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Review

Towards a Sustainable Transport System: Exploring Capacity Building for Active Travel in Africa

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Abstract: The promotion of active travel is deemed a crucial component of the transition to sustainable urban mobility. Several barriers hinder its policy implementation and uptake. Some evidence suggests that capacity building could be a useful tool for deepening sustainability efforts. This concept involves the development and deployment of skills and resources. However, a clear framework for understanding the dimensions of capacity building for active travel is lacking. Furthermore, most research and findings use cases within a Global North context, constricting implications and transferability to the Global South, especially to African cities. This study responds to the dearth of scholarly work exploring Global South cases and fills a knowledge gap regarding capacity building in the case of active travel. Through a literature review, we examined the dimensions of capacity building that are necessary to improve active travel in selected African countries. We focus on multilevel transportation governance with highlights from five African cities. Our findings suggest that the literature and policies on transport in Africa have key dimensions for capacity building for active travel but lack the introduction of key instruments and strategic pathways to meet these requirements for improved sustainable mobility. We propose a thematic guiding framework that delineates the strategic application of capacity building at three levels of governance. This framework helps integrate capacity building for active travel policies and implementation at the institutional, individual, and environmental levels.

Keywords: capacity building; active travel; sustainability; participatory GIS; urban governance; climate change; urban planning

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1. Introduction

Globally, biking and walking are increasingly viewed as sustainable modes of transport that require more attention in cities [1,2]. These modes, central to capacity-building efforts for sustainable urban mobility, produce less noise and pollution and are quieter. More environmentally friendly solutions for urban mobility are on the rise as a result of growing environmental awareness and the threat of climate change impacts such as pollution, fossil fuel emissions, and global warming [3,4]. Pressure is mounting on the shoulders of city planners and decision makers to add cycling and walking facilities. However, similar to other urban challenges, adapting policy and practices is met with resistance owing to complexities and uncertainties. In this study, we argue that building capacity of cities is a crucial yet under-developed process for adapting policies and practices towards sustainable mobility and especially active travel. In this study, we discuss practical strategies, specifically on the role of capacity building in fostering active travel in Africa's unique urban context.

Scholarly research has indicated that diverse public transportation options have significant environmental and health benefits associated with diverse public transportation options [5]. Cities that reduce car dependency experience better quality of life outcomes such as decreased obesity rates [6]. Recently, the tremendous importance of walking

and cycling for significant economic, social, environmental, and health benefits has been reported [7,8]. More walking and cycling are seen as symbols of freedom and social integration, owing to their reduced noise, pollution, and serenity. Moreover, the pressing need for eco-friendly urban mobility solutions has become evident, particularly given the threat posed by climate change.

Africa's transportation landscape presents a distinct blend of challenges and opportunities. Urban areas face issues such as rapid urbanization and increased car dependency, resulting in traffic congestion and pollution [9], and inadequate safe and efficient infrastructure for walking and cycling [10]. Despite these difficulties, opportunities exist to create sustainable transportation solutions, including enhancing mobility and social inclusion. However, most research on sustainable transport, particularly active travel, such as walking and cycling, primarily focuses on cases from the Global North, resulting in a scarcity of knowledge about the unique context of African cities [11]. This study seeks to address this gap in scholarly work by examining cases in the Global South, particularly in African cities. In line with interdisciplinary methodology [12], our research similarly evaluates the strategic aspects of capacity building for policy change in urban transportation. We acknowledge the significance of adaptable and reflective methodologies in this context. We aim to highlight the current challenges and opportunities and provide a framework for future improvements in sustainable transport. This includes a critical examination of how capacity building can transform urban transport policies and practices, specifically in the context of cycling and walking.

This paper begins with an examination of the concept of capacity building, tracing its development through academic literature to contextualize its significance in current research. Subsequently, the primary research problem is scrutinized and positioned within the broader landscape of ongoing studies in this field. The study transitions to a discussion of the methodology employed, followed by a presentation and evaluation of the findings. Finally, policy recommendations and a guiding framework are proposed.

1.1. Capacity Building

In addition to summarizing the evolution of capacity building, we focus on how this concept has been applied in the context of active travel. Studies have demonstrated that capacity-building initiatives such as training programs, policy development, and community engagement play a pivotal role in enhancing active travel in urban environments [13–15]. The improvement of an individual's or an organization's facility (or capability) "to produce, perform, or deploy" is known as capacity building [16]. This is also known as capacity development or capacity strengthening. Both capacity development and building have been used interchangeably. In recent years, the discussion has shifted from "capacity building" to the newer formulation "capacity development" [17,18]. Since "building suggests a process starting with a plain surface" [19] and 'capacity development' inherently entails capacities already there that may be built upon, some scholars maintain that the use of "capacity development" is more appropriate than those already defined [16].

This change can be attributed to the French phrase 'le renforcement des capacités', which more closely aligns with the concept of 'capacity development' rather than 'capacity building'. However, the change remains minimal, as many scholars still refer to 'capacity building' as 'capacity development' and even use them quite interchangeably [17–24]. The fact that practitioners in the public and non-profit sectors were at the forefront of knowledge production from the start and produced a wealth of gray literature is a remarkable aspect of the evolution of the concept. These practitioners primarily relied on case studies and anecdotes when looking for normative frameworks or standards for "best practices" [20].

