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POSITION PAPER: THE STATE OF KNOWLEDGE AND RESEARCH

USER DIVERSITY AND MOBILITY PRACTICES IN SUB-SAHARAN AFRICAN CITIES: UNDERSTANDING THE NEEDS OF VULNERABLE POPULATIONS



A VREF PROGRAMME

**MOBILITY
& ACCESS**

in
African
Cities

August 2020

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Commissioned by

This publication was commissioned by Volvo Research
and Educational Foundations (VREF) as part of its
programme Mobility and Access in African Cities
(MAC). VREF inspires, initiates and supports research
and educational activities. Our vision is: *Sustainable
transport for equitable access in urban areas.*

Please cite this publication as Porter, G., Abane, A.,
Lucas, K. (2020). *User diversity and mobility practices
in Sub-Saharan African cities: understanding the needs
of vulnerable populations. The state of knowledge and
research.* Gothenburg, Sweden: Volvo Research and
Educational Foundations.

This paper is part of a series of position papers
commissioned by VREF for the Mobility and Access in
African Cities (MAC) initiative. The series consists of the
following publications:

- Cirolia, L.R., Harber, J., Croese, S. (2020). *Governing mobility in Sub-Saharan African cities. The state of knowledge and research.*
- Porter, G., Abane, A., Lucas, K. (2020). *User diversity and mobility practices in Sub-Saharan African cities: understanding the needs of vulnerable populations. The state of knowledge and research.*
- Schalekamp, H., Saddier, S. (2020). *Emerging business models and service options in the shared transport sector in African cities. The state of knowledge and research.*
- Tiwari, G., Khayesi, M., Mitullah, K., Kobusingye, O., Mohan, D., Zuidgeest, M. (2020). *Road traffic injury and transport-related air quality in Sub-Saharan Africa. The extent of the challenge.*
- Venter, C., Barrett, I., Zuidgeest, M., Cheure, N. (2020). *Public transport system design and modal integration in Sub-Saharan African cities. The state of knowledge and research.*



EXECUTIVE SUMMARY

Brief and objectives

The overall aim of this position paper is to inform the Volvo Research and Educational Foundations (VREF) and other researchers during the development of a research agenda for the Mobility and Access in African Cities (MAC) initiative¹. One of the thematic areas identified for future research is that of *access and mobility needs among vulnerable users in low-income countries*.

The paper was thus commissioned by the Volvo Research and Education Foundations (VREF) with a specific remit to focus on user needs and practices, and equity issues. The commission was based on the premise that there is a substantial knowledge gap, especially in terms of 'lack of in-depth qualitative studies of actual travel/mobility practices, problems and needs among heterogeneous groups in sub-Saharan Africa'.

The paper is part of a thematic series, which includes public transport system design; the shared transport sector; governance of mobility; and road traffic injury and transport-related air quality in Sub-Saharan Africa.

Objectives of this position paper

- To provide an overview of the state of current knowledge regarding user diversity and mobility practices in Sub-Saharan African (SSA) cities, with particular attention to understanding the needs of vulnerable populations;
- To highlight gaps in knowledge that might be addressed by future research and education, with specific attention to the potential for an extended social science contribution;
- To summarise the state of research and research capacity around this theme.

Key findings regarding the State of Knowledge

In-depth knowledge about user diversity and mobility practices and needs in SSA cities remains relatively sparse, especially when considering more vulnerable groups and their non-motorised travel practices.

Attention to user diversity and mobility practices requires careful, sustained attention to the power relations that shape everyday practices, habits, and routines, but also recognition of the un-met needs and stasis that contribute to current poverty among vulnerable groups in African cities.

Key transport needs extend well beyond conventional transport planning foci (access to livelihoods, health, education, and other basic services) to incorporate wider considerations such as access to social networks, leisure, and places of worship (all of which are intimately tied up with both economic and social well-being). Getting to places in comfort and with dignity is vital for women and men of all ages. The vulnerability of women and girls to harassment, whether walking or using public transport, is still inadequately charted and addressed. The travel constraints faced by people with disabilities represents an even more glaring research gap, and the needs and concerns of other marginalised groups, such as ethnic and faith minority populations or lesbian and gay people, are almost entirely overlooked.

The massive expansion of Africa's relatively low-density, and in most instances unplanned and informally developed, cities now imposes a substantial travel burden, especially on poor, peripherally located people trying to access better-paid work and services located in central or more affluent districts. The high cost of fares, long uncomfortable journeys, poor/lengthy connections between modes and key destinations, and safety and security issues (whether walking, on public transport or waiting at stops) all mitigate against travel.

¹ See <http://www.vref.se/macprogramme>

Walking is the dominant mode of transport in African cities, yet most cities lack safe, adequately designated walking spaces; dangers expand further at night-time, given the common absence of working streetlights. Significant investment and a cultural change that accepts walking as a valued means of travel is urgently needed, especially given the growing trends towards obesity among young people. Cycling, by contrast, is increasingly an uncommon practice, especially in larger African cities. Many view it as a mode for poor people, but the lack of safe cycle paths and security concerns contribute to its lack of popularity even among the poor – although there is some revival amongst younger and more affluent citizens working and living in enclaves in revitalised urban centres.

The choice of motorised transport in SSA cities is often shaped principally by cost considerations, especially in poorer households. Few have sufficient resources to purchase a vehicle for personal use (despite their seemingly almost ubiquitous desirability), and must depend on available public transport. Paratransit dominates in most cities, notwithstanding commonly expressed low levels of customer satisfaction (such as overcrowding, reckless driving, unreliability, and theft). Despite its disadvantages, paratransit usually offers the cheapest mode available in most areas.

Two- and three-wheeler motorcycle-taxis offer a faster but more expensive and potentially dangerous journey, but have been banned from some city centres due to a range of factors associated with anti-social driver behaviours (often young male drivers with a taste for speed, who carry multiple passengers without helmets, experience high crash rates, and are sometimes perceived to have associations with theft and political unrest). However, there are efforts to bring their use under control, through programmes such as Safe Boda in Uganda.

Recent additions available to users in some cities include Bus Rapid Transit (BRT) and Light Rail. BRT is a controversial addition² and is still restricted to a small number of SSA cities, such as Lagos in Nigeria, Dar es Salaam in Tanzania, and Cape Town, Johannesburg and George in South Africa. BRT fares tend to be relatively high and routes relatively few, rarely reaching the more peripher-

al, poorer areas most in need of reliable and affordable public transport. Benefits, however, can accrue to residents close to a route who are able to reduce their travel time, and wider benefits are anticipated through reduced pollution and improved road safety. Light rail has been developed in a few cities but BRT is mostly viewed by implementers as a cheaper alternative.

The use of technology in the form of mobile phones and smart mobility apps has expanded dramatically over the last two decades. Its potential as a means of accessing transport (and in some contexts as a substitute for travel) was quickly recognised by users; for women it has become a valuable aid to travel safety. With the widespread adoption of smart phones, ride-hailing companies such as Uber have also expanded dramatically in major cities. The potential for technology to enable seamless user travel is seductive, however, and there is a danger of the (corporate-driven) smart city agenda sidelining the needs of low-tech users.

User experience is shaped by a wide range of actors. 'Experts' enthralled by automobility still dominate the planning scene within African cities, despite the relatively low levels of car ownership and use. The state and private sector are characteristically unwilling to engage with the experiences and perceptions of informal settlement residents, who remain outside of the loop in most new ('Smart') city planning. Training of key policy makers and practitioners in participatory transport planning would enable them to understand the diverse mobility needs of the residents of informal settlements, and the lack of sound empirical evidence about those needs requires urgent attention.

Better forums for user engagement are essential, for instance the establishment of city-wide and community-based transport consumer groups and citizen audits in the transport sector linked to wider budget accountability and public scrutiny. Engagement with transport consumer groups could beneficially extend beyond the state, to transport unions, citizen rights advocacy groups, and the private and voluntary sectors, many of which already recognise transport and accessibility as core issues in the achievement of the Sustainable Development Goals (SDGs) in their cities.

² See the position paper in this series, Venter et al (2020), Public transport system design and modal integration in Sub-Saharan African cities

State of research capacity

Research and associated practitioner capacity, which focuses specifically on urban transport in Sub-Saharan Africa, remains very small. For work with users, there is a particularly urgent need to build social science capacity and extend interdisciplinary expertise beyond the current engineering and economics stronghold. Transport planning has largely stayed in the hands of professionals who have little knowledge of how to learn about and understand user needs, or the direct participatory engagement with users that is required to better meet these needs in environmentally sustainable ways.

The importance of understanding the contextual significance of each city and neighbourhood tends to be little appreciated. While social science interest within Africa is growing in the broad field of urban research, specific social science expertise in transport and mobility is rarely encountered. More case studies are needed to demonstrate achievable and cost-effective, context-relevant solutions to the mobility and accessibility needs of African cities.

Key research gaps

Building in-depth knowledge about user diversity and mobility practices and needs in Sub-Saharan African cities needs far greater attention, especially when considering more vulnerable groups and their non-motorised travel practices. Wider mobility considerations around comfort and dignity, and recognition of the importance of a wide range of people's accessibility needs (beyond access to employment and markets, extending to social networks, leisure, and places of religious worship, for instance), is also urgently needed within the planning and development of African cities.

In relation to meeting the needs of vulnerable social groups, close charting of the vulnerability of women and girls to harassment, whether walking or using public transport, and specific attention to how to address this, is needed; to do so, careful reference to local context is essential. The travel constraints faced by people with disabilities are essentially unknown in most African cities, requiring considerable further exploration, as do the needs of marginalised ethnic and faith groups and lesbian and gay people.

The locational focus of research needs extension. Primate cities have been the main focus of urban transport research in Africa. Far less attention has been given to

the transport needs of residents of secondary cities. In part this can be ascribed to the location of many leading research-focused universities in the primate cities. A more concerted effort to engage with transport issues in secondary cities, which do not have well-established universities with a research tradition, is required. There has also been inadequate focus beyond the peri-urban in the peripheral city-connected areas outside the city boundary; these generate substantial daily traffic in and out of cities, and are part of the interdependency that shapes the urban-rural continuum.

What is required is an ambitious rethinking of research approaches and methods to improve understanding of user needs and practices. A move to a more holistic interdisciplinary approach to transport research is essential if recent advances in urban studies research are to benefit the transport field. The value, in urban studies research, of drawing from a richer methodological repertoire strongly embedded in situated, participatory processes is now increasingly recognised, but is only gradually gaining ground in the transport sector. Greater appreciation of and training in mixed-methods research (qualitative as well as quantitative methods) will be essential among transport researchers if the gaps identified in this section are to be filled satisfactorily. Quantitative surveys and big data (from mobile phones, GPS etc.) can help to show where people move around and by what modes, but will provide little understanding of the reasons behind these movements and will fail to capture others who are immobile.

Embedded ethnographic research with participant observation, in-depth interviews and possibly a range of Participatory Action Research (PAR) methods, including follow-along methods and mobility biographies, will help avoid over-reliance on travel behaviour survey data. Community peer-research, in which community members are trained as co-investigators, is even more labour intensive than conventional qualitative inquiry but will allow research to be more securely embedded and evolve as a firm sounding board at all stages of work.

Consultative meetings that bring peer researchers, NGOs, CBOs, private sector actors, and other community members together with relevant ministries (not just transport, but also health, education, women and children's affairs, employment, etc., depending on the focus of research), from the start of a study, can help build alliances across sectors and move forward with interventions that are likely to have traction in the focus communities.

ACKNOWLEDGEMENTS

We are grateful to Tanu Priya Uteng for her review of this paper, and to Gail Jennings for editorial inputs.

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INTRODUCTION

Brief and objectives

The objectives of this position paper are:

- To provide an overview of the state of current knowledge regarding user diversity and mobility practices in Sub-Saharan African (SSA) cities, with particular attention to understanding the needs of vulnerable populations;
- To highlight gaps in knowledge that might be addressed by future research and education, with specific attention to the potential for an extended social science contribution;
- To summarise the state of research and research capacity around this theme.

Scope

Attention to user behaviour and needs among public transport and non-motorised transport users has only recently started to emerge in transport planning in African cities, although research to encourage and support more appropriate interventions has been gradually gathering pace over the last two decades (not least VREF-supported case study research in Ghana, Kenya, Nigeria, South Africa, and Uganda³).

Transport planning for the most part has privileged elite automobility, where the practice is to draw up plans that focus on the movement of motorised vehicles and road building, the (very small) formal sector, and their fit within the wider urban management agenda (Olvera, Plat and Pochet, 2013). The shift to considering other road users can be attributed not only to the myriad challenges currently posed by rapid urbanisation and associated physical expansion of cities in Africa, but also to the concretisation of such challenges in the targets set out by the Sustainable Development Goals (SDGs) (see below).

This paper considers the needs and everyday practices of the diversity of users and potential users who

inhabit African cities and whose needs have largely been unexamined due to the legacy of a planning and research focus on motorised transport and private vehicles. That narrow focus has left gaps in the knowledge and understanding of the access and mobility needs of marginalised and non-motorised users across the continent. The paper concludes that these gaps are more likely to be filled through a richer methodological repertoire than that of traditional transport planning, particularly one that is embedded in situated, participatory processes.

Geographically, the strongest focus of this paper is on the countries in Sub-Saharan Africa (SSA) where the authors have amassed extensive fieldwork experience and empirical knowledge over a long period (particularly in Ghana, Malawi, Nigeria, South Africa, Tanzania, Kenya, and Uganda). Drawing on wider literature and our broader knowledge based on short study periods in many other African countries, however, we also offer reflections as to the degree to which our insights into the experience of the cities cited is an experience shared elsewhere in Sub-Saharan Africa. This facilitates the identification of associated knowledge gaps.

Method and approach

Reflections in this paper regarding priorities for meeting the access and mobility needs of low-income populations in developing urban contexts are based primarily on the authors' extensive personal field experiences, as social researchers, in Sub-Saharan Africa. They are also grounded in a series of recent stakeholder workshop events and meetings incorporating field visits to selected low-income communities, enabled by a Global Challenges Research Fund (GCRF)-funded Network Project, and in an ongoing major research study in three African cities (Abuja, Tunis, and Cape Town) funded by the UK Economic and Social Science Research Council [ESRC] GCRF⁴. This evidence-base is underpinned by a review of published and grey social science literature relevant to the theme and includes an increasing body of work that

3 See Lucas et al 2019 previous report for VREF <https://intalinc.leeds.ac.uk/wpcontent/uploads/sites/28/2019/07/Overarching-report.pdf>

4 <https://transportandouthemploymentinafrica.com/>

is generated by Africa-based researchers in the context of their own cities⁵.

