.
- Benjamin, S.A. (2003) From income to urban contest in global settings: chronic poverty in Bangalore, SSRN, <https://ssrn.com/abstract=1757745>.
- Bharathi, N., Malghan, D.V. and Rahman, A. (2018) Isolated by Caste: Neighbourhood-Scale Residential Segregation in Indian Metros, Indian Institute of Management Bangalore Research Paper No 572, www.iimb.ac.in/sites/default/files/2018-06/WP%20No.%20572.pdf.
- Bhide, A. (2017) Changing trajectories of local urban governance, in S. Patel and O. Goyal (eds) *The Contemporary Urban Conundrum*, Delhi: India International Centre Quarterly, pp 172–83.
- BMRCL (Bangalore Metro Rail Corporation Limited) (2019) *BMRCL Annual Report of Bangalore Metro Rail Corporation Limited: 13th Annual Report, 2018–19*, Bengaluru: BMRCL, <https://english.bmrc.co.in/#/finance>.
- BMTC (Bangalore Metropolitan Transport Corporation) (2019) *22nd Annual Administration Report 2018–19*, Bengaluru: BMTC, <https://mybmtc.karnataka.gov.in/storage/pdf-files/ADM%20REPORT%20%202018-19%20%20-%20%20ENGLISH%20BMTC.pdf>.
- BMTC (Bangalore Metropolitan Transport Corporation) (2020) *23rd Annual Administration Report: 2019-20*, Bengaluru: BMTC, <https://mybmtc.karnataka.gov.in/storage/pdf-files/ENGLISH%20AAR%20BMTC%202019-20.pdf>.

- Buffel, T., Phillipson, C. and Scharf, T. (2012) Ageing in urban environments: developing 'age-friendly' cities, *Critical Social Policy*, 32(4): 597–617. doi: [10.1177/0261018311430457](https://doi.org/10.1177/0261018311430457)
- Burnett, P. and Lucas, S. (2010) Talking, walking, riding and driving: the mobilities of older adults, *Journal of Transport Geography*, 18(5): 596–602. doi: [10.1016/j.jtrangeo.2010.05.006](https://doi.org/10.1016/j.jtrangeo.2010.05.006)
- Carlson, H.J. (2018) Model employers and model cities? Bangalore's public sector and the rise of the neoliberal city, *Urban Geography*, 39(5): 726–45. doi: [10.1080/02723638.2017.1388734](https://doi.org/10.1080/02723638.2017.1388734)
- Chikaraishi, M., Jana, A., Bardhan, R., Varghese, V. and Fujiwara, A. (2017) A framework to analyse capability and travel in formal and informal urban settings: a case from Mumbai, *Journal of Transport Geography*, 65: 101–10. doi: [10.1016/j.jtrangeo.2017.09.001](https://doi.org/10.1016/j.jtrangeo.2017.09.001)
- Church, A., Frost, M. and Sullivan, K. (2000) Transport and social exclusion in London, *Transport Policy*, 7(3): 195–205. doi: [10.1016/s0967-070x\(00\)00024-x](https://doi.org/10.1016/s0967-070x(00)00024-x)
- Curl, A. and Musselwhite, C. (eds) (2018) *Geographies of Transport and Ageing*, Cham: Palgrave Macmillan.
- Dayanand, N. (2019) Pay-and-use toilets to be set up near some metro stations, *The Hindu*, 11 August, www.thehindu.com/news/cities/bangalore/pay-and-use-toilets-to-be-set-up-near-some-metro-stations/article28979821.ece.
- Deccan Herald (2020) Budget misses the bus to support a broke BMTC, 5 March, www.deccanherald.com/state/karnataka-districts/budget-misses-the-bus-to-support-a-broke-bmtc-811005.html.
- Department of Empowerment of Persons with Disabilities (nd) Accessible India Campaign, <https://depwd.gov.in/accessible-india-campaign/>.