In investigating various aspects of capacity building for active travel in urban environments, several transport-related studies have highlighted capacity-building indicators necessary for active travel. Although not primarily focused on capacity building, these studies enrich our understanding of sustainable urban transportation and active travel. For instance, the significance of transportation planning, the use of geographic information

systems (GISs), and multi-criteria analysis in developing sustainable urban transportation models are emphasized [21]. These models are essential for addressing the growing demands of urban travel and enhancing active travel options such as walking and cycling. Furthermore, individual and environmental factors impact active travel in urban settings and highlight the need for supportive environments that encourage active travel, particularly in areas with lower car ownership [22].

Urban planning and the built environment play a determining role in physical activity levels [23]. The authors advocate for urban design, land-use patterns, and transportation systems that support walking and cycling, contributing to the development of healthier communities. Additionally, the relationship between urban spatial walkability and the active participation of people with disabilities in daily activities has also been explored [24]. This study emphasized the importance of inclusive planning and the need for accessible transportation options for all individuals. Moreover, a comprehensive framework for assessing city walkability by considering various urban contextual features has been introduced [25]. This approach is crucial for promoting active transport and for understanding the connection between the built environment and health outcomes. Collectively, these studies emphasize the multifaceted nature of capacity-building initiatives for urban environments.

Our aim in this study was not to introduce a new definition, synthesize the concept's development, or thoroughly investigate how it has been applied to disciplines and contexts. Furthermore, we do not seek to evaluate the effectiveness of capacity building or whether it has impacted sustainability, as has been done in the past [18,23,24]. Instead, our aim is to explore the meaning of capacity building in Africa in relation to active travel. By understanding how capacity-building strategies work and adapting them to African urban settings, we can improve their effectiveness for cycling and walking. To achieve this, we propose an approach that integrates capacity building at three multilevel governance levels. Our literature review analysis focuses on four themes: capacity needs, transport policy and implementation, transport infrastructure and culture, and the role of participatory GIS. We will then discuss how capacity building can be applied to these themes and at which level of governance is appropriate.

1.2. What Is the Problem?

Unlike the developed world, where an increasing number of sustainable transport systems are being advocated, the situation is quite different in the Global South, particularly in Africa. Studies that address the challenges faced by African countries in the context of cycling and walking are lacking. Although capacity building has been acknowledged as a critical component of sustainable development in the literature [26,27], it has seldom been adopted in transport research, government transport policies, and implementation mechanisms. In the African context, understanding capacity building for active travel and devising strategies and frameworks to integrate it are essential.

More succinctly, we focus on (a) what capacity building means for Africa's transport in the context of active travel, (b) understanding transport issues in Africa, what capacity-building strategies are required, and (c) what framework can guide the integration of capacity building for active travel at different levels of governance and the implications of this integration for sustainable transport and urban development. By exploring the concept of capacity building for active travel in Africa, this study offers valuable insights into the key elements, strategies, and resources necessary to effectively build the capacity to promote active travel in selected African countries. In addition, this study fills a knowledge gap in the capacity-building framework needed to support the development and implementation of successful active travel initiatives in Africa.

1.3. Capacity Building for Africa's Transport

As discussed above, capacity building is multifaceted. Therefore, it is essential to establish a clear theoretical foundation, given its potential influence on developmental

theories [28,29]. We positioned capacity building as a crucial component for sustainable transport, especially considering the unique challenges African nations face in promoting walking and cycling as sustainable modes of transport [11]. In the authors' opinion, capacity-building practices in Africa are not limited to external actors that address transportation and mobility issues. Empowering local and regional stakeholders through capacity building is a common approach across various domains, including military operations [30] and disaster risk reduction.

Capacity building has traditionally focused on improving organizational capabilities. However, some experts [31,32] argue that capacity building should address multiple levels, including individual, organizational, and environmental/institutional. At the individual level, 'capacity' encompasses technical and analytical abilities, competencies, skills, and knowledge. At the organizational level, it refers to an organization's capacity or ability to execute policies and programs through the deployment of resources, including human resources, and to anticipate resource needs. The institutional level pertains to the capacity of people, organizations, communities, states, and societies in an environment to address their combined issues and produce long-term benefits for their stakeholders. To translate individual skills into organizational capabilities for active travel, institutional competencies must be evaluated, and existing capacities must be built or expanded [16].

When capacity building is viewed as a multilevel governance framework, it involves more than just individual knowledge and skill. Previously, capacity was narrowly defined as training or technical knowledge transfer [33]. Accordingly, structural factors, such as power dynamics, institutions, and stakeholder interests, are now recognized as important. Capacity is not just about technical skills and procedures but also about incentives and governance. It is crucial to understand the existing context, including power structures [34] and capabilities, and consider the impact of capacity-building efforts in this context. A successful approach to capacity building for active travel in African cities also requires a well-organized and inclusive framework of stakeholders, including local governments, community groups, and international partners. It is vital to consider the socioeconomic and political contexts. This includes understanding unique needs and challenges, existing infrastructure, cultural attitudes towards walking and cycling, and the need for safe and accessible routes. Collaboration with stakeholders to develop and implement contextually relevant sustainable strategies is crucial.

