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A Historical Account of Walking in Nairobi Within the Context of Spatial Justice

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Abstract

In the ostensibly unceasing prioritization of motorized infrastructure, walking has remained a ubiquitous mode of mobility for a large proportion of Nairobi's urban commuters. Planning for motorized mobility has historically been at a higher level of consideration although a much larger percentage of the population travels on foot. The conspicuous pedestrian has been and continues to be masked under the spotlight of the motor vehicle with a discernible outcome of spatial injustices. Using secondary data, historical literature and expert interviews, this paper examines how walking as a mode of mobility has developed over time and the challenges experienced by pedestrians in Nairobi. Linking to the notion of justice, the paper attempts to assess the association between walking and spatial justice using three dimensions—spatial, modal and individual dimensions—that are used as a framework to assess how injustices unfold and are experienced by Nairobi's pedestrians. The historical path dependency that has restricted and attempted to replace walkability by prioritizing motor vehicle use as well as the technical engineering design that lacks integration of social aspects of mobility has presented challenges in provision of safe non-motorized infrastructure in the contemporary urban travel in Nairobi, enduringly dismissing walking as a valid mode of mobility. Advancing spatial justice in Nairobi's urban mobility will require more than a technical process of extending the side of the road by a metre or two but rather deliberate effort in understanding the pedestrians' mobility needs that can best be understood by attuning to the everyday realities of travelling on foot.

Keywords Pedestrian · Walking · Justice · Infrastructure · History

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Introduction

Advocacy for use of active mobility using terms such as the 'fifteen-minute city' has drawn attention to the use of sustainable means of mobility through transit-oriented development (Ibraeva et al., 2020; Pozoukidou & Chatziyiannaki, 2021). This principally involves increasing the number of opportunities or services that can be reached in a short period—preferably through walking or cycling—and planning cities around ease of reach to public transport. The ASI (Avoid-Shift-Improve) framework (Dalkmann & Brannigan, 2007), a strategy for promoting sustainable mobility, emphasizes the reduced desire to travel in order to achieve zero carbon emissions and where travelling is necessary, shifting to more environmentally friendly modes of mobility and improving the vehicle technology for energy-efficient motorized modes. The *Avoid* strategy advocates for strategic planning that endeavours to reduce or, as much as possible, hold off the need to travel using motorized transport by shortening the distances to places of necessity to encourage active travel, i.e. travelling on foot or cycling. Shifting towards more energy-efficient modes of public transport and improving efficiency through vehicle technology for individual motorized transport are specific strategies within the ASI framework that support sustainable urban mobility.

In many African cities, studies on non-motorized mobility have called attention to (a) the ubiquity of walking as a main mode of mobility for many urban dwellers in cities such as Cape Town, Nairobi and Dar es Salaam (Khayesi et al., 2010; Mitullah et.al., 2017; Salon & Gulyani, 2010; 2019; Salon & Aligula, 2012); (b) the challenges that pedestrians experience daily while travelling along urban roads (Nyamai & Schramm, 2022; Odhiambo, 2021); and (c) the legislative framework of non-motorized transport (NMT) (Odhiambo, 2019) as well as the positive impacts on climate change for promoting the use of non-motorized mobility (Cooke et al., 2019). Nearly 78% of people in Africa travel on foot every day according to an assessment by UNEP and UN-Habitat in a report on walking and cycling in Africa. Non-motorized mobility however constitutes the highest number of victims of road crashes mainly due to inadequate and unsafe infrastructure. Most of the roads fail to meet the acceptable spatial requirements to cater to the large volumes of foot traffic, and where the service for pedestrians is provided, it is often of poor quality, on the one hand, making walking unpleasant for those who are already accustomed to walking and, on the other, discouraging the uptake of walking as a mode of sustainable urban mobility (United Nations Environment Programme and United Nations Human Settlements Programme, 2022).

Walking is an ordinary and only mode of commute for nearly half of Nairobi's urban commuters. According to the 2014 Nairobi Integrated Urban Development Master Plan (County, 2014), over 40% of all daily trips that include going to work, going to school, shopping and travelling back home are made on foot and over long distances of more than 3 km. Across many poor settlements in Nairobi, walking is the main mode of mobility for over 65% of adults and over 96% of school-going children (Salon & Gulyani, 2019). Despite the overt immensity of

pedestrians throughout the city, infrastructure is bereft along many of the urban roads in Nairobi. Odhiambo, (2021) analysed the infrastructure provision on twelve of the corridors with high foot traffic and found that nearly all the corridors are characterized by a limited number of pedestrian crossings; narrow sidewalks that are inadequate for the high volumes of pedestrians; and along some busy corridors, divested sidewalks that force the pedestrians to share the road with the speedy motorists, posing a high risk to pedestrian safety.

Planning for motorized modes of mobility is often prioritized over non-motorized modes even though walking is the most used mode of mobility (Khayesi et al., 2010). According to the 2017 Nairobi Non-Motorized Transport Policy, less than 2% of the annual budget of road infrastructure is dedicated to non-motorized infrastructure. This imbalanced investment in motorized modes vis a vis non-motorized modes takes away the prioritization of walking infrastructure with resultant spatial injustices experienced by the pedestrians, evident in the number of road crashes where pedestrians are largely casualties. More than 60% of annual road crash victims in Nairobi between 2015 and 2019 constituted pedestrians as recorded by the National Transport and Safety Authority (NTSA) of Kenya, a statutory body that oversees road safety; motor vehicle registration and licencing; and the enhancement of traffic law. These high incidences of pedestrian fatalities are mainly due to inequalities of infrastructure provision where many streets lack safe and spatially adequate infrastructure to support the high volume of pedestrian flows. Unlike other means of mobility such as motorized vehicles that have safety belts or airbags to reduce the chances of fatal accidents, or helmets that provide a degree of safety for cyclists, walking is the only mode of mobility that relies on infrastructure for safety. The lack of provision of safe infrastructure in the design of urban roads, therefore, subjects the pedestrian to much higher risks and reflects the degree of spatial injustices exposed to the pedestrian relative to other road users.