The research approach for these various studies accords well with the so-called 'mobilities turn' literatures, (Sheller and Urry, 2006) which reinvigorated transport-related research in the social sciences. This 'mobilities turn' has encouraged academic researchers away from the largely quantitative treatment of transportation issues that characterised most earlier work, toward a much broader conceptualisation of movement that puts multiple interacting mobilities at the centre of social change. The journey is both a space and a process in which *identities are constructed and reconstructed* within a complex nexus of power relations that shape everyday human practices, habits, and routines (Bourdieu, 1990; Cresswell, 2010). The social construction of movement and associated entanglements with power clearly play a pivotal role in determining individual well-being and life chances. As Cresswell (2010: 21) observes, mobility is 'a resource that is differentially accessed', and as such the site for serious inequalities in the distribution of its benefits and burdens.

Outline of this paper

After an overview of key concepts, discussion commences with a review of the diverse interest groups that reside within Africa's urban areas, and an outline of their key needs as transport users. This is followed by a review of the equity issues that surround the current transport dispensation.

Subsequent sections consider mobility practices and constraints with reference to different transport modes, the role of technology, road safety, and user potential for engagement with wider transport sector actors. Throughout the paper, the aim is to point to key knowledge gaps regarding user mobility practices, constraints and unmet needs, and suggest methodologies and strategies that can help uncover these. We conclude with reflections regarding the current research environment in Africa, noting issues around social science capacity and interdisciplinary expertise, and make suggestions of key priorities for transformational research that can support effective action.

⁵ The International Network for Transport and Accessibility in Low Income Communities (INTALInC) provides access to many of these resources on its website <https://intalinc.leeds.ac.uk/publications/>, as well as a number of African case study research reports <https://intalinc.leeds.ac.uk/media/africa/>

KEY CONTEXTUAL FACTORS

User diversity and travel needs

It is important at the outset to emphasise user- and non-user diversity. This is a key factor shaping the ability to travel, trip mode, and the (potentially complex) temporalities and spatialities of travel across the globe. Class, income/socio-economic status, gender, age, household composition, bodily abilities (physical and mental health), religion/cultural attributes, sexualities, employment status and livelihood type, and residential and work locations are all likely factors in the mix shaping people's everyday travel opportunities and experiences.

Intersectionality – the interconnected nature of these social categorisations that can contribute to overlapping and interdependent systems of discrimination and disadvantage – adds further complexity: the older woman who needs a wheelchair to get around and is resident in a poor neighbourhood experiences mobility very differently from the wealthy young woman who owns and drives her own car. Spatial context and factors such as seasonality extend this potential for mobility complexity even further, as physical environment (including climate and topography), national and local political economy, and historical legacy (including infrastructural legacy) intersect with user diversity in specific places at specific times. While there are potentially massive contrasts globally, within Africa these can still be substantial; just within West Africa, for instance, compare the potential for an older woman in a wheelchair to negotiate the hillslopes of densely settled Freetown in the rainy season with a similarly situated woman negotiating the very different context of city streets in relatively flat, lower density Abuja in the dry season.

User (and current non-user) urban transport needs are, unsurprisingly, similarly diverse, associated with their differentiated activities and personal circumstances. Access to services of some sort or other (such as education, health services, child minders, administrative and financial services) tends to be essential for all, but the type and regularity of service required will vary in association

with user characteristics, including age, health status, livelihood, etc. Access to work/livelihoods is often crucial to a wide age-range in Africa cities, from the very young to the very old, in the absence of a welfare state (see Lucas 2011 for the Tshwane region, South Africa; Esson et al. for Accra, Ghana 2016; also Lucas and Porter, 2016).

Access to places of worship/religious significance also appears to be rated of crucial importance across much of Sub-Saharan Africa. Olvera et al. (2013) observe this to be the case in Muslim countries (mostly for men), noting from their household travel surveys in six West and Central African cities that more than one in 10 trips in Conakry and Niamey were made in order to pray. Twenty percent of respondents (mostly aged c. 20–40 years) surveyed while waiting for transport services in low-income areas of metropolitan Abuja, Nigeria (which have both Christian and Muslim residents) said they have transport difficulties in accessing religious facilities (Oviedo, Levy and Davila, 2018). The importance of regular travel for religious purposes is similarly highlighted in surveys of (mostly Christian) urban children (9–18 years) in Malawi, Ghana and South Africa (Porter et al., 2017).

Access to leisure pursuits and social networks – ceremonies, meetings of associations and other social networking – is another common reason for travel across the world, but in Sub-Saharan Africa social networks play a particularly strong role in supporting efforts towards 'getting by' in the city (as Langevang and Gough, 2009 observe in the case of unemployed young people in urban Ghana visiting relatives, friends etc, and Porter et al., 2017, ch 5, demonstrate for young people 9–18 years in 12 urban sites in Ghana, Malawi, and South Africa). A vast body of social research (mostly focused outside transport) has documented over many decades that building and embedding social relations has been and remains crucial for survival in cities across Africa – whether people are in or out of work (see Gough and Langevang, 2016). Mobile phones may change the pattern of connection but seemingly do not obviate the need for face-to-face interaction from time to time.

Oviedo et al. (2018: 177), working in Nigeria, roll these multifarious traveller needs into a broad, three-pronged concept that equates well-being with a compendium of accessibility requirements and transport assets and resources that enable people to 'live well'. This includes "the material assets required for attaining an adequate standard of living, and the set of skills, abilities and environmental conditions to secure such assets"; secondly, relational dimensions around personal and social relations, including networks of support and obligation; and thirdly, subjective dimensions associated with perceptions, values and experiences, encapsulated in the term 'happiness' – notably around freedom to travel when and where you want to. In this latter context Oviedo et al. highlight the importance of safe night transport to residents of Abuja's satellite towns in the context of ongoing concerns about crime and terrorism.

Beyond movement *per se*, however, getting to places comfortably and with dignity is a vital element of the whole user-needs equation: research conducted in Ghana, for instance, reveals that availability of a seat, space between seats, vehicle cleanliness, availability of a resting place while waiting at bus stop/taxi rank, and driver courtesy, are all factors that shape well-being on the move (Sam and Abane, 2017; Abane 2012; Sam, Hamidu and Daniels, 2018).

For example, in Abuja, the lack of comfort on city buses (with the exception of some high-capacity buses such as Abuja Urban Mass Transit and Abuja First BRT) has substantial impact on passenger satisfaction – lack of comfortable seats, open windows for airflow and adequate legroom all discourage patronage of public bus transport services; lack of shade/shelter and seating at bus stops is another common complaint (Nwachukwu, 2014). Dignity is a major theme for Pirie (2014), writing from South Africa, but in this context with reference to Africa in general: Pirie emphasises issues around harassment and inappropriate touching, in addition to the themes raised in Ghanaian research above. In Nairobi, Mutongi (2017) tells a similar story around matatu travel. Personal observation by this paper's authors in cities across east, west, and southern Africa supports these indications that public transport rarely meets user requirements adequately when it comes to either comfort or dignity. It remains to be seen whether recent interventions such as BRT, which offers more space and

waiting areas, are able to maintain the improvements they have brought in these respects.

Vulnerabilities and transport disadvantage

A decade ago, Pirie (2009:23) challenged the transport sector in Sub-Saharan Africa to think differently, and encouraged policy makers away from the "easy mobility of privileged people" and towards meeting the needs of socially vulnerable and disadvantaged population groups. This challenge remains largely unaddressed. Indeed, expanded contestations of mobility subjects, including potential clashes between the increasing emphasis in Africa on bringing women into the workforce, and the requirement this brings for them to be more spatially mobile, adds to mobility tensions.

As Sheller (2016:28) more recently argues, the "contrasts between the smooth mobilities of global elites and the striated mobilities of informal infrastructures of survival urbanism will only grow in importance in the face of climate change and its imminent disruptions of mobility systems". For a start, consider the complexity and potential chaos associated with the sheer number of people involved: 70% of Africa's urban population lives in informal settlements (Kariuki et al., 2013). Beyond that, we have to contemplate changing demographics and changing vulnerabilities, such as the expanded proportions of older people: over the next 35 years, the population of older people is expected to grow globally by about 130%, but by 260% in Sub-Saharan Africa, and 420% in the (most extreme) case of Kenya (Murphy, 2018). This may well have a considerable impact on family mobility dynamics, especially in cities (Plyushteva and Schwanen, 2018).

In African cities, where the economic and social outcomes of transport disadvantage have long been glaringly evident, poorer urban residents must spend a large portion of their household budget on food. Once housing costs have also been accounted for, the poorest will have little – if anything – left to pay for transportation (see Olvera, Plat and Pochet, 2008 for francophone Africa; and Venter, 2011 for South Africa – these papers still offer some of the soundest analyses of household transport expenditure in Africa). Walking is likely to be their only option.

Lucas, Mattioli, Verlinghieri and Guzman (2016:356) suggest a definition of transport poverty that includes a much wider range of considerations, beyond simply mobility and accessibility, that transport planners and policymakers need to address:

An individual is transport poor if, in order to satisfy their daily basic activity needs, at least one of the following conditions apply.

- *There is no transport option available that is suited to the individual's physical condition and capabilities.*
- *The existing transport options do not reach destinations where the individual can fulfil his/her daily activity needs, in order to maintain a reasonable quality of life.*
- *The necessary weekly amount spent on transport leaves the household with a residual income below the official poverty line.*
- *The individual needs to spend an excessive amount of time travelling, leading to time poverty or social isolation.*
- *The prevailing travel conditions are dangerous, unsafe or unhealthy for the individual.*

When we talk about vulnerable populations, it is necessary to be more specific regarding the populations being targeted for mobilities/transport-related support, and to recognise the likely diversity of their needs. At the same time, it is also necessary to note complexities that multiple identities (e.g. woman, older person, business-owner, care-giver, peri-urban informal settlement resident), and the interconnected nature of these social categorisations, may impose. As a generalisation, the more vulnerable tend to include women, children and young people, older people, people with disabilities, pregnant women, the unemployed, and people resident in sites with especially poor access (e.g. off-road peri-urban areas; camps for internally displaced people, etc.). However, within each of these groups there may be some who are far more vulnerable than others. Major vulnerable groups are briefly introduced below, then followed up where appropriate in ensuing sections of the paper.

If we take **children and young people** as one important such group, for instance, while there are broad characteristics of the group that tend to encourage vulnerability (such as lack of voice and, for younger children, small physical stature), within the group there are diverse, distinctive categories and specific associated needs. Examples from our case study research in Ghana⁶ include school pupils, for whom unsafe travel may affect school attendance, or who may not be allowed to travel by bus in peak periods because they only pay a half fare; youth with disabilities that affect their ability to travel safely; unemployed youth seeking work, for whom there may be significant travel costs that will shape their job-seeking efforts; very poor young workers in the informal sector for whom transport is a niche employment (as porters, minibus call-boys etc.); and child street traders working daily in heavy traffic (Porter et al. 2010, 2017).

Children and young people have rarely been the focus of transport research in Africa: the most detailed information available to date comes from a large mixed-methods research study with young people 9-18 years conducted across 12 low-income urban neighbourhoods in Ghana (Cape Coast and Sunyani), Malawi (Blantyre and Lilongwe) and South Africa (Gauteng and Mthatha (Porter et al., 2017). For South Africa, see also studies by Benwell (2009) for Cape Town, and De Kadt, Norris, Fleish, Richter and Alvanides (2014) for Johannesburg-Soweto. Another more recently published study focused on Cape Town and Dar es Salaam and reviews experiments with walking buses (Bwire et al. 2018). Broader reviews of literature relevant to understanding child mobility issues across Africa are available in Porter (2010) and Porter and Turner (2019).

Female gender often imposes additional constraints on mobility: the transport and travel arena is currently highly gendered across the globe, but nowhere is this more evident than in Sub-Saharan Africa. Here women's access to resources tends to be constrained by a mix of entrenched socio-cultural and associated legal factors, plus widely prevalent male dominance in the transport sector (Porter, 2008). Women's and girls' poorer access to financial resources leads to higher dependence on pedestrian travel, and associated safety and security issues as they walk city streets – they are far more vulnerable than men to harassment, rape, and reputational issues associated with unaccompanied travel. Kunieda and Gauthier (2007)

⁶ <https://intalinc.leeds.ac.uk/wp-content/uploads/sites/28/2019/06/Ghana-national-report.pdf>; see also similar material for Kenya: <https://intalinc.leeds.ac.uk/wp-content/uploads/sites/28/2019/06/Kenya-Scopingstudy.pdf>

and Uteng and Turner (2019) provide broad gender reviews for low-income countries; individual African city studies focused purely on women's travel needs are also gathering pace, as evidence of the impact of travel constraints on women's empowerment grows (see Venter, Vokolkova and Michalek, 2007 for Durban; Salon and Gulyani, 2010 for Nairobi; Action Aid 2016 for Abuja, as part of a wider three-city study; Porter et al., 2018 for Mthatha, South Africa; and Vanderschuren, Phayane and Gwynne-Evans, 2019, for Cape Town). The need to dress 'demurely', for instance, can become a significant consideration for women when undertaking journeys (in Nairobi leading to the #MyDressMyChoice campaign⁷).

The vulnerability of women on urban public transport – especially when there is overcrowding – has been emphasised in recent research in diverse cities (see ActionAid 2016; also ongoing studies in Tunis, Abuja, and Cape Town⁸). In order to avoid such harassment, those who can afford to do so will select safer transport – but this is costly and yet another factor reducing their potential income from employment. UN Habitat and the Flone Initiative are now promoting practical attention to gender issues in transport through their toolkit based on work in Nairobi (2019)⁹.

Given that women so often bear the brunt of inadequate planning and transport provision, Sietchiping, Permezel and Ngomsi (2012) argue that urban planning and transport infrastructure should be (re)designed with particular focus on the well-being of the poorest, but given the cost of such projects, wider economic constraints, meagre city budgets, and a technocratic approach to planning tend to impose a very different shape on key transport sector decisions. In Abuja, ActionAid (2016) estimated that a reduction in overcrowding on buses (a key element in reducing sexual harassment) would require an additional 600 buses and cost US\$54 million, but argue that closing tax loopholes could significantly expand funds for spending on gender-responsive public transport projects of this kind.

Older people, to date, have received relatively little attention in urban mobility studies across the world (Gorman, Jones and Turner, 2019). In Sub-Saharan Africa, studies are still mostly confined to West Africa, particularly Nigeria (Odufuwa, 2006; Ipingbemi, 2010; Olawole and Aloba, 2014; Olawole, 2015).

Odufuwa (2006), using household surveys in four Nigerian cities (including Lagos and Abuja) points to long waiting hours at bus stops, unfair charges, hostile behaviour of operators, and inaccessible location of bus stops. Ipingbemi's (2010) study of older people's mobility and travel characteristics draws on a smaller survey in one major south-west Nigerian city Ibadan. This shows that nearly 30% of their journeys were associated with livelihood activities (followed closely by health-related journeys). Access to livelihoods is often still essential for older people in African cities, in the absence of social security: they may need transport as workers, in addition to their needs as carers, health-seekers etc. Olawole and Aloba's (2014) small household survey in Osogbo, a state capital in south-west Nigeria, puts traffic congestion as the greatest travel constraint for older people, but followed by other problems similar to those identified by Odufuwa (2006) and Ipingbemi (2010). Olawole (2015), presenting data for another small town (Ilesa) in the same region, shows travel to work, followed by journeys for religious purposes, dominating in terms of regular daily travel.

