

# **Reframing Accessibility is the Key to Achieve Sustainable Urban Mobility in the Global South: Freetown, Sierra Leone Case Study**

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## **Abstract**

African cities have an urgent need to achieve transitions to more sustainable urban mobility to respectively progress their projected rapid population growth to 1.2 billion by 2050. Freetown and other Sub-Saharan cities in Africa lack accessibility and a holistic sustainable transport management, which have already brought about serious issues. Congestion, urban sprawl, lack of infrastructure, unreliable transport and unsafe mobility shape the disadvantageous reality in Freetown aggravated by environmental hazards in the most vulnerable areas of the city. Adopting a mainstream definition and reframing accessibility to the Global South context would aid practitioners to improve urban mobility and access to the city. Accessibility must be looked at in the multidimensional local context in order to understand the needs and concerns of the city. Paratransit and walking have the potential to serve as a foundation for the future sustainable accessibility, which could be achieved by provisional land-use, infrastructure and development management in Freetown and other African cities facing similar challenges. The current COVID and the 2014-15 Ebola crises urge the transition to a city with location-based accessibility.

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## **Abbreviations**

DPU	-	Development Planning Unit (of UCL)
ECMT	-	European Conference of Ministers of Transport
ESD	-	MSc Environment and Sustainable Development Programme (of DPU)
EU	-	European Union
EVD	-	Ebola virus disease
FCC	-	Freetown City Council
GHG	-	greenhouse gas(es)
NEMA	-	National Environmental Management Act of 1998
NGO	-	non-governmental organisation
SDG	-	sustainable development goal
SLRTC	-	Sierra Leone Road Transport Corporation
SLURC	-	Sierra Leone Urban Research Centre
SSL	-	Statistics Sierra Leone
TOD	-	transit-oriented development
T-SUM	-	Transitions to Sustainable Urban Mobility in Sub-Saharan Africa
UCL	-	University College London
UN	-	United Nations
WHO	-	World Health Organisation

## 1. Introduction

This dissertation addresses the lack of accessibility and its role in achieving a transition to a more sustainable urban mobility in the Global South. The research for this dissertation is based on the case study of Freetown, Sierra Leone. The research scope is limited towards seeking objective possibilities on framing accessibility as a relative concern for sustainability; to understand Freetown's current trajectory; and exploring accessibility's role in achieving sustainable trajectories. Owing to my fellowship with Transitions to Sustainable Urban Mobility (T-SUM) it was possible to identify and analyse the challenges to this transition. Although this research is inspired by the importance of environmental justice and social equity, environmental issues will not be the (sole) focus of the research apart from using it as evidence of quantitative data that is shown to justify part of the aim of the research.

The work's aim is to propose a framework for an advanced transition to a more sustainable urban mobility. Analysing the challenges to this transition identified in Freetown will be performed through the lens of accessibility. Rapidly growing cities in Africa need this transition due to the problem that they lack accessibility, and their level of accessibility will continue to decrease as they grow uncoordinatedly (Venter et al., 2019). Furthermore, there is an urgent need for a mainstream definition of accessibility (Ferreira & Papa, 2020), which applies to both the African and the broader context of Global South cities.

The *research questions* that the dissertation devotes finding answers on are:

- How to frame accessibility as a relative concern for sustainability in the African urban context?
- What is the current trajectory of accessibility in Freetown?
- What is the role of accessibility in achieving the transition to sustainable urban mobility in Freetown?

The findings of the research and its follow-up analysis will make it possible to answer the research questions within my framework. This framework's aim is to be applied to other cities in Sub-Saharan Africa, which face similar challenges. The same pathway can be implemented elsewhere throughout the Global South, too.

The broader perspective of this report is to urge sustainability on the global scale, to take action in development and guide urban sprawl to the right direction by causing the least amount of negative impact on the environment. We must mitigate climate change and its impacts in order to preserve the natural environment of the Earth. The dissertation aims to present a trajectory towards an advanced local infrastructure of mobility, which is just, inclusive and accessible to all, sustainable, and has the

best effect on the individual wellbeing of the urban residents directly or indirectly. *Sustainable Development Goals* (SDGs) were set by the United Nations (2015) for the member states to meet the 2030 Agenda for Sustainable Development. The interest of this dissertation explicitly works with issues connected to Goal 11th which focuses on making cities and human settlements inclusive, safe, resilient and sustainable: “by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all” (United Nations, 2015, p. 21).

What is *sustainability*? This word has been used as a modern contextual catchword, which requires a definition for our context. Humanity must sustain environmental conditions and natural resources despite economy and “the capacity of the ecosystem to sustain those flows is not to be run down. Natural capital is to be kept intact” (Daly, 2006, p. 1). National Environmental Management Act of 1998 (NEMA) framed sustainable development in South African context as “the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations” (Republic of South Africa National Environmental Management Act, 1998).

*Sustainable mobility approach* aims to use instruments which inspire modal shift, achieve reduced travel-needs and trip lengths, and provide a more efficient transport system (Banister, 2008). “The goal changed from moving vehicles to seeking to move as many people, rather than cars, as efficiently as possible” (Oviedo, Cavoli, et al., 2020, p. 4).

Todd Litman (2002) framed probably the most widely used definition of *transport equity*. To understand equity’s importance in transport, his definition suggests “Equity (also called justice and fairness) refers to the distribution of impacts (benefits and costs) and whether that distribution is considered fair and appropriate” (Litman, 2002, p. 3). Litman’s work supports the need for a just and accessible transport system that can be used by all equally in an urban context and does not exclude any layers of the urban society.

Accessibility was mainly defined in the Global North context (Geurs & van Wee, 2004; Handy & Niemeier, 1997; Páez et al., 2012). This dissertation is willing to contribute new knowledge by reframing accessibility for the inadequately developed areas of Global South, more explicitly in the African context. There is a lack of data collected in Africa concerning urban transport and accessibility (Ferreira & Papa, 2020; Oviedo, Cavoli, et al., 2020). The insufficient dataset available - mostly due to the struggle of recording and presenting a considerably complex, rapidly changing and disaggregated context (Kane, 2010) - also ensues the absence of accessibility considerations in African urban planning. There is not only a lack of accessibility but also an urging demand for a mainstream accessibility definition for the rest of the Global South in general.



According to Geurs and Van Wee (2004) *accessibility* means “the extent to which land-use and transport systems enable (groups of) individuals to reach activities or destinations by means of a (combination of) transport mode(s)” (Geurs & van Wee, 2004, p. 128). They identified four types of accessibility components: land-use, transportation, temporal, and individual components. To identify the main accessibility issues in Freetown, and the potential pathways to an optimal transition, I will analyse the current practices and urban conditions that have negative impacts on urban mobility by following these four components.

*Sustainable accessibility* could be an alternative trajectory for this transition in Freetown. No matter what transport planners’ focus was, walking and cycling have never disappeared from cities; however, walking - the most ecologically friendly-form – has not been adequately explored in recent researches concerning sustainable mobility (Schipper et al., 2020). *Sustainable accessibility’s* achievement is possible by focusing on mobility modes that already exist in a city with special attention to pedestrian and cycling infrastructure. It does not require expensive implementations of new services (which would only withdraw expensive fees and maintenance, not to mention users’ adaptation to it), and its use will be ensured regardless of the users’ economic or social situation. A development is sustainably accessible if its use and maintenance are economically and environmentally neglectable.

It has become even more urgent to address the issues of unsustainability and inaccessibility in the context of COVID-19. A city based on local access is required to provide sustainable accessibility for communities, which should be achieved by a controlled and more effective land-use (Levine, 2020). There is a large demand to create opportunities in closer proximity in more neighbourhoods to reduce the need for long travel-distances and avoid collective transport in epidemic crises (or pandemic) to reduce the risk of spreading viruses or diseases (T-SUM, 2020a).

Literature in the topic (Levitas et al., 2007; Lucas, 2012) advises that vulnerable groups of society need to overcome social exclusion and persistent poverty because of the lack of access which limits their opportunities (Venter et al., 2019). The connecting issues of inaccessibility in an urban context is shown in Figure 1.

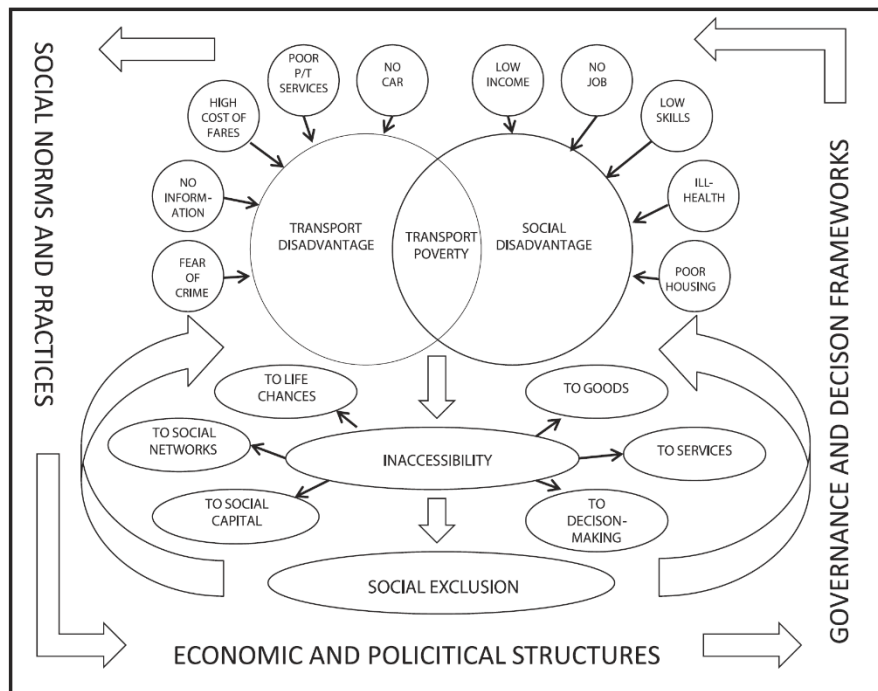


Figure 1 The central connection of (in)accessibility to social exclusion. Source: (Lucas, 2012)

Accessibility depends on land-use and its linking. Social outcomes, such as urban poverty and social exclusion, can easily arise from urban and transport planning (Hansen, 1959). Church et al. (2000) had proposed seven dimensions of *transport-related exclusion* that is essential to mention, which were extended by an eighth dimension by Benevenuto and Caulfield (2019): physical exclusion, geographical exclusion, exclusion from facilities, economic exclusion, time-based exclusion, space exclusion, - and the additional eighth - social position-based exclusion. Urban development with adequate focus on accessibility is a trajectory where social exclusion can be prevented.

It is evident that Global South cities, such as Freetown need to develop a more accessible and just transport service and connect infrastructures for creating equal and sustainable urban mobility.

## 2. Literature review

### 2.1 Accessibility

Accessibility is the most important feature of the urban lifestyle and the very purpose of mobility and urban transport (Levine, 2020; Verlinghieri & Schwanen, 2020). Urbanisation happens for a reason: people prefer to move to cities from the countryside in the hope of a more accessible life with more benefits. Handy and Niemeier reframed accessibility in 1997 as "the potential for interaction, both social and economic, the possibility of getting from home to a multitude of destinations offering a

spectrum of opportunities for work and play" (Handy & Niemeier, 1997, p. 1175). Mobility options in an urban context are equally important; furthermore, travel choices proportionally increase accessibility. Although this fact was already well-known at the end of the '90s, in many countries development has not been focused on accessibility properly, and 'exclusive' developments do not enable a wide range of travel choice. They rather foster socio-spatial and economic inequality. Car-oriented development is disadvantageous for lower-income groups, the elderly, students, and for people living next to busy road infrastructures, pedestrians and cyclists.

Accessibility approach focuses on land-use management (accommodating local variety of opportunities, mixed-use zoning and other reducing measures for movement), transportation-demand management, New Urbanism, TOD, infill development, street connectivity and non-motorised transport. Newer urbanist-oriented accessibility research prioritises local proximity, walking, cycling, public transport and the existence of travel mode alternatives (Handy, 2002; Levine, 2020). Levine (2020) suggests that urban transportation must be looked at in a multidimensional context of environmental, social and economic considerations. Accessibility approach is the advanced version of mobility approach, which overcame the former's weaknesses by adding more aspects and dimensions but kept its advantages (Ferreira & Papa, 2020).

Geurs and van Wee (2004) identified the accessibility components mentioned above and the basic perspectives on measuring accessibility (infrastructure-based, location-based, person-based and utility-based measures). To be able to measure accessibility as a complex of components, Geurs and van Wee (2004) put together a diagram in which they summarise and reframe concepts regarding accessibility used by academics up to that point. This diagram was further developed by Oviedo et al. (2020) adding new considerations to the existing components and relations by accounting informality, technology and dynamic relations of power. This elaborated version (Figure 5, expanded later in the framework) presents the complexity of accessibility which needs consideration when working on a development for sustainable mobility.