2. Materials and Methods

2.1. Literature Review

We focus on the broad literature on transport and transport policies in selected African countries, such as Ghana, Nigeria, Kenya, Ethiopia, and Mozambique, and assess how they meet the requirements of capacity building for active travel. These countries' choices were linked to their recent developments in terms of increased population, economic activities, and pressure on the transport infrastructure. Ghana and Nigeria were chosen because of their rapid urbanization and emerging transportation issues [35,36], whereas Kenya and Ethiopia were selected because of their innovative approaches to transportation policy and infrastructure development [37–40]. Mozambique was chosen because of its distinct socioeconomic dynamics and their impact on urban transportation systems [41,42]. Figure 1 presents the geographical locations of the selected countries. This choice allowed for a thorough examination of multiple scenarios in Africa, providing an understanding of the different capacity-building requirements and methods in the context of promoting active forms of transportation. Cities in emerging economies are expanding at an increasing pace. The population of sub-Saharan Africa is expected to grow significantly by 2050 [43]. This rapid urbanization is projected to result in the region having between 1.5 and 2 billion people by 2050, making it one of the fastest-urbanizing continents. It is disappointing that these urbanization trends have not been without hurdles for Africa's developmental progress. The large-scale infrastructure deficit on the continent is one of the most widely

recognized challenges inhibiting the realization of sustainable and prosperous African cities.

Figure 1. Location of study area: Ghana, Nigeria, Mozambique, Ethiopia, and Kenya.

The data gathered consisted of reviews of diverse literature and policy documents on *transport in Africa, capacity building, and country-related transport policy*. We also used the snowballing technique to extract relevant information from related literature using a litmap application.

2.2. Literature Review Approach

With a few modifications made to this work, our data search technique is fully described in an a priori systematic and snowball review process [44]. A wide range of peer-reviewed and gray literature sources were used for the literature search. To develop a guiding framework for capacity-building issues in multilevel governance, a literature search was conducted on *active travel*, *capacity building*, *transport policy*, and *public participation geographic information systems (PPGISs)*. A search string of relevant keywords and terms was created. The data sources included UNEP, AfDB, UN Technical Reports, Google Scholar, Scopus, Web of Science, and university websites. The search criteria included publications from 1980 to 2023 to capture a broad range of literature. All searches were conducted in English.

2.3. Literature Screening and Appraisal

The review employed a three-stage process to evaluate the articles based on their titles, abstracts, and full text. For inclusion, a literature document needed to address capacity-building-related subjects. We selected 200 papers that met this criterion and loaded them into a structured data frame using Python's pandas library. To identify entries related to "capacity building", a case-insensitive search was conducted across all columns of each row. The "str.contains" method was used to ensure consistent searching regardless of data type variations in the columns. A total of 39 filtered articles were obtained. An additional search was conducted using a combination of "active travel", "PPGIS", and "transport policies" in

the selected countries. However, this search did not yield any significant results. Therefore, the snowballing technique was used to identify 46 additional articles. These results were added to the 39 filtered articles for a total of 85.

Then, using "counting and comparisons" of significant terms, we carried out summative content analysis and extraction for each retrieved article [45]. We evaluated the content in an Excel sheet using, e.g., "capacity building", "Transport culture and infrastructure", "Capacity needs", "Active transport policies/failures and success", "What should be done/the direction of transport policies and what cities are doing", "and the role of GIS/RS in capacity for active travel", as extraction parameters. The remaining papers were critically reviewed and assessed for their relevance, rigor, and fit. We used theme analysis [46] to examine the filtered articles. The summative content analysis and snowballing technique resulted in 58 articles. Figure 2 is a flowchart of the systematic literature review process.