A major national study for South Africa also includes older people and urban perspectives (Venter, 2011). Venter (2011) uses National Household Travel Survey data from 2003 to show that among the urban elderly (over 65 years), about half are 'immobile', undertaking no travel whatsoever on the survey day. Although urban people are more mobile than rural people, still 40% or more (depending on income category) are immobile. Venter's (2011) analysis of transport problems (categorised into access problems i.e. no available/suitable transport, affordability, and service quality) by settlement type for older people shows that around one-third, or slightly more, of older people in urban areas refer to access problems (as opposed to around two-thirds in rural areas); service quality is mentioned as a problem by around one-third of the elderly; affordability presents as a problem to 21% of poor urban elderly, compared to 48% of rural poor but very similar to the poor urban population as a whole (23%). Venter argued that if there is a case to be made for *expanding concessionary fares*, it could be made for older people, at little extra cost to the public transport subsidy.

However, as older people's proportions of total population in Africa rise, a stronger focus on their needs will become increasingly essential (Murphy, 2018; Porter,

7 <https://blogs.worldbank.org/developmenttalk/mydressmychoice-tackling-gender-discrimination-and-violencekenya-one-tweet-time>.

8 <https://transportandyouthemploymentinafrica.com/>

9 https://issuu.com/floneinitiative/docs/toolkit_for_gender_sensitive_mini-bus

Tewodros and Gorman, 2018). Infirmary/disability tends to grow with age, which can present challenges in reaching key services such as health centres, whether the journey is made on foot or travelling on public transport; there is likely to be increased danger of injury from falls, for example while keeping balance on a moving vehicle as a standing passenger, as Kalula, Ferreira, Swinger and Badri (2016) show for Cape Town. Here people living in the predominantly black neighbourhoods reported fewer falls than those in white or mixed-ancestry neighbourhoods, which the authors suggest may relate to their being engaged mostly in physically demanding occupations and the resulting advantage in terms of muscle reserve capacity and function, and better maintenance of gait and balance. Widespread hazards common in African cities, such as poor infrastructure for pedestrians (uneven pavements, storm drains etc.), and uneven roads and poorly regulated traffic for cyclists, may well increase danger-levels for older people, especially those with poor eyesight, hearing, or balance issues (Porter et al., 2018).

Poverty in conjunction with residential location

is often a key factor in vulnerability, with peri-urban, peripheral residential locations commonly the home of the poorest, most marginalised populations in Sub-Saharan Africa; residents are often recent migrants to the city, but also in some cases this is because city authorities locate housing in peripheral areas where land is relatively cheap (for instance, in Nairobi, and in South African cities). Many cities are over 30km broad, yet the better paid jobs in both modern and informal sectors, as well as better urban facilities (hospitals, banks, major markets) are still relatively concentrated in central areas (Olvera et al., 2013, citing the case of a number of Francophone West African cities).

Lusaka, meanwhile, has experienced about a 233% increase in the total urban land-use area between 1990–2010, to the extent that approximately 40% of the city comprises unplanned residential land-use dominated by informal settlements (30%) (Simwanda and Murayama, 2018).

Xu et al. (2019) have quantified urban growth and form changes in Africa via spatiotemporal analysis of urban land densities in concentric rings over three time points for 25 African cities (1990, 2000, and 2014). They show

that African cities have rapidly grown both in population and built-up areas (which increased by about 4% and more than 5% per annum, respectively), and note that urban land density (defined as the proportion of the built-up area to the buildable area) in each concentric ring decreases from the city centre to the periphery but with diverse patterns among cities. Comparatively, small cities have a lower urban land density and a more dispersed urban form than medium-sized and large cities. Comparisons with cities of over one million population elsewhere in the world reveal that African cities have a relatively less compact urban form.

The implications of these urban forms for jobs are particularly severe. As Lall, Henderson and Venables (2017) observe, physical segregation of unskilled workers from job opportunities leads to high commuting and job search costs. The impacts can include higher unemployment rates and lower average wages. They cite the case of Addis Ababa, Ethiopia, where a randomised control experiment to provide youth living in peripheral neighbourhoods with a transit subsidy to search for employment in the city centre led to an increase in employment (26% versus a mean of 19%) and better-quality jobs within four months, compared to a control group, where the employed were more likely to have part-time, informal, local jobs requiring less commuting (Franklin, 2015).

Travel demand surveys conducted in Nigeria, in Abuja (2013), Kano (2012), and Lagos (2009, 2012), indicate the high cost of transport and consequent importance of walking in low-income households (Lall et al., 2017: 77): 49%, 40%, and 33%, respectively of household budgets went on public transport in these cities. But even in households with average incomes, 31%, 32%, and 24% respectively of household budget was taken up by public transport. In such circumstances, clearly much travel has to be on foot, and Lall et al. (2017) calculate that if pedestrians travel at an average of 4km an hour in a straight line, such residents can access opportunities only within a 50 square kilometre area of where they live by walking for an hour. In Nairobi's case, this would cover only about 7% of the core city: many metropolises cover more than 1 000 square kilometres (ibid: 78). The average distance between informal settlements and main job centres is estimated at 7.2km for Nairobi, and even longer, at 9.6km, for Addis Ababa (Venter, Mahendra and Hidalgo, 2019). In the peripheries, where land-use regulations are absent

or only weakly enforced, large areas tend to be developed by the private sector, with little attention to access to good roads and high quality transit (ibid).

In these circumstances, a high transport cost burden looks inevitable for the residents of peripheral areas (though estimations of transport expenditure are complex, as Olvera et al., 2008, demonstrate by reference to expenditure data collected from cities across Africa). Estimates that 55% of users spent more than 10% of their income on transport in Dar es Salaam and 63% in Nairobi (figures for 2001 cited in Bruun, Del Mistro, Venter and Mfinanga, 2016) give some indication of the scale of the problem. The fluctuation in transport fares – especially minibus-taxi fares – associated with heavy traffic or rain (as noted by Bruun et al., 2016 for Nairobi, and Xiao, 2018 for Lagos, but observed widely across Africa) are particularly difficult for those on very low incomes. In Nairobi the official fare may be posted on the windscreen but only applies for some 20% of the time (McCormick et al. cited in Bruun et al., 2016). The rise in cost is common during heavy rain because demand for motorised transport expands, congestion grows, and traffic slows dramatically, especially in areas with poor road surface conditions (author observations, for instance in Abuja, Accra, Cape Coast, Lagos, Ibadan, Maputo, and Mombasa).

Thus, unsurprisingly, Salon and Gulyani (2010) note that while two-thirds of residents work outside their homes in informal settlements in Nairobi, walking is the 'choice' of the majority, despite the relatively good (but unaffordable) *matatu* services penetrating the informal settlements. Women and children are disproportionately affected. Women here are more likely to be poor than men, and have more childcare responsibilities, which means they are more likely than men to need to work within their home settlement.

Even within informal settlements, however, there is heterogeneity. Such settlements can present a wide range of income levels and, at the same time, diverse mobility constraints that may not map directly on to income levels. Some residents will be richer and more educated than others and, as Salon and Gulyani (2010) note in the Nairobi context, more-educated men and women are more likely to work outside the settlement, but less-educated men are still more mobile than more-educated women.

The South African case is particularly complex because of the apartheid legacy, which still shapes the long-distance commutes, the long walks, and long waits at the insalubrious stations and stops that characterise travel to work for poor people. Here low-density and decentralised cities tend to have multiple activity nodes, rather than a concentration of opportunities in the CBD (a feature more common in cities elsewhere in Sub-Saharan Africa): wealthy populations as well as poorer populations have moved out of the centre, and built new economic nodes in peripheral areas, but they are located far distant from the peripheries where the poor have been rehoused. Moreover, travel from poor to rich peripheries to pursue work is hampered by the lack of good public transport into the richer areas. These enclaves of former white privilege now include a more ethnically diverse upper middle-class, but the residents still depend on private cars and continue to promote security/access restrictions – gated communities – that hamper the movement of non-residents (Harber, 2017). In the Pretoria-Johannesburg region (Gauteng), informal settlement residents are estimated to travel an average of 20-23km to look for work (Venter et al., 2019).

Meanwhile, for the very poor residents of peripheral townships, lack of affordable transport has complex implications, for instance shaping the choice of (often more costly) shops and markets that can be patronised (first author field research, Cape Town, 2019). Long journeys to work are common, and hampered by the cost, time, and other potential hazards (including security) of transferring between modes. Direct services are inevitably preferred by users because each transfer requires payment of a new full fare (the reason why cashless smart cards and, ultimately, an integrated ticketing system that works across modes have been piloted – although as yet with limited success: see Schalekamp, McLaren and Behrens, 2017). Jobs may be so distant that it is necessary to leave home well before dawn (when travel is especially dangerous), or find somewhere to sleep in town during the week because of travel costs/difficulties. When parents leave their homes in such circumstances, young children are left alone for long periods, a factor that encourages reduced school attendance and can even lead to involvement in criminal activities (Porter et al., 2017, fieldwork in Gauteng/NorthWest Province).

Venter et al. (2019) distinguish four types of resident in Johannesburg: well-located urbanites (the most

advantaged of all, spending less than the average amount of time and money on daily travel); well-located commuters (with medium to high levels of access, who may travel longer distances, mostly by car, in order to access higher wages); the mobile under-served (in distant suburbs and informal settlements, travelling long distances by formal and informal transport to access economic opportunities); and the stranded under-served (who face such severe travel constraints that they travel less than the average and tend to live in peripheral areas like Diepsloot). The well-located are estimated to constitute a minority of residents; well-located commuters constitute approximately half all residents, mobile under-served about one-quarter and stranded under-served 17% of residents.

Increasing attention is now being given to the consequences of transport inequality, but to date, progress has been slow. Sheller's (2018) argument that increasing access to transport and urban space more generally will not solve the problem of poor urban travel, if we ignore the underlying processes and relations that produce mobility injustice, needs careful reflection. Across and beyond these vulnerable groups, it is worth reflecting on Pirie's (2014:12) wider contention that dignified travel is an objective worth pursuing for all: *"Late, draughty, dirty, overcrowded and unsafe public transport is not just a negative entry on an operator's chart of key performance indicators; it also insults and demeans people."*

MOBILITY PRACTICES AND CONSTRAINTS

Mobility practices and constraints in African cities have evolved over the last century in accordance with interactions between prevailing patterns of city governance, cultural mores, economic conditions, and the availability of transport modes. There is a substantial social science literature that describes how pre-independence cities were smaller and all classes lived closer to work: consequently, there was considerable dependence on non-motorised transport – walking and cycling featured as acceptable modes for both workers and the middle-classes (see for instance O'Connor, 1983). In the 1960s and 70s there was substantial new investment in road infrastructure and motorised transport (mostly privately operated) expanded dramatically. Structural adjustment programmes in the 1980s saw significant cutback in infrastructure investment and transport services, including in cities such as Dar es Salaam and Lagos (Porter, 1996), but second-hand imports, particularly to West Africa (from Europe in the 1990s and subsequently from the US after 2000, see Beuving, 2015; Madugu, 2018; Ezeoha, Okoyeuzu, Onah and Uche, 2019), fuelled the growth of minibus services, while an aspiring middle-class took to private car ownership.

The 2000s onwards have also seen the dramatic rise of the personal use of two-wheelers across Africa and (wherever government allows them) both two- and three-wheeler use for taxi businesses. Two- and three-wheeler taxis are widely in evidence in many cities – for example Dar es Salaam (Tanzania), Nairobi (Kenya), and Lome (Togo) (Olvera, Plat and Pochet, 2016). However, these taxis remain banned nation-wide in Ghana, and bans have been instituted in city CBDs such as Lagos and Abuja (for detail see the section below on two- and three-wheelers).

Travel across these expanding cities remains disconnected and costly as users must move between diverse modes (Lall et al., 2017). At the same time, however, it is important to recognise the way user agency inserts itself in urban systems, as clandestine tactics are mould-

ed to cope with a changing urban world and, where required, users opportunistically engage in necessary transgressions. Official rules are, to some degree, negotiable, and user patronage of *boda bodas* and their use across legal and illegal spaces is arguably a prime example of this (Olvera et al., 2016; Lall et al., 2017). The following sections review current practices and constraints by transport mode.

Walking

Walking is the dominant mode of transport in African cities (UN Environment, 2016), yet it still gains relatively little attention from urban and transport planners, despite being the mode (along with cycling) with least environmental negatives and most positive health benefits (if walkways are protected from other traffic). Planners mostly concentrate on improving urban automobility (despite increasing lip service to NMT considerations), and new roads rarely make adequate provision for pedestrians (Vanderschuren, Jennings, Khayesi and Mitullah, 2017). Yet in cities such as Nairobi and Dar es Salaam, walking constitutes around 50% of modal share, in part a factor of very low incomes and slow, congested public transport (Bruun et al., 2016).

The gender split of pedestrians appears to be relatively even in Nairobi, Cape Town, and Dar es Salaam, while age-wise the majority of pedestrians are aged 19-45 years (Vanderschuren et al., 2017). In many cases in these cities, trip segments only involve 10 minutes to the nearest paratransit stop. The average walking time in these cities is 10–20 minutes, although some walk much further – a maximum of 2.34 hours in Nairobi and four hours in Cape Town (Vanderschuren and Jennings, 2017).

Lack of well-designated, safe walking spaces is a feature of most African cities (as UN Environment, 2016, shows for Lagos, where lack of shade trees is another noted deterrent to long walks). Unsafe pedestrian spaces even characterise CBDs, for example as

Quayson (2014: 14-17) describes so effectively for 'Oxford street' in central Accra. Here, the sidewalk is:

"merely the stripped-down extension of the interior of the many commercial enterprises along the street... augmented by the presence of vendors of various kinds, both itinerant and stationary...walking along Oxford street involves a lot of zigzagging, moving off and onto the sidewalk or roadway ... amid various kinds of vehicles, vendors, goods, and pedestrians as convenience and inclination dictate....The messy interactions of pedestrians with other pedestrians, with pushcarts, with itinerant hawkers on the sidewalks, and with vehicles on the roadway means that misunderstandings regularly break out as to the proper courtesies of street use".