Although it is hard to build an overall framework to measure accessibility, as each scenario requires a different approach (Geurs & van Wee, 2004), it is clear that we cannot measure accessibility based on the same criteria in Africa as we do in Europe, for example. The need for a different approach is due to the fact that definitions come from the Global North, and using them would reproduce development methods from colonial times. In post-colonial Africa we need to stop looking at urban development from a Eurocentric view and consider – in this case - accessibility in the African context as we cannot utilise the same concerns that were defined in a developed world context. Accessibility must be reframed both in the African and the Global South context. There is an extensive overview on

accessibility of Latin American approaches (Vecchio et al., 2020), yet the majority of Global South seriously needs accessibility development in cities.

The urban population growth in Africa is projected to over 1.2 billion from less than half a billion people by 2050 (Stucki, 2015). African cities generally were not on top of controlling the urban growth of the recent decades; therefore, they also failed to provide effective transport to cover the needs. This resulted in the emergence of unrouted paratransit, which has stepped in to fill the gap and provide an alternative transport service to cover mobility demands unsatisfied by the formal transport services. Paratransit service means a door-to-door service that can be also used as a last-mile solution. Unrouted transport has two recognised advantages: it runs without subsidy from the government, which makes it a low-cost solution for the city; and it is advantageous to respond to demanded changes thanks to its flexibility (Venter et al., 2019).

Paratransit has the potential to improve accessibility; it is required to be formalised in order to integrate it in the new public transport system, and to become a reliable part of the transport network. For instance, Cape Town has introduced a regulatory system to control paratransit services. Johannesburg and Lagos have also taken paratransit operators into account in transport development by including them in the ownership and the operation of the new BRT system (Stucki, 2015). It is essential to include paratransit operators in the new ‘formalised’ transport system to substitute the existing less efficient ‘informal’ system. The shift can be done by coordinating and improving paratransit to be more effective, sustainable and affordable. Without ‘formalising’ paratransit services, such as enabling them to systematically feed the main public transport lines, like a BRT; paratransit operators will not keep their time and schedule, and this would result in an unreliable transport system, as it happened in Quito, Ecuador (Stucki, 2015). Stucki (2015) developed a conceptual framework, called EASI (see: Appendix 1), which points out the required actions to implement the transition towards sustainable accessibility in African cities.

Designers must develop mobility in Freetown from the perspective of the African context. It would be a mistake to consider the same accessibility measures as in a Global North context. This is due to cultural differences, compared to the North, such as gender distinctions in using and operating transport: women have restricted access because of social status, respect and honour, and are widely not accepted to drive or even cycle. As a result, the majority of women commute on foot (ITDP, 2018; Porter, 2008). Focusing on accessibility in transition to better urban mobility would mean to develop existent practices to be more accessible, for instance pedestrian mobility.

Investing in pedestrian infrastructure should be amongst top priorities because in African cities typically 36-90 per cent of trips are made on foot, making walking the most important mode of

mobility there (Behrens et al., 2004; Stucki, 2015). Walkability can be improved by establishing sidewalks with street lighting and widening the existing walking space for a safer pedestrian environment (Venter et al., 2019). Unfortunately, cycling infrastructure has smaller feasibility in Africa. We cannot take cycling as a basic instrument for improving non-motorised accessibility like in Europe, because of the above-mentioned socio-cultural context. If the image of women operating a vehicle changed, and they would be accepted to bike; it could also reduce their everyday commute time and improve their carrying capacity. In Africa, women's traditional role restricts them to a generally poorer economic position, not to mention their higher level of time-poverty (ITDP, 2018; Venter et al., 2019).

I argue that *sustainable accessibility* must play an essential role in policy implementation in the transition to future urban mobility in Africa with extra focus on the already existing non-motorised transport infrastructure. This way it can guarantee successful infrastructure investments which fit into the local cultural context. The key is to improve the current transport and mobility practices and urban land-use to reduce commute time, and mitigate urban sprawl instead of investing in pricey transport systems which may not be affordable and may fail after all.

## 2.2 Sustainable urban mobility

As cities grow and develop, the change is usually not controlled nor planned as it should be. There is an economic factor why a sudden jump in urbanisation happens, and city authorities may not be ready for this. People move to cities from the countryside in hope of employment and access to other benefits of urban life. In this scenario, urban development, including transport infrastructure, is usually led by powerful financial incentives of economy. Where authorities cannot catch up with rapid city-growth, mobility and accessibility are individual problems. It will be impossible to connect communities with a well-functioning transport network since there is no space left for building proportionate routes between the informally formed settlement units. Practitioners must learn from past mistakes and the car-centric development of the US cities. According to Venter et al. (2019) cities in the Global South experience a decline in accessibility due to rapid urbanisation and motorisation trends, which result in high travel burden or restriction in opportunities. Transport emission is globally responsible for 24% of greenhouse gas (GHG) emissions (ECMT, 2007; Marsden & Rye, 2010). Road transport was responsible for 75% of emissions in 2010, and its share is expected to rise by 1.7% yearly until 2030 (Zhao et al., 2013) which is projected even higher, 3.4% in the Global South (Grazi et al., 2008). Therefore, it is imperative not only to reduce GHG emission in the transport sector, but also to specifically focus on the Global South in transition to sustainable urban mobility, where cities have still low-but-rising level of motorisation in order to mitigate Climate Change appropriately. As Oviedo et al. (2020) points out, "sustainable urban mobility transition refers to the capacity cities have to grow

within a way that meets the needs of present and future urban citizens while effectively maintaining renewable resources and minimising impacts on non-renewable resources, alongside reducing impacts on global carbon sinks” (Oviedo, Cavoli, et al., 2020, p. 2). Consequently, there is need for raising awareness to the effective use of renewable resources and a well-planned education that will help in mitigating the carbon footprint of future generations.

Current sustainable mobility approaches in Africa mostly cover BRT integrated TOD solutions, such as in the City of Johannesburg, Cape Town or Lagos (Pieterse & Owens, 2018; Stucki, 2015). These are working solutions for connecting distant, informally formed neighbourhoods with the CBD; however, in rapidly growing and changing African cities public transport needs a more flexible solution to react to the change of urban practices and mobility, for which paratransit services have proved to be on top. Despite the disorganised urban planning that represents Africa in general, Cape Town recognised the importance of focusing on walking and cycling, and also to publicly invest in support the more vulnerable layers of the city (Kane, 2010).

Dittmar (1995) framed the goal of a sustainable transportation system as “transportation facilities should accommodate various modes of travel: an arterial road, for example, should provide safe, convenient, attractive access for the pedestrian, the bicyclist, and the transit passenger as well as for the local driver, even if this means some sacrifice of throughput performance by the automobile. In addition, transportation systems and facilities should be integrated into the community context and into both the built and the natural environment”(Dittmar, 1995, p.11). Drawing on Dittmar’s conclusion, in order to achieve the goal of a transportation system we must provide multimodal accessibility in cities, justifying the essential role of accessibility in the transition to sustainable urban mobility.

### 2.3 Implications of sustainability for a healthier urban lifestyle

According to Whitelegg and Haq (2003) non-motorised transport is vital; we lack precise quantitative data, but in cities from the Global South, especially in Africa, people are heavily dependent on non-motorized forms of transport, such as cycling or walking (Behrens et al., 2004; Stucki, 2015). Non-motorised mobility is more accessible, sustainable, it prevents significant issues of car-centric mobility and prioritises different qualities (such as pleasure and environmental factors), unlike vehicular transport which is assessed through travel time and the level of network congestion (Iacono et al., 2010). However, it has its limitations as well, as walking and cycling are both slow speed, and possible only for shorter distances (Page, 2005) and they are highly dependent on weather and space. Without advanced land-use in a neighbourhood where all accessibility needs are met, people will be forced to use motorised vehicles at longer distances. Goodman and Tolley (2003) suggest that travel choice is

not only dependent on physical factors but also on socio-cultural influences that set certain social standards, such as the status symbol (power and wealth) of car-ownership. Vehicle-associated cultural attachments imply that it will be a more significant challenge to encourage people to walk and cycle in an already car-centric environment as bad individual travel behaviour (and habits) is effortful to change. As a consequence, urban mobility agendas in the Global South must prioritise non-motorised mobility, such as walking (Venter et al., 2019) to prevent the need for owning a vehicle to stay mobile.

What planners can do in Africa for sustainable mobility is limited by many circumstances - such as cultural context, planning and budgeting limitations. However, the need to act is urgent not only because of environmental consequences of car-centric transport, but also because road fatality rate is the highest in Africa (WHO, 2018), which presents probably the biggest concern in the region.

#### 2.4 Transport equity

We need to define equity in the transport context to achieve an ideal transition to sustainable urban mobility with just and accessible transport network. Equity is wedded to accessibility; a city is truly accessible if it has inclusive transport granted to everyone in the same way, equally. Although many authors defined equity in the academic literature (Geurs et al., 2009; Lucas, 2012), I introduced Litman's (2002) widely used definition in the introduction. Transport inclusion (or social inclusion in transport) is a must for a truly accessible urban mobility, where social exclusion is prevented in transport by having all layers of urban population "participating adequately in society, including education, employment, public services and activities" (Litman, 2003, p. 2). There is a new shift happening currently from transport equity to transport justice, which broadens the focus of distributional justice by adding procedural justice and the recognition of justice to the context (Karner et al., 2020; Schwanen, 2020; Verlinghieri & Schwanen, 2020).

#### 2.5 Land-use policies connected to accessibility concerns

A coherently planned land-use will generate an urban context where not only sustainable urban mobility is possible, but also urban life is more accessible. The two major sectors that contribute the most to CO<sub>2</sub> (and other GHG) emissions are transport and land-use. As a result, professionals have suggested planning transport integrated into land-use policies by using TOD (Cervero, 2004; Cervero & Sullivan, 2011; Curtis et al., 2009), because with favourable land-use policies neighbourhoods can gain more accessibility and more effective mobility reducing pointless motorised trips and their adequate portion of GHG emissions. Sustainable transport planning requires to view urban transport holistically in planning and policymaking, without isolating its transport compounds, land-use and environment (ECMT, 2001). An urban context of increased densities and well-connected street

networks promotes public transport use and non-motorised mobility in a compact, mixed land-use (residential, commercial, recreational functions together in one neighbourhood). The environment makes it possible to break the vicious cycle of urban sprawl and car dependency that are feeding on each other (Cervero & Sullivan, 2011). This approach creates more accessible urban transport and a more sustainable mobility than car-oriented neighbourhoods. Bertolini and Le Clercq (2003) claim that accessibility can be directly related to transport and land-use system qualities.

Accessibility is also about bringing destinations (services, opportunities) closer to a neighbourhood. Increasing accessibility is the best way to ensure proper transport. A properly mixed land-use and compact urban form can solve not only accessibility problems and the issue of economic incapability to pay for the ride for longer commute destinations, but it would also decrease time-poverty and enhance the economic situation of local dwellers by creating job opportunities in the neighbourhood (ITDP, 2018). It requires less money to be invested in affordable transport to support local needs as we invest in developing the local economy of the neighbourhood directly. Mixed land-use would result in more residents being able to pay for the necessary rides. Using mixed land-use would increase the general walking safety as vulnerable groups would not have to walk long destinations and cross dangerous areas. It would encourage more women, children and elderly to live a more prosperous urban lifestyle, further on, women would have to carry less when purchasing goods for the household, and it would provide them with some leisure time next to leading the household.

### **3. Methodology**

#### **3.1 Empirical approach**

The objective of the research was to collect data in order to understand the mobility situation and accessibility issues in Freetown. Both qualitative and quantitative secondary data supported the research which aimed to answer the following research questions:

- How to frame accessibility as a relative concern for sustainability in the African urban context?
- What is the current trajectory of accessibility in Freetown?
- What is the role of accessibility in achieving the transition to sustainable urban mobility in Freetown?

#### **3.2 Scope and limitations of the research**

Answering my objectives, this research is focused on collecting data about the broader African (and Global South) context of urban accessibility and Freetown. As urban accessibility in Africa is not a



widely explored field, and the problem developed only quite recently, it does not require further filtering. Data about Freetown is considered in the research, if:

- (I.) it has historical data to form a basic understanding of the local context;
- (II.) it contains recent information about local transport, mobility and infrastructure situation;
- (III.) it supports data related to the four relevant accessibility components that will be used as lenses in the analysis.

It is essential to highlight the use of recent data in the research given that the urban fabric changes rapidly and continuously in the process of urban growth, and it proportionally loses relevance.

### 3.3 Research Methods

The research consisted of only secondary data which had been collected primarily through my scholar connections. To find the research problem for the transition in Freetown, I researched grey sources. Then I started collecting white sources for finding reliable evidence to support my analysis. The prior criterion in selecting my sources was to collect data from known, reliable and up-to-date resources. These resources consisted of local knowledge gathered by my fellowship advisors from T-SUM and their partners, SLURC and NGOs, such as the UN. Further on, I have broadened my research with other local literature, and previous data collection made by my ESD colleagues from DPU in cooperation with SLURC, and other series of research that were conducted in previous years by DPU. In order to be able to collect the complete range of information for the case study and to expand the understanding of the collected data, I reviewed other kinds of sources, too, such as maps, visual recordings and interviews. For the sake of analysing spatial context for mobility and accessibility, I needed to rely on information recorded on maps. I used a convergent type of mixed methods (Cresswell & Plano Clark, 2011) which included secondary quantitative and qualitative data gathered and analysed. These two approaches resulted in my mixed data analysis. I also used visual elements as part of the qualitative research applying the tool of 'Visual movement' (Heisley, 2001).