This paper investigates walking from a historical perspective in order to understand the path dependencies that pose difficulties in addressing the present mobility needs of pedestrians in Nairobi. Using a framework of three dimensions that comprise the spatial, individual and modal dimensions, (see Nyamai & Schramm, 2022), the research investigates how spatial justice is understood and ascertained within the mode of walking. The spatial dimension focusses on the prioritization and provision of the necessary infrastructure to support travelling by foot. The modal dimension is concerned with walking as the main mode of mobility for accessibility to areas of opportunities and services. Since walking as an active mode of mobility does not engage the support of other tools for movement (e.g. motorized vehicles that rely on the car or cycling that relies on the bicycle), it is therefore closely linked to the individual dimension which is concerned with the pedestrian as the individual whose journey is actively made on foot. The individual dimension also considers the individual's socio-economic characteristics such as income, gender, age and physical capabilities *inter alia* particularly because walking in Nairobi is experienced differently across various income and social groups. For instance, it is a mode of mobility used mainly by the poor due to public transport affordability constraints while those in higher levels of income mainly consider walking as a leisure activity; walking is also experienced differently by women and men based on perceived

safety along certain streets, and people with disabilities and the elderly have trouble when walking in places where infrastructure is bereft. Tenably, the interaction of these dimensions advances the comprehension of how spatial injustices manifest in active mobility. Due to their independent complexities, it cannot be assumed that addressing each of the dimensions directly relates to obtaining spatial justice. This research postulates that understanding the interrelation of these dimensions underscores the emancipatory potential of advancing a more inclusive urban mobility system through the lens of spatial justice, especially in a southern city context.

By investigating the historical overview of walking as a common mode of daily travel in Nairobi, this paper aims to firstly underscore the enduring ubiquity of walking despite the constant prioritization and advancement of motorized modes over non-motorized ones and, secondly, to call attention to the need for prioritizing safe infrastructure for walking as a step towards a just mobility system in Nairobi. The paper traces the development of mobility in the city from the colonial history and its influence on contemporary urban mobility in Nairobi while building on two key points. Firstly, from both the individual and modal dimensions, the protracted neglect of walking as a mode that is common to a significant majority has manifested spatial injustices experienced mainly by pedestrians. Secondly, from a spatial dimension, the historical and contemporary development of Nairobi as a motor-centric city has infringed and restricted walking as a popular mode of mobility and contributed to the paucity of investment in adequate and safe non-motorized infrastructure.

This paper seeks to identify some of the ways in which investment in and allocation of non-motorized infrastructure in Nairobi can be related to epistemic view of justice. The paper then continues with a theoretical review of the link between mobility and justice by looking into the different notions of epistemic justice in an urban mobility context. The section that follows explains the methodology and data used in this research followed by an analysis of walking in Nairobi in three periods that broadly assess historical and contemporary development of urban mobility. The last section enunciates the events of the different periods of mobility development in Nairobi using the framework of the spatial, modal and individual dimensions and underscores the spatial injustices experienced by the pedestrians. The paper concludes with the understanding that walking has not only been the norm for many urban commuters in Nairobi both historically and in contemporary times but that other forms of mobility, especially motorized mobility modes, have rather infringed, restricted, altered and attempted to replace patterns of ever-existing flows of walking in Nairobi.

Mobility and Justice

Justice as fairness often places the less fortunate at the core of the discourse on the distribution of primary goods and resources to ascertain the benefit of the greater majority. This comprehension of social justice postulated by John Rawls in the 'difference principle' (Rawls, 1971: 75) advocates for securing the wellbeing of the less fortunate amidst the changing inequalities in society as a fair way of ensuring justice

for all. When invoked in the mobility discourse, justice relates to prioritizing the mobility needs of the less fortunate in society, more specifically, the poor and people with disabilities as they often have the most limited choice of mobility options due to affordability constraints and physical restraints (Pereira et al., 2017; Lee et al., 2017; Dong, 2018). Social justice is concerned with the fair distribution of goods that individuals require to advance their daily lives and the processes of fair distribution by institutions that are held accountable for fair outcomes (Moroni, 2020; Rawls, 1971; Soja, 2009). Closely linked to social justice is the notion of spatial justice that is related to the way social justice unfolds in space and across various domains. The geographical difference across cities produces a variation of the distribution of inherent resources and the processes of their distribution and, hence, the unfolding of spatial justice is heterogeneous (Soja, 2013). Space, however, not only contains resources that can be distributed but also consists of individuals whose actions and mobilities constantly modify the urban form (Nyamai & Schramm, 2022) and who make up the institutions and authorities that are mandated to ensure fair processes in the distribution of goods (Soja, 2009). The crosscutting understanding of both social and spatial justice is the fairness in distribution of resources, the shared benefits and burdens of accessing and utilizing the resources, the processes of resource distribution and the decorum of the institutions responsible for equitable outcomes (Harvey, 1973; Soja, 2013).

In a study of Walzer's sphere of justice, Karel Martens, (2012) highlights transport as a social good that is subject to distribution, recognizing the inescapable inequalities of access that emerge from the organization of space which inevitably creates a centre and periphery. The varied registers of meaning of what constitutes a social good produce different impacts on the distribution of transport as a good. This distributive element of transport can be related to the spatial dimension in this paper that emphasizes on equitable distribution of mobility infrastructure to support all modes of mobility but especially non-motorized modes as they are first of all sustainable and, second, mainly used by the less fortunate in the context of Nairobi. Transportation planning and policy that seeks to reduce the inequality between the transport disadvantaged and those that have multiple opportunities of accessibility represents a fair mobility system. The transport disadvantaged are categorized as those that often live in the periphery with reduced accessibility to opportunities and services in comparison to those living in proximity with more diverse opportunities and advantages of accessibility (Martens, 2012). In some cities such as Nairobi, the choice to live in suburban areas in the periphery for exclusivity distorts the spatial urban form of the city and effectuates access by use of motor vehicles. Given that rental costs are also more affordable for the low income in peripheral areas, those who cannot afford to purchase a private vehicle or can only intermittently bear the cost of public transport experience higher disadvantages of access to opportunities and services clustered in the core.

A nuanced perspective on the association of mobility and justice is the understanding of accessibility as a human capability (Pereira et al., 2017; Vecchio & Martens, 2021). Emerging from Amartya Sen's, (1999) 'capability approach', the discourse primarily advocates for recognition of diverse human capabilities and the freedom to be mobile in order to undertake activities that are essential for survival.