Pedestrians face the potential for collisions with bicycles and pushcarts, not only with motor vehicles, whether they are simply walking along the road or trying to cross it: they must take their chances in these spaces, where physical separation is rarely in place. Clearly, pedestrians of all genders, social classes, and ages may experience considerable stress as they attempt to negotiate city streets. They may walk along sidewalks which may be not only narrow and badly maintained but also – as Mitullah and Opiyo (2017) describe in Nairobi – possibly unpaved, discontinuous, waterlogged and impassable in the rains, and/or encroached upon by traders and vehicles, perhaps also having to climb up overpasses that are badly located. Similar conditions are widely in evidence across a majority of cities in Sub-Saharan Africa outside South Africa. Moreover, footpaths, where they exist, often do not follow direct routes to key service locations. Black female university students resident in an inner-city campus in Johannesburg (members of an upwardly mobile population), for example, emphasised the unpleasantness of walking along crowded, dusty, noisy, polluted streets that affect their sense of personal and psychological space. Fear of crime (from pick-pocketing to being robbed at gunpoint, and rape) restricts not only the spatial range of these students, especially at night, and the need to find companions to walk with, but even their dress (avoiding gold jewellery and mini-skirts) (Seedat, McKenzie and Mohan, 2006). Such detailed focus on women's walking experiences in urban Africa remains surprisingly rare (though for girls' walk-to-school experiences see

Porter et al., 2010 for Mthatha, Cape Coast, and Blantyre; and Porter et al. 2017, for Gauteng pp. 79-80, Blantyre and Cape Coast p. 82, Mthatha pp. 185-86; also see van Blerk, 2013 on street children's mobility in Cape Town).

Those who encounter street harassment regularly (from insults to ogling and stalking) are mostly women, and not only those from the poorest sector of society (as Peoples, 2008, describes for Cairo; Chafai, 2017, for urban Morocco; the literature specifically devoted to street harassment of women is more extensive for North Africa than Sub-Saharan Africa). The sexual policing of women's everyday movements can extend to the wealthiest. While women tend to develop strategies for avoiding or responding to it, there can be significant potential negative impacts on how and where women socialise, their employment-seeking behaviours, their engagement in civic life, even how well they sleep (Logan, 2015).

Poorer people often take much longer journeys on foot, of necessity. Olvera et al. (2016) analyse household surveys conducted in Dakar in 2000 and 2015 and show that in both surveys the percentage of people who only travel on foot (so-called captive pedestrians) decreases as income rises. In cities across Africa, such walks may require crossing major arterial roads and freeways, in the absence of pedestrian crossings or inappropriately located/designed crossings, sometimes while balancing heavy loads – trays of bananas, reams of newspapers etc. In Dar es Salaam, pedestrians made up 67% of total road-based fatalities in 2008 (Masaoe, 2017). One common strategy in Cape Town, South Africa (and widely observable in cities across Africa), is for pedestrians to bunch together when crossing a roadway, especially when traffic speeds are relatively uniform: as Behrens and Makajuma (2017) reflect, this tactic presents as a psychological challenge to force speeding motorists to slow down. Further challenges are faced at night, for rich and poor: lack of streetlights/working streetlights is often a significant issue, and unfortunate events can occur even in a short walk between workplace and private vehicle. For those with long journeys, walking home to peripheral neighbourhoods, the risk of a fall into a storm drain or raw sewer, a physical attack, or involvement in a traffic collision, are much higher.

As Vanderschuren et al. note (2017: 1), providing for safe walking (and cycling) is now ever more challenging in

African cities because of the need to retrofit. Significant investment is needed, not only in redesigning transport and land-use policies and practices to provide a safe network of paths (with shade), laws and regulations that protect pedestrians (and cyclists), and appropriate public transport connections, but also a changed culture that accepts walking (and cycling) as a valued means of travel. Given growing concerns around the increasing prevalence of obesity in lower- and middle income-households, and the potential for safe walking to improve health (if exposure to motorised vehicles and vehicle pollutants can be reduced), the arguments for such financial reallocation appear unassailable. Walking buses to school could prove one means of promoting walking and would help militate against growing trends towards obesity among young people in African cities, providing they are supported by appropriate institutional arrangements and strong school and municipal support (Bwire et al., 2017).

Cycling

Cycling now occupies only a small niche among the transport modes of most African cities: SSATP (2005) reported that cycling made up only a small proportion of daily trips, varying between 0.05 and 2% and proportions are unlikely to have grown substantially since. Cycling was rarely acknowledged by planning authorities (Sietchiping et al., 2012) and although UN Environment (2016) notes that 69% of Africa's countries or National Transport Authorities have an NMT commitment, they also record that data are poor and few countries (with an exception of Namibia) pay attention to the complexities of behaviour change processes. They further observe that though South Africa and Tanzania have drafted high-quality engineering design and construction guidelines for bicycle and pedestrian facilities, these remain guidelines rather than requirements (p. 25). Meanwhile, Jennings, Petzer and Goldman (2017) observe for Cape Town, where bicycle modal share has remained at just 0.5% despite many years of policy and funding attention to bicycle transport, the focus on hard infrastructure per se is insufficient – here they argue the need for more broad-based interventions, including bicycle promotion. Wood (2020), charts the debates around a bike-share scheme in Johannesburg (following similar schemes across the Global North and Brazil, China etc.), and notes how a range of political and practical challenges,

including the size and low-density sprawl of the city and its security issues, contributed to its rejection.

Across the majority of Sub-Saharan African cities north of South Africa, the bicycle (unless it is a smart sports model) still seems to be seen by a majority of all classes as a mode for the poor, with automobility as their preference: the sentiment that *"a bicycle makes you lower class"* (Porter, 2003, with reference to southern Ghana) – i.e. that cycling is associated with the poor – is echoed elsewhere, notably in a quotation reported by UN Environment (2016:35), and further supported by comments from the South African National Department of Transport and the Council for Scientific Research (CSIR) (ibid) and a specific report from Nigeria (ibid:53); this sentiment also features as a deterrent to cycle use among low-income people in Cape Town (Irlam, 2016).

In cities such as Cape Town, cycling as recreation is a pastime, but cycling as a means of transport to work or school is relatively rare. The decline in cities such as Nairobi (where some government departments and companies once gave their employees loans to buy a bicycle) is attributed to fear of road crashes (Vanderschuren and Jennings, 2017). Bicycle use for transportation is probably under 1% in Cape Town and perhaps 1% in Nairobi. A study in one Cape Town low-income settlement suggests poor road safety and the risk of being hit by a car while cycling as primary barriers to cycling (Irlam, 2016). In Dar es Salaam, Nkurunziza, Zuidgeest, Brussel and Van Maarseveen (2012) found a number of factors militated against its popularity there, including weather, lack of safe parking, lack of bicycle paths and showers at workplaces, plus social status issues.

In smaller cities, cycle use appears more common – in a late 20th century study of NMT it was estimated at 23% of all daily trips in Morogoro and 12% in Eldoret (but was already negligible at 1% in Nairobi; SSATP, 2005: 10-11). There is a lack of recent published evidence, but in smaller urban centres today, for instance Lilongwe and Blantyre, Malawi, bicycle usage is still common (in these cities also as bicycle-taxis). As motorcycle use expands cycling is likely to decline (see Porter et al., 2017, pp. 189-193 regarding urban children's cycle use in Blantyre and Lilongwe).

Most utility cyclists are male (over 80% in Cape Town and Dar, nearly 91% in Nairobi) (Vanderschuren and

Jennings, 2017). Vanderschuren and Jennings note both security risks (citing Garrard, Handy and Dill, 2012) and cultural barriers (citing Pochet and Cusset, 1999) as deterrents to female cyclists. Irlam's (2016) study of cycling in a low-income Cape Town settlement notes that, among women, the most significant barriers are fear of being hit by a car when cycling; being unable to carry loads on a bicycle and inability to transport a bicycle on the train. (See also Porter, 2003 for a full review of cycle and cycle-trailer usage and constraints in Ghana, including issues around female dress and other cultural issues which still remain prevalent in that country.)

Among children, early work by Grieco, Turner and Kwakye in Acora (1994) demonstrated the importance of cultural context. More recent studies in Ghana, Malawi, and South Africa (Porter et al., 2017, chapter 7) indicate that cycling is largely restricted to boys (with cycling by girls and women widely considered inappropriate: sexual innuendo, household work demands and traffic hazard all contribute to this view). This series of studies showed that in Malawi (poorest of the three countries), boys value bicycles as a business opportunity (transporting produce or operating a bicycle-taxi), whereas in Ghana and South Africa bicycles were more likely to be used for personal transport or sport.

In Dar es Salaam, a small pilot cycle train with children from one primary school supported by volunteers from a local cycling organisation indicated generally positive perceptions among children because of reduced potential for bicycle theft and assistance with breakdowns. However, few children had bicycles to participate, and sustainability appears difficult – this experiment does not seem to have continued in the long-term, at least in part due to issues regarding payment of supervisors (Bwire et al, 2017). For the most part, innovative cycling projects are led by NGOs and local interest groups, rather than through local or national government initiatives (Sagaris and Arora, 2018). South Africa's Shova Kalula project is a rare exception (Porter, 2010).

Motorised transport users – the formal-informal nexus

Household ownership of motorised vehicles purchased for private use tends to be low across African cities (even

among the middle-classes). For example, in a rare six-city study in Francophone Africa, over 90% of people surveyed in Conakry, Dakar, and Douala had no private vehicle (car, motorcycle or bicycle), 84% in Niamey, and 70% in Bamako – though in Ouagadougou the figure was much lower (37%) because so many people own their own bicycles and motorcycles (Olvera et al., 2013).

Most people in African cities (excluding the wealthiest) are dependent to some degree on paratransit (Behrens, McCormick and Mfinanga, 2016; Heinrichs, Ehebrecht and Lenz, 2017) but this does not mean that their transport experience is untouched by institutional forces. Although formal regulations are commonly enmeshed with informal rules and practices, they may still impinge on the fares users pay, the routes on which they can find transport, location of stops etc., unless customers and drivers collude in by-passing such regulations (e.g. by picking up vehicles on the move so drivers can avoid fines for stopping illegally).

Traffic congestion

As urban incomes have expanded and the availability of new and second-hand vehicles from Asia has increased, urban motor traffic in African cities has grown exponentially, particularly when governments have reduced or removed the taxation on imports (as for instance Kenya has done for motorcycles, see Sietchiping et al., 2012; Ehebrecht, Heinrichs and Lenz, 2018). One significant consequence for users is that travel speed in all motor transport, formal and informal, tends to be constrained – often paralysed – by traffic congestion. Further, congestion is worsening because of increasing use of private vehicles. Interestingly, in Abuja, Oviedo et al. (2018) find that users consider time more of an issue than cost with reference to using transport to access opportunities. However, such assessments may vary widely depending on the segments of population concerned and the reasons driving their transport demand: the first author's ongoing research with young unemployed women in peripheral areas of Abuja, for instance, suggests a contrary conclusion.

Where timing and congestion at peak periods is an issue, users will strategise (as is the case globally) in particular by travelling earlier to work, and only leaving for home late

in the evening. The case of commuters in Lagos leaving for work from peripheral low-income neighbourhoods at 4 am is a prime example (Ibitayo, 2012). In a Lagos study, some low-paid workers sleep at their place of work during the week rather than attempt long journeys to and from home. Commuters of all classes also strategise in many of West Africa's cities by shopping as they travel, through the open window of their vehicle as it sits in the go-slow – for newspapers, bread, clothes brushes, toilet rolls, children's plastic toys, even hot water bottles, or whatever trinkets traders have acquired following the latest shipping consignment (see Amankwaa, 2015; Stasik and Klaeger, 2018 for Accra; Porter et al., 2010 for Cape Coast). This is rather less prevalent in South African urban contexts, at least partly due to security concerns.

Cost of travel as a factor in mode selection

Cost of travel appears, commonly, to be a key element shaping the selection of transport mode, especially in poorer households. Although household budget and transport expenditure data are difficult to analyse in low-income economies, and local contextual factors have to be taken into account, Olvera et al. (2008) cite a series of examples from the literature that suggest the high sensitivity of transport expenditure to economic downturns. Travel costs absorbed 16-20% of household income in a six-city survey in Francophone Africa (Olvera et al., 2013 – a key reference for work in this field). Data from Pietermaritzburg, South Africa, from the Pietermaritzburg Economic Justice & Dignity (PEJD) Household Affordability Index (PEJD, 2010), shows even higher proportions of income spent on transport: here transport costs to/from work for some households earning the national minimum wage represented 38.9% of income earned. In a survey of passengers at major transport terminals in four Ghanaian metropolitan areas (n=1 000), Abane (2011) found that although cost of food and education far exceeded transport costs among passengers surveyed, affordability came out as the highest factor shaping their choice of transport mode (the main factor for 46% of men and 43% of women). Availability was the second most important (for 15% of men but 17% of women), followed by accessibility, timeliness, and comfort/convenience. Reliability of service and safety were ranked lower (ibid): with reference to

safety, "it is always assumed that once they have prayed before a trip, nothing negative would befall them" (ibid:9).

High transport costs may affect choice of transport mode, time of travel (selecting off-peak where possible), travelling at least one way on foot, undertaking sections of the trip on foot where connections will introduce a second fare, and missing activities because of lack of funds to pay for a fare (Olvera et al., 2013). But it may also encourage fare dodging. However, the sales advantages for traders working in the city centre, as opposed to staying in peripheral residential locations, may still make high fares worthwhile: in Conakry (Guinea), incomes of poor self-employed traders reportedly average 40% above that of traders who operate in their home area and walk to work (ibid). There seems to be a lack of comparative data for other cities, perhaps because informal trader income is difficult to assess.

Travel uncertainties and the liminality of travel

Understanding of the broader experiences and emotions that shape the mobile lives of travellers in African cities is vital to a full appreciation of travel behaviour. Reliability and regularity of services may be of even greater importance than cost, particularly for women if they need to return home for childcare or to prepare an evening meal after a day's work. Travel on motorised transport may bring stressful challenges in reaching the vehicle, awaiting its arrival, and within the vehicular space. Ortar (2016), observes how mobility "creates discontinuity within continuity and makes daily routines precarious, for lack of sufficient repetition."

But even in everyday daily travel within African cities, uncertainties of travel and accumulated fatigue may limit any "fine-tuned knowledge of the physical twists and turns of different spaces of transit (Ortar, 2016:3)". The fight for a seat and the "kinesthetic and olfactory intrusions" (Ortar, 2016:34) that intrude on personal space can form a significant backdrop to travel: such sensory experiences inevitably help shape the felt quality of travel. Drenching rain and air pollution may add to these hazards. In this vein, Xiao (2018) provides a rare, very effective experiential account of Lagos travel drawing on his personal travel on *danfos*

(minibuses). Even at major bus terminals and stops, passengers typically wait outside without shelter or amenities (which encourages people who can afford to do so to pay a higher fare to avoid walking or a long wait in bad weather, as Bruun et al., 2016, describe for Nairobi). Bus Rapid Transit (BRT) (discussed below) will only improve the situation within limited, designated corridors.