I believe this composition of mixed methods is the most suitable for such a case study, as I needed to deal with a complex problem. I needed to understand not only the local transport systems in a quantitative way, but also the socio-spatial and power relations in order to gain a proper grasp on the real fabric of Freetown. This was an unorthodox way to do accessibility research, and the complex and different reality of the local context required it contrary to the conventional context of traditional accessibility research.

The papers supporting my research objectives are collected in Table 1. This table does not include Global North sources to prevent bias or assumptions from the Global North.

Objective	Territorial context	Papers
Framing accessibility as a relative concern for sustainability	Global South	Beard et al. (2016), Cervero & Golub (2007), ITDP (2018), Oviedo & Guzman (2020), Vecchio et al. (2020)
	African	Porter (2008)
	Freetown, Sierra Leone	Oviedo, Okyere et al. (2020)
Understanding the current trajectory	Global South	Benevenuto & Caulfield (2019)
	African	Pieterse & Owens (2018)
	Freetown, Sierra Leone	FCC (2014, 2019, 2020), Froment et al. (2020), GoSL (2015), Lynch et al. (2020), Macarthy et al. (2018), SSL (2016, 2017), T-SUM (2020a), The World Bank (2017)
Accessibility's role in achieving sustainable trajectories	Global South	Venter et al. (2019)
	African	Behrens et al. (2004), Kane (2010), Stucki (2015),
	Freetown, Sierra Leone	Oviedo, Cavoli et al. (2020), T-SUM (2020b, 2020c)

*Table 1 Inventory of data for the research analysis*

## 4. Analytical Framework

### 4.1 Urban trajectory of Freetown

T-SUM (2020c) framed a strategic vision for sustainable urban transport and mobility in Freetown, and the key concepts are as follows (Figure 2).

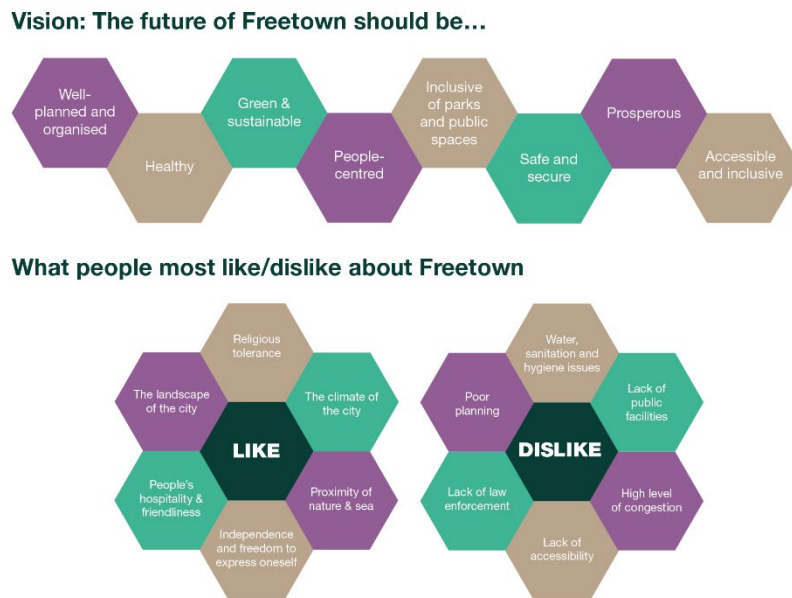


Figure 2 Vision of future Freetown; and the advantages and disadvantages of the present city. Source: (T-SUM, 2020c)

Figure 3 (T-SUM) identified main policy instruments and their feasibility, their priority on timing, by focusing on two intervals (2020-2030 and 2030-2040). Their feasibility relies on cultural and political support and the regulatory environment that exist in the local context.

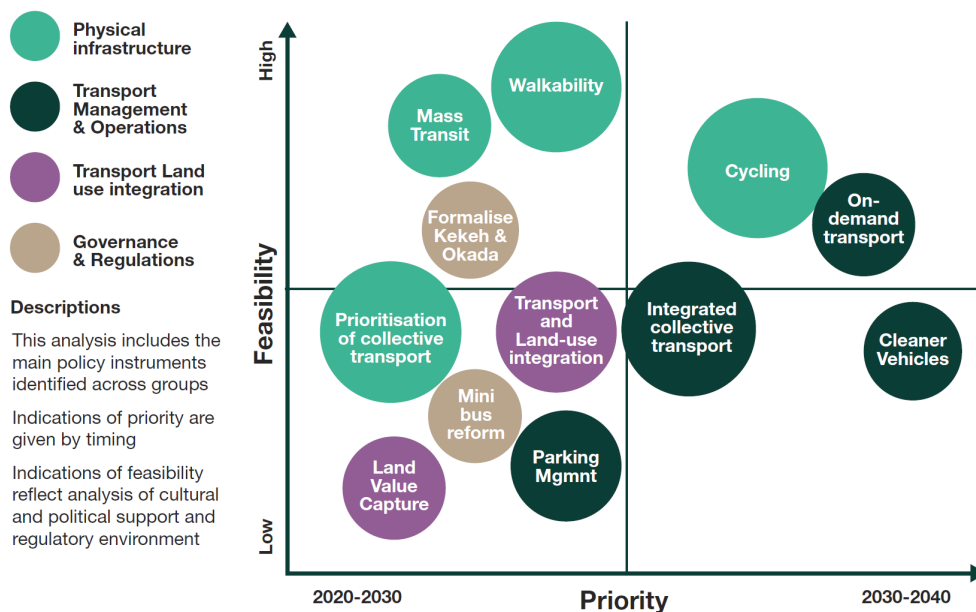


Figure 3 Different policy instruments concerning their urgency and feasibility. Source: (T-SUM, 2020c)

I can firmly state that accessibility can play a positive role in constructing this vision. Freetown needs these improvements for future mobility not simply to improve transport or mobility, but to improve accessibility in the city in all its features together. It would be unwise to focus on these instruments isolated from each other; rather these instruments need to be looked at holistically in the context where they are intertwined. Failing this, it would only result in a further going socio-spatial exclusion. Accessibility approach results in future urban transport and mobility, which can offer equal opportunity to all potential users. Freetown is for its citizens; local dwellers have equal right to access the urban space and its opportunities by their 'right to the city' (Lefebvre, 1996). It should be highlighted that Freetown is proud of its freedom, acceptance and independence and individualism (T-SUM, 2020c). It is essential to understand that the trajectory towards city-wide accessibility is a long-term process. It will not be granted by only one instrument, but this transition is going to manifest across time. Some instruments aiming to improve land-use and reduce necessary shopping trips can be achieved faster, like establishing new markets (FCC, 2020); and some policies need longer time to accomplish, like improving overall walkability or planning and developing road infrastructure (see more about the envisioned priority of policies in Appendix 2)

T-SUM (2020a) published a COVID-19 policy brief in July. Sierra Leone, learning from its experience with Ebola, limited the maximum capacity of collective transport vehicles, restricted movements between districts and reduced the pressure on the limited transport system by closing schools. Authorities face the challenge of implementing movement-restricting policies by limiting social and economic activities, and ensuring adequate local access to services and employment to slow the spread of COVID and prevent extreme poverty. Freetown is advised to rearrange street space, and discourage on-street parking to increase and secure pedestrian mobility. Virtual communication must be increased to improve access to services and reduce needs for mobility (T-SUM, 2020a).

#### 4.2 Urban practices of Freetown

Currently, a mix of transport and mobility practices exists which can be classified as (a.) routed public transport, (b.) unrouted paratransit and (c.) private transport from which (d.) the non-motorised form of mobility should be separated (Oviedo, Cavoli, et al., 2020). Routed public transport, even though it exists, has failed to cover much of the urban area. Lack of public transport resulted in the emergence of various types of unrouted transport operators offering a so called paratransit service (a door-to-door service, which is often used as a last-mile transport solution) to the city dwellers complementing the (non-)existent formal services in large areas. Paratransit modes in Freetown are keke (tuk-tuk or rickshaw), poda-poda (minivan / minibus of 8-20 ppl), okadas (motorbike taxis), and shared taxis (Oviedo, Cavoli, et al., 2020; Y. Yusuf, personal communication, April 23, 2020). Private transport is

usually used by the more privileged high-income households. Lastly, there is the non-motorised mobility such as walking or cycling. Majority of dwellers are used to walking (Venter et al., 2019) making it the most popular way of mobility; however, there is no appropriate infrastructure to support this non-motorised mobility. The current practices try to complete each other in an informal system, yet, the existing structure has many defaults for various reasons. It is not safe, nor inclusive, sustainable or effective; developing a better-coordinated structure, a more accessible system can be achieved.

Rapidly growing cities need to develop arterial connections and quality transit services to fast-growing edge neighbourhoods. Further, it is necessary to improve and integrate informal and formal transport, and to build dedicated infrastructure and introduce fare integration (Benevenuto & Caulfield, 2019; Venter et al., 2019).

The existing practices should be the foundation of accessibility in the transition. The advantages of these practices could contribute beneficially to the trajectory of Freetown's future mobility. Freetown must take advantage of the current informal practices and its highly walking-centric mobility in the development of its vision.

#### 4.3 Structural drivers of Freetown

Freetown is spatially limited, the city is situated on a peninsula, where urban space is limited from the North and by steep mountains from the South. The city is socio-spatially divided into West and East sides; East, where poverty and informality are common, has worse infrastructure, is denser, and extreme road congestions happen daily. The West side is where higher income households are located next to Freetown's beaches and this part of the city has more investments in urban development. Freetown's central business district (CBD) is in the middle of the socio-spatially divided city. Most jobs, services and markets are located here; however, many neighbourhoods have no opportunities to offer aside living.

Stepping away from the traditional accessibility research is necessary for this dissertation because of the higher degrees of poverty, informality and the complex reality associated with the state of development in Sierra Leone. It is essential to recognise that accessibility does not apply the same way in this context; this is a different 'reality' compared to the context in which mainstream accessibility literature was written. Sustainable accessibility in Freetown should focus on developing non-motorised transport infrastructure and improving the current paratransit services primarily, as the majority of Freetown uses these transport and mobility modes.

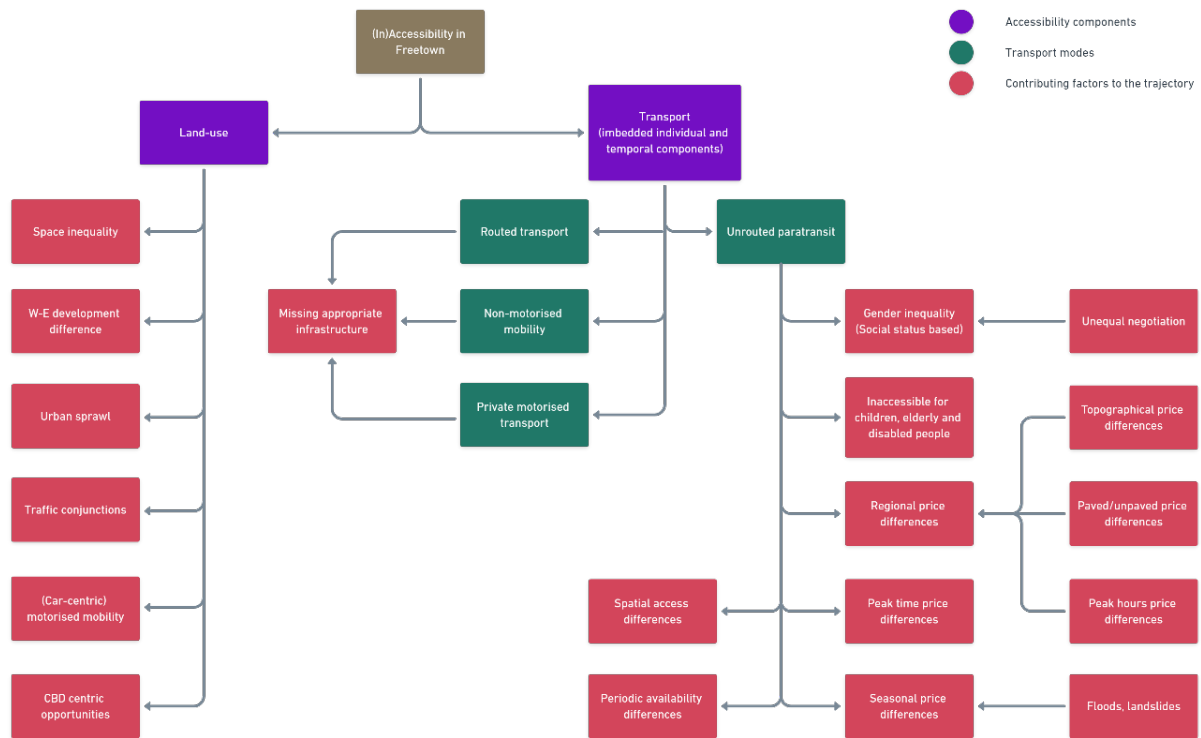


Figure 4 (In)accessibility links in Freetown. Sources: Own elaboration based on (Oviedo, Cavoli, et al., 2020; Y. Yusuf, personal communication, April 23, 2020)

Figure 4 summarises (in)accessibility factors and their connections in Freetown; it is extended by the relevant considerations, pathways proposed to these links in Appendix 3.