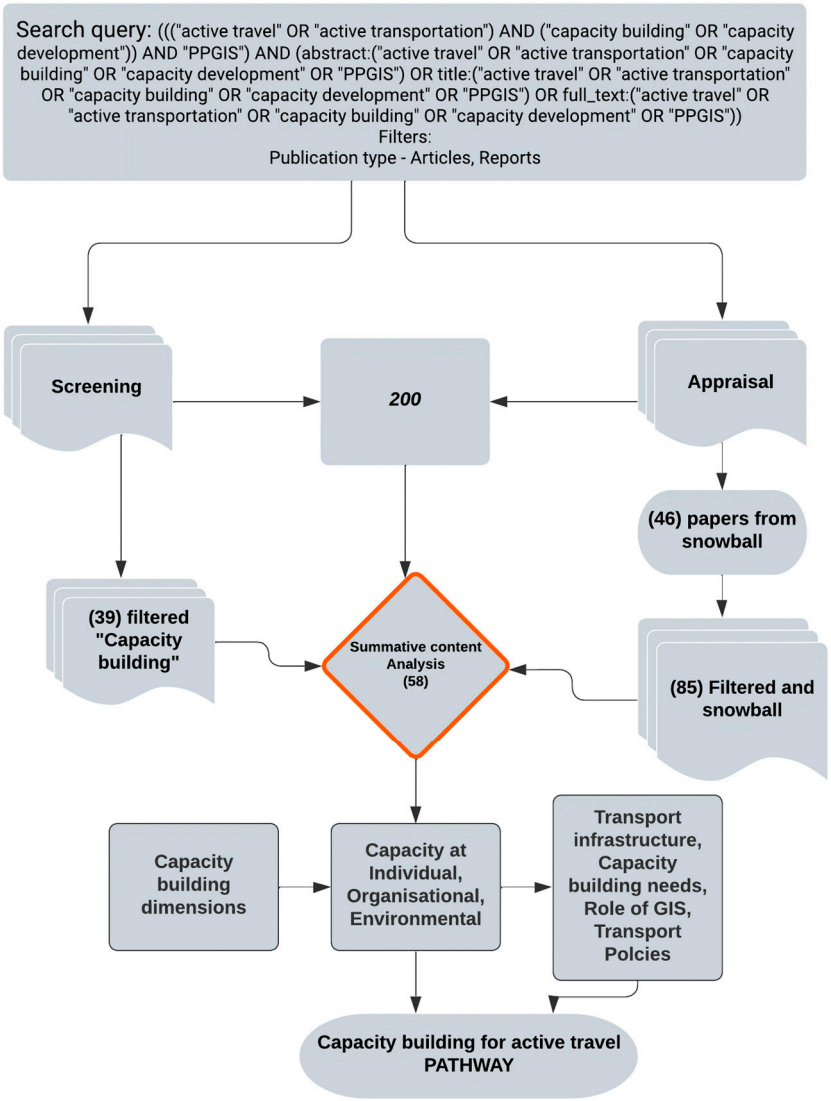

Figure 2. Approach to systematic literature review.

3. Results

3.1. Transport Culture

According to our review, transportation infrastructure is recognized as a critical element of economic development, as it promotes the production of new attractions and the expansion of existing ones [47]. Transport infrastructure as a factor determining the desirability of a location has also been identified in [48,49]. Africa's transport and culture

have been shaped by its history and politics; with the exception of Ethiopia and Liberia, all of Africa was colonized by 1945. Many transportation facilities have been built for natural resource extraction and export [50]. Additionally, China's recent investment in railways has been driven by the need to secure supplies of scarce minerals, which is critical for its growth. Investments in modern infrastructure, such as China's emphasis on railways for mineral transportation, have a significant impact on shaping the transportation culture. These advancements offer opportunities to enhance the capacities of African transportation systems. By implementing the necessary transport policies, these investments can be leveraged to promote sustainable and active transportation.

During the colonial era, natural resources were heavily exploited [51]. The colonial government primarily focused on port cities and paid little attention to inland transportation and passenger travel. Contemporary capacity-building efforts face the daunting task of developing sustainable and inclusive transport solutions that cater to both passenger travel and local economic development while moving beyond the traditional export-focused framework. This presents a significant challenge, as these efforts must now prioritize the development of transport solutions that address the needs of local communities and promote sustainable development. The infrastructure built during this period was primarily used to export agricultural and mineral resources. The connections between the port and the neighbouring landlocked country's material supply are of utmost importance. As a consequence, the transportation industry suffered significant economic consequences, leaving behind structural and institutional distortions, from which it had yet to fully recover. Africa's transportation landscape has been shaped by its historical and political context, which highlights the distinct need for capacity building. The historical context of colonial exploitation and resource-extraction-focused infrastructure has resulted in a foundational gap in sustainable urban transportation systems. To address this legacy, capacity-building efforts must concentrate on creating a transportation infrastructure that promotes active travel and supports local economic needs.

3.2. Infrastructure

Our review revealed significant developments in the transport infrastructure of the region, highlighting the importance of evaluating the infrastructure to promote sustainable urban mobility. Various strategies and initiatives have been implemented to address transportation issues, with [52] identifying common challenges in African cities, such as aging infrastructure, traffic jams, pollution, accidents, long commutes, and lack of effective policies linking transport and land use. The significance of capacity building is emphasized by these challenges in developing successful strategies and initiatives for transportation enhancement in the region. Cycling and walking are becoming increasingly popular modes of transport. Recent policy and literature have increasingly focused on walking, which is a positive step towards new mobility paradigms and ideals [53,54]. Walking as a social activity is an example of a topic of interest in the literature, and walking indicators contribute to goals aligned with public health, transportation policies, and environmental sustainability [55]. The growing interest in walking requires capacity-building efforts in policy and infrastructure development to support active transportation.

It has also been argued that urban transport networks in African cities, particularly small- or medium-sized ones, are not diversified, with most emphasis placed on constructing highways and promoting car-centric cities without integrating other modes of transportation, such as buses and railways [11]. This has led to unproductive urban environments, traffic congestion, urban sprawl, and other transportation problems. Limited access to motorized transportation and financial constraints in Africa have made walking and other physical modes of transportation popular. However, obstacles, such as inadequate infrastructure, safety concerns, and long walking distances to transportation hubs, hinder their use (see Figure 3).