- Department of Empowerment of Persons with Disabilities (2023) Meeting minutes of review meeting on implementation of RPWD act and rules, 6 April, https://divyangjan.depwd.gov.in/upload/uploadfiles/files/Minutes%20of%20Meeting%20held%20on%2006_04_2023.pdf.
- Di Ciommo, F. and Shiftan, Y. (2017) Transport equity analysis, *Transport Reviews*, 37(2): 139–51. doi: [10.1080/01441647.2017.1278647](https://doi.org/10.1080/01441647.2017.1278647)
- DULT (Directorate of Urban Land Transport) (2009) *Bangalore Mobility Indicators 2008: Draft Final Report*, https://dult.karnataka.gov.in/assets/front/pdf/bangalore_mobility_indicators-2008.pdf.
- DULT (Directorate of Urban Land Transport) (2011) *Bangalore Mobility Indicators 2010-11: Draft Final Report*, https://dult.karnataka.gov.in/assets/front/pdf/Bangalore_Mobility_Indicators_%2822-12-2011%29.pdf.
- DULT (Directorate of Urban Land Transport) (2021) Active Mobility Bill, https://dult.karnataka.gov.in/uploads/media_to_upload1640773786.pdf.
- DULT (Directorate of Urban Land Transport) (2022) Bengaluru Metropolitan Land Transport Authority Bill, 2022. https://prsindia.org/files/bills_acts/bills_states/karnataka/2022/Bill%20No.%2029%20of%202022%20KRTK.pdf.
- Friedman, T.L. (2005) *The World Is Flat*, New York, NY: Farrar, Straus and Giroux.
- Footpath Initiative (2019) Analysis of pedestrian crashes in Bangalore: 2018.
- Golub, A. and Martens, K. (2014) Using principles of justice to assess the modal equity of regional transportation plans, *Journal of Transport Geography*, 41: 10–20. doi: [10.1016/j.jtrangeo.2014.07.014](https://doi.org/10.1016/j.jtrangeo.2014.07.014)

- Gopakumar, G. (2020) *Installing Automobility: Emerging Politics of Mobility and Streets in Indian Cities*, Cambridge, MA: Massachusetts Institute of Technology.
- Government of Karnataka (2018) Bengaluru district statistics, <https://cdn.s3waas.gov.in/s33621f1454cacf995530ea53652ddf8fb/uploads/2019/05/2019052711.pdf>.
- Government of Karnataka (2019) *Karnataka at a Glance*, Bengaluru: Directorate of Economics and Statistics, <https://planning.karnataka.gov.in/storage/pdf-files/Latest%20News/KAG%20REPORT%202021%20FINALM%2020%2001%202021.pdf>.
- Gowda, C. (2010) 'Advance Mysore!' The cultural logic of a developmental state, *Economic & Political Weekly*, 45(29): 88–95.
- Gowda, M.J., Bhojani, U., Devadasan, N. and Beeranahally, T.S. (2015) The rising burden of chronic conditions among urban poor: a three-year follow-up survey in Bengaluru, India, *BMC Health Services Research*, 15: 330. doi: [10.1186/s12913-015-0999-5](https://doi.org/10.1186/s12913-015-0999-5)
- Gwilliam, K. (2010) Urban transport in developing countries, *Transport Reviews*, 23(2): 197–216. doi: [10.1080/01441640309893](https://doi.org/10.1080/01441640309893).
- Idiculla, M. (2020) Unpacking local self-government: the uncertain power of cities in the Indian constitution, *Verfassung in Recht und Übersee*, 53(1): 30–50. doi: [10.5771/0506-7286-2020-1-30](https://doi.org/10.5771/0506-7286-2020-1-30)
- Indian Institute for Human Settlements (2015) *Urban Transport in India: Challenges and Recommendations*, IIHS RF Paper on Urban Transport, Bangalore: Indian Institute for Human Settlements, https://iihs.co.in/knowledge-gateway/wp-content/uploads/2015/07/RF-Working-Paper-Transport_edited_09062015_Final_reduced-size.pdf.