This understanding has been defended as an approach that considers the diversity of humanity in terms of (i) personal/physical features, e.g. the less abled whose capability for mobility is limited; (ii) choices, such as residential choice or choice of mobility option; and (iii) aspirations that affect the opportunities that individuals can access as well as their ability to be mobile in order to fulfil diverse wants and needs (Vecchio & Martens, 2021). An alternative but closely linked stance of the 'capability approach' in relation to transport by Randal et.al., (2020) introduces transport policy as a factor for social transformation that enables an individual to convert resources and opportunities into capabilities that benefit the individual's life. Policies can be perceived as an initial step towards just mobility systems as they provide operational guidelines for infrastructure provision and against which retributive action can be pursued in the event of injustice. The formulation of policies, however, is not an end in itself and requires enforcement. Poorly formulated policies can potentially evoke latent injustices, for instance, when policies acknowledge the need for an integrated transport system but prioritize and enforce infrastructure that encourages the use of motorized modes without consideration for non-motorized means. This directly relates to the modal dimension of this research whereby the ubiquity of walking tends to be masked under the spotlight of the motorized vehicle. It also reflects a degree of injustice through the risks and misfortunes that result from the high incidences of road crashes and health risks that pedestrians are exposed to relative to other commuters. Additionally, the systems of political management and the powerplay in controlling mobility in cities result in unequal capabilities for movement among city inhabitants (Sheller, 2018).

Notions of epistemic justice in relation to urban mobility are complex and multifaceted as they are not only defined by the organization of space but also the social, cultural and economic characteristics of individuals that determine their mobility and access to places of necessity. Injustices in urban mobility can however be recognized in different spatial forms whereby the design and layout of streets are consequential to the accessibility of different groups of people—those with disabilities or the aged population (Sheller, 2018)—and to the inclusion of different groups as streets are often spaces where cultures meet, information is shared, ideas exchanged, friendships formed (Kinyanjui, 2014) and also where income inequalities are made manifest (Kamau & Manga, 2020).

Bringing together these perspectives of justice in relation to urban mobility conveys the interpretation that the fair distribution of infrastructure and equity in investment that supports safe mobility for all in the city along with the prioritization of the mobilities of those with less capabilities and limited options of movement reflects how spatial justice in relation to mobility unfolds and is understood. By shifting the narrative to look not only at the distribution of infrastructure as a good but also at the risks and misfortunes shared among urban commuters in Nairobi, the paper contributes to a nuanced perspective of investigating justice in relation to urban mobility. Since mobility is not a good that can be distributed or redistributed (Nyamai & Schramm, 2022), the associated misfortunes that result from reduced accessibility to opportunities and the risks of fatalities in everyday travel relate to how mobility can be associated with justice. Put differently, when one mode of mobility becomes far riskier for a significant majority than any other mode, then tenably, injustices

become prevalent. Noteworthy, the association between spatial justice and mobility is intertwined with several elements that involve the influence of politics and external actors on the governance and management of infrastructure and the choices and preferences of individuals as well as the heterogeneity of space that rouses the complexities of justice in relation to mobility but, at the same time, implores constant cognizance of these complexities for advancement of fairness in the development of urban mobility systems.

Research on socially just public transport in the context of Kenya by the Socially Just Public Transport Working Group (SJPT-WG) developed five pillars for a socially just transport which include availability; safe and affordable access; inclusion; human rights and equity; and sustainability. Although the pillars directly address social justice in motorized public transport, the pillar on safety forms the central argument of this research as it emphasizes the need for pedestrian infrastructure that enhances safe mobility. In addition to this is the necessity for a supportive political system and a government that actively involves the users of the various mobility modes in its effort to provide a just mobility system (Kamau & Manga, 2020).

Data and Methodology

The intertwined association of the spatial, modal and individual dimensions that are used as a framework for analysing the link between urban mobility and spatial justice in this research produces overlapping outcomes. Since the research considers a historical perspective, the period of analysis is categorized in three parts for coherence and the ease of analysis using the framework of the dimensions. The first period, called the *early period*, refers to the colonial period between 1899 and Kenya's independence in 1963, and then, the period after independence to the year 2019 forms the second part of the research period referred to as the *recent past*. The third part, *contemporary development*, relates to the current infrastructural changes for non-motorized mobility that have taken place in Nairobi due to an unexpected temporary change in governance that led to changes in spatial infrastructure for non-motorized mobility. It also raises awareness on the design of urban roads and the existing standards that pose challenges in the socio-technical approach to road infrastructure projects.

Early Period

To analyse the spatial dimension, the research uses various data to investigate the infrastructure provision for walking from a historical perspective that dates to the colonial history of Nairobi. This applies diverse historical literatures that discuss the spatial development of Nairobi (Banyikwa, 1990; Kingoriah, 1987; Morgan, 1967; Mumford, 1961; Murunga, 2012; Ogot, 1963; Ogot & Ogot, 2020) including the review of the pre-existing Nairobi urban development plans of 1926 and 1948 to understand the foundations of urban growth and the projections of infrastructure

provision. Since infrastructure for walking in Nairobi is often designed to accompany road infrastructure, the review focusses on historical development of road infrastructure for motorized mobility to infer the development of infrastructure for non-motorized mobility.

The modal and the individual dimensions are closely interlinked as walking is a form of active mobility that completely engages the effort of the individual without the use of any vehicular machines. Investigating the history of walking as a main mode of mobility therefore also includes the study of the individual's characteristics that relate to gender and income (Kinyanjui, 2014; Mutongi, 2017). Walking has been a common mode of mobility for a larger number of the population both historically and in contemporary urban mobility but the design of mobility infrastructure that prioritizes motorized mobility has continued to persist despite the ubiquity of pedestrians in Nairobi. The review of both scientific literature and historical books about Nairobi that outline walking as a dominant mode of mobility (Mutongi, 2017; Klopp, 2012; Miller, 1971; Jedwab et al., 2017) has been used to understand the path dependency of prioritizing motorized infrastructure and the spatial injustices that have been perpetuated by the constant neglect of investment in safe infrastructure for walking.

Recent Past

To connect the past with contemporary mobility, the research investigates both walking and public transit as affordability of public transit is causal to walking especially among the poor (Salon & Gulyani, 2019). Analyses of existing household data from the Kenya National Bureau of Statistics (KNBS) is used to investigate the modal share in Nairobi and the cost of travel among Nairobi's public transit commuters. The KNBS is a national governmental body that is mandated to collect, analyse and distribute statistical data. KNBS performs periodic household surveys every 10 years and this research analysed data from the periodic survey of 2016. This section also addresses the challenges that pedestrians experience through an analysis of accidents data recorded between 2015 and 2018 by the NTSA.