In order to frame the analysis I will use the four components of accessibility (Figure 5) as lenses introduced by Geurs and Van Wee (2004) and elaborated by Oviedo et al. (2020) by taking informality, technology and power relations within these components into consideration. Using these components to analyse the issues and challenges of Freetown regarding accessibility will highlight the needs and risks that the transition should focus on during this development process.

The research starts with introducing the urban context of Freetown (5.1) in order to understand its geographical, historical situation and other factors which have shaped the city to the way it is currently. Then, the research will complement the previously introduced city vision (4.1) with the interpretation of the four accessibility components (Figure 5).

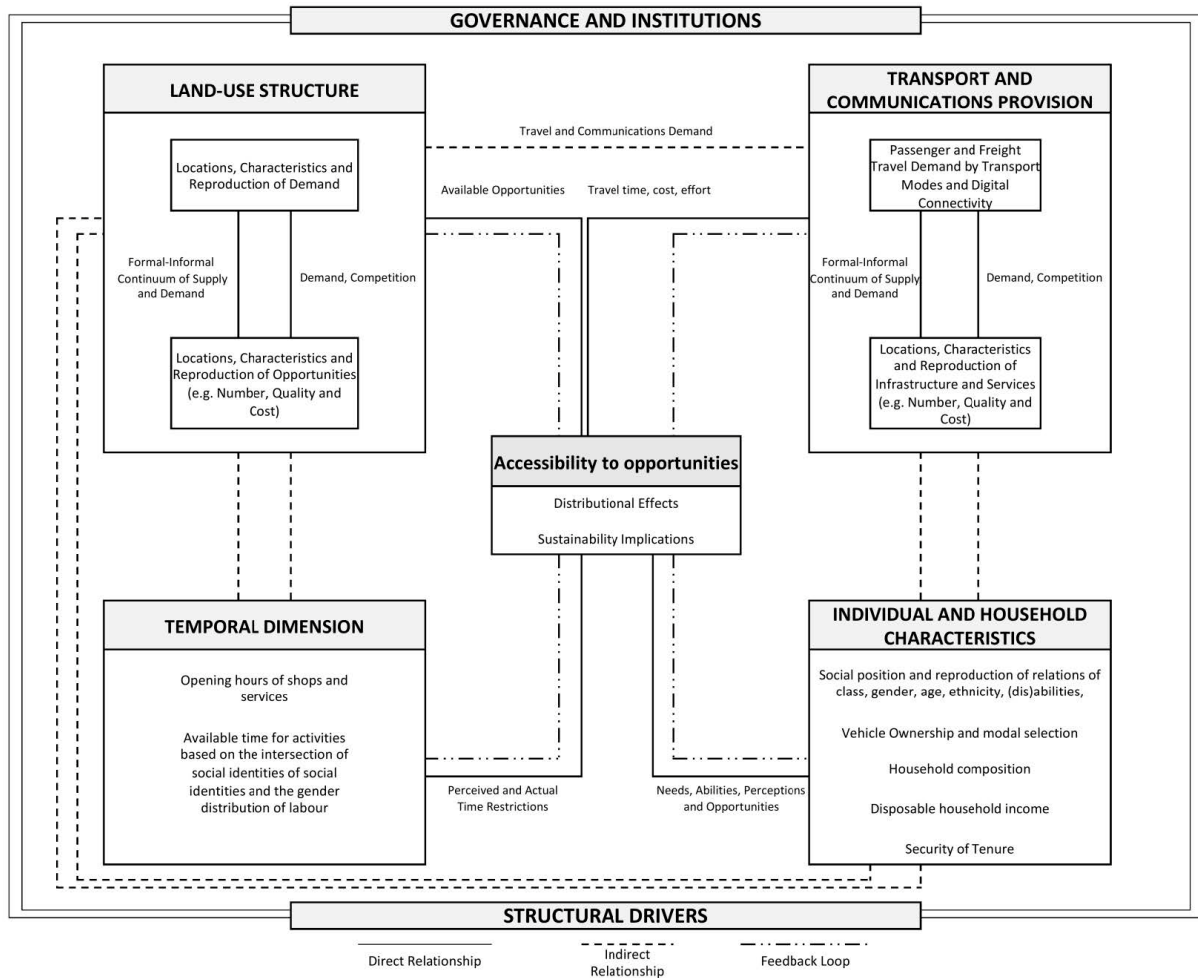


Figure 5 Components and relations of accessibility. Source: (Oviedo, Cavoli, et al., 2020)

After I describe the findings of the case study in the sub-sections mentioned above, I will analyse those findings in relation (or connecting) to the theories and definitions in the relevant literature introduced previously.

## 5. Case Study: Challenges of Freetown, Sierra Leone

### 5.1 Background of Freetown urban context

Freetown is Sierra Leone's capital city with a 1.2 million population, which makes it the biggest city in the country (SSL, 2016). Freetown is considered as a high-density city with 8,450 persons per km<sup>2</sup> (Oviedo, Cavoli, et al., 2020). Freetown's average population growth rate is 4%, and it has grown from 100,000 since the 20<sup>th</sup> century (SSL, 2017). Sierra Leone is currently one of the poorest countries struggling with many dysfunctionalities (lack of infrastructures, low human development, negative environmental impacts) in the post-independence crisis. The country was affected by a protracted civil war (1991-2002) and the Ebola Virus Disease epidemic in 2014-15 (Lynch et al., 2020); in 2015

September, Freetown experienced heavy rainfalls, massive floods and landslides; and was further impacted by the recent COVID-19 outbreak.

Due to the rapid growth and the authorities' inability which is partially due to the above-mentioned events and the post-colonial struggle, the city has been unable to cope with the situation (GoSL, 2015) and provide appropriate development for the growing population, thus over 72 unregulated and uncoordinated informal settlements were created. These settlements appeared in three forms due to the territorial limitations of the area; coastal settlements, sprawling inland settlements and hillside settlements (Oviedo, Okyere, et al., 2020). In January 2019, the Mayor of Freetown launched the initiation called 'Transform Freetown' to improve the urban sphere (after the 1994 Master Plan for Freetown, which could not be carried out due to the civil war) (FCC, 2019). For a broader overview of the Sierra Leonean capital and its struggles in planning and development, see Lynch et al. (2020).



Figure 6 Map of Freetown with its major informal settlements. Source: Own elaboration based on (DPU, 2019; Lynch et al., 2020)

## 5.2 Land-use in Freetown

People in Freetown face huge spatial inequalities as several city parts outside the city centre are almost entirely disconnected from primary access to opportunities. Many neighbourhoods have limited access to markets, hospitals, or job opportunities, as most of these opportunities are located only in the CBD area (Oviedo, Cavoli, et al., 2020). The city is socio-spatially divided, and this radically influences which regions are better developed. The city's western area contains higher-income households alongside rich beaches or near the CBD, which lies at the centre. The city's eastern part is where the generally low-income households are situated, people here more commonly live in poverty and informality. It has greater density, worse infrastructure and extreme road congestions; meanwhile the western side has been rewarded by more development investment (Y. Yusuf, personal



communication, April 23, 2020). The higher-income areas have more mixed-use land enriching the area with more opportunities, in contrast to the low-income, often informal neighbourhoods, which are limited to residential areas, and do not offer further opportunities. Among other things, job opportunities are mostly concentrated in the CBD; therefore, the poorest neighbourhoods fall away from the economic benefits of accessibility, too.

Because of urban-rural migration, massive deforestation occurred around Gloucester, Leicester and Regent which were mountain villages outside Freetown. Houses were constructed on unstable hillsides in this area, and due to heavy rainfalls, large areas of the Sugar Loaf mountain have been affected by landslides on 14 August 2017. The city's rapid growth results in monotonic land-use, and it lacks specific uses such as space for schools, clinics or other facilities (Lynch et al., 2020). Some of these specific uses can be initiated individually or community-led in a later period, such as in the case of Moyiba (Oviedo, Okyere, et al., 2020). However, these developments tend to be spatially and economically limited. Schools and water access points are the most popular amenities in the informal settlements, but clinics or markets providing for household needs require more complex logistics, bigger funds and out-of-community support. According to surveys from other neighbourhoods, Freetown generally has low local supply of healthcare and they are badly equipped (Macarthy et al., 2018; Oviedo, Cavoli, et al., 2020). It was also pointed out in a T-SUM workshop, that it is challenging to get vehicles to take people to hospital (Appendix 4).

### 5.3 Transport in Freetown

Transport in Freetown has quite a few options to offer on the city scale; however, most of the options are informal and variably unsafe. The existent practices of mobility try to complete each other in a system with many defaults, and can be categorised into four main groups:

- a. routed public transport
- b. unrouted paratransit services
- c. private mode of transport
- d. non-motorised mobility

The transport sector was indicated as the second-highest job generator in Freetown; however, 85% of the workers are informal operators, which makes them vulnerable (Oviedo, Cavoli, et al., 2020). Consequently, it is highly recommended to involve current stakeholders in developing sustainable transport for Freetown.

#### a. Routed transport

Freetown operates 30% of the city's transport, only this section of transport services is considered as conventional public transport (ESD, personal communication, June 1, 2020). SLRTC, which is the conventional public transport run by the city, could not grow together with the urban population boom because limited paved road infrastructure cannot support large transport vehicles, and they become hard and slow to navigate on the congested unregulated roads. More practical transport services – poda-poda (cheapest option: LE1500-LE5000) and shared taxi (LE1500 in fixed-route mode) - rapidly emerged in the city, they took over the role of public transport (Kamara, 2017; Oviedo, Cavoli, et al., 2020) and these paratransit operators run on fixed routes with fix prices. The typically crowded ferry connects Freetown with the mainland of the country, and this is the fastest connection to the Lungi International Airport. The ferry costs USD0.50 (about LE2000-5000) and is used mostly by female traders. It represents the main shipping trade route for Freetown. The crossing takes less than one hour and saves 4-5 hours of driving (Brar, 2019).

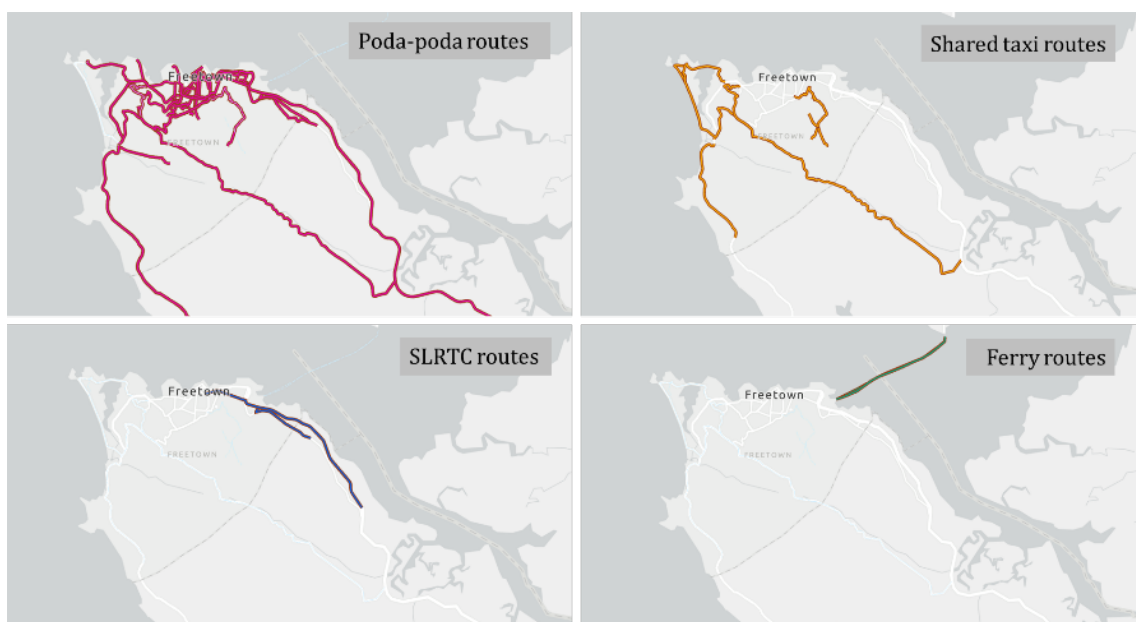


Figure 7 Routed transport services in Freetown. Source: (Oviedo, Cavoli, et al., 2020)

#### b. Unrouted paratransit services

70% of Freetown's transport is operated by paratransit operators who are private vehicle owners offering unorganised and overlapping transport services (ESD, personal communication, June 1, 2020). These operators are rival stakeholders who have no communication or cooperation with each other. However, they are joined in unions, and stakeholders attend meetings now to represent their interests. The different types of paratransit services in Freetown are keke (costs LE2000), okada (price offered by operator), poda-poda and shared taxi, which can be used unrouted, too (Kamara, 2017; Oviedo, Cavoli, et al., 2020). These unrouted services are commonly used by the middle- and low-

income households who cannot afford private vehicles. Kekes and okadas are the only available mode for people from the hillside communities to access facilities outside their neighbourhood. These operators can be found usually in the 500m radius of routed transport stops; however, they do not usually go in too deep on the unpaved routes of the communities. The quality of roads is connected to the increase of transport services (Oviedo, Cavoli, et al., 2020). Kekes and okadas are more expensive and slower on unpaved roads, and do more damage to vehicles.