- Infrastructure Development Corporation (Karnataka) Limited (2020) *Comprehensive Mobility Plan for Bengaluru: Final Report - 2020*, https://dult.karnataka.gov.in/assets/front/pdf/Comprehensive_Mobility_Plan.pdf.
- International Institute for Population Sciences, National Programme for Health Care of Elderly, Ministry of Health and Family Welfare, Harvard T.H. Chan School of Public Health and University of Southern California (2020) *Longitudinal Aging Study in India (LASI): Wave-1*, Mumbai: International Institute for Population Sciences.
- Iyer, M. (2022) *Discovering Bengaluru: History, Neighbourhoods, Walks*, Bengaluru: Indian National Trust for Art and Cultural Heritage, Bengaluru Chapter.
- Jamwal, N. (2006) Urban myths, *Down to Earth*, 15(7): 26–34.
- Kamath, L. (2007) Lobbying for Change: The Story of Corporate India's Engagement in Urban Governance, CASUMM Working Paper, <https://casumm.files.wordpress.com/2008/02/ravichandar-interview.pdf>.
- Karner, A. (2016) Planning for transportation equity in small regions: towards meaningful performance assessment, *Transport Policy*, 52: 46–54. doi: [10.1016/j.tranpol.2016.07.004](https://doi.org/10.1016/j.tranpol.2016.07.004)
- Karner, A., London, J., Rowangould, D. and Manaugh, K. (2020) From transportation equity to transportation justice: within, through, and beyond the state, *Journal of Planning Literature*, 35(4): 440–59. doi: [10.1177/0885412220927691](https://doi.org/10.1177/0885412220927691)
- Kaufmann, V., Bergman, M.M. and Joye, D. (2004) Motility: mobility as capital, *International Journal of Urban and Regional Research*, 28(4): 745–56. doi: [10.1111/j.0309-1317.2004.00549.x](https://doi.org/10.1111/j.0309-1317.2004.00549.x)
- Kharola, P.S. (2013) Analysing the urban public transport policy regime in India, *Economic & Political Weekly*, 48(48): 95–102.

- Klopp, J.M. (2011) Towards a political economy of transportation policy and practice in Nairobi, *Urban Forum*, 23(1): 1–21. doi: [10.1007/s12132-011-9116-y](https://doi.org/10.1007/s12132-011-9116-y)
- Kumar, N. (2017) Directly elected mayors: a step towards democratic urban governance, *Economic & Political Weekly*, 54(46): 243–64.
- Li, Y., Xiong, W. and Wang, X. (2019) Does polycentric and compact development alleviate urban traffic congestion? A case study of 98 Chinese cities, *Cities*, 88: 100–11. doi: [10.1016/j.cities.2019.01.017](https://doi.org/10.1016/j.cities.2019.01.017)
- Litman, T. (2002) Evaluating transportation equity, *World Transport Policy and Practice*, 8(2): 50–65.
- Lucas, K. (2011) Making the connections between transport disadvantage and the social exclusion of low-income populations in the Tshwane Region of South Africa, *Journal of Transport Geography*, 19(6): 1320–34. doi: [10.1016/j.jtrangeo.2011.02.007](https://doi.org/10.1016/j.jtrangeo.2011.02.007)
- Lucas, K. (2012) Transport and social exclusion: where are we now? *Transport Policy*, 20: 105–13. doi: [10.1016/j.tranpol.2012.01.013](https://doi.org/10.1016/j.tranpol.2012.01.013)
- Lucas, K., Martens, K., Di Ciommo, F. and Dupont-Kieffer, A. (2019) Introduction, in K. Lucas, K. Martens, F. Di Ciommo and A. Dupont-Kieffer (eds) *Measuring Transport Equity*, Amsterdam: Elsevier, pp 3–12.
- Lucas, K., Van Wee, B. and Maat, K. (2015) A method to evaluate equitable accessibility: combining ethical theories and accessibility-based approaches, *Transportation*, 43(3): 473–90. doi: [10.1007/s11116-015-9585-2](https://doi.org/10.1007/s11116-015-9585-2)
- Mahendra, A. and Seto, K.C. (2019) *Upward and Outward Growth: Managing Urban Expansion for More Equitable Cities in the Global South*, Washington, DC: World Resources Institute, www.wri.org/wri-citiesforall/publication/upward-and-outward-growth-managing-urban-expansion-more-equitable.