Contemporary Developments

The unprecedented changes in Nairobi County governance between 2020 and 2022 impacted the provision of infrastructure for walking. In the first quarter of 2020, four core functions of the County government were transferred to the central government among which transport was one. The formation of the Nairobi Metropolitan Services (NMS), which governed the County for a period of 2 years, led to the prioritization of non-motorized infrastructure especially in the central business district. Through an interview with the director of roads and public works at the NMS, this section highlights the impact of change in governance, albeit temporary, for the progress and prospects of safe infrastructure for walking in Nairobi. Furthermore, through a review of the existing road design guidelines and an interview with a civil engineer working in a long-established engineering firm in Nairobi, this section highlights

the structural and pedagogical constraints that viably contribute to the constraints of prioritizing non-motorized infrastructure.

Walkability in Nairobi in the Early Period (1899–1963)

Nairobi was ostensibly founded along a mobility route during the construction of the East Africa Railway from Mombasa city in the coast of Kenya, to Kampala, the capital of Uganda (Ogot & Ogot, 2020). Several scattered camps were in the area that is today Nairobi's city centre, but the larger part was a swampy area and a wildlife territory (Miller, 1971). This provided large uninhabited space for development such that when the railway arrived in Nairobi in 1899, development of Nairobi into a town began rapidly soon after. The formation of an administrative authority and the relocation of the headquarters of the colonial government from Machakos County in the East to Nairobi County catalysed the development of Nairobi (Morgan, 1967). The rapid growth attracted an increasing number of Europeans and a large number of Asians who worked on the railway construction as well as Africans from different parts of the region who sought after trade and employment (Murunga, 2012).

Alongside the rapid growth of population was also the rapid growth of infrastructure to support movement throughout the city. Road construction in Nairobi began as soon as the government administration was set up in 1899, and within a decade, most of the road network that still exists in the city centre today was established (Morgan, 1967), shaping the functions of Nairobi as a future motor-centric capital. The car defined the focus of infrastructure provision as it was envisioned as a symbol of prestige and was the main mode of mobility for the ruling colonial government. Car acquisition among the Europeans increased sharply such that by 1928, Nairobi city had accumulated up to 5000 vehicles, obtaining a global record of the city with the highest per capita vehicle ownership at the time (Klopp, 2012).

The allocation of functions within space was controlled by the British colonial administration who took on the responsibility of land subdivision in the city centre (Murunga, 2012:465). Allotment of land parcels was based on partiality, first to the European then to the Asian (Kingoriah, 1983:250, Kinyanjui, 2014). This endeavour largely defined the mobility of different groups in the city as racial hierarchies dictated residential spaces and the freedom of movement among the African population. Majority of the land (90%) in the city centre was owned by the Europeans and a relatively less percentage (10%) belonged to the Asians while the Africans resided in the margins of the city where they lived in settlements—a political move that ensured surveillance and dominance (Vogel, 2008). Spatially, the city centre located administrative offices, government services, commercial areas and partly residential areas especially in the south of the city centre. These residential areas were mainly habited by the Indian businessmen who lived in storeyed dwellings that were partitioned to accommodate their business activities and to provide residence (Murunga, 2012). Most of the Africans resided in proximity to the industrial area where they provided cheap labour and earned incomes that could mainly afford them to commute to their workplaces on foot (Kingoriah, 1983:253).

The mobility of Africans in the city was restricted by the issuing of pass laws in 1902, at the early stages of the development of the city (Robertson, 1997:14). In the spatial development plan of 1948 one objective stated under Section 8 of Chapter 21 was to 'promote stabilization of the urban African population and reduce horizontal mobility' (White et al., 1948:57). The pass laws dictated who had access and where the access could be granted. Only Africans who worked for the Europeans could obtain access to the city centre (Mutongi, 2017:22). These were largely African men as the colonial labour policies favoured men over women (Kinyanjui, 2014). Despite the restrictions on mobility, Nairobi attracted many Africans from different parts of the country who mainly travelled on foot for long distances. On a documentation of trade in the Nairobi area during the colonial period, Claire Robertson gives an account of the multitudes of traders who travelled every day into Nairobi from neighbouring counties for trade. These traders, who were mainly women, walked as far as 20 km on foot from regions bordering Nairobi to buy and exchange goods (Robertson, 1997:107). Trade was the only way that women dared to obtain access to spaces that excluded them and created barriers of movement (Kinyanjui, 2014). A similar recountal by Kenda Mutongi indicates that women mainly walked for distances as far as 24 km on foot to their regular destinations while some men occasionally rode bicycles (Mutongi, 2017:23).

Accompanying this image of long-distance pedestrians was the image of a motor-centric city. Nairobi was viewed as an elitist town—a town for Europeans even though the African population comprised the majority (Robertson, 1997:13). As a result, the design and investment in mobility infrastructure were guided by the ease of access for elitist groups as development was dictated by the British colonial government whose main mode of mobility was the motorized vehicle. In two of the earliest urban development plans of Nairobi for the years 1926 and 1948 shown in Figs. 1 and 2, spatial expansion of the road infrastructure throughout the city was a definitive priority. The planners, F. Walton James and Eric Dutton, proposed an expansion of the road network from the original 25 km^2 to 77 km^2 (Vogel, 2008).

Section 6 in Chapter 21 of the 1948 Master Plan indicated the objectives of enhancing faster flows of motorized traffic through 'a clearly defined parkway system for fast traffic both for local and national needs, a clearly defined system of local main roads, feeding the parkway system at restricted intervals'. The plan also considered the establishment of cycle lanes but restricted them to 'open spaces of neighbourhood units and not along main roads' (White et al., 1948:57). Although the plans did not materialize due to financial constraints (Vogel, 2008), they indicate the vision of improving access by use of motorized vehicles throughout the city and hence only those who could afford moving by motorized mobility could get faster access to places of necessity and move easily within the city while cycling was restricted to neighbourhood areas. As the population grew, public transport became a necessity for movement of larger masses across the city. The public transport system, introduced in 1934, initially only served the Europeans and was funnelled through a set of designated routes, operating within specific time schedules (Klopp, 2012; Opiyo, 2002). As the bus fleet increased, some of the buses became admissible for the Africans; however, the modest income of many could only afford travelling by bus for a few days—on and after pay day. For the rest of the month,