Destinations influence the price of kekes; it is cheaper to travel to the city centre than to less accessible areas. Although the price can be negotiated, it relies on the social status of the client, which results in inequality. Okada operators are harder to negotiate with and show the same tendency for area price fluctuation. Moreover, they are unlikely to go to the south-east part of Freetown (Oviedo, Cavoli, et al., 2020). The pricing and frequency of paratransit services are influenced by road and topography conditions of the route, dry/rainy season, peak hours and willingness to negotiate depending on individuals' social position. In the latter, young women come out more disadvantaged.

#### c. Private modes of motorised transport

Private transport is not common but rapidly rising due to urban sprawl. This section is covered by the more privileged people who can afford to have vehicles (Oviedo, Cavoli, et al., 2020). Although only high-income households - mostly from the western, more developed part of the city - can afford vehicle-ownership, private motorisation grows simultaneously with the raising number of higher-income residents. In Freetown, accessibility improving development is often community-initiated, and non-car-users perceive that car-owners (who have not contributed to the improvement) use and damage these infrastructures. Bridges and footpaths are used by heavy vehicles too, which makes pedestrians vulnerable. Higher-income car owners damage the community-initiated infrastructures, which were not made for car users and increase traffic-related exposures (Oviedo, Cavoli, et al., 2020). Private vehicles of high-income groups degrade the travel quality of other social groups by contributing to congestion. It increases air pollution and time spent in traffic for people with long journey requirements.

#### d. Non-motorised mobility:

Even though there is a wide range of transport modes present in Freetown, non-motorised mobility is the most popular option as the majority of city-dwellers are used to walking (Oviedo & Guzman, 2020). In dense areas, the only possible way to stay mobile is via pathways unsuitable for vehicles. Cycling does not have a widespread reputation in Africa; however, it has its potentials in the future - but it must overcome some socio-cultural barriers. In a T-SUM workshop, it was mentioned that there are only few cyclists due to its high cost (Appendix 4). Cycling could offer a wider city-accessibility without

spreading diseases via collective transport in another virus crisis. Collective transport is highly disadvantageous in isolation, and it was essential to limit the capacity of vehicles during both the Ebola epidemic and the current COVID-19 pandemic (T-SUM, 2020a).

Although non-motorised mobility in a compact urban environment could be the basis of inclusive and sustainable accessibility in the city, currently this layer is the most vulnerable group on the streets of Freetown because street infrastructures do not secure equal shares between the different modes of transport.

Walking is not a preference, especially in informal settlements of Freetown where the conditions make it often the only travel choice. Based on a research by Oviedo, Okyere, et al. (2020) 86% of the Moyiba community would not walk if they had other options. Furthermore, women were reported to walk more frequently than men due to their household duties and more local activities. In Moyiba, people walk up to 40 minutes inside the community to engage in economic activities (see Figure 8 for facilities and pathways). Their research shows that half of the respondents use the same routes to-and-from social and economic engagements, routes may be altered in case of a change in physical condition, risks, crime events. It was also indicated that people pay more attention to their surroundings when they walk on unknown routes, and nobody tends to walk night-time because of safety reasons.

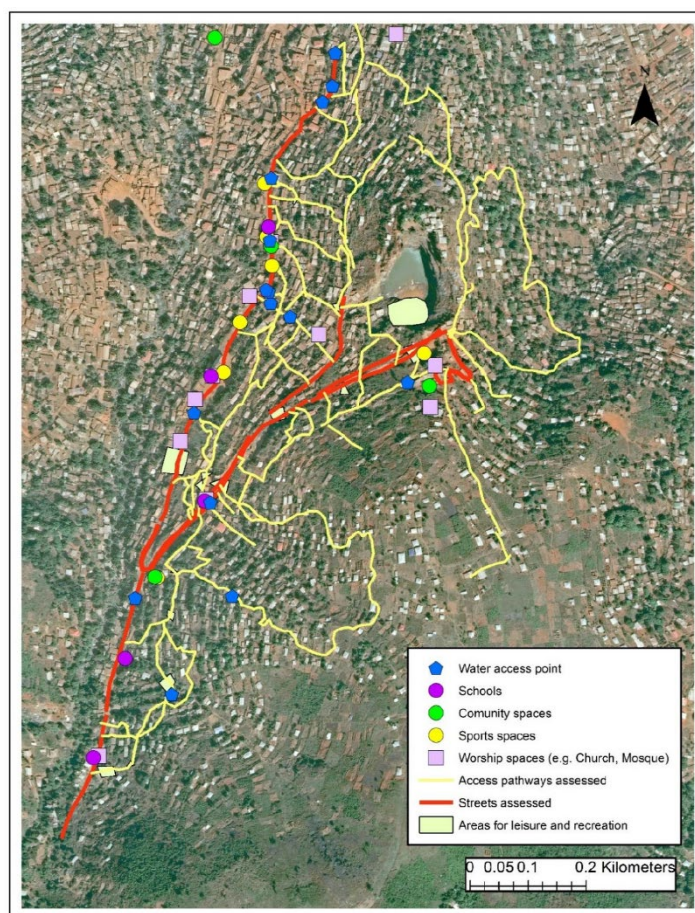


Figure 8 Facility distribution, streets and pathways in Moyiba. Source: (Oviedo, Okyere, et al., 2020)

Walking has an essential role in Freetown's mobility, yet the city lacks a developed pedestrian infrastructure to support it. Walking and paratransit services play an essential role in accessibility and have high potentials in proposing an alternative implementation of sustainable mobility.

#### e. Infrastructures with effect on mobility

Road infrastructure in Freetown is not ready to serve the amount of traffic that the city has. Only 5% of land is covered by roads (recommended 30%) and not even these are in adequate condition (Oviedo, Cavoli, et al., 2020). The current situation of roads highly contributes to the unsafe transport environment; many areas have only dirt roads, where paved roads exist, those generally have no lanes nor pedestrian sidewalks. Road users of different modes of transport share the same undivided space, which leaves non-motorised travellers extremely vulnerable. Narrow, unpaved roads lead women, for example, to various hazards (Oviedo, Cavoli, et al., 2020). Roads do not have signs nor traffic lights, which would formally regulate the heavy daily traffic. The western part of Freetown operates traffic police to assist busy road crossings, but in the eastern part where extreme congestions happen in rush hours, commuters try to deal with the problem as they can, with no help from the authorities in controlling the heavy traffic (Y. Yusuf, personal communication, April 23, 2020). Low-income

neighbourhoods (such as Dwarzark) were only able to settle in informal communities situated on bordering hillsides due to the rapid growth; they lack infrastructure developed by the government. The location of neighbourhoods, the lack of local transport and proper infrastructures make these residents' daily commute nearly impossible in their economic situation. These neighbourhoods are exposed to major risks of floods, and heavy rains wash significant parts of such neighbourhoods away. Most flooding originates from the lack of waste and drainage management in hillside neighbourhoods. Residential waste is not collected in these areas, and waste frequently blocks the trenches made to steer drainage. The accumulated water usually streams down from the hillside and blocks the underdeveloped roads which become inaccessible both for vehicles and pedestrians (Froment et al., 2020; SLURC & DPU-ESD, 2019; The World Bank, 2017). Flooding is a frequent issue that needs to be solved because it generates serious problems which burden transport. It is impossible to navigate through the city during rainy season, and this influences the frequency of services and results in acute price variation. During floods, entire neighbourhoods remain separated from the rest of the city, which prevents communities from accessing goods, jobs or services (ITDP, 2018; The World Bank, 2017).

The current road infrastructure does not only present a problem in (not) connecting these low-income areas with the rest of the city, but the lack of proper roads inside the neighbourhoods, even in the CBD, prevents firefighting vehicles from accessing multiple building units. This disadvantageous urban structure made it impossible to stop fire from spreading in many parts of the city in 2017 (IYECC, 2017). Due to the rapid growth, the physical infrastructure could not keep pace and has become inadequate and insufficient, which causes environmental degradation. Freetown introduced an Infrastructure Structure Plan in 1997, which is important to mention; however, it has never been implemented. (Lynch et al., 2020)

According to Oviedo, Cavoli, et al. (2020), three main routes of paved roads are identified (Figure 9): 1. along the western coast towards Aberdeen; 2. through the centre of the peninsula; and 3. along the eastern coast of the peninsula.

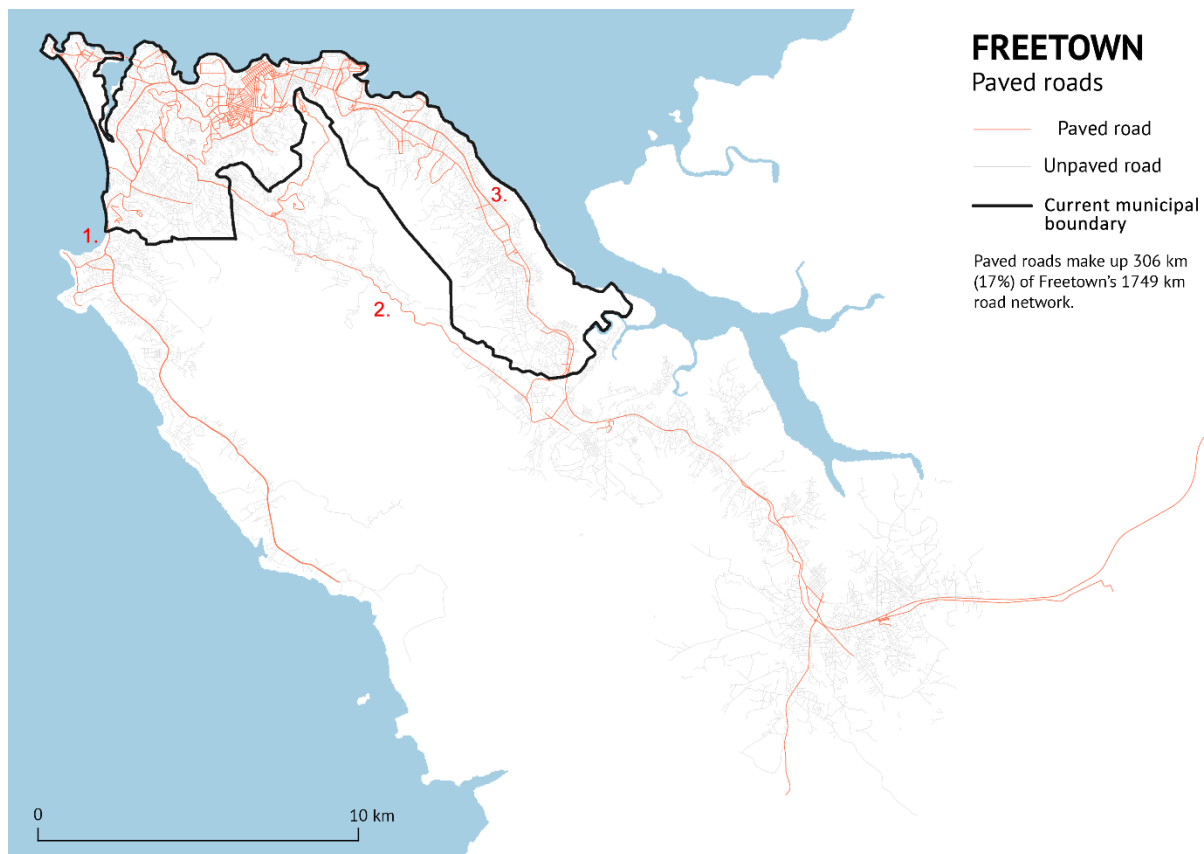


Figure 9 The three paved roads and the current municipality boundary of Freetown. Source: Own elaboration based on (Lynch et al., 2020; Oviedo, Cavoli, et al., 2020)

Informal settlements have inferior road networks from which the ones on the hillside are especially disadvantageous because of their topography. They only have an artery dirt-road that connects hillside settlements with the rest of the city, and the rest of the neighbourhood is only possible to be reached via footpaths. The topography, the economic situation of dwellers and the inaccessible roads for collective transport make these settlements the most inaccessible areas in Freetown (Oviedo, Okyere, et al., 2020). As a consequence, residents of these neighbourhoods mostly stay in their community which they access through footpaths. Vehicular inaccessibility (any form of transport included) largely limits people in accessing emergency services in these most vulnerable settlements.

Before developing any real mass transit system to connect parts of Freetown in a systematic network, the city needs to provide the necessary infrastructure development in order to be able to run and feed such a system.