Users with accompanied petty freight

Users with small amounts of accompanied freight form a significant component of daily travel in African cities, especially in West Africa (Grieco et al., 1994). Women marketers are often the largest category travelling the city with their produce. If distances are short, or resources unavailable, this is likely to be a matter of pedestrian load-carrying by themselves and/or their children: men may use carts (UN Habitat 2013:90). If they have the funds, they will take paratransit services to the main retail markets, ramming their goods in car boots, under seats, on roof-racks, on their knees, and into any available space. Where new BRT services are available, these are unlikely to be patronised by such petty traders because they are not designed for travel with large items. Yet such traders do not have sufficient loads to warrant separate despatch and are often determined to travel with their goods as the safest means to ensuring no losses occur en route to the market.

Additionally, hawkers and informal traders travel round African cities from early morning each day till nightfall, perambulating the streets with their wares – baskets of fruit, boxes of cooked food, watches, water sachets, newspapers and so on – looking for customers. These are generally people with insufficient resources to rent a shop or market space, though they may pay for transport to reach the city central area where custom is better. They may try to set up on the sidewalk for short periods – where they are likely to impede other users – though police, local government officials and owners of permanent shops often move them on.

Neither marketers nor hawkers are adequately envisaged by transport authorities as they plan for the future

city, nor are they adequately served by current transport services. Yet given their likely continued significance in city provisioning (and the importance of their activities to the income of poor household)] it is imperative that greater attention is given to addressing their needs, rather than merely condemning their movements as unacceptable or moving designated trading spaces to locations that traders find too expensive or inappropriately located (see Ikioda, 2016, for market trade/transport development tensions in Lagos).

Two- and three-wheeler motorcycles

Few cities have adjusted to the massive expansion in motorcycle ownership (whether for personal or commercial use). Ouagadougou (Burkina Faso) is a rare example of a city with designated motorcycle lanes (Ouongo, 2009). Benefits for users are clear: door-to-door service, access to areas with a poor road network, and their potential to beat traffic congestion. Users may pick up the motorcycle-taxi (*boda boda*) at one of the designated 'stages' where they await passengers, or at the place from which they called the vehicle. In Kampala, in a small passenger survey, 64% of interviewees saw speed as a key advantage of *boda boda* usage (Evans, O'Brien and Ch Ng, 2018). In francophone West Africa, cheap motorcycle running costs have been facilitated by cheap legal and illegal fuel from Nigeria (Seitchiping citing Olvera, 2010).

In a number of African cities, such as Abuja, Port Harcourt, and Lagos in Nigeria, motorcycle-taxis (*okada*) are banned in the city centre; these bans are linked to high crash statistics associated with reckless driving by young men, lack of helmets, and riders carrying multiple passengers (see for instance Nguyen et al., 2016, for Moshi, Tanzania; Xiao, 2018, for Lagos). However, bans extending to both private and commercial motorcycles also occur from time to time (as for instance in Addis Ababa¹⁰). City authority concerns around motorcycles clearly extend beyond crashes to their widespread association with theft, political unrest, and other anti-social behaviour among predominantly young male motorcyclists (Bishop, Barber, Charman and Porter, 2018: section 3.9.6). On a more mundane level, women and older people in Abuja (Nigeria) also point to difficulties in

¹⁰ <https://www.bbc.co.uk/news/world-africa-48920877>

getting on and off these modes, because they need to sit astride and are hampered by traditional dress (Oviedo et al., 2018). (For an extensive listing of literature on motorcycle-taxis, both urban and rural, see Bishop et al., 2018.)

Paratransit

Private -sector paratransit services dominate transport in most African cities (see Behrens et al., 2016, for a full review of this). Paratransit is dealt with in-depth in the position paper in this series that covers emerging business models and service options in the shared transport sector in African cities (Schalekamp and Saddier, 2020).

Paratransit vehicle types vary but range from minibuses to midi-buses, and large buses (McCormick, Schalekamp and Mfinanga, 2016). Since operators tend to be too cash-strapped to provide well-maintained, serviceable, comfortable vehicles, and drivers mostly lack skills such as customer relations, safe driving, security and first aid, passenger satisfaction tends to be low. Competition for passengers before the vehicle starts up (due to the dependence of operating crews on fares) can be so violent that passengers themselves may face injury, while poor vehicle condition (from broken seats to brake failure), overcrowding, and reckless driving behaviour make for further uncomfortable/dangerous passenger experiences. Pickpocketing, muggings, and sexual harassment may add to on-board hazards (Mutongi, 2017). Even alighting may be dangerous, given on-street boarding and middle-of-the-street alighting. There tend to be no formal schedules and, inevitably, arrival and departure times are unpredictable.

Nevertheless, Mutongi (2017:13) also draws attention to the social and ethnic mix that characterises paratransit ridership, and is optimistic about its role in encouraging people to rub along, “all intermingled, all at the mercy of the drivers to whom they have entrusted their lives... by sharing their fates in boisterous *matatus* they share the same cosmopolitan experience...[and] learn to live together as Nairobians”. This emphasises another perspective of public transport – that it is also public space, and a space where people encounter diverse others. Passengers thus possibly share conviviality, as Mutongi (2017) suggests, in a way that can aid social integration

– though the shared space also has the potential to be a place of differentiation, intolerance and exclusion.

Another attribute of these paratransit services is that they respond quickly to changing demands (daily, seasonal and longer term) related to the mobility needs of the population they serve as best they can (McCormick et al., 2016). Work to develop passenger information about paratransit routes in Nairobi and similar work in South Africa¹¹ has the potential to improve passenger confidence in the system and save their time, while new features such as on-board wifi in Nairobi and South Africa are beginning to improve travel experience. Given high and still rising levels of ownership of internet-enabled phones across the population in African cities this is an important facility (Jennings, Bruun, Orero and Browning, 2016). In Dar es Salaam, where *dala dalas* are assigned routes and fares, paratransit seems to be somewhat better regulated than in Nairobi for example, but they are still unsafe and their services of poor quality (Mfinanga and Madinda, 2016). Here they reportedly operate at 10-12km/h in peak periods, compared to Nairobi where they can only achieve 5-10km/h in peak periods, due in part to lack of sufficient high-capacity, high performance bus lanes, or even traffic controls that favour public transport modes. Public transport lanes are almost non-existent in cities like Nairobi (Bruun et al., 2016). Passenger comfort is also low given the congestion in vehicles (Bruun et al., 2016).

Bus Rapid Transit (BRT)

BRT is a relatively new element in the transport mix of African cities. This mode, and its at times controversial implementation, is dealt with in-depth in the position paper in this series that covers public transport system design and modal integration in Sub-Saharan African cities (Venter et al., 2020). BRT systems that have been implemented to date – Lagos (2008), Johannesburg (2009), Cape Town (2011), and Dar es Salaam (2016) – together amount to just 104 kilometres of exclusive bus lanes (Lall et al., 2017:144); a key point to note is that BRT routes tend to be few and seldom reach the poorest areas where good transport is most needed. High fares are a factor that deter poor people in any case, as Mfinanga and Madinda (2016) observe in the case of Dar es Salaam BRT. Lionjanga and Venter (2018) show

11 <https://www.wheremytransport.com/case-studies/integrating-the-informal-mapping-cape-towns-minibustaxi-network/>

how in low-income residential areas of Johannesburg there is no evidence that the additional accessibility provided by the BRT has improved the general sense of well-being in the communities it serves. They did note that well-being improvements occurred among the narrower cohort of actual users of BRT, especially in terms of their satisfaction with their amount of free time.

As Lall et al. (2017) note, the complexities of introducing BRT are substantial: careful planning and implementation are essential. Nonetheless, they point to potential benefits of BRT, notably with reference to travel times (as in the Johannesburg case noted above). In Lagos, commuting time fell by an average of 25 minutes along a 22-kilometre corridor and wait time was reduced from 45 minutes to 10 (Peltier Thiberge, 2015). Other potential benefits of BRT are reductions in pollution and improved road safety.

Train/metro/light rail

Light rail is an expensive option for urban transport, and in most cities BRT is viewed as a cheaper alternative. In South Africa, train services have been part of the urban transport mix since early in the 20th century, but have been subject to marginal investment and have significant personal safety risk, with the exception of the Gautrain rapid rail service in Gauteng, South Africa (Bruun et al., 2016). A similar situation pertains in Tunis: here trains tend to be viewed by much of the travelling public as a risky option because of the high incidence of theft and (for women) sexual harassment. Addis Ababa's light railway, opened in 2015 and planned to ease city traffic in the capital, is reportedly regularly overcrowded, and the network reaches only limited parts of the city. Moreover, tracks are elevated in places or cut between and through road lanes, thus adding to rather than reducing road traffic congestion (Tarrosy and Vörös, 2018; Beall, Cherenet, Cirolia and da Cruz, 2019). In Nigeria, Abuja's light rail, part of the first phase on the new city's master plan, is only just coming into operation – its impact on users is therefore not clear as yet.

Private cars

Across Africa, the private car is still widely viewed as a status symbol. In Nigeria, for instance: "Acquiring a car is a goal for most citizens" (UN Environment 2016: 53).

In work conducted in Dar es Salaam, Bruun et al. (2016), note that even though car commutes are slow, they at least provide comfortable seating, privacy, and a choice of company and entertainment. However, as Hart (2016: 183-184) notes in a Ghanaian context, the growing number of cars on the road is:

"...seen by many as a symbol of the widening income gap.... Increasingly, these tensions have played out on the road, pitting the elite 'myself' drivers with luxury SUVs and sedans against working-class urban residents crammed in dilapidated trotros [paratransit] and taxis, all asserting the rights to space, mobility, and opportunity".

In Johannesburg, where crime levels are particularly high, perceptions of public transport are negative because any engagement with public space is considered potentially dangerous: "South Africans are socialised into the perception that the car is desirable and the solution of all public transport problems" (Scheidegger, 2009:208, 210; see also Luke, 2018 for South African student perceptions of the importance of car ownership). In this highly unequal society, dominant social groups still tend to neglect the inadequacies of travel conditions for the urban underclass. Public transport would arguably quickly improve if the middle-classes used it extensively.

Technology: the expanding role of mobile phones and smart mobility apps

Mobile phone adoption in Africa has expanded dramatically over the last two decades: the potential for phones to ease access to transport services was rapidly recognised by transport users. Mobile phones are now an established part of the wider transport nexus. They are used to organise everyday transportation, to coordinate individual mobility, to organise transportation in emergencies (especially health emergencies such as accidents, illness and childbirth), and to reduce exposure to violence and harassment. For women, the mobile phone is particularly valuable as an aid to improve travel safety, including through geographical location and way-finding, especially on long, unfamiliar journeys. This reduces escort costs, assists location-finding in new

places and improves the safety of passengers (Porter et al., 2018). However, travel (especially with an expensive phone on display) can also increase the threat of mugging and theft.

Until a few years ago, almost all ICT/transport connectivity in African cities followed an essentially mundane channel, in which users called or texted their known transport supplier(s) when they needed to travel (Porter, 2015, Porter et al., 2018). While ride-hailing services are now changing that scenario (see below), in many smaller cities and towns the main interface between phone and transport provider remains a personal connection. Most people have access to at least a basic mobile phone on which they have entered the phone numbers of trusted transport suppliers, particularly motorcycle-taxi riders and conventional taxis. For many women in cities across Africa, the potential to call a taxi is now a vital element of their safety net, especially if they have to travel after dark or in unknown and potentially unsafe locations (Porter et al., 2018, for South Africa; also first author field research Tunis and Abuja, 2019, and wider cross-country observations). The mobile phone may also be used to substitute for physical travel with potential savings in money and time. In a mixed-methods study among young people (9-25 years, survey n=396) from low-income areas of two South African cities (one in Gauteng, one in the Eastern Cape), over half of those surveyed in the Eastern Cape study city estimated that their phone use had enabled them to reduce the number of short journeys they had made in the past year (Porter et al., 2018).

With the widespread adoption of smartphones, the potential for use of transport apps has expanded dramatically: Uber and Uber-style apps are widely available and used in major cities. In South Africa, for instance, Uber has operated in major cities since 2013, despite considerable initial hostility from metered taxi companies. E-hailing or ride-hailing companies now operate in many African cities (including for *boda bodas*/motorcycle-taxis), in Nairobi, Kampala, and Kigali, for example.

The Digital Matatu Project, a mapping of Nairobi's *matatu* system facilitated by geo-location-enabled mobile phones and GPS, has shown the potential for creation of public transit maps that can provide users with crucial open information on paratransit services.

Interestingly, however, evidence from Nairobi and a similar digital mapping exercise in Maputo also demonstrate the resistance of key transport planner stakeholders to paratransit. City master plans here focus on BRT and lack adequate consideration of the value of paratransit, rather emphasising the shortcomings of paratransit such as air pollution and congestion (Klopp and Cavoli, 2018).

There is great interest among funders in the potential for technology to enable ever more seamless user travel in the smart city. The notion is seductive. However, the (essentially corporate-driven) Smart City agenda is potentially pernicious if it fails to recognise the needs of (all) users and focuses on technical potential. Uteng and Lucas' (2018: 12) warning against "elite imaginaries of the future" needs to be kept in mind as visions of intelligent streets, smart parking, and public transport tracking creep into policy and practitioner portfolios, as they undoubtedly will.

Apps to improve safety and improve travel between different modes for women and other vulnerable groups have potential to bring substantial benefit, but are less likely to attract significant interest among big businesses. In this respect, the Safetipin app, first launched in India, then followed by other case study cities (including Nairobi), is particularly notable. The social enterprise uses crowd-sourcing to audit and map safe and unsafe areas that individual users can then view and use to plan their journeys. It also enables them to add comments and report problems such as poor/no lighting, broken/blocked footpath, open wiring etc (Uteng and Turner, 2019).

Users and road safety

This topic is dealt with in greater depth in the position paper in this series on road traffic injury and transport-related air quality in Sub-Saharan Africa (Tiware, Khayesi, Mitullah, Kobusingye, Mohan, Zuidgeest, 2020).

Passenger, motorist and pedestrian road safety is one of the greatest challenges facing Africa's transport sector: research and action to date that could improve user safety has been extremely limited. Pedestrians, cyclists, motor transport passengers and drivers all face higher risk of death from road crashes in Africa than elsewhere

in the world. The risk is highest in Nigeria and South Africa (Vanderschuren et al., 2017:5), but risks everywhere have been growing as vehicle numbers expand (Vanderschuren and Zuidgeest, 2017). A recent and growing mode in many African cities, the motorcycle-taxi (*boda boda*) helps passengers travel rapidly, especially where traffic is congested, but has added to prevailing hazards.