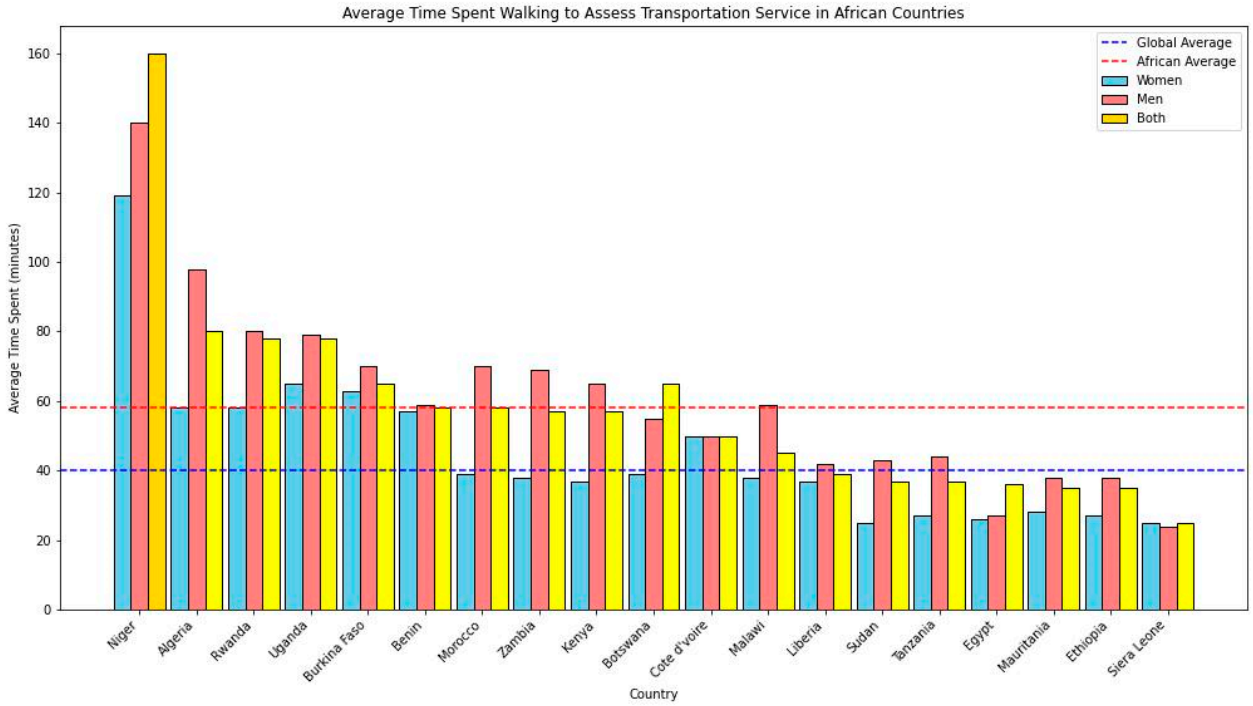

Figure 3. Average time spent walking or cycling for transport. Data from UNEP, 2022 [54].

According to [11], there is a noticeable absence of planning and policy initiatives, despite the fact that numerous individuals are required to walk or cycle extended distances for work and other obligations. This absence underscores the urgent need for capacity building in planning and policymaking to formally recognize and improve active transportation modes. Motorcycle taxis are increasingly prevalent in urban areas, such as Lagos, Douala, Cotonou, and Mombasa. There is intense competition between traditional and motorcycle taxis [11]. Furthermore, many African countries are taking steps to formalize motorcycle transportation [56]. For instance, Kenya eliminated import duties on motorcycles used as taxis and established motorcycle lanes in Burkina-Faso and Ouagadougou.

Walking and cycling in Africa are challenging, unpleasant, and dangerous because of the persistent absence of necessary infrastructure. People who walk and cycle in Africa are considered to have various needs (Figure 4). Experts estimate that 67% of pedestrians would prefer a continuous network of pathways and secure areas for walking [55]. Cycling safety and a continuous network of bike lanes are likely required for 85% of cyclists.

3.3. Transport Capacity-Building Needs

There is general consensus among most reviewed studies that transport infrastructure is often lacking in African countries [50,55,57–59]. This makes it more difficult for people to use walking and cycling as viable modes of transportation. We also noticed from the review that non-motorized transportation and active travel modes, such as walking and cycling, have not been widely recognized as significant strategies for tackling transportation issues in most country-transport-related policies. According to most of the reviewed literature, discussions on transportation often focus on reducing traffic jams, congestion, and pollution [11,60]. Africa is the least accessible continent in the world [61–63], with only 31.7% of the population having access to public transportation within a walking distance of 500–1000 m, as measured by the UN Habitat for Sustainable Development Goal 11. We summarized the transport capacity needs for active travel to include infrastructure and services, safety, policy, and motivation. This aligns with the findings of previous studies [55,64].