#### f. Power-relations of stakeholders and the authorities

Authorities enacted the Local Government Act in 2004 to re-establish local councils and require them to implement individual development plans. Even though there was a great effort put on decentralisation, the EU recognised the need for formal support for planning and helped to revise urban planning laws a few years later. Freetown lacked the professional capacity of urban

management and legal provision. The city had only two local town planners in 2014 (Lynch et al., 2020). The challenging reality is unchanged in the capital. Although Sierra Leone implemented adequate laws and has established urban management, in reality, Freetown still does not have the capacity to adopt legal provision and cope with infrastructure needs (EU, 2019). Same goes for managing Freetown's overall development to achieve sustainable urbanisation (GoSL, 2015). In January 2019, the new Mayor, Yvonne Aki-Sawyerr OBE started the Transform Freetown initiation which addressed the challenges of urban mobility in two targets by 2022: to reduce congestion, and increase public awareness of traffic and road safety (FCC, 2019).

Currently, multiple Institutes cooperate to eliminate the lack of professionals within authorities, such as SLURC, UCL, Sierra Leone Institute of Engineer; and T-SUM has been organising workshops with the authorities, partners and about 50 stakeholders, also representatives across sectors (T-SUM, 2020b) to investigate and analyse the needs for the transition to sustainable mobility in Freetown.

Such a partnership across all stakeholders is essential in order to develop a long term and well-coordinated vision. The transition is scheduled in two phases, the periods between 2020-2030 and 2030-2040 (T-SUM, 2020c), which will require a long-term engagement of the governing parties and stakeholders. Both authorities and communities tend to strive for improving Freetown. According to a focus group of South Ridge, the government is expected to ensure a higher provision of infrastructure and transport services, and to support the community technically and financially to improve infrastructure (Oviedo, Cavoli, et al., 2020).

#### 5.4 Temporalities of accessibility

The temporal component of accessibility tends to rely on different conditions, change of surroundings and individuals accessing services. In the morning peak-hours, there are multiple options offered for a ride by paratransit operators and congestion happens on the main trunk roads and in the city centre. Female traders start their long journey the earliest (Oviedo, Cavoli, et al., 2020). Paratransit operators disappear off-peak, due to limited opportunities for transport. All operators tend to work acutely in peak-hours (Venter et al., 2019). Women are greatly affected by this fact in their shopping and other daily activities. The ability of students to access schools depends on walkability as most of them cannot have money for transport, so education is greatly affected by the distance to schools, rainy season, and potential risks on the way. There are higher restrictions on going out during night-time because of the higher risk of crime perceived, which is even more accentuated in the weekends (Oviedo, Cavoli, et al., 2020). Walking at night-time inside the community in hillside settlements is marked highly unwanted (Oviedo, Okyere, et al., 2020), which can be explained by the difficulty of walking on unreliable walking routes in the dark. Furthermore, strong differences were found in mobility during



dry and rainy season. Heavy rainfalls result in higher paratransit fees, more accidents and total immobility in many areas of the city (Oviedo, Cavoli, et al., 2020). People tend to change habits during rainy season. They walk less and divert routes. If the rain washed their route away, they must save money for shopping as goods and transport are more expensive. They rarely travel under these conditions, resulting in transporting larger packages on their return journey (Oviedo, Okyere, et al., 2020).

### 5.5 Individual accessibility in Freetown

Individuals from low-income neighbourhoods - whose only choice for mobility is unrouted paratransit - must negotiate the price for their trips, as paratransit operators do not utilise fixed prices. Negotiation can cause issues to women, since their role is to buy groceries for the family, yet they also make up most of the market sellers working there part-time. The distant informal settlements maintain most markets and in order to reach them, women are exposed to long journeys with increased risks. Not everyone can afford to pay a higher cost for transport, and in this unequal price negotiation, vulnerable groups end up with higher prices. Women are especially affected by these disadvantageous mobility factors; they regularly travel in off-peak hours when paratransit operators are harder to find, and they ask for a higher price then. Due to cultural characteristics, women do not have the same chances in price negotiation as male commuters. In general, men tend to reach a more beneficiary price agreement for the same journey (Cervero & Golub, 2007; ITDP, 2018; Oviedo, Cavoli, et al., 2020). Many women are unable to allocate enough money for transport and are required to walk to the market, if there is one in a reachable distance. It should also be noted that these trips can be extremely dangerous. Further, many families cannot provide their children with money to pay for paratransit options either, which are often the only mode of transport to their distant school locations. The elderly are in the same situation, they are not able to access the rest of the city due to lack of income. Other family members have more significant need for the low amount of daily household income, such as buying food or going to work. Therefore, walking has an essential role in Freetown's mobility; however, the city lacks a developed pedestrian infrastructure to support it. Walking and paratransit services have high potential in proposing an alternative implementation of sustainable mobility.

## 6. Reflection on findings

Findings show that accessibility is challenging to be framed in the Global South, as local context will always influence it. The case study shows that unsustainability in transport derives from the lack of local access to services and facilities, the lack of transport coordination, and a holistic sustainability approach. Freetown has an underdeveloped infrastructure with huge poverty and density with no provisional land-use. The lack of planning results in significant location-based inequalities in several city-parts outside the centre, which are almost entirely disconnected from basic access to opportunities. The spatially distributed, advantageous socio-economic situation of the residents can be linked with their greater access to opportunities. (Oviedo, Cavoli, et al., 2020) Transport operators cluster around densely situated services, where infrastructure is better, and the city is more accessible. This leaves the rest of the city inaccessible to those most vulnerable. This urban fabric does not fulfil the 'right to the city' theory (Lefebvre, 1996). The need to travel long distances, the lack of infrastructure, the uncoordinated and ineffective transport system result in congestion, long travel time and multiple risks of hazards. The socio-economic inequality that is revealed in the price negotiation, the location-dependent access and price of transport services, also traffic- and environment-related exposures make the most vulnerable groups the least mobile. Freetown needs a multimodal accessibility that provides equal access to vulnerable groups.

The trajectory of accessibility will be determined by the current practices of mobility. Freetown has multiple transport modes to provide access to opportunities. However, these modes do not provide an accessible urban environment, especially that walking is the most popular mode of mobility. Freetown needs to improve accessibility by building on the strengths of the instruments already in practice. City developers need to focus on outweighing the weaknesses of these instruments to improve accessibility with the least change in the urban environment. Authorities should play an essential role in controlling and implementing the right measurements in infrastructure, in transport services reform, and in land-use to nourish a sustainable accessibility. A sustainably accessible urban form would consist of:

- a. mixed land-use with locally accessed social, economic and other types of opportunities which foster non-motorised mobility,
- b. planned infrastructure, which always provides safe and equal access to all modes of transport,
- c. coordinated formalised transport network that supplies a city-wide accessibility and prevents congestion.

During the case study, the disadvantages of paratransit services were pointed out; however, these services cover much of the access provided for staying mobile in the city. Improving accessibility

should certainly happen by involving these actors in paratransit and building on their strengths. The advantages of paratransit services are flexibility and adaptability to change, such as routes, schedule or assisting the impaired and disadvantaged passengers, which can positively contribute to such a trajectory in a rapidly growing and changing city. At the same time, it is necessary to mitigate their weaknesses by formalising, coordinating their operation to integrate them into a city-wide accessible and just transport network. There is no one way to 'upgrade' paratransit services in the Global South context, we need to improve them by tailoring them to the local context. In order to create equal access to opportunities, it is strongly needed to focus on areas where vulnerable groups live, and to develop infrastructure in those areas, too. Developing infrastructure will not only mitigate the effects of seasonality on mobility but will also provide improved living conditions and decrease the risk of environmental hazards such as landslides and floods.

Research shows that transition to sustainable urban mobility must happen by meeting the needs of the urban community. Moreover, it should happen by integrating a city-wide accessibility into future transport and mobility. Looking at accessibility can point out the mishaps of the city structure and its current practices. An accessibility approach can show what to change, how to improve the city, which would eventually improve mobility. Improving accessibility by applying a holistic approach in Freetown has the potential to help transition to sustainable urban mobility based on the current practices. Such an approach will result in a feasible trajectory for the transition improving land-use and implementing a decentralised planning policy, which will result in wider access to opportunities locally, thus reducing residents' dependency on transport. On the other hand, improving current transport practices will not only provide a safer, more reliable and effective transport in Freetown but it would involve current stakeholders, too. Non-motorised mobility is a common mode of accessing opportunities in Sub-Saharan Africa; however, it makes its users highly vulnerable to multiple risks. The essential role of non-motorised mobility should be nourished by an infrastructure that provides equal share for pedestrians and potential cyclers, and creates a protective environment for its users. Such infrastructure will improve sustainable mobility through the lens of accessibility, a.k.a. 'sustainable accessibility'.

## 7. Conclusions

Planning in an urban context has a multidimensional nature which must be considered especially in transport and mobility development. The transport system of a city provides the basic links in an urban environment, influencing every aspect of life. Urban mobility must be looked at in a context which considers environmental quality, social equity, well-being and economic development at the same time, and the ability to access the city-offered opportunities. As the level of accessibility strongly influences mobility, I hypothesised to look at the trajectory of achieving sustainable urban mobility through the lens of accessibility. The concern of this approach is even more elevated in Africa because of its challenges of mobility and accessibility, and the projected urban population growth to over 1.2 billion people by 2050. Sustainable mobility approach is specifically important in such a projected urban growth as reproducing a car-centric city-model would have catastrophic consequences to the environment and to the future urban life in Africa.

Lack of accessibility is a serious issue in African cities and in the Global South in general. Moreover, there is an urgent demand for reframing accessibility in this context, as accessibility literature has been almost exclusively produced in the Global North context. The origin of resources is an essential concern; and this dissertation demonstrated the importance of understanding residents' needs and influencing factors in the local context. Sub-Saharan African cities' accessibility needs can be identified based on the case study. Accessibility concerns must be reframed to the Global South with foci on: improving local access to services and facilities; urban transport system should have a holistic sustainability approach which also provides a city-wide access to all; improving city infrastructures with distinguished attention to most vulnerable areas; providing an equal and safe multimodal accessibility; and having a controlled land-use provision with particular attention on densification and urban sprawl.

My second objective was to understand the current trajectory of accessibility in Freetown, for which it was necessary to know the city structure and the current practices which provide current access to economic, social opportunities, also health- and educational facilities. The importance of paratransit and walking was highlighted, among other practices. These modes are the primary means of accessibility, and could serve as a basis to create sustainable accessibility. Based on the research, it is crucial to provide a better land-use which reduces the need for long journeys, establishes local access to services and facilities by a more compact urban structure. The building on these current practices and complementing them with the above-mentioned land-use policies can achieve an advantageous trajectory. This form of trajectory can prevent collective transport dependency of residents in case of a crisis (such as EVD or COVID). Further, introducing a cycling infrastructure could result in independent wider-city access for many vulnerable groups. However, it was discovered that

Freetown needs major infrastructure developments for securing multimodal accessibility. Authorities must have a major role in controlling and implementing the right measurements, both on policy level and in practice. Authorities of Freetown have not had the financial and professional capacity to control land-use and infrastructure development. African cities should start with building capacity on the government level to be able to control a long-term city vision adequately.

Accessibility's role in achieving sustainable transport was also recognised by the SDGs. My research analysis of secondary data pointed out the urgency to solve accessibility needs in Freetown (also in other African cities) in order to reduce the need to travel long distances, to improve overall mobility and travel safety, and to reduce congestion. Regarding my final research objective, most unsustainable urban practices derive from the accessibility issues present in Freetown. Addressing these issues of accessibility will solve initial concerns of sustainable urban mobility. A transition to sustainable urban mobility must focus on community needs and preferences. The transition should focus on improving the accessibility of residents, otherwise it cannot succeed, and change will not happen. Accessibility approach shows what the city needs and what instruments will be effective in the future. A transition to sustainable urban mobility in African cities should be accomplished through the lens of accessibility focusing on the local context and prioritising vulnerable groups by providing a feasible and sustainable accessibility.