- Manaugh, K. and El-Geneidy, A. (2012) Who benefits from new transportation infrastructure? Using accessibility measures to evaluate social equity in public transport provision, in K.T. Geurs, K.J. Krizek and A. Reggiani (eds) *Accessibility Analysis and Transport Planning*, Cheltenham: Edward Elgar Publishing, pp 211–27.
- Manoj, M. and Verma, A. (2015) Activity-travel behaviour of non-workers from Bangalore City in India, *Transportation Research Part A: Policy and Practice*, 78: 400–24. doi: [10.1016/j.tra.2015.06.006](https://doi.org/10.1016/j.tra.2015.06.006)
- Meijering, L. (2021) Towards meaningful mobility: a research agenda for movement within and between places in later life, *Ageing & Society*, 41(4): 711–23. doi: [10.1017/s0144686x19001296](https://doi.org/10.1017/s0144686x19001296)
- Menezes, N. (2019) Metro has a new priority: parking space at stations, *The Economic Times*, 7 March, <https://economictimes.indiatimes.com/industry/transportation/railways/metro-has-a-new-priority-parking-space-at-stations/articleshow/69211726.cms>.
- Metz, D.H. (2000) Mobility of older people and their quality of life, *Transport Policy*, 7(2): 149–52. doi: [10.1016/s0967-070x\(00\)00004-4](https://doi.org/10.1016/s0967-070x(00)00004-4)
- Ministry of Housing and Urban Affairs (2017) Metro Rail Policy, 2017, http://mohua.gov.in/upload/whatsnew/59a3f7f130eecMetro_Rail_Policy_2017.pdf.
- Ministry of Road Transport and Highways (2019) *Handbook on Transport Statistics in India*, New Delhi: Transport Research Office, Ministry of Road Transport and Highways.
- Ministry of Urban Development (2014) National Urban Transport Policy, <https://mohua.gov.in/upload/uploadfiles/files/TransportPolicy.pdf>.

- Mohan, A.K. (2020) A clash of plans for Bengaluru, *Deccan Herald*, 31 January, www.deccanherald.com/opinion/in-perspective/a-clash-of-plans-for-bengaluru-800244.html.
- Mohan, A.K. and Rajagopal, C. (2010) Outsourcing Governance? Revising the Master Plan of Bangalore, 46th ISOCARP Congress, Nairobi, www.isocarp.net/Data/case_studies/1810.pdf.
- Mohan, D. (2008) Mythologies, metro rail systems and future urban transport, *Economic & Political Weekly*, 43(4): 41–53.
- Morrison, E., Nagesh, P. and Bailey, A. (2020) It's high time BMTC got people with disabilities on board: here are five steps to ensure this, *Citizen Matters*, 4 September, <https://bengaluru.citizenmatters.in/persons-with-disabilities-bmtc-bus-accessible-india-campaign-survey-fare-concession-50979>.
- Munshi, T., Sankar, M. and Kothari, D. (2018) Out-of-home mobility of senior citizens in Kochi, India, in A. Curl and C. Musselwhite (eds), *Geographies of Transport and Ageing*, Cham: Palgrave Macmillan, pp 153–70.
- Nair, J. (2005) *The Promise of the Metropolis: Bangalore's Twentieth Century*, New Delhi: Oxford University Press.
- Nair, J. (2015) Indian urbanism and the terrain of the law, *Economic & Political Weekly*, 50(36): 54–63.
- Nilekani, N. (2003) *BATF: A Partnership with Promise? The Fourth Annual Public Affairs Lecture*, Bangalore: Public Affairs Centre, <https://books.google.nl/books?id=yB7B5NcvMX4C&printsec=frontcover#v=onepage&q&f=false>.
- Office of the Registrar General and Census Commissioner (2001) *Census of India 2001*, New Delhi: Office of the Registrar General and Census Commissioner.