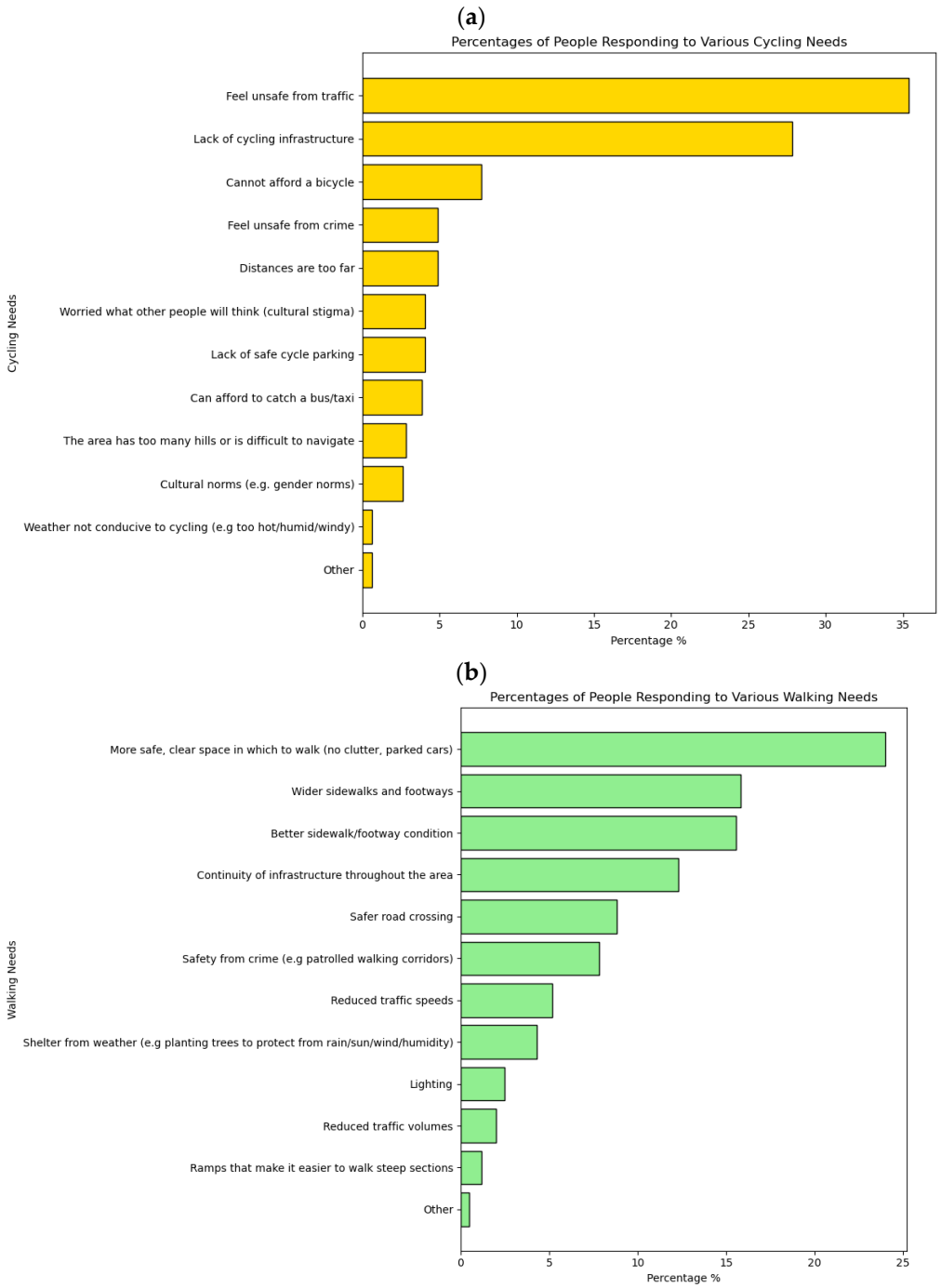

Figure 4. (**a**) Perceived cycling needs and (**b**) walking needs in Africa. Data adapted and modified from UNEP, 2022 [54].

We also found that walkable access to public transport is critical, especially for women, children, persons with disabilities, and older persons who can only have guaranteed access if their walking environment is safe [65]. Ninety-five percent of the roads in Africa that were evaluated using the International Road Assessment Programme's (iRAP) 5-star rating system failed to provide walkers and cyclists with an acceptable level of service [55,66]. Most roads are substandard and lack safe crossings, cyclical lanes, and high vehicular speeds. People's choice of mode is significantly influenced by their level of comfort and perception [67].

3.4. Transport Policy and Implementation

Complex transportation policy solutions are required because of the complexity of the African transportation system and culture [68]. In Africa, we identified various key factors underlying these trends, particularly considering the continent's unique developmental landscapes. These factors emphasize the importance of capacity building in policy formulation and implementation, which is specifically tailored to the unique contexts of Africa. A key factor is the growth of the large middle class, which is characterized by rising spending power and has eventually fuelled the demand for private transportation [69].

We also identified that the purchasing power of African city dwellers has improved over the past 20 years, and cars and bicycles are now more accessible (CCI—Centre du Commerce International, 2009) [70]. Currently, there is no workable transport policy for equalizing or reducing the use of motorized transportation. This has resulted in an influx of used cars from industrialized nations, as well as new two-wheelers. Urban planning and policy initiatives for diverse transportation networks are rarely implemented in small- or medium-sized communities.

In contrast, for transport policies to support other forms of transportation, such as railways, trams, and bus networks, the trend in transportation policies is toward roads and freeways that promote car-dependent cities. On the 'ground' in African cities, there are very limited facilities for cycling and walking for example [67]. New road developments seldom provide adequate provisions for these transport modes. Further, when it comes to public transport facilities, African transport policies often privilege larger cities, partly due to economies of scale, but at the expense of smaller and fast-growing urban centres [55]. Nevertheless, we recorded some progress in some African government institutions in their commitment to sustainable transportation systems, but this was consequently characterized by weak performance (Figure 5).