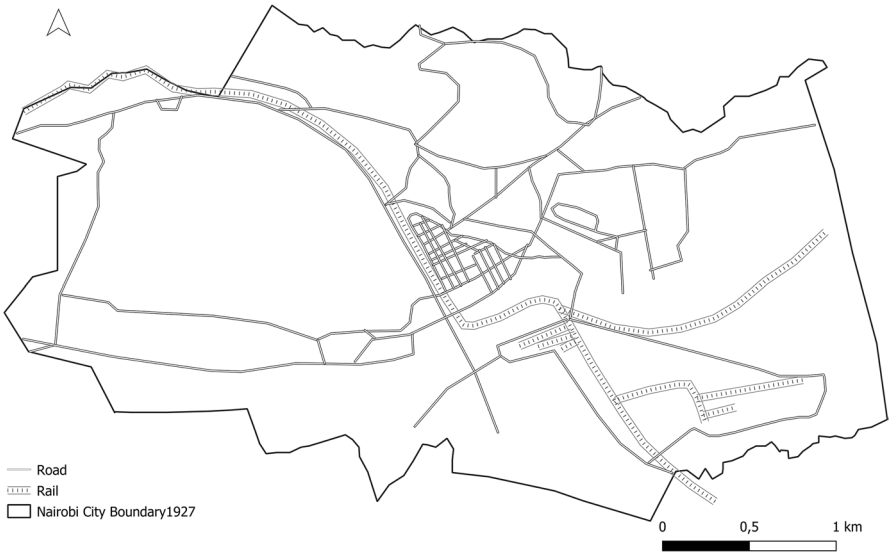

Fig. 1 Major transport routes in the 1926 development plan of Nairobi. The proposed transport routes were digitized by the author. Source: ETH Studio Basel—History of Urban Planning in Nairobi (Vogel, 2008)

Fig. 2 Major transport routes in the 1948 development plan of Nairobi. The proposed transport routes were digitized by the author. Source: ETH Studio Basel—History of Urban Planning in Nairobi (Vogel, 2008)

travelling to work or for shopping or visiting friends and relatives was mainly on foot (Mutongi, 2017:22). Public transport therefore excluded the poorest who could not afford as well as those who lived in the periphery away from the bus service routes.

Walkability in Nairobi in the Recent Past (1963–2019)

Walking continued to be a main mode of mobility among many Africans due to affordability constraints and poor accessibility as the buses did not serve the areas where many Africans resided (Mutongi, 2017). This contributed to the foundational tenet that walking was a mode of mobility only for the poor, despite its importance as a sustainable means of mobility. A decade prior to Kenya's independence, a state of emergency was declared due to fears of uprisings as the Africans fought for independence. Within this period, the movement of Africans throughout the country was kept under surveillance and highly controlled by the colonial government especially in Nairobi and its environs (Durrani, 2018:132; Mutongi, 2017). When Kenya obtained independence in 1963, the period marked a significant moment in Nairobi's mobility history. Firstly, it meant not only freedom of governance but also freedom of mobility, particularly for the Africans, when the state of emergency was lifted and the restrictions on movement were abolished (Mutongi, 2017:17). Secondly, independence induced a large influx of migrants looking for employment opportunities in Nairobi especially from the rural areas such that Nairobi grew at a rapid rate of 10% p.a. (Mutongi, 2017:43). Additionally, it meant the emancipation of women in overcoming material deprivation by generating employment for themselves through the 'informal economy' that rapidly grew in the city (Kinyanjui, 2014). The migration resulted in a third significant outcome which was the expansion of the city boundaries to accommodate the large inflow of migrants. The city grew eight times larger in size in 1963 from the original demarcated boundary in 1948 (Banyikwa, 1990:187). The boundary has remained unchanged since then (Morgan, 1967); however, it induced residential mobility in areas that were further away from the city centre—where most services and opportunities were concentrated. These events shaped the mobility of Nairobi and continue to impinge the progress of sustainable urban mobility.

After independence, the Kenya Bus System (KBS) was the only legal form of transport in the city, and although the bus fleet had a carrying capacity of over 100,000 passengers daily (Mutongi, 2017:31), they did not adequately meet the needs of the larger population. The new migrants who flocked Nairobi from rural areas in search of jobs were unable to afford the buses and many resided in neighbourhoods that were outside the designated ply routes of the buses. Journeys made on foot were common as was the most affordable way to search for livelihood opportunities in Nairobi; however, it was not long until some of the Africans who owned private vehicles started providing public transport services when the exigencies of affordable and accessible mobility demanded it. These individualized public transport services were accessible in areas where many Africans resided and led to the

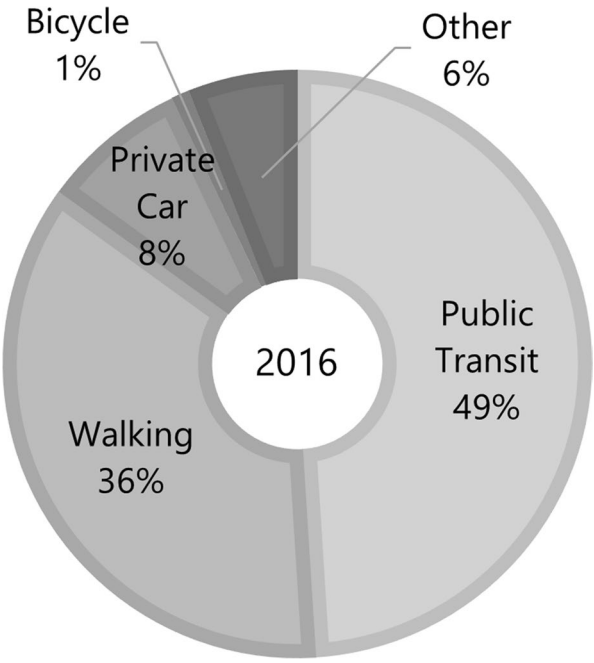

Fig. 3 Modal share in Nairobi in 2016. Source: Author's analysis of KNBS household survey data. The survey comprised of 1050 respondents from Nairobi

evolution of the private 'Matatu' industry (Mutongi, 2017:24) that presently dominates the public transport sector in Nairobi (Kamau & Manga, 2020).

The Matatus are presently registered as public transport providers by the NTSA but are operated by private individuals organized in Savings and Credit Cooperations (SACCOs) according to their route of operation. In an analysis of 1050 respondents of a 2016 household survey conducted by the KNBS, public transit accounted for the highest modal share among many respondents as shown in Fig. 3. This was also registered in a study of the 2014 Nairobi Integrated Urban Development Master Plan (NIUPLAN), where Matatus were the main mode of mobility for trips to work.