- Oyeyemi, A.L., Kolo, S.M., Oyeyemi, A.Y., Omotara, B.A., Yahaya, S.J. and Sallis, J.F. (2023) Neighborhood environment and quality of life among community-living older adults in Nigeria: the moderating effect of physical activity, *Preventive Medicine Reports*, 35: 102330. doi: [10.1016/j.pmedr.2023.102330](https://doi.org/10.1016/j.pmedr.2023.102330)
- Pani, N., Radhakrishna, S. and Bhat, K. (2010) *Bengaluru, Bengaluru, Bengaluru*, New Delhi: SAGE India.
- Pereira, R.H.M., Schwanen, T. and Banister, D. (2016) Distributive justice and equity in transportation, *Transport Reviews*, 37(2): 170–91. doi: [10.1080/01441647.2016.1257660](https://doi.org/10.1080/01441647.2016.1257660)
- Plouffe, L. and Kalache, A. (2010) Towards global age-friendly cities: determining urban features that promote active aging, *Journal of Urban Health*, 87(5): 733–9. doi: [10.1007/s11524-010-9466-0](https://doi.org/10.1007/s11524-010-9466-0)
- Pojani, D. and Stead, D. (2017) The urban transport crisis in emerging economies: an introduction, in D. Pojani and D. Stead (eds) *The Urban Transport Crisis in Emerging Economies*, Cham: Springer, pp 1–10.
- Pucher, J., Korattyswaropam, N., Mittal, N. and Ittyerah, N. (2005) Urban transport crisis in India, *Transport Policy*, 12(3): 185–98. doi: [10.1016/j.tranpol.2005.02.008](https://doi.org/10.1016/j.tranpol.2005.02.008)
- Pucher, J., Peng, Z.R., Mittal, N., Zhu, Y. and Korattyswaroopam, N. (2007) Urban transport trends and policies in China and India: impacts of rapid economic growth, *Transport Reviews*, 27(4): 379–410. doi: [10.1080/01441640601089988](https://doi.org/10.1080/01441640601089988)
- Rahul, T.M. and Verma, A. (2018) Sustainability analysis of pedestrian and cycling infrastructure – a case study for Bangalore, *Case Studies on Transport Policy*, 6(4): 483–93. doi: [10.1016/j.cstp.2018.06.001](https://doi.org/10.1016/j.cstp.2018.06.001)
- Ramachandran, M. (2012) *Metro Rail Projects in India*, New Delhi: Oxford University Press.

- Rathi, S. (2017) India, in D. Pojani and D. Stead (eds) *The Urban Transport Crisis in Emerging Economies*, Cham: Springer, pp 81–106.
- Ray, A. (2017) BMRCL to CPI: centre to consider concessional fare on metro, *The Times of India*, 24 July, <https://timesofindia.indiatimes.com/city/bengaluru/bmrcl-to-cpi-centre-to-consider-concessional-fare-on-metro/articleshow/59741101.cms>.
- Reddy, B.S. and Balachandra, P. (2012) Urban mobility: a comparative analysis of megacities of India, *Transport Policy*, 21: 152–64. doi: [10.1016/j.tranpol.2012.02.002](https://doi.org/10.1016/j.tranpol.2012.02.002)
- Roy, D., Palavalli, B., Menon, N., King, R., Pfeffer, K., Lees, M. and Sloot, P.M. (2018) Survey-based socioeconomic data from slums in Bangalore, India, *Scientific Data*, 5(1): 1–9. doi: [10.1038/sdata.2017.200](https://doi.org/10.1038/sdata.2017.200)
- RoyChowdhury, S. and Upadhyay, C. (2020) *India's Changing Cityscapes: Work, Migration and Livelihoods*, Bengaluru: Institute for Social and Economic Change and National Institute of Advanced Studies.
- Saldaña, J. (2021) *The Coding Manual for Qualitative Researchers*, London: Sage.