Although it is difficult to obtain accurate crash statistics for urban areas (police and hospital data often seem inaccurate), most cities appear, as might be expected, to have fatality rates above the relevant national average. Moreover, it is clear that there is a broad gender bias, with around three of every four road deaths estimated to be among males (Vanderschuren and Zuidgeest, 2017): one transport issue where gender disadvantage is with males not females. In three cities, Nairobi, Dar es Salaam, and Cape Town, just 20-25% of pedestrian fatalities are female. In these cities, pedestrians, cyclists, and motorised two- and three-wheeler riders made up 66-80% of road fatalities, with 57% being pedestrians

in Dar es Salaam, and 57% in Cape Town (ibid). Dangers for road users seem to increase at the weekend, possibly due to higher levels of alcohol consumption and other substance abuse (by both motorists and pedestrians), and increased motor travel (ibid). Among pedestrians, crossing where there are no demarcated facilities (largely because of inappropriately located crossing facilities) adds to these risks (Behrens and Makajuma, 2017; Vanderschuren and Zuidgeest, 2017). The fact that government crash data collection currently mostly focuses on motorised vehicle crashes contributes to the low visibility of pedestrian deaths and injuries (Adeloye et al. 2016): this clearly needs urgent rectification.

A study by Sam and Abane (2017) which examined public transport operators' interventions designed to enhance safety and security in three Ghanaian cities, found that 58.2% of respondents feel it is unsafe to travel on public transport, because of speeding drivers as well as security challenges (including baggage theft, assault, and robbery).

ENGAGING WITH USERS TO IMPROVE USER EXPERIENCE

User experience is shaped by a wide range of actors – both human and material. Over a decade ago, SSATP (2005:153) noted how user participation was “*considered essential to the success of the NMT pilot projects*” they ran. User platforms were established to articulate and prioritise user needs in those projects, and ensure their active involvement in planning interventions etc., despite some resistance from engineering professionals (ibid 153-156). However, in recent years there seems to have been little further progress in bringing users to the fore in transport planning – whether with reference to walking, cycling, or motorised transport.

Engaging with ‘experts’ and the state

The characteristic approach to envisaging and preparing for the future of African cities remains dominated by a “tyranny of experts”, national and international, and still enthralled by automobility (Klopp and Cavoli, 2018:105, citing Easterly, 2013). Parnell and Pieterse note (2014:238) that across Africa, “politicians and officers do not share a professional or technical discourse; there is rarely common purpose on what constitutes adequate knowledge from which to make strategic planning decisions for cities”. Moreover, the state is, characteristically, particularly unwilling to engage with the everyday experiences and perceptions of residents of informal settlements: such communities are stigmatised and marginalised by private sector partners too (McFarlane and Silver, 2017).

To identify and provide more socially equitable mobility solutions in African cities, policymakers, urban planners, and city managers/personnel need to receive appropriate training in how to develop more socially inclusive transport strategies in their daily work practices and wider decision-making processes. This will require the establishment of suitable frameworks for multi-modal planning, including the full integration of non-motorised

and paratransit modes. These should be seen as an integral part of the overall transport systems of African cities, and not replaced or disrupted by large infrastructure projects, as currently tends to be the case.

The transport, mobility, and accessibility needs and concerns of low-income communities and vulnerable populations should be raised as part of the planning and development process. Many communities are under-served, and people cannot easily access markets and other important destinations in the city. These situations may worsen with any planned removal of informal services and introduction of major new infrastructure projects.

A lack of empirical evidence means that it is difficult to understand the complex social interactions of people living in informal settlements with people’s activities in the city, including work, trade, schooling, and healthcare. This evaluation is needed *before* irreversible interventions and resettlement decisions are made, which will negatively affect the economic and social well-being of citizens. The potential interconnections between land-use and daily mobility are rarely adequately researched in such cases.

Better guidance is needed from policymakers to understand the types of data that they already hold, how to make it available for research use, and what more is required in terms of data collection. This will enable researchers to target their proposals towards funding opportunities and programme calls that will enhance their impact upon national and local governments’ stated Sustainable Development Goals and sustainable transport policy aims and objectives.

To assist with this inclusive transport agenda, African cities need to institute participatory transport planning processes, and undertake participatory planning exercises with different communities (including informal and slum settlements), to understand their actual mobility and

accessibility needs. This will provide wider visibility of successful bottom-up mobility solutions (e.g. evening markets, elevated pavements with in-built space for street vending, halting relocation of people living in informal settlements, etc.). Donor agencies should seek to work with these established local planning processes, rather than impose their own externally generated values, aspirations, modal and technologically driven preferences in the African context. Effective partnerships will be needed between public and private funders for the delivery of these locally appropriate, practical solutions at all levels of planning intervention.

Policymakers need to fully evaluate their existing transport policies to understand how they address the needs of different low-income communities and population groups, such as female workers, and young and older people, and explore how to expose power relations and vested interests in the provision of transport infrastructure and service provision.

High turnover of staff and politicians is such that Parnell and Pieterse (2014) suggest the need for academics to engage more directly, for instance promoting research practice where staff are embedded in city institutions, where research agendas are co-determined with NGOs, local government and politicians, and where 'city labs' engage widely in debate on local research questions and findings. However, it is important to ensure that users are also brought directly into such engagements, not merely as bystanders but as active participants who can speak from their own evidence. As Oviedo et al. (2018) note for Abuja, users do not seem to have much idea of, or expectations, regarding the things that government could do to improve transport services – they tend to merely think about government's role in infrastructure (roads). Meanwhile, national and local planners are often simply ignorant of user needs and practices, and lack a clear understanding as to how they can investigate such issues which may present as overwhelming in scale. City engineers tend to hold tenaciously to the technocratic approaches that encourage a focus on infrastructure systems because their training and professional identity is built on these, and they perceive them to be safest. They rarely know which channels would be productive to learning, but also may fear engaging with what may be potentially a difficult, unruly public (ibid).

As noted above, there is an urgent need to build better forums for user engagement. Researchers can help promote this engagement if they can bring engineers, planners, non-transport ministries (e.g. women and children's affairs, energy) and the private sectors together with

communities on a regular basis for discussions when research projects are in progress (as in the Country Consultative Groups that have aided progress in a series of mobility research projects led by the first author). In conjunction with this approach, the Community Peer Research method (see Porter, 2016) can play a powerful role in enabling users to work in a participatory fashion with community members, gathering their own evidence of transport needs and constraints. With the marshalling of these grounded urban experiences, we can start to identify the potential for other actors, including government, to help improve transport services.

Remarkably few well-established specialist NGOs operate in the transport sector in Africa. Only a few (for instance, the International Forum for Rural Transport and Development, and Transaid) have worked across more than one African country for any length of time. There is clearly space for more civil society organisations, within country and across Africa, with a specific transport remit and the strength to lobby key interest groups. Perhaps promoting the establishment of both citywide and community-based transport consumer groups would help support longer-term relationships in the urban transport sector and beyond. For example, there would seem to be a place for citizen audits in the transport sector, linking to wider budget accountability.

By contrast with NGOs and CBOs, Transport Unions are well established and politically powerful in many African countries, such that political leaders can rarely afford to ignore them. User transport experience is often shaped in part by the role of unions, not least when they come up against intimidation and violence linked to union strikes and clashes between transport operators which can extend into street chaos. Unions across Africa could encourage stronger, more sustained attention to the needs of vulnerable users. Transport consumer associations could also be beneficial in supporting user protection around issues such as route changes.

Engaging with transport providers in the private sector

User needs and practices also have some potential to impact transport providers in the private sector: if the service provided is extremely poor, too dangerous, or near prohibitively expensive, some users may decide to walk instead, if time allows. As with the unions, transport consumer associations could be beneficial in supporting user protection when engaging with the private sector.

STATE OF RESEARCH CAPACITY

Since Parnell and Pieterse (2014:238) wrote about the “inadequate cadre of urban researchers” in Africa, research activity and expertise focused on urban issues *per se* has expanded considerably. However, research and associated practitioner capacity specifically focused on the transport field remains very small. Many transport planners and engineers currently occupying senior positions in universities and ministries across Africa undertook all, or the vast majority, of their training in universities in the Global North, where the curriculum is largely focused on Northern transport problems and technical solutions.

Where work with users is concerned, there is a particularly urgent need to build social science capacity and ex-

tend interdisciplinary expertise (a need that applies not only to Africa but globally). Siloed technocratic thinking prevails widely. Transport planning has largely stayed in the hands of professionals who, for the most part, have little knowledge of how to learn about and understand user needs and the direct participatory engagement with users that is required. The importance of understanding the contextual significance of each city and neighbourhood tends to be little appreciated. While social science interest within Africa is growing in the broad field of urban research (most notably at University of Cape Town’s African Centre for Cities), specific social science expertise in transport and mobility is rarely encountered.

KEY RESEARCH GAPS

The need for further research into user experiences and meeting user needs has been noted at various points in this review: on road safety and travel security (especially for pedestrians); on particularly vulnerable groups (there is remarkably little work to date for instance regarding disability); on accompanied freight for city provisioning; and on ICT-transport connectivities. This section will focus not only on what needs to be researched, but on how that can best be accomplished. Gaps in the knowledge cannot be filled effectively using the same methods used to date in understanding user needs and behaviours.

Research method and discipline

Research specifically associated with transport users comes from various disciplinary stables but, in particular, from anthropology (in the case of in-depth ethnographic work, especially with vulnerable groups), and from geography (for wider contextual urban analyses built around the spatiality of the city). By contrast, Transport Studies tends to approach user needs from a more narrowly economic and technical focus, built around reducing journey times, willingness to pay, cost efficiency, and engineering and technical solutions. Stronger cross-disciplinary collaborations, with greater attention across the board to everyday political economy perspectives, could probably do much to improve inputs from each of these perspectives. The growing recognition of the value of mixed-methods research, bringing together qualitative and quantitative studies, will support this.

Building on the recent momentum in Urban Studies research

There is potential to build on work currently being pursued within the Urban Studies field around concepts such as mobility assemblages and 'seeing like a slum' (Thieme and Kovacs, 2015). The value of engaging more

directly with the concept of assemblage, including mobility assemblages that shape discourse, practice and infrastructures of mobility, is particularly clear. These are assemblages conceived as "constellations of actors, actions, and meanings that are influenced by mobility regimes that govern who and what can move (or stay put), when, where, how, under what conditions and with what meanings" (Sheller, 2018). More broadly, Urban Studies is now producing a vast body of material on issues ranging from land use to environmental stresses that have relevance to understanding the wider context in which transport use is set. Moving to more holistic inter-disciplinary approaches is essential.

Exploring city peripheries and the rural-urban continuum

Beyond the outer boundaries of the peri-urban, peripheral (city-connected) rural locations have received even less attention, yet many cities are surrounded by a substantial belt of satellite villages that experience a daily ebb and flow of population. Pedestrians, or vehicles packed with employed workers, would-be workers, traders, schoolchildren, and a host of other travellers, move city-ward and home-ward along congested route-ways, while hawkers striving to eke a living work their way through lines of standing traffic at key junctions. Such city-connected rural places are important if we are to understand the '*in-between practices*' that help shape city life.

Berdiel (2018, following Simone, 2013) proposes the notion of in-between geographies which relocate the 'urban centre' to multiple cores and peripheries that "through movement, encounter, and exchange facilitate complex circuits of support". This concept, which emphasises the multiple temporalities and governance systems that overlap and exist simultaneously within (and beyond) the city area, and the differential deployment of state power so dependent on a hierarchical conceptualisation of space, draws on Simone's (2010)

notion of peripheries as generative spaces of possibility with potential to destabilise the centre. Users' agency is seen to transgress bounded spaces, circumventing technologies of power and mobilising what is available to fulfil their aspirations (see also Roy 2009, and Pieterse and Simone, 2013). The need to extend mobilities research beyond the perceived urban periphery to surrounding *connected* rural sites resonates with the 'nexus thinking' currently gaining ground in intergovernmental organisations i.e. a focus on crucial environmental resource interdependences that extend across the rural-urban continuum. (This is not arguing for a 'city region' approach, which has lost some traction in recent decades in Western Europe and may have little application in many African contexts.)

Extending research into secondary cities

The vast majority of urban transport/mobilities research in Africa has focused on primate cities such as Nairobi and Johannesburg, though within such cities there has been some re-centring of research towards the urban peripheries where so many of the poorest are resident and where people's transport and accessibility needs are typically barely met. Simone (2005, 2010) has been an important proponent of this refocusing, which is still gathering pace. Peri-urban sites are likely to remain a key locational context of research for years to come, because evidence suggests that population growth in the urban peripheries of primate cities, and their further spatial expansion, will continue unabated at least for some decades, especially in Sub-Saharan Africa. Far less attention has been given to the transport needs of poor populations in secondary cities. However, such centres are often a key element in patterns of (step-wise) rural-urban migration (e.g. Riddell and Harvey, 1972; FAO IFAD IOM WFP 2018) and, arguably, better transport and accessibility provision for the poor in such places, could significantly reduce onward flows to primate cities. Christiaensen and Todo (2013) point to fact that poverty reduction is greater if people move into secondary towns than if they move to metropolitan areas.

However, as Parnell and Pieterse note (2015), there is a bias in research towards African cities with established

universities. Research in the secondary city of Cape Coast has benefitted from having a university (Geography) department with strong transport interests. A more concerted effort to engage with transport issues in secondary cities without well-established universities with a research tradition is required.

Research methods to improve understanding of user needs and practices

The value, in Urban Studies research, of drawing from a richer methodological repertoire strongly embedded in situated, participatory processes is now increasingly recognised (McFarlane and Silver, 2017; Sheller, 2018). However, the value of a mixed-methods approach, firmly set within a participatory framework, is only gradually gaining ground in the transport sector. Quantitative surveys and big data (from mobile phones, GPS etc.) can help to show where people move around and by what modes, but will provide little understanding of the reasons behind these movements – moreover, while they pick up information on people who are mobile, they will fail to capture others who are immobile. Rama (2018) illustrates the importance of qualitative work as a complement to quantitative studies with specific reference to South Africa's National Household Transport Survey which uses quantitative data to show that women on average travel later to work than men. As she notes, this is possibly a factor of safety, but in the absence of textual or narrative data we cannot know.

Qualitative studies of the type typically conducted by anthropologists, sociologists and social geographers are only gradually filtering into transport research in Africa. These are likely to include embedded ethnographic research with participant observation, in-depth interviews, and possibly a range of Participatory Action Research (PAR) methods (Alam, McGregor and Houston, 2018), follow-along participant observation/mobile ethnography (as in Porter et al. 2010; McFarlane and Silver, 2017; Pollio, 2019 etc.); also autoethnography, where researchers focus on their own experiences of travel (Rink 2016; Xiao, 2018). Mobility biographies, for instance, exploring mobility and mobility negotiations across the life-course, such as those associated with caring relationships (Plyushteva and Schwanen, 2018), will help avoid over-

reliance on travel behaviour survey data. However, all these methods are time- and labour-consuming and thus tend to be restricted in scale.