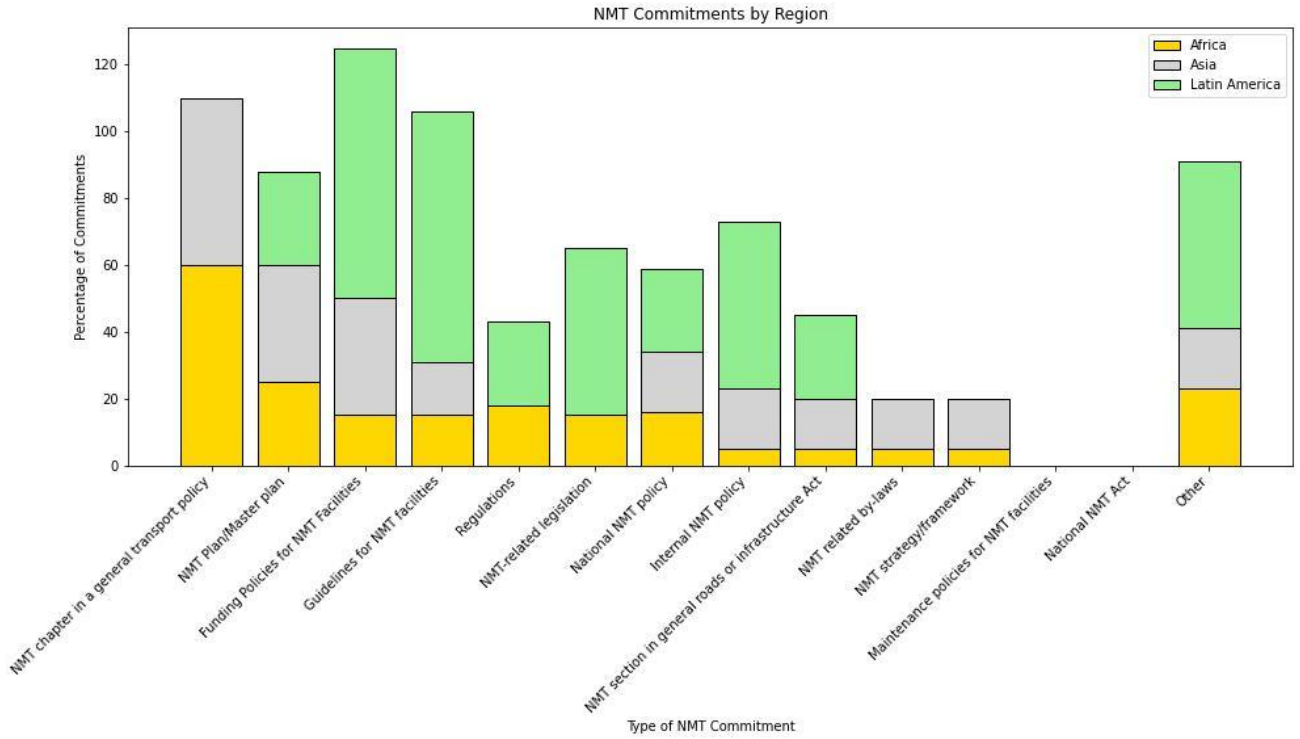

Figure 5. Regional commitments towards active travel.

There were some improvements and indications for sustainable transport in the reviewed country policy documents. Some countries have implemented non-motorized transportation (NMT) policies. Ethiopia, Kenya, and Uganda have regulations that support safe, secure, and high-quality environments for bicycles and pedestrians. The introduction

of NMT policies in these countries is crucial for building a sustainable transport capacity. These policies highlight how enhancing capacity can improve safety and accessibility for bicyclists and pedestrians. For example, the 2017 Nairobi City County NMT Policy [71] aimed to improve NMT amenities, mobility, accessibility, transportation safety, recognition, and image in Nairobi County. It also ensures that the NMT infrastructure receives adequate funding and investment, including devoting 20% of the building budget to the infrastructure in 2018 [72].

South Africa's National NMT Policy (2008) [73] aims to support marginalized communities such as women, people with disabilities, children, rural populations, and the poor. The policy recognizes the importance of transportation in society and how it limits access to opportunities for employment, education, and healthcare for women and girls. In addition, to ensure pedestrian access for all, including those in wheelchairs and those with various disabilities, Uganda's National NMT Policy (2012) [74] also integrates Universal Design principles.