- Schwanen, T., Banister, D. and Bowling, A. (2012) Independence and mobility in later life, *Geoforum*, 43(6): 1313–22. doi: [10.1016/j.geoforum.2012.04.001](https://doi.org/10.1016/j.geoforum.2012.04.001)
- Sheller, M. (2018) *Mobility Justice: The Politics of Movement in an Age of Extremes*, London: Verso.
- Sheller, M. and Urry, J. (2006) The new mobilities paradigm, *Environment and Planning A: Economy and Space*, 38(2): 207–26. doi: [10.1068/a37268](https://doi.org/10.1068/a37268)
- Social Exclusion Unit (2003) *Making the Connections: Final Report on Transport and Social Exclusion*, London: Office of the Deputy Prime Minister.
- Sridhar, K.S., Gadgil, R. and Dhingra, C. (2019) *Paving the Way for Better Governance in Urban Transport: The Transport Governance Initiative*, Singapore: Springer.
- Sudhira, H.S., Ramachandra, T.V. and Subrahmanya, M.H.B. (2007) Bangalore, *Cities*, 24(5): 379–90. doi: [10.1016/j.cities.2007.04.003](https://doi.org/10.1016/j.cities.2007.04.003)
- Susewind, R. (2017) Muslims in Indian cities: degrees of segregation and the elusive ghetto, *Environment and Planning A: Economy and Space*, 49(6): 1286–307. doi: [10.1177/0308518x17696071](https://doi.org/10.1177/0308518x17696071)
- TomTom Index (2020) Traffic Index Ranking, 2019, (Accessed: 20 Apr 2020), www.tomtom.com/en_gb/traffic-index/ranking/.
- United Nations (2008) Convention on the rights of persons with disabilities and optional protocol, www.un.org/disabilities/documents/convention/convoptprot-e.pdf.
- United Nations (2015) *Transforming our World: The 2030 Agenda for Sustainable Development*, United Nations, <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>.
- Vaidyanathan, V. and Rathi, S. (2018) Urban transport planning in Bengaluru: a polycentric governance system, *Economic & Political Weekly*, 53(16): 50–6.
- Valentine, G. (2007) Theorising and researching intersectionality: a challenge for feminist geography, *The Professional Geographer*, 59(1): 10–21. doi: [10.1111/j.1467-9272.2007.00587.x](https://doi.org/10.1111/j.1467-9272.2007.00587.x)
- van Wee, B. and Roeser, S. (2013) Ethical theories and the cost–benefit analysis–based *ex ante* evaluation of transport policies and plans, *Transport Reviews*, 33(6): 743–60. doi: [10.1080/01441647.2013.854281](https://doi.org/10.1080/01441647.2013.854281)
- Vasconcellos, E.A. (2005) *Urban Transport, Environment and Equity*, London: Earthscan Publications Ltd.

- Venter, C., Mahendra, A. and Hidalgo, D. (2019) *From Mobility to Access for All: Expanding Urban Transportation Choices in the Global South*, Washington, DC: World Resources Institute.
- Vithayathil, T. and Singh, G. (2012) Spaces of discrimination: residential segregation in Indian cities, *Economic & Political Weekly*, 47(37): 60–6.
- Walsh, K., Scharf, T. and Keating, N. (2017) Social exclusion of older persons: a scoping review and conceptual framework, *European Journal of Ageing*, 14(1): 81–98. doi: [10.1007/s10433-016-0398-8](https://doi.org/10.1007/s10433-016-0398-8)
- Watson, V. (2015) The allure of ‘smart city’ rhetoric: India and Africa, *Dialogues in Human Geography*, 5(1): 36–9. doi: [10.1177/2043820614565868](https://doi.org/10.1177/2043820614565868)
- Webber, S.C., Porter, M.M. and Menec, V.H. (2010) Mobility in older adults: a comprehensive framework, *The Gerontologist*, 50(4): 443–50. doi: [10.1093/geront/gnq013](https://doi.org/10.1093/geront/gnq013)
- World Health Organization (2007) *Global Age-Friendly Cities: A Guide*, Geneva: World Health Organization.