Community peer-research, in which community members are trained as co-investigators so that they can undertake research with their peers, is even more labour intensive than conventional qualitative inquiry and standard PAR (Porter, 2016). However, mobilities research studies conducted over 15 years in collaboration with children, with older people, and ongoing work with young unemployed women in diverse African cities (Cape Coast, Sunyani, Blantyre, Lilongwe, Mthatha, Gauteng, Tunis, Cape Town, Abuja; see Porter et al., 2017; Porter and Turner, 2019) using this approach, indicate its value as a seed bed within which academic research can be more securely embedded and evolve and as a firm sounding board at all stages of work. In essence, it is about endeavouring to build power within marginalised communities (Lefebvre's 'self-government') and develop alliances with potential for co-construction of future transport worlds. In the work cited, it has been drawn on firstly to identify key issues in the relevant community, then to build such key issues into subsequent academic-led qualitative and survey research so that important questions are given full attention. This allows extensive triangulation across data sets and will expose contradictions between data sets if these emerge, promoting further investigation.

This approach to mixed-methods research through a preliminary focus on community co-investigation, followed by academic-led qualitative work based on those findings, before moving to large-scale surveys, can

enable a more textured picture of user practices, experiences, and needs. When coupled with Country Consultative Group meetings that bring peer researchers and other community members together with relevant ministries (not just transport, but also health, education, women and children's affairs, employment, depending on the focus of research), NGOs and CBOs and private sector actors, from the start of the study, there is potential to build alliances across sectors and move forward with interventions that are likely to have traction in the focus communities (Porter 2008, 2016; Porter and Abane 2008; Porter et al. 2010, 2017). This can help give a clearer understanding of why, where, and by what modes people move and the impact this has on everyday lives and well-being, because community voices are at its centre. Outcomes to date have been modest but encouraging. Such a broad approach could feasibly take in qualitative and quantitative methods, starting with and accompanied by community peer-research but also perhaps extending to incorporate large-scale surveys, GIS/GPS travel analysis, app-based and mobile phone tracking-based mapping, and concrete interventions whose impacts are carefully tracked over time. In essence, we are talking about living transport labs where community voice is at the core and has real teeth.

CONCLUSION: KEY PRIORITIES FOR TRANSFORMATIONAL RESEARCH AND ASSOCIATED ACTION

Bodies, streets, transport equipment, transport systems, urbanisation, local, regional and transnational infrastructure are all complexly interrelated. As Sheller (2018:1) observes, immobility and mobility are *“always connected, relational, and co-dependent... dynamic constellations of multiple scales, simultaneous practices, and relational meanings”*. Transformational research in this transport/mobility arena that can significantly benefit users in terms of access and practices will be extremely challenging.

Key priorities for transformational research and associated action in Africa's cities will include improved understanding of user needs through in-depth participatory research, with particular consideration of more vulnerable groups. But it is also necessary to stress the importance

of understanding the wider context of assemblages within which transport operates, and the need to build skills (including mobilities-related training in communities, universities and government), make road safety interventions (prior-tested through action research), and vigorously promote a low-carbon focus including full attention to transport-ICT connectivities. However, these suggested interventions will require not only a fairer allocation of central and local government funds to support mobility and accessibility across all city neighbourhoods, but also the much greater attention to nurturing the cross-sectoral alliances and holistic approach beyond the transport sector that are key to successful integrated mobility and accessibility planning.

REFERENCES

- Abane, A. M. (2011). Travel behaviour in Ghana: empirical observations from four metropolitan areas. *Journal of Transport Geography*, 19(3), 313-322.
- Abane, A. M. (2012). *Of drivers, pedestrians and mechanics: Interrogating the road carnage phenomenon in Ghana*. Inaugural Lecture. University of Cape Coast, Cape Coast, Ghana.
- ActionAid. (2016). *Freedom to move: Women's experience of urban public transport in Bangladesh, Brazil and Nigeria, and how lost tax revenues can pay to improve it*. ActionAid. https://actionaid.org/sites/default/files/178619_2785.pdf
- Adeloye, D., Thompson, J. Y., Akanbi, M. A., Azuh, D., Samuel, V., Omoregbe, N., Ayo, C. K. (2016). "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4933140/" The burden of road traffic crashes, injuries and deaths in Africa: a systematic review and meta-analysis. *Bulletin of the World Health Organization*, 94(7), 510-521.
- Alam, A., McGregor, A., Houston, D. (2018). Photo-response: approaching participatory photography as a more-than-human research method. *Area*, 50(2), 56-265.
- Amankwaa, E. F. (2015). Women and men at the traffic lights: The (re) configuration and (re)gendering of street water vending in Ghana. *GeoJournal*, 82(2), 329-344.
- Beall, J., Cherenet, Z., Cirolia, L., da Cruz, N., F. (2019). Understanding infrastructure interfaces: common ground for interdisciplinary urban research? *Journal of the British Academy*, 11-43.
- Behrens, R., McCormick, D., Mfinanga, D. (2016). An introduction to paratransit in Sub-Saharan African cities. In R. Behrens, D. McCormick & D. Mfinanga. (Eds). *Paratransit in African cities: Operations, Regulation and Reform* (pp1-26). Abingdon: Routledge.
- Behrens, R., Makajuma, G. (2017). Pedestrian crossing behaviour in Cape Town and Nairobi. Observations and implications. In W. Mitullah, M. Vanderschuren & M. Khayesi (Eds). *Non-motorised transport integration into urban transport planning in Africa* (pp. 27-56). Abingdon: Routledge.
- Benwell, M. (2009). Challenging minority world privilege: Children's outdoor mobilities in post-apartheid South Africa. *Mobilities*, 4(1), 77-101.
- Berdiel, F. (2018). Undertheorized mobilities. In T. P. Uteng & K. Lucas. *Urban mobilities in the Global South* (pp.195-214). Abingdon: Routledge.
- Beuving, J. (2015). American cars in Cotonou: Culture in African entrepreneurship and the making of a globalising trade. *Journal of Modern African Studies*, 53(3), 317-338.
- Bishop, T., Barber, C., Charman, S., Porter, G. (2018). *Enhancing understanding on safe motorcycle and three-wheeler use for rural transport: Literature review*. Africa Community Access Partnership. Amend and Transaid.
- Bourdieu, P. (1990). *The logic of practice*. Stanford: Stanford University Press.
- Bruun, E., Del Mistro, R., Venter, Y., Mfinanga, D. (2015). The state of public transport systems in three sub-Saharan African cities. In R. Behrens, D. McCormick & D. Mfinanga. (Eds). *Paratransit in African cities: Operations, Regulation and Reform* (pp. 26-35). Abingdon: Routledge.
- Bwire, H., Muchaka, P., Behrens, R., Chacha, P. (2017). Implementation and evaluation of walking buses and cycle trains in Cape Town and Dar es Salaam. In W. Mitullah, M. Vanderschuren, & M. Khayesi (Eds). *Non-motorised transport integration into urban transport planning in Africa* (pp. 150-168). Abingdon: Routledge.
- Chafai, H. (2017). Contextualising street sexual harassment in Morocco: a discriminatory sociocultural representation of women. *The Journal of North African Studies*, 22(5), 821-840.
- Christiaensen, L., Todo, Y. (2013). *Poverty reduction during the rural-urban transformation- the role of the missing middle*. The World Bank.
- Cresswell, T. (2010). Towards a politics of mobility. *Environment and Planning D: Society and Space* 28(1), 17-31.
- De Kadt, J., Norris, S. A., Fleisch, B., Richter, L., Alvanides, S. (2014). Children's daily travel to school in Johannesburg-Soweto, South Africa: Geography and school choice in the Birth to Twenty cohort study. *Children's Geographies* 12(2), 170-188.
- Ehebrecht, D., Heinrichs, D., Lenz, B. (2018). Motorcycle-taxis insub-Saharan Africa: Current knowledge, implications for the debate on "informal" transport and research needs. *Journal of Transport Geography*, 69, 242-256.
- Esson, J., Gough, K., Simon, D., Amankwaa, E. F., Ninot, O., Yankson, P. W. (2016). Livelihoods in motion: Linking transport, mobility and income-generating activities. *Journal of Transport Geography*, 55, 182-188.
- Evans, J., O'Brien, J., Ch Ng, B. (2018). Towards a geography of informal transport: Mobility, infrastructure and urban sustainability from the back of a motorbike. *Transactions of the Institute of British Geographers*, 43(4), 674-688.
- Ezeoha, A., Okoyeuzu, C., Onah, E., Uche, C. (2019). Second-hand vehicle markets in West Africa: A source of regional disintegration, trade informality and welfare losses. *Business History*, 61(1), 187-204.
- FAO IFAD IOM WFP. 2018. The Linkages between Migration, Agriculture, Food Security and Rural Development. Rome. 80pp. (<http://www.fao.org/3/CA0922EN/CA0922EN.pdf>).
- Gorman, M., Jones, S., Turner, J. (2019). Older people, mobility and transport in low- and middle- income countries: A review of the research. *Sustainability*, 11(21), 6157.
- Garrard, J. Handy, S., Dill, J. (2012). Women and cycling. In J. Pucher & R. Buehler (Eds.), *City cycling* (pp. 213-234). London: MIT Press.
- Gough, K., Langevang, T. (2016). *Young Entrepreneurs in sub-Saharan Africa*. London: Routledge.
- Grieco, M., Turner, J., Kwakye, E. (1994). A tale of two cultures: Ethnicity and cycling behaviour in urban Ghana. *Transportation Research Record*, 1441.
- Harber, J. (2017). One hundred years of movement control: Labour (im)mobility and the South African political economy. In T. P. Uteng & K. Lucas (Eds.), *Urban mobilities in the Global South* (pp. 175-192). Abingdon: Routledge.
- Hart, J. (2016). *Ghana on the go: African mobility in the age of motor transportation*. Bloomington: Indiana University Press.
- Heinrichs, D., Ehebrecht, D., Lenz, B. (2017). Moving beyond informality? Theory and reality of public transport in urban Africa. In T. P. Uteng, & K. Lucas (Eds.), *Urban mobilities in the Global South* (pp. 134-154). Abingdon: Routledge.

- Ibitayo, O.O. (2012). Toward effective urban transportation system in Lagos, Nigeria: Commuters' opinions and experiences. *Transport policy*, 24, 141-147.
- Ikioda, F. (2016). "https://www.sciencedirect.com/science/article/pii/S0966692315002148" The impact of road construction on market and street trading in Lagos. *Journal of Transport Geography*, 55, 175-181.
- Ipingbemi, O. (2010). Travel characteristics and mobility constraints of the elderly in Ibadan, Nigeria. *Journal of Transport Geography*, 18(2), 285-291.
- Irlam, J. H. (2016). *Barriers to cycling mobility in Masiphumelele, Cape Town: a best-worst scaling approach*. Masters Dissertation, Centre for Transport Studies. University of Cape Town.
- Jennings, G., Bruun, E., Orero, R., Browning, P. (2016). Strategy options for paratransit business development and service improvement. In R. Behrens D. McCormick & D. Mfinanga (Eds.), *Paratransit in African cities*. Abingdon: Routledge.
- Jennings, G., Petzer, B., Goldman, E. (2017). When bicycle lanes are not enough: growing mode share in Cape Town South Africa. In W. Mitullah, M. Vanderschuren and M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 80-89). Abingdon: Routledge.
- Kalula S. Z., Ferreira, M., Swinger, G. H., Badri, M. (2016). Risk factors for falls in older adults in a South African Urban Community. *BMC Geriatrics*, 16(1), 51.
- Klopp, J. M., Cavoli, C. M. (2018). The paratransit puzzle. Mapping and master planning for transportation in Maputo and Nairobi. In T. P. Uteng & K. Lucas, *Urban mobilities in the Global South*. Abingdon: Routledge.
- Kariuki, R. M., Bakalina, A. E., Lall, S., White, R., Parby, J. I., Huang, C. Y., Shi, T. (2013). *Harnessing urbanization to end poverty and boost prosperity in Africa: An action agenda for transformation*. (No 81456). The World Bank.
- Kunieda, M., Gauthier, A. (2007). Gender and urban transport: fashionable and affordable. *Sustainable transport: a sourcebook for policy-makers in developing cities*. Eschborn: GTZ.
- Lall, S. V., Henderson, J. V., Venables, A. J. (2017). African cities: opening doors to the world. Washington DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/25896>
- Langevang, T., Gough, K. (2009). Surviving through movement: the mobility of urban youth in Ghana. *Social and Cultural Geography*, 10(7):741-756.
- Lionjanga, N., Venter, C. (2018). Does public transport accessibility enhance subjective well-being? A study of the City of Johannesburg. *Research in Transportation Economics*, 69, 523-535.
- Logan, L. S. (2015). Street harassment: current and promising avenues for researchers and activists. *Sociology Compass*, 9(3), 196-211.
- 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), 1320-1334.
- Lucas, K., Mattioli, G., Verlinghieri, E., Guzman, A. (2016). Transport poverty and its adverse social consequences. *Proceedings of the Institution of Civil Engineers - Transport*, 169(6), 353-365.
- Lucas, K., Porter, G. (2016). Mobilities and livelihoods in urban development contexts: Introduction. *Journal of Transport Geography*, 55, 129-131.
- Luke, R. (2018). Car ownership perceptions and intentions amongst South African students. *Journal of Transport Geography*, 66, 135-143.
- Madugu, Y. U. (2018). Filling the mobility gaps: The shared taxi industry in Kano, Nigeria. *The Journal of Transport History*, 39(1), 41-54.
- Masaoe, E. (2017). Safety of vulnerable road users on a road in Kinondoni municipality, Dar es Salaam, Tanzania. In W. Mitullah, M. Vanderschuren and M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 80-89). Abingdon: Routledge.
- McCormick, D., Schalekamp, H. Mfinanga, D. (2016). The nature of paratransit operations. In R. Behrens, D. McCormick, & D. Mfinanga (Eds.), *Paratransit in African cities* (pp. 59-78). Abingdon: Routledge.
- McFarlane, C., Silver, J. (2017). Navigating the city: the dialectics of everyday urbanism. *Transactions of the Institute of British Geographers*, 42(3), 458-471.
- Mfinanga, D., Madinda, E. (2016). Public transport and daladala: Dar es Salaam. In R. Behrens, D. McCormick, & D. Mfinanga (Eds.), *Paratransit in African cities* (pp. 155-173). Abingdon: Routledge.
- Mitullah, W. V., Opiyo, R. (2017). Non-motorised transport infrastructure provision on selected roads in Nairobi. In W. Mitullah, M. Vanderschuren & M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 90-111). Abingdon: Routledge.
- Murphy, M. (2018). *Ageing in sub-Saharan Africa in the context of Global Development: The Multiple Indicator Survey project (MISA)*. London School of Economics and Political Science. <https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2019/06/population-ageing-project.pdf>
- Mutongi, K. (2017). *Matatu. A history of popular transportation in Nairobi*. Chicago: University of Chicago Press.
- Nguyen, T. D. V., Joelson, T., Vissoci, J., Pesambili, M., Haglund, M., Mvungi, M., Staton, C. A. (2016). Injury prevalence and safety habits of motorcycle taxi drivers in urban Moshi, Tanzania. *Injury Prevention*, 22 (Suppl 2), A187-A187.
- Nkurunziza, A., Zuidgeest, M., Brussel, M., Van Maarseveen, M. (2012). Examining the potential for modal change: Motivators and barriers for bicycle commuting in Dar-es-Salaam. *Transport Policy*, 24, 249-259.
- Nwachukwu, A. A. (2014). Assessment of passenger satisfaction with intra-city public bus transport services in Abuja, Nigeria. *Journal of Public Transportation*, 17(1), 99-119.
- Oduduwa, O. B. (2006). Enhancing mobility of the elderly in sub-Saharan Africa cities through improved public transportation. *IATSS Research*, 30(1), 60-66.
- Olawole, M. O., Aloba, O. (2014). Mobility characteristics of the elderly and their associated level of satisfaction with transport services in Osogbo, Southwestern Nigeria. *Transport Policy*, 35, 105-116.
- Olawole, M. O. (2015). Analysis of intra-urban mobility of the elderly in a medium-size city in Southwestern Nigeria. *Mediterranean Journal of Social Sciences*, 6(3), 90-104.
- O'Connor, A. (1983). *The African city*. London: Hutchinson.
- Olvera, L. D., Plat, D., Pochet, P. (2008). Household transport expenditure in sub-Saharan African cities: measurement and analysis. *Journal of Transport Geography*, 16(1), 1-13.
- Olvera, O., Plat, D., Pochet, P. (2013). The puzzle of mobility and access to the city in sub-Saharan Africa. *Journal of Transport Geography*, 32, 56-64.
- Olvera, O., Plat, D., Pochet, P. (2016). *Changes in daily mobility patterns in Dakar (Senegal)*. Paper presented at the 14th World Conference on Transport Research, Shanghai.
- Ortar, N. (2016). Domesticating transport: the sensory experience of work-related travel. Translated by Carmen Ruschinsky. *The senses and society*, 11(3), 275-285.