Although the use of public transit is high, many journeys are made on foot especially for key livelihood activities that include shopping, going to school, trips to work and trips back home. Walking is a mode of mobility across every wealth bracket as indicated in a study by Salon and Aligula, (2012) on urban travel in Nairobi, but with a significant increase among the very poor urban residents. In another analysis, Salon and Gulyani, (2019) found walking to be the dominant mode of mobility for more than 65% of adults and 96% of school-going children living in poor settlements in Nairobi. This is related to the high costs of public transit which is operated by private individuals who are driven by profit gains; hence, the poor who cannot afford the high and fluctuating fares are excluded from using public transit and opt to walk (Avner & Lall, 2016). The 2016 KNBS household survey data as analysed in this research revealed that many commuters pay approximately between $1 and $2 US dollars a day for a journey to work and back home as shown in Table 1.

Table 1 Costs of transport using public transit (Matatu). Source: Author's analysis of KNBS 2016 household survey data. The survey comprised of 1050 respondents from Nairobi

Cost of transport for a round trip	Percentage of households
Less than 100 Kenya shillings (less than ≈$1)	38%
Between 100 and 200 Kenya shillings (between ≈$1 and ≈$2)	47%
Between 201 and 300 Kenya shillings (between $2 and $3)	3%
More than 300 Kenya shillings (more than ≈$3)	12%

More than 60% of public transit users paid over 100 Kenya shillings (≈1$) for a round trip. Although this is causal to other factors such as distance and time of travel, the data failed to capture this additional information; however, out of the 47% who paid over $1 for a roundtrip, 37% were casual and seasonal workers whose daily wage according to the 2011 Kenya Regulation of Wages Amendment Order (Law, 2011) averages between 400 and 600 Kenya shillings (≈$4–$6) a day. This indicates high transport expenditure costs among low-income commuters who spend on average about 20% of their income on transport. In a study on household expenditure on transport in Sub-Saharan Africa (Olvera et al., 2008), households categorized as 'very poor' and 'poor' based on household expenditure accounted for higher expenditure on transport, around 15–20%, than the estimated expenditure on consumption indicating that the poor spent a significant share of their cost on transport even though they did not afford to travel on a daily basis.

The lack of affordability of public transport among the poorest enroots their invisibility in the planning of inclusive urban mobility. In Nairobi, this is embedded in the historical development of the city where pedestrians were not part of the imaginaries of the urban city. Termed as the 'urban invisibles' in the assessment of Nairobi as a just city, Churchill Otieno, (2020) refers to those who are excluded from the city's socio-economic architecture design as 'mobility invisibles' whose safety and accessibility are compromised.

Lack of infrastructure to support safe walking unfortunately renders it as the riskiest mode of mobility given the high number of pedestrian crashes recorded in the NTSA database annually. Over 60% (more than 400) pedestrian crashes were recorded between 2015 and 2018 as shown in Fig. 4 posing a threat to many poor urban commuters as walking remains the only option of mobility for the poorest even though public transit stops are easily accessible across many residential neighbourhoods in Nairobi (Salon & Gulyani, 2010).

Contemporary Developments on Walking (2020–2022)

The ambiguity of the design guidelines for urban roads in Kenya developed by the Ministry of Local Government under the Kenya Urban Transport Infrastructure Project (KUTIP, 2001) presents challenges in the provision of safe pedestrian infrastructure in the contemporary mobility system of Nairobi. While the guidelines provide

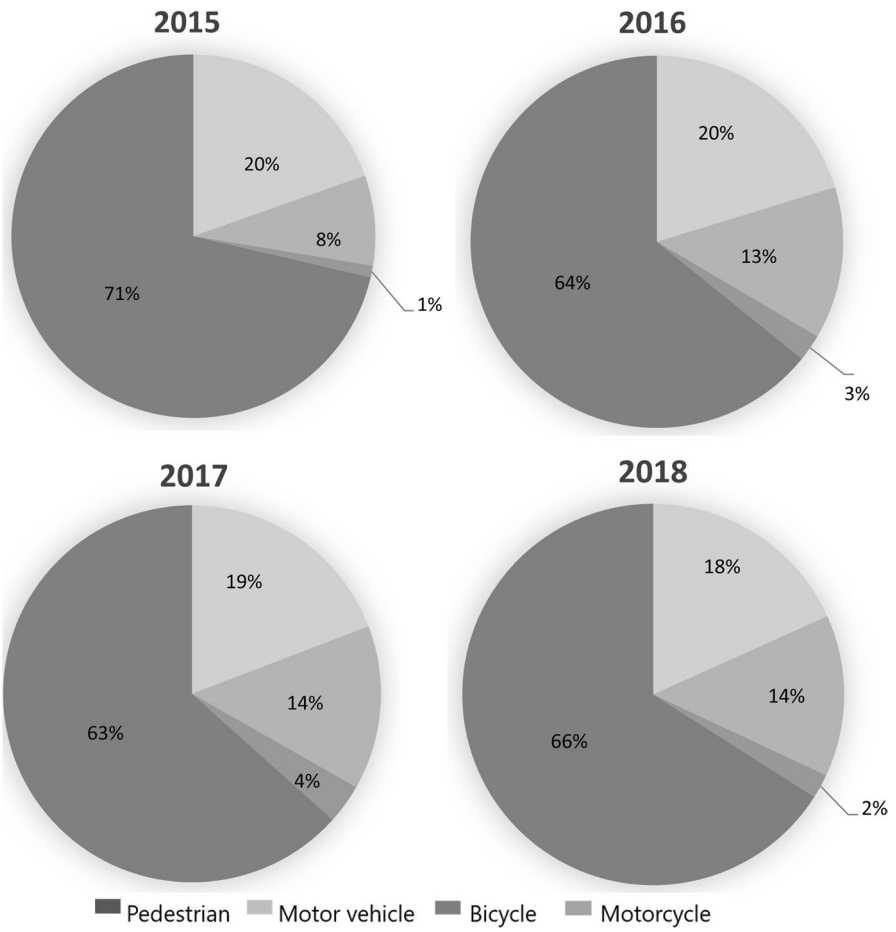

Fig. 4 Recorded annual road crashes in Nairobi. Source: Author's analysis of data derived from the National Transport and Safety Authority of Kenya (NTSA)

a minimum width of footpaths along selected roads, the recommended 1.25 m is inadequate to cater for the high foot traffic along many urban arterial roads. Furthermore, the explicit divestment of footpaths along international and national trunk roads contributes to the risks of pedestrian crashes as these roads register very high foot traffic because they connect key commercial and industrial areas where many urban poor people travel daily on foot to look for or provide casual labour. These are some of the ways in which the spatial development of mobility infrastructure contributes to spatial injustices and deters the uptake of walking as a sustainable means of mobility among those who would do not necessarily belong to the low-income bracket but would prefer to walk, for instance, for health reasons.