## Bibliography

- Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy*.  
<https://doi.org/10.1016/j.tranpol.2007.10.005>
- Beard, V., Mahendra, A., & Westphal, M. (2016). Towards a more equal city: Framing the challenges and opportunities. *GROWTH*.
- Behrens, R., Diaz-Olvera, L., Plat, D., & Pochet, P. (2004). Meta-Analysis of Travel of the Poor in West and Southern African Cities. *10th World Conference on Transport Research, Istanbul, 4-8 July 2004*.
- Benevenuto, R., & Caulfield, B. (2019). Poverty and transport in the global south: An overview. *Transport Policy*. <https://doi.org/10.1016/j.tranpol.2019.04.018>
- Bertolini, L., & le Clercq, F. (2003). Urban development without more mobility by car? Lessons from Amsterdam, a multimodal urban region. *Environment and Planning A*.  
<https://doi.org/10.1068/a3592>
- Brar, P. (2019). *Sierra Leone: Improving ferry transport to Freetown*. YouTube.  
<https://www.youtube.com/watch?v=CCHC2hIV9C8&t=3s>
- Cervero, R. (2004). Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects. In *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*. <https://doi.org/10.17226/23360>
- Cervero, R., & Golub, A. (2007). Informal transport: A global perspective. *Transport Policy*.  
<https://doi.org/10.1016/j.tranpol.2007.04.011>
- Cervero, R., & Sullivan, C. (2011). Green TODs: Marrying transit-oriented development and green urbanism. *International Journal of Sustainable Development and World Ecology*.  
<https://doi.org/10.1080/13504509.2011.570801>
- Church, A., Frost, M., & Sullivan, K. (2000). Transport and social exclusion in London. *Transport Policy*. [https://doi.org/10.1016/S0967-070X\(00\)00024-X](https://doi.org/10.1016/S0967-070X(00)00024-X)
- Cresswell, J. W., & Plano Clark, V. L. (2011). Designing and conducting mixed methods research. 2nd edn Sage Publications Inc. *Thousand Oaks, CA*.
- Curtis, C., Renne, J. L., & Bertolini, L. (2009). Transit oriented development: Making it Happen. In *Transit Oriented Development: Making it Happen*.
- Daly, H. E. (2006). Sustainable development-definitions, principles, policies. In *The Future of Sustainability*. [https://doi.org/10.1007/1-4020-4908-0\\_2](https://doi.org/10.1007/1-4020-4908-0_2)
- Dittmar, H. (1995). A broader context for transportation planning: Not just an end in itself. *Journal of the American Planning Association*. <https://doi.org/10.1080/01944369508975615>
- DPU. (2019). *Colbot 2019*. Youtube. <https://www.youtube.com/watch?v=s-6uIAVUo30&t=45s>
- ECMT. (2001). *Implementing Sustainable Urban Travel Policies*.
- ECMT. (2007). Cutting transport CO2 emissions: What Progress? In *Cutting Transport CO2 Emissions: What Progress?* <https://doi.org/10.1787/9789282123782-en>
- EU. (2019). *The Freetown Development Plan*.  
[http://eeas.europa.eu/%0Adelegations/sierra\\_leone/eu\\_sierra\\_leone/tech\\_financial\\_cooperation/infrastructure/%0Athe\\_freetown\\_development\\_plan/index\\_en.htm](http://eeas.europa.eu/%0Adelegations/sierra_leone/eu_sierra_leone/tech_financial_cooperation/infrastructure/%0Athe_freetown_development_plan/index_en.htm).

- FCC. (2014). *URBAN PLANNING PROJECT 2011-2014 Freetown City Council A Spatial Development Strategy for Sierra Leone* (Issue January). Freetown City Council, Coordination: Alphajoh Cham, MLCPE GOPA- CES Consultants & 3BMD Consulting Engineers, financed by European Union.
- FCC. (2019). *Transform Freetown: An Overview 2019-2022*.
- FCC. (2020). *Transport Freetown: One Year Report January 2019 - January 2020*.
- Ferreira, A., & Papa, E. (2020). Re-enacting the mobility versus accessibility debate: Moving towards collaborative synergies among experts. *Case Studies on Transport Policy*.  
<https://doi.org/10.1016/j.cstp.2020.04.006>
- Froment, E., Clifton, J., Masroor, S. M., Kwong, N., Rodríguez, N., Asvanon, R., Osmani, V., & Sánchez-Aizcorbe, V. (2020). *Driving Freetown Towards Enhanced Mobility: Emerging opportunities from health crises for improved access to livelihoods*.  
[https://www.ucl.ac.uk/bartlett/development/sites/bartlett/files/esd\\_mobility\\_report\\_final.pdf](https://www.ucl.ac.uk/bartlett/development/sites/bartlett/files/esd_mobility_report_final.pdf)
- Geurs, K. T., Boon, W., & Van Wee, B. (2009). Social impacts of transport: Literature review and the State of the practice of transport appraisal in the Netherlands and the United Kingdom. In *Transport Reviews*. <https://doi.org/10.1080/01441640802130490>
- Geurs, K. T., & van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: Review and research directions. *Journal of Transport Geography*.  
<https://doi.org/10.1016/j.jtrangeo.2003.10.005>
- Goodman, R., & Tolley, R. (2003). The decline of everyday walking in the UK: Explanations and policy implications. In *Sustainable Transport*. <https://doi.org/10.1016/B978-1-85573-614-6.50012-4>
- GoSL. (2015). *Habitat III National Report*.  
[https://www.slurc.org/uploads/1/0/9/7/109761391/final\\_draft\\_gosl\\_habitat\\_iii\\_report\\_jan2016\\_signed.pdf](https://www.slurc.org/uploads/1/0/9/7/109761391/final_draft_gosl_habitat_iii_report_jan2016_signed.pdf)
- Grazi, F., van den Bergh, J. C. J. M., & van Ommeren, J. N. (2008). An empirical analysis of urban form, transport, and global warming. *Energy Journal*. <https://doi.org/10.5547/ISSN0195-6574-EJ-Vol29-No4-5>
- Handy, S. L. (2002). Accessibility- vs. Mobility-Enhancing Strategies for Addressing Automobile Dependence in the U.S. *Institute of Transportation Studies*. <https://doi.org/10.1007/s11116-007-9132-x>
- Handy, S. L., & Niemeier, D. A. (1997). Measuring accessibility: an exploration of issues and alternatives. *Environment and Planning A*, 29(7), 1175–1194. <https://doi.org/10.1068/a291175>
- Hansen, W. G. (1959). How Accessibility Shapes Land Use. *Journal of the American Planning Association*. <https://doi.org/10.1080/01944365908978307>
- Heisley, D. D. (2001). Visual Research: Current Bias and Future Direction. *Advances in Consumer Research*.
- Iacono, M., Krizek, K. J., & El-Geneidy, A. (2010). Measuring non-motorized accessibility: issues, alternatives, and execution. *Journal of Transport Geography*.  
<https://doi.org/10.1016/j.jtrangeo.2009.02.002>
- ITDP. (2018). *Access For All: Policies for Inclusive TOD Access and Gender*.
- IYECC. (2017). *Home*. Facebook.  
[https://www.facebook.com/story.php?story\\_fbid=1038262116308750&id=763769877091310](https://www.facebook.com/story.php?story_fbid=1038262116308750&id=763769877091310)

- Kamara, E. (2017). *Getting around Freetown, Sierra Leone: Taxi, Okada, Keke, Poda Poda or Private Vehicle*. <https://www.visitsierraleone.org/getting-around-freetown-sierra-leone/>
- Kane, L. (2010). Sustainable transport indicators for Cape Town, South Africa: Advocacy, negotiation and partnership in transport planning practice. *Natural Resources Forum*. <https://doi.org/10.1111/j.1477-8947.2010.01313.x>
- Karner, A., London, J., Rowangould, D., & Manaugh, K. (2020). From Transportation Equity to Transportation Justice: Within, Through, and Beyond the State. *Journal of Planning Literature*. <https://doi.org/10.1177/0885412220927691>
- Lefebvre, H. (1996). The right to the city. *Writ. Cit.*, 6, 63–181.
- Levine, J. (2020). A century of evolution of the accessibility concept. *Transportation Research Part D: Transport and Environment*. <https://doi.org/10.1016/j.trd.2020.102309>
- Levitas, R., Pantazis, C., Fahmy, E., Gordon, D., Lloyd, E., & Patsios, D. (2007). *The multi-Analysis of social exclusion*.
- Litman, T. (2002). EVALUATING TRANSPORTATION EQUITY. *World Transport Policy & Practice*.
- Litman, T. (2003). Social Inclusion As A Transport Planning Issue in Canada. *Transport Policy*.
- Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy*. <https://doi.org/10.1016/j.tranpol.2012.01.013>
- Lynch, K., Nel, E., & Binns, T. (2020). ‘Transforming Freetown’: Dilemmas of planning and development in a West African City. *Cities*. <https://doi.org/10.1016/j.cities.2020.102694>
- Macarthy, J. M., Conteh, A., Sellu, S. A., & Doughty, T. (2018). *The State of healthcare access in Freetown’s informal settlements*.
- Marsden, G., & Rye, T. (2010). The governance of transport and climate change. *Journal of Transport Geography*. <https://doi.org/10.1016/j.jtrangeo.2009.09.014>
- Oviedo, D., Cavoli, C., Jones, P., Koroma, B., Macarthy, J., Sabogal, O., Levy, C., & Arroyo, F. (2020). ACCESSIBILITY AND SUSTAINABLE MOBILITY TRANSITIONS IN AFRICA: ANALYSIS OF FREETOWN, SIERRA LEONE. In *unpublished paper*.
- Oviedo, D., & Guzman, L. A. (2020). Revisiting accessibility in a context of sustainable transport: Capabilities and inequalities in Bogota. *Sustainability (Switzerland)*. <https://doi.org/10.3390/su12114464>
- Oviedo, D., Okyere, S. A., Nieto, M., Kusi, L. F., Yusuf, Y., & Koroma, B. (2020). *The social construction of walkability in informal settlements: practices, ingenuity and informality in Freetown*.
- Páez, A., Scott, D. M., & Morency, C. (2012). Measuring accessibility: Positive and normative implementations of various accessibility indicators. *Journal of Transport Geography*. <https://doi.org/10.1016/j.jtrangeo.2012.03.016>
- Page, M. (2005). “Non-Motorized Transportation Policy.” In D. A. (Ed. . Button, K.J. and Hensher (Ed.), *Handbook of Transport Strategy, Policy and Institutions ( Vol. 6)* (pp. 581–596). Emerald Group Publishing Limited.
- Pieterse, E., & Owens, K. (2018). Johannesburg : Confronting Spatial Inequality. *Case Study*.
- Porter, G. (2008). Transport planning in sub-Saharan Africa II: Putting gender into mobility and transport planning in Africa. *Progress in Development Studies*. <https://doi.org/10.1177/146499340800800306>

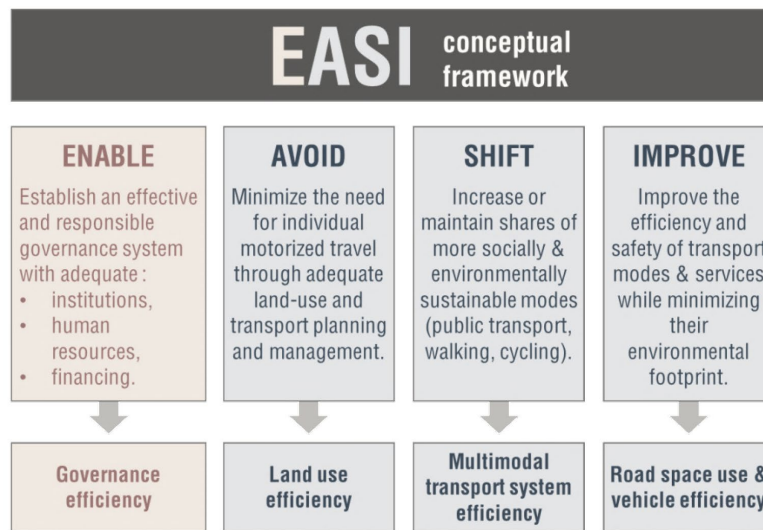


- Republic of South Africa National Environmental Management Act, South African Government Gazette (1998).
- Schipper, F., Emanuel, M., & Oldenziel, R. (2020). Sustainable Urban mobility in the present, past, and future. *Technology and Culture*. <https://doi.org/10.1353/tech.2020.0004>
- Schwanen, T. (2020). Low-Carbon Mobility in London: A Just Transition? *One Earth*. <https://doi.org/10.1016/j.oneear.2020.01.013>
- SLURC, & DPU-ESD. (2019). *Dworzark*. YouTube. [https://www.youtube.com/watch?time\\_continue=104&v=6wzD-JqrvSg&feature=emb\\_title](https://www.youtube.com/watch?time_continue=104&v=6wzD-JqrvSg&feature=emb_title)
- SSL, (Statistics Sierra Leone). (2016). *Statistics Sierra Leone 2015 Population and Housing Census Summary of Final Results*. 1–190. <http://www.statistics.sl>
- SSL, (Statistics Sierra Leone). (2017). *Sierra Leone 2015 Housing and Population Census: National Analytical Report*. Thematic Report on POPULATION STRUCTURE AND POPULATION DISTRIBUTION.
- Stucki, M. (2015). *Policies for Sustainable Accessibility and Mobility in Urban Areas of Africa*.
- T-SUM. (2020a). *Policy Brief - SIERRA LEONE : Urban Mobility, Accessibility & COVID 19*. [https://ad5b5332-e62d-4e9c-8935-0f9b558d7475.filesusr.com/ugd/b4aba8\\_deabf51f28f94b3693e01d81e2d71524.pdf](https://ad5b5332-e62d-4e9c-8935-0f9b558d7475.filesusr.com/ugd/b4aba8_deabf51f28f94b3693e01d81e2d71524.pdf)
- T-SUM. (2020b). *Strategic vision for sustainable urban transport and mobility in Sierra Leone - Practical implementation constrains and opportunities - Lessons and insights from Freetown*.
- T-SUM. (2020c). *Strategic vision for sustainable urban transport and mobility in Sierra Leone Lessons and insights from Freetown*.
- The World Bank. (2017). Sierra Leone Rapid Damage and Loss Assessment of August 14th, 2017 Landslides and Floods in the Western Area. In *Sierra Leone Rapid Damage and Loss Assessment of August 14th, 2017 Landslides and Floods in the Western Area*. The World Bank. <https://doi.org/10.1596/28836>
- United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. United Nations Sustainable knowledge platform. *Sustainable Development Goals*. <https://doi.org/https://sustainabledevelopment.un.org/post2015/transformingourworld>
- Vecchio, G., Tiznado-Aitken, I., & Hurtubia, R. (2020). Transport and equity in Latin America: a critical review of socially oriented accessibility assessments\*. *Transport Reviews*. <https://doi.org/10.1080/01441647.2020.1711828>
- Venter, C., Mahendra, A., & Hidalgo, D. (2019). From Mobility to Access for All: Expanding Urban Transportation Choices in the Global South. *World Resource Report*.
- Verlinghieri, E., & Schwanen, T. (2020). Transport and mobility justice: Evolving discussions. *Journal of Transport Geography*. <https://doi.org/10.1016/j.jtrangeo.2020.102798>
- Whitelegg, J., & Haq, G. (2003). The global transport problem: Same issues but a different place. In E. J. Whitelegg and G. Haq (Ed.), *The Earthscan Reader on World Transport Policy and Practice* (pp. 3–25). Earthscan.
- WHO. (2018). Global Status Report on Road Safety 2018: Summary. In *Geneva: World Health Organization; 2018 (WHO/NMH/NVI/18.20)*. Licence: CC BY-NC-SA 3.0 IGO).
- Zhao, P., Chapman, R., Randal, E., & Howden-Chapman, P. (2013). Understanding resilient urban

futures: A systemic modelling approach. *Sustainability (Switzerland)*.  
<https://doi.org/10.3390/su5073202>