Ghana's National Transport Policy (2008) [75] has made similar commitments to ensure accessibility for women, children, the elderly, and people with physical disabilities. By encouraging access to non-motorized and intermediate modes of transport, and ensuring that NMT facilities are properly integrated to satisfy their needs, Malawi, Zambia, and Ghana seek to meet the rural transportation needs of women and other vulnerable populations. Kenya's national and municipal authorities have also acknowledged that women are more likely to become impoverished because they have fewer transportation alternatives. According to the Integrated National Transport Policy (2009) [76] , women should spend less time on transportation-related tasks, such as carrying water and gathering firewood, and have easier access to non-motorized and intermediate modes of transport. Namibia's Sustainable Urban Transport Master Plan (SUTMP) 2013 [77] emphasizes the need to create a forgiving NMT network for vulnerable user groups, including children, to ensure their safety while traveling to and from schools. Despite these attempts by these countries, there has been little success in implementing sustainable transportation policies. The disconnection between policy formulation and successful implementation underscores the urgent need for capacity building. Strengthening institutional capabilities for policy enforcement and public involvement is essential for achieving the objectives of such policies.

3.5. The Role of GIS in Capacity Building

One of the growing sectors in transport and mobility is GIS and remote sensing [78–81]. Local initiatives encouraging walking and cycling have gained recognition in recent years as being among the key components of the transition to sustainable urban mobility [82]. Evidence from [80–82] revealed that traditional active travel data collection methods (e.g., manual, temporary, and automated counts) are labour- and time-intensive, with low spatial and temporal resolutions. Public participation GIS (PPGIS) plays a role in strengthening the capacity for active travel. ICT advancements, such as cloud storage, broadband communication, and GPS-enabled smart devices, offer data with higher spatial and temporal resolutions for monitoring the movement of people, purpose of movement, and areas of concentration. This in turn provides city planning authorities with access to areas that have walking and cycling needs.

In addition, social fitness networks (SFNs) such as Endomondo, Fitocracy, Runtastic, Map My Ride, My Fitness Pal, and Strava enable users to track and share their fitness activities (e.g., cycling, wheelchair use, running, skateboarding, and walking) using GPS-enabled devices [83–85]. Anonymized data from SFNs can be used to plan the transport infrastructure and address its related needs. According to our findings, SFNs have many applications, such as infrastructure evaluation [86], ridership factors [87], and active travel user safety [88]. These participatory GIS tools were also found to have several shortcomings. For instance, the overrepresentation of active travel users may reduce the advantages of SFN data, leading to bias and bad decisions [89].

Moreover, Web 2.0, which involves non-expert mapping of topics with geospatial services, has enabled public participatory mapping (PM). Google Maps also provides local mapping skills. PM platforms can be either (i) platforms created by experts, such as planners and scholars, to acquire spatial data on movements from participants for research and decision making, or (ii) platforms created by citizens to share and assemble spatial data, called volunteer geographic information (VGI) or geographic information systems for public participation (PPGISs) [90].

We also noted that the effectiveness of PPGIS technologies relies on their integration into planning and decision making, with public participation and local knowledge being key [91]. PPGIS use has certain disadvantages [83,92]. For instance, Strava's data, limited to fitness-tracking users, may not represent all population interests, leading to a bias. This can affect the prioritization of infrastructure investments for active travel if not critically assessed. PPGIS allows citizens to comment on transport rules, identify problems, and suggest solutions. This will aid in the creation of transportation policies that meet local needs and promote sustainability and equity.

4. Discussion

4.1. Applying Dimensions of Capacity Building to Transport Issues

Based on the issues identified and analysed, the subsequent subsection explores a clear pathway for active travel in the region. In addition, we applied the dimensions of capacity building to the transport issues identified in our review. By integrating definitional characteristics, administrative procedures, institutions, organizational requirements, and policies, capacity-building efforts can improve performance and help organizations achieve their goals.

4.2. Institutional, Organizational, and Resource Requirements

Capacity building goes beyond individual improvement and encompasses changes at both organizational and institutional levels. This viewpoint is based on the belief that capacity building seeks to redefine "the rules of the game" across various levels, that is, local to global [16,93]. Such redefinitions range from normative procedures and administrative structures to resource allocation, all of which can affect the effectiveness of active transportation initiatives in Africa. Ultimately, a comprehensive approach that includes institutional and organizational strengthening and resource allocation is crucial for promoting active travel in the region.

Referring to the literature on institutional capacity in maritime security, including [32], we have observed that numerous EU initiatives have aimed at enhancing the capabilities of key institutions. The significant focus of these initiatives, largely funded by the EU, has fostered intercountry cooperation, particularly among African nations. We argue that the core of capacity building for active travel lies in fortifying institutional strength and solidifying the collaborative relationships between countries and institutions. This perspective harmonizes with, yet also distinguishes itself from, the prevailing conversation on successful capacity-building strategies.

At present, several African nations do not boast of a highly decentralized government, which gives rise to new obstacles in the area of transportation policy formulation, framing, and implementation. Although numerous African states have embarked on significant decentralization initiatives, issues related to effective local governance continue to persist because of a lack of willingness on the part of central authorities to release control and the inherent complexity of organizational structures [94]. While efforts towards decentralization are underway, they are not consistent across all African countries. Additionally, top-down governments, which are common in many African nations, may hinder the effective execution of policies that promote active or non-motorized transportation. Institutions represent institutional capability mechanisms [95]. Therefore, we propose that capacity building should focus on strengthening them. Neglecting institutional capacity building can limit the effectiveness of individual or organizational capacity-building efforts.

The literature in our review highlights the need for clear mechanisms at the institutional level for each country to monitor how the implementation of their transport policies has evolved over time to adapt to new situations. We recognize that