The 2017 Non-Motorised Transport Policy addresses the lack of safe infrastructure for pedestrians, however, in practise, the provision for 'safe' walking

infrastructure across many highways are the footbridges. The use of quotation marks for the word 'safe' denotes the illusion of safety that these footbridges provide. They are rather constructed with the intention to ensure faster and free flow of traffic without any interruptions of pedestrian crossings than to provide actual safety for the pedestrians.

Most of the footbridges in Nairobi are unsafe spaces at night and at times also during the day. They are often appropriated by vendors, restricting the space allocated for walking. Some of the footbridges are also spaces of advertisement with large billboards that create blind spots for unsafe practises. Furthermore, the design of footbridges often fails to provide direct access across the motor way and increases the travel time for pedestrians. For this reason, many pedestrians risk directly crossing the motorway for faster access, increasing the risk of accidents that are mostly fatal.

This directly links to the disconnect of the social and technical elements of infrastructure in the design and development of urban roads in Nairobi. The pedagogy of civil engineering at the tertiary level of education lacks provision for the social component of infrastructure and viably forms the basis of the negligence of the pedestrian as a significant road user and the risks of fatalities that they are exposed to. In an interview with an engineer in one of the leading and oldest engineering firms in Nairobi, the lack of integrating the social element to infrastructure design is not only a pedagogical problem in engineering studies but also the perpetuation of outdated design standards that historically failed to envision the pedestrian as a user of the road.

> Well, the fact that non-motorized infrastructure doesn't features as part of the design is a combination of things. As an engineer, I have not been trained to think of infrastructure in a multi-disciplinary manner, meaning the social, environmental, climate or stakeholder engagement such as planners. It is because engineering is a codified science that strictly follows what the standards and regulations dictate. We tend to follow what the code says so we can easily push through projects […]. In engineering school, inclusion of non-motorized infrastructure doesn't feature prominently. It has never been at the forefront of engineers' mind to provide for walking and cycling lanes. I think this is in part because a lot of the engineering that is currently taught is dated and was taught at a time when there was a huge deficit of infrastructure and brownfield areas of development […] We still have a lot of old traditional engineers who are teaching and have taught through many decades. It's a profession that it's a bit rigid in accepting new ways of doing things. For road design, we primarily use British standards and that is what we have been taught. [Interview with a civil engineer from a top engineering firm in Nairobi that has existed since the 1930s]

The spatial inequalities of non-motorized infrastructure provision are therefore rooted in colonial pasts where outdated British standards are applied in contemporary road designs despite the expansion of the city and the ubiquity of pedestrians in the city.

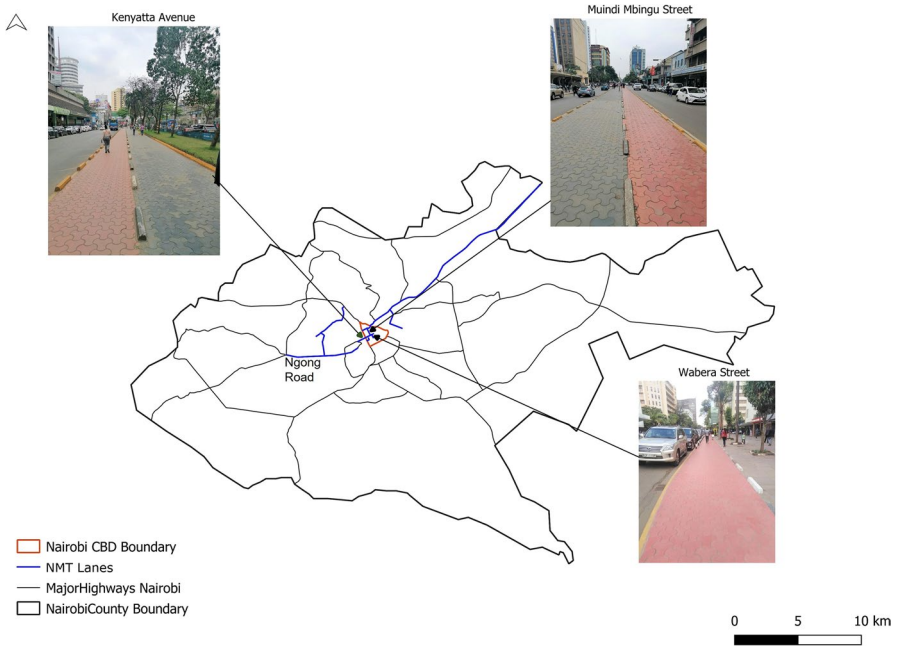

Fig. 5 Non-motorized infrastructure provided by the Nairobi Metropolitan Services (NMS) along selected roads in Nairobi's Central Business District (CBD). Source: author's

This despondent narrative of the neglect of pedestrian safety however recently witnessed a temporary shift after an evanescent change of county governance between February 2020 and March 2022. Within this period, four core functions of the county government, among which was transportation, were transferred to the central government. This led to the formation of the Nairobi Metropolitan Services (NMS) who attested a significant progress in provision of NMT infrastructure. In the confluence of the outbreak of the Corona pandemic and the formation of NMS, more than 7 km of newly developed footpaths and extended sidewalks as shown in Fig. 5 were developed along several streets in the Central Business District (CBD). The recognition of the need for safe NMT infrastructure was central to the NMS according to an interview with an NMS official responsible for transport.

> Since the development of the Nairobi integrated urban development plan, a directive was given to all road agencies to include NMT in infrastructure development especially in urban areas. As NMS, we have prioritized NMT because we have over two million people who walk to their places of work daily […]. The challenge we have is that the infrastructure has not been designed to cater for pedestrians and cyclists. They are the major victims of road crashes in Nairobi. In 2018, a study was carried in Nairobi to assess the safety of Nairobi commuters particularly with regards to crashes. What was found was that 71% of all fatalities are pedestrians and cyclist. This means that they are very vulnerable, and the contributing factor is lack of infrastructure. This has now been

given priority as part of the sustainable mobility plan for Nairobi. [Nairobi Metropolitan Services (NMS) representative]

Although the formation of the NMS was temporary, the spatial changes in the CBD indicate the progressive changes over a short period of time that can be achieved when investment is directed to serve those who need it most. The lived experiences of pedestrians however extend beyond the CBD which is often a transitory space to get access to other areas in the city. Risks are much higher along other urban roads where the infrastructure is either inadequate or divested (Odhiambo, 2021).