## Appendices

### Appendix 1:



Appendix 1 EASI conceptual framework towards sustainable accessibility and mobility in Africa. Source: (Stucki, 2015)

# Strategic vision for sustainable urban transport and mobility in Sierra Leone

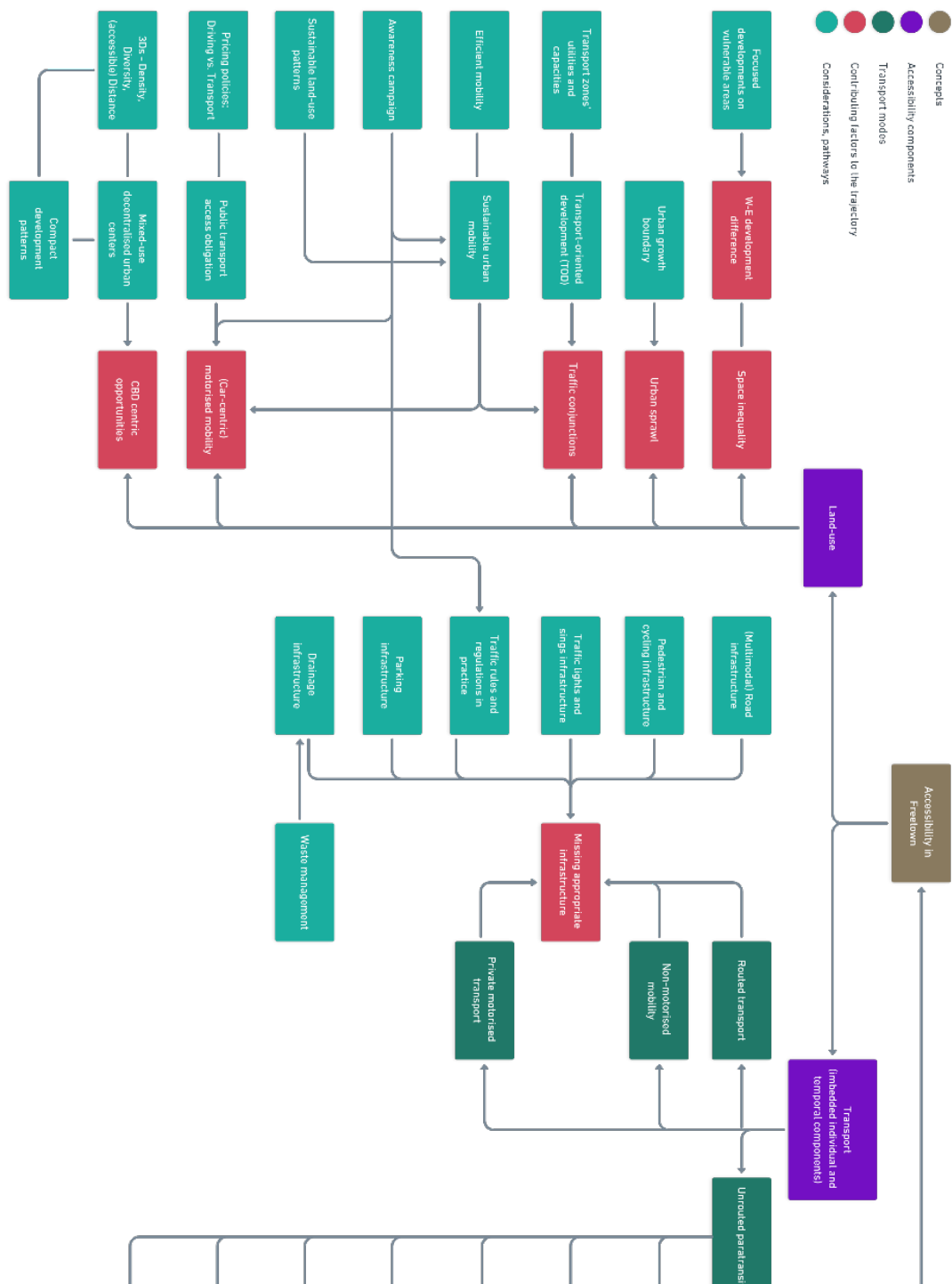
## Timeline of policy priorities

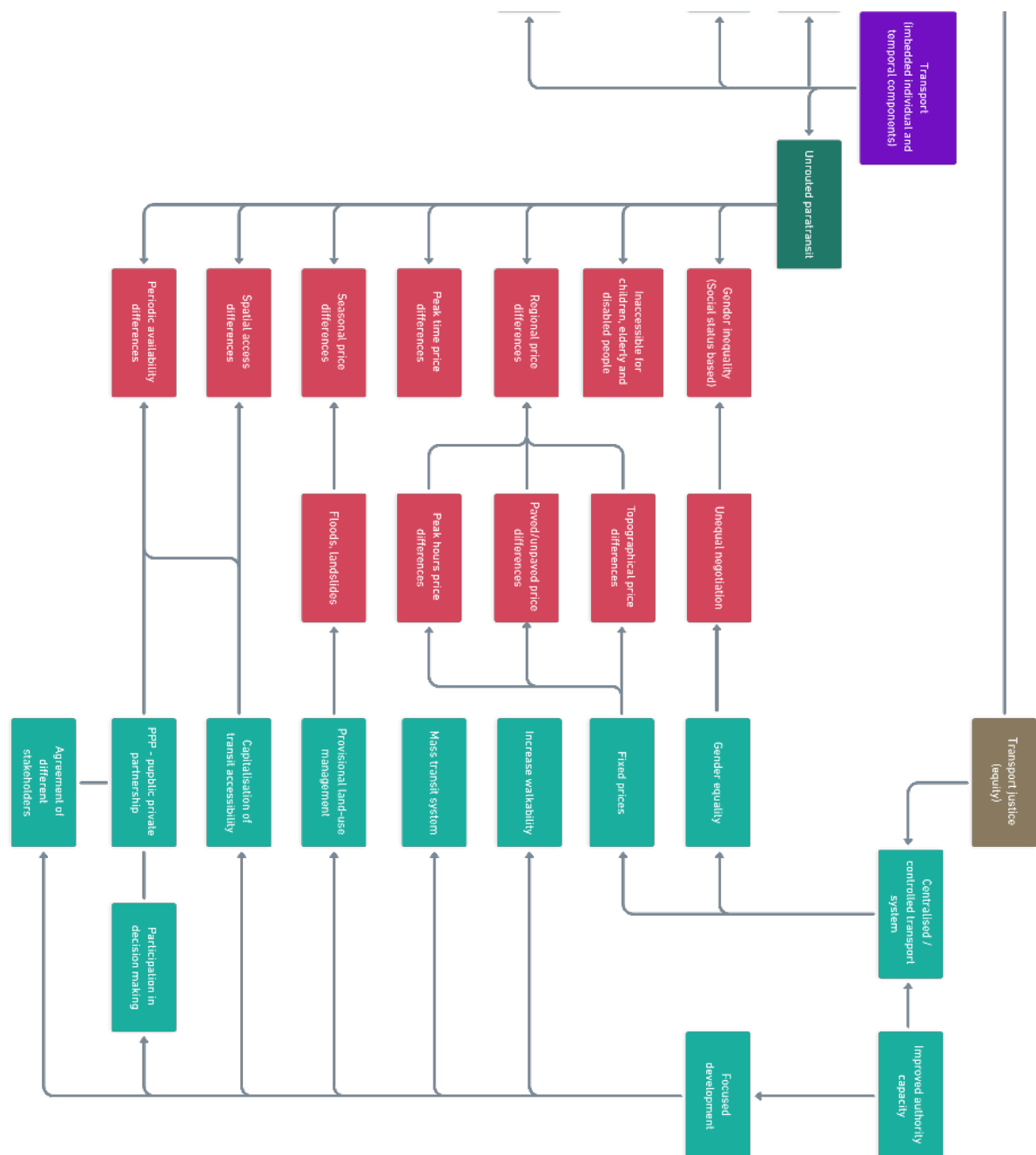


Appendix 2:

Appendix 2 Strategic vision: Priorities of policy implementations. Source: (T-SUM; forthcoming publication)

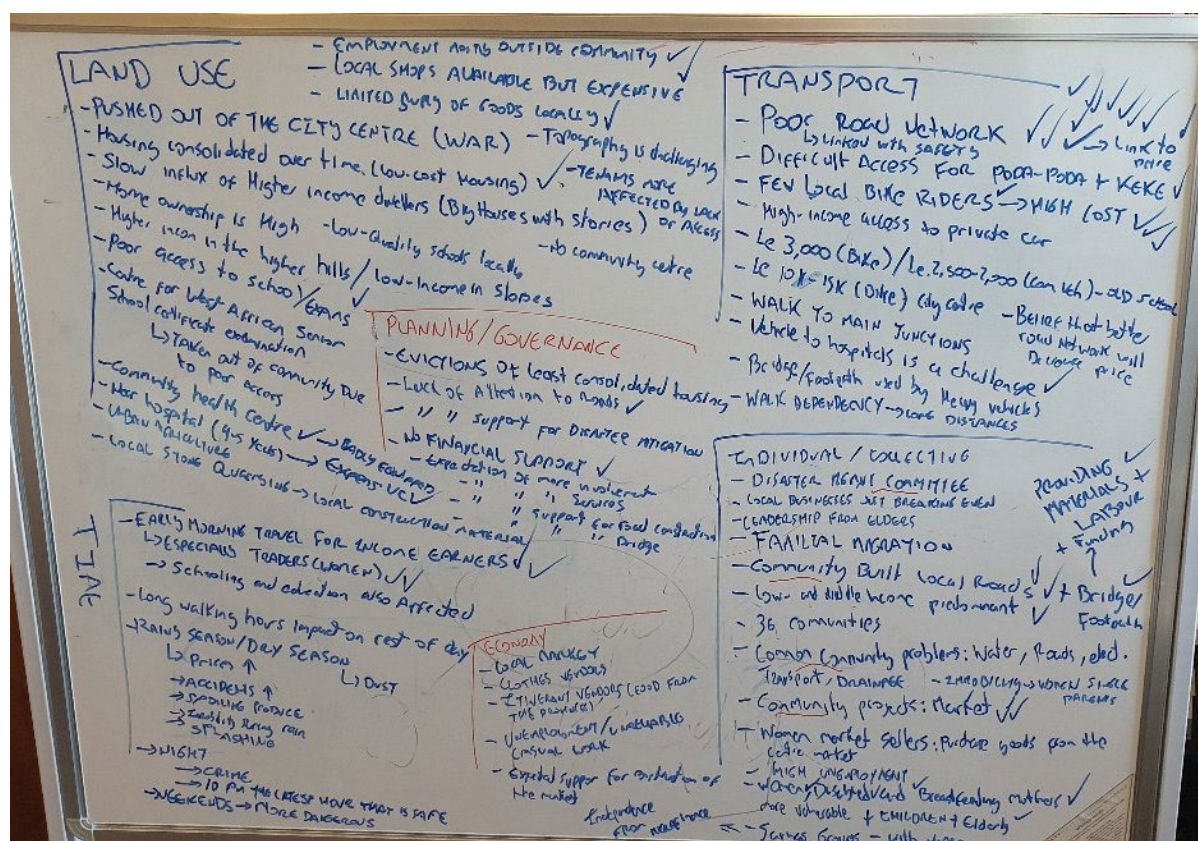
### Appendix 3:





Appendix 3 Accessibility links of factors and considerations in Freetown. Sources: Own elaboration based on (Oviedo, Cavoli, et al., 2020; Y. Yusuf, personal communication, April 23, 2020)

## Appendix 4:



Appendix 4 Whiteboard from T-SUM meeting in Freetown, March 2020. Source: (T-SUM database (2020). Whiteboard image from T-SUM Workshop 3 on March 4, 2020. Retrieved from T-SUM database, 22.08.2020.)

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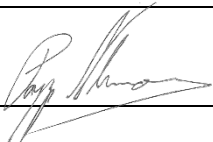
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