- Ouongo, C. (2009). Problematique du transport et de la securite routiere a Ouagadougou. "http://www.cifal-ouaga.org" http://www.cifal-ouaga.org.
- Oviedo, D., Levy, C., Davila, J. (2018). Constructing well-being, deconstructing urban (im)mobilities in Abuja, Nigeria. In T. P. Uteng & K. Lucas (Eds.), *Urban mobilities in the Global South*. Abingdon: Routledge.
- Parnell, S., Pieterse, E. (2015). Translational global praxis: Rethinking methods and modes of African urban research. *International Journal of Urban and Regional Research*, 40(1), 236-246.
- Peltier-Thiberge, N. (2015). Lagos' Bus Rapid Transit System: Decongesting and Depolluting Mega Cities. *World Bank Transport for Development Blog*. December 8. Available at: <http://blogs.worldbank.org/transport/lagos-bus-rapid-transitsystem-decongesting-and-depolluting-mega-cities-0>.
- Peoples, F. M. (2008). Street Harassment in Cairo: A Symptom of Disintegrating Social Structures. *The African Anthropologist*, 15(1&2), 1-20.
- Pietermaritzburg Economic Justice and Dignity Group. (2019). Household affordability index: September 2019. Available at: <https://pmbelj.org.za/wp-content/uploads/2019/09/September-2019-Household-Affordability-Index-PMBEJD.pdf>
- Pieterse, E., Simone, A. (2013). *Rogue urbanism*. Johannesburg: Jacana.
- Pirie, G. (2009). Virtuous mobility: moralising vs measuring geographical mobility in Africa. *Afrika focus*, 22(1), 21-35.
- Pirie, G. (2014). Transport pressures in urban Africa: Practices, policies, perspectives. In S. Parnell & E. Pieterse (Eds.), *Africa's urban revolution* (pp. 133-147). London: Zed.
- Plyushteva, A., Schwanen, T. (2018). Care-related journeys over the life course: Thinking mobility biographies with gender, care and the household. *Geoforum*, 97, 131-141.
- Pochet, P., Cusset, J. M. (1999). Cultural barriers to bicycle use in Western African cities. *IATSS Research*, 23(2), 43-50.
- Pollio, A. (2019). Forefronts of the sharing economy: Uber in Cape Town. *International Journal of Urban and Regional Research*, 43(4), 760-775.
- Porter, G. (1996). Structural Adjustment Programmes and road transport deterioration in West Africa: A review. *Geography*, 81(4), 8-11.
- Porter, G. (2003). *Intermediate Means of Transport: an extended review paper with special reference to Ghana*. Report to the UK DFID.
- Porter, G. (2008). Transport planning in sub-Saharan Africa. Progress report 2. Putting gender into mobility and transport planning in Africa. *Progress in Development Studies*, 8(3), 281-289.
- Porter, G. (2010). Transport planning in sub-Saharan Africa. The challenges of meeting children and young people's mobility and transport needs. Progress report 3. *Progress in Development Studies*, 10(2), 169-80.
- Porter, G. (2014). Transport services and their impact on poverty and growth in rural sub-Saharan Africa: A review of recent research and future research needs. *Transport Reviews*, 34(1), 25-45.
- Porter, G. (2015). Mobile phones, mobility practices and transport organisation in sub-Saharan Africa. *Mobility in History*, 6, 81-88.
- Porter, G. (2016). Reflections on co-investigation through peer research with young people and older people in sub-Saharan Africa. *Qualitative Research*, 16(3), 293-304.
- Porter, G., Hampshire, K., Abane, A., Munthali, A., Robson, E., Mashiri, M. (2017). *Young people's daily mobilities in sub-Saharan Africa. Moving young lives*. London: Palgrave Macmillan.
- Porter, G., Abane, A. (2008). Increasing children's participation in transport planning: Reflections on methodology in a child-centred research project. *Children's Geographies*, 6(2), 151-167.
- Porter, G., Hampshire, K., Abane, A., Robson, E., Muthali, A., Mashiri, M., Tanle, A. (2010). Moving young lives: Mobility, immobility and inter-generational tensions in urban Africa. *Geoforum*, 41(5), 796-804.
- Porter, G., Hampshire, K., de Lannoy, A., Gunguluza, N., Mashiri, M., Bango, A. (2018). Exploring the intersection between physical and virtual mobilities in urban South Africa: Reflections from two youth-centred studies. In T. P. Uteng, & K. Lucas (Eds.), *Urban mobilities in the Global South*. Abingdon: Routledge.
- Porter, G., Tewodros, A., Gorman, M. (2018). Mobility, transport and older people's well-being in sub-Saharan Africa: Review and prospect. In A. Curl & C. Musselwhite (Eds.), *Geographies of transport and ageing* (pp. 75-100). London: Palgrave Macmillan.
- Porter, G., Turner, J. (2019). Meeting young people's mobility and transport needs: Review and prospect. *Sustainability*, 11(22), 6193.
- Quayson, A. (2014). *Oxford Street Accra: City life and the itineraries of transnationalism*. Durham: Duke University Press.
- Rama, S. (2018). Gendered mobilities: The methodology, theory and practice disjuncture. *Agenda*, 32(2), 113-122.
- Riddell, J. B., Harvey, M. E. (1972). The urban system in the migration process: An evaluation of step-wise migration in Sierra Leone. *Economic Geography*, 48(3), 270-83.
- Rink, B. (2016). Race and the micropolitics of mobility: Mobile autoethnography on a South African Bus Service. *Transfers*, 6(1), 62-79.
- Roy, A. (2009). The 21st century metropolis: new geographies of theory. *Regional Studies* 43, 6: 819-830.
- Sagaris, L., Arora, A. (2018). Cycling for social justice in democratizing contexts: Rethinking 'sustainable' mobilities. In T. P. Uteng & K. Lucas. *Urban mobilities in the Global South* (pp. 19-40). Abingdon: Routledge.
- Salon, D., Gulyani, S. (2010). Mobility, poverty and gender: Travel 'choices' of slum residents in Nairobi, Kenya. *Transport Reviews*, 30(5), 641-657.
- Sam, E. F., Abane, A. M. (2017). Enhancing passenger safety and security in Ghana: Appraising public transport operators recent interventions. *Journal of Science and Technology*, 37(1), 101-112.
- Sam, E. F., Hamidu, O., Daniels, S. (2018). "https://www.sciencedirect.com/science/article/pii/S2213624X17301232" SERVQUAL analysis of public bus transport services in Kumasi metropolis, Ghana: Core user perspectives. *Case Studies on Transport Policy*, 6(1), 25-31.
- Scheidegger, U. (2009). Mobility and the promotion of public transport in Johannesburg. In T. Ohnmacht, H. Maksim, & M. Bergman (Eds.), *Mobilities and inequality* (pp. 207-218). Farnham: Ashgate.
- Schalekamp, H., McLaren, M., Behrens, R. (2017). *Exploring cashless fare collection in the context of urban public transport reform in South Africa*. Paper presented at the 36th Southern African Transport Conference (SATC 2017), Pretoria.
- Seedat, M., MacKenzie, S., Mohan, D. (2006). The phenomenology of being a female pedestrian in an African and an Asian city: A qualitative investigation. *Transportation Research part F: traffic psychology and behaviour*, 9(2), 139-153.
- Sheller, M. (2016). Uneven mobility futures: A Foucauldian approach. *Mobilities*, 11(1), 15-31.
- Sheller, M. (2018). *Mobility justice: The politics of movement in an age of extremes*. London: Verso.
- Sheller, M., Urry, J. (2006). The new mobilities paradigm. *Environment and Planning A*, 38(2), 207-226.
- Sietchiping, R., Permezel, M. J., Ngomsi, C. (2012). Transport and mobility in sub-Saharan African cities: An overview of practices, lessons and options for improvements. *Cities* 29(3), 183-189.

- Simone, A. (2005). *Urban Africa. Changing contours of survival in the city*. London: Zed Books.
- Simone, A. (2010). *The social infrastructures of city life in contemporary Africa*. Uppsala: Nordiska Afrikainstitutet.
- Simone, A. (2013). Cities of uncertainty: Jakarta, the urban majority, and inventive political technologies. *Theory, Culture and Society*, 30(7-8), 243-263.
- Simwanda, M., Murayama, J. (2018). Spatiotemporal patterns of urban land use change in the rapidly growing city of Lusaka, Zambia: Implications for sustainable urban development. *Sustainable Cities and Society*, 39, 262-274.
- Sub-Saharan Africa Transport Policy Program (SSATP). (2005). *Non-motorized transport in African cities: lessons from experience in Kenya and Tanzania*. SSATP working paper no. 80. Africa Region, World Bank.
- Stasik, M., Klaeger, G. (2018). Reordering Ghana's roadside spaces: Hawking in times of infrastructural renewal. In U. Engel, M. Boeckler & D. MüllerMahn, (Eds.), *Spatial Practices: Territory, Border and Infrastructure in Africa*, (pp. 153-172). Leiden: Brill.
- Tarrosy, I., Vörös, Z. (2018). China and Ethiopia, Part 1: The light railway system. *The Diplomat*. <https://thediplomat.com/2018/02/china-and-ethiopia-part-1-the-light-railway-system/>
- Thieme, T., Kovacs, E. (2015). Services and slums: Rethinking infrastructures and provisioning across the nexus. *The Nexus Network Think Piece Series*, Paper 4. Economic & Social Research Council. https://thenexusnetwork.org/wp-content/uploads/2014/08/ThiemeandKovacs_ServicesandSlumsNexusThinkpiece2015.pdf
- UN Environment (2016). *Global Outlook on Walking and Cycling 2016*. UN Environment, Nairobi.
- UN Habitat (2013). *Planning and design for sustainable urban Mobility: Global Report on Human Settlements 2013*. Abingdon: Routledge.
- UN Habitat/Flone Initiative. (2019). *Gender Sensitive Mini-Bus Services & Transport Infrastructure for African Cities: A Practical Toolkit*. <https://floneinitiative.org/wp-content/uploads/2019/05/Gender-Toolkit.pdf>
- Uteng, T. P., Lucas, K. (2018). The trajectories of urban mobilities in the Global South. An introduction. In T. P. Uteng, & K. Lucas, K (Eds.), *Urban mobilities in the Global South*. Abingdon: Routledge.
- Uteng, T. P., Turner, J. (2019). Addressing the linkages between gender and transport in low- and middle-income countries. *Sustainability*, 11(17), 4555.
- Van Blerk, L. (2013). New street geographies: The impact of urban governance on the mobilities of Cape Town's street youth. *Urban studies*, 50(3), 556-573.
- Vanderschuren, M., Jennings, G., Khayesi, M., Mitullah, W. V. (2017). Introduction: Challenges and opportunities for non-motorised transport in urban Africa. In W. Mitullah, M. Vanderschuren, & M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 1-10). Abingdon: Routledge.
- Vanderschuren, M., Jennings, G. (2017). Non-motorised travel behaviour in Cape Town, Dar es Salaam and Nairobi. In W. Mitullah, M. Vanderschuren & M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 11-26). Abingdon: Routledge.
- Vanderschuren, M., Zuidgeest, M. (2017). Road safety and non-motorised transport in African cities. In W. Mitullah, M. Vanderschuren & M. Khayesi (Eds.), *Non-motorised transport integration into urban transport planning in Africa* (pp. 57-72). Abingdon: Routledge.
- Vanderschuren, M., Phayane, S. R., Gwynne-Evans, A. J. (2019). Perceptions of gender, mobility and personal safety: South Africa moving forward. *Transport Research Record* 2673 (11), 616-627.
- Venter, C., Vokolkova V., Michalek J. (2007). Gender, residential location, and household travel: Empirical findings from low-income urban settlements in Durban, South Africa. *Transport Reviews*, 27(6), 653-677.
- Venter, C. (2011). Transport expenditure and affordability: The cost of being mobile. *Development Southern Africa*, 28(1), 121-140.
- Venter, C., Mahendra, A., Hidalgo, D. (2019). *From mobility to access for all: Expanding urban transportation choices in the Global South*. Working Paper, World Resources Institute, Washington D.C.
- Wood, A. (2020). Tracing the absence of bike-share in Johannesburg: a case of policy mobilities and non-adoption. *Journal of Transport Geography*, 83, n.p.
- Xiao, A. H. (2018). 'Oyinbo, Wole!': urban rhythms and mobile encounters in the Lagos transport systems. *Urban Forum*, 30(2), 133-151.
- Xu, G., Dong, T., Cobbinah, P. B., Jiao, L., Sumari, N.S., Chai, B., Liu, Y. (2019). Urban expansion and form changes across African cities with a global outlook: Spatiotemporal analysis of urban land densities. *Journal of Cleaner Production*, 224, 802-810.