The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works (MOTIHUD-PW) together with the Institute for Transport and Development Policy (ITDP), UN-Habitat, Global Road Safety Fund (GRSF), The World Bank and International Climate Initiative (IKI) developed a street design manual that was published in February 2022. This is the most recent advancement of standards that recognize the need for safe infrastructure for pedestrians in Nairobi. The manual offers guidelines for development of various street typologies in accordance with the classification of urban roads in Kenya. Recognizing the high volume of foot traffic, the manual explicitly indicates a minimum of 2 m width for footpaths and comprehensively addresses the needs of pedestrians including gender sensitivity given that perceptions of safety differ among men and women. The manual further offers guidelines for motorist speed limits of between 15 and 30 km/h on smaller streets to maximize safety for pedestrians. If adhered to, this manual will not only address the historically embedded spatial injustices that are perpetuated in contemporary urban road standards and designs but will significantly improve the safety of pedestrians and contribute to the advancement of a just mobility system.

Discussion and Conclusion

Spatial Dimension

Bringing the three periods together within the framework of the spatial dimension, infrastructure for motorized mobility has been at the fore front of Nairobi's development from the inception of the city. Spatial injustices in provision of pedestrian infrastructure have been manifested from the onset of the development of Nairobi city both by design and by political choice. The established colonial racial hierarchy resulted in prioritization of motorized mobility against the considerable number of pedestrians in the city. Soja (2013) and Fainstein (2014) in their theorization of justice acknowledge that fairness—or its absence—is made manifest in the outcome of allocation of resources. The outcome of land distribution that spatially excluded the Africans and dictated the allocation of road infrastructure created an imbalance of mobility and accessibility and manifested spatial injustices.

This is a situation that persists in contemporary modes of mobility in Nairobi where pedestrians experience a disproportionate share of risks as the 'invisibles' in the mobility plans of the city. The historical path dependency of prioritizing

motorized mobility over non-motorized modes has contributed to the neglect of safe pedestrian infrastructure as well as the perception of pedestrian as a nuisance to the flow of car traffic. Private car use in Nairobi makes up a small percentage (13%) of the modal split relative to walking (49%) but receives much more investment at the cost of safe non-motorized infrastructure. The budget allocated to non-motorized transport, according to the 2017 Nairobi NMT policy, is only 2% of the total transport budget contrary to the incessant prioritization of motorized mobility manifested in contemporary investments particularly in the development of the Nairobi Expressway. Recent development of the updated street design manual as well as the recent transformations of spatial infrastructure in the city centre by the NMS demonstrate progressive efforts towards a just mobility system; however, the investment in the costly Nairobi Expressway demonstrates retrogressive efforts. The government of Kenya invested billions of Kenya shillings on a road project to mainly facilitate the movement of private vehicles from Nairobi's major international airport to the west of the city in an aim to enhance business operations in the city. The commissioning of the road allowed for the use of public transport but only temporarily after a lot of contestations related to road accidents. The toll fee charged for the use of the road makes it exclusive to only those who can afford, and for public transport, the cost is transferred to the passengers. Given the unclarity of whether public transport will be allowed to use the highway, and the already low percentage (13%) of private car ownership in Nairobi, the investment of such costly infrastructure to serve a limited number of Nairobi's travellers, mainly the elite, illustrates the contemporary neglect of the mobility needs of the most vulnerable who make up the majority of urban commuters. This not only represents the subalternate position of non-mototrized mobility but also manifests an overt injustice to many pedestrians who risk their lives daily in the absence of adequate pedestrian infrastructure.

Modal and Individual Dimensions

Linking the modal and individual dimension to the spatial dimension, walking in Nairobi can be said to be the place where sustainability and poverty meet and where spatial injustices are made manifest. Historically, the growth of Nairobi as an urban city bore the imaginaries of motorized mobility that did not include the pedestrians in the future of urban mobility of the city, resulting in spatial inequalities of accessibility that manifest themselves in contemporary Nairobi. The exclusion of the poorest from accessing public transport during the colonial period when the buses were unaffordable to many is also perpetuated in present-day public transit that results in the poor walking as the only affordable mode of mobility. This neglect of pedestrians has exposed them to a disproportionate share of mobility risks and misfortunes as the chances of pedestrian deaths are significantly higher than any other road user. Since pedestrians contribute a large proportion of the urban poor, the inequalities are even higher given that their choice of mobility options is limited relative to other urban dwellers. Reflecting on John Rawls' 'Difference Principle' (Rawls, 1971:75), injustices are evident when securing the advantage of the well-off comes

at a disadvantage for the less fortunate. With respect to walking in Nairobi, securing the interests of those with private vehicles, by investing in the extension of the road network and expansion of the existing roads without paying attention to non-motorized means, has come at the costly price of loss of lives among the pedestrians who mainly comprise the poor.

The channelling of pedestrians through unpleasant and unsafe footbridges signifies that the pedestrian is viewed as a nuisance to the free flow of motor vehicle traffic. On the one hand, the footbridges expose the pedestrian to inconveniences of indirect access and, on the other, to the restricted space appropriated by vendors and the spaces of potential anti-social behaviour.

The recent efforts by the NMS to provide safe infrastructure for pedestrians in the city centre provide hope for the prospects of safety. However, the temporality of the NMS and the latent mindset that indexes car ownership with prestige and walking with poverty challenges the prioritization of pedestrian infrastructure in Nairobi. Walking in this research has been presented as a mode of mobility that has persisted over time despite the spatial, institutional and political efforts of promoting motorized infrastructure as way of hindering, altering, restricting and even attempting to replace ever-existing patterns and flows of walking in the city.

The injustices that pedestrians in Nairobi experience are historical legacies that infiltrate the paucity of recognizing the urgent need for pedestrian safety. Prioritizing safe pedestrian infrastructure will not only require a technical process of widening the footpaths adjacent to road infrastructure but rather a deliberate effort to provide direct access to destinations according to the mobility patterns of pedestrians. In many cases, pedestrian infrastructure is laid side by side with motorized mobility leading to exposure to health risk from carbon emissions. The pedestrian is also forced to adapt to the design of infrastructure that was prioritized to provide direct access to the motor vehicle, resulting to indirect access and in some cases longer journey time for the pedestrian. Breaking the path dependency of investment in motorized transport while neglecting the mobility needs of pedestrians will require deliberate effort from the authorities at both the local and national level. Unless the authorities attune to the realities daily travel on foot and unless structural changes are made in the pedagogy and standards of road design, the attempts to ensure safety will continue to be lethargic at the expense of pedestrians' lives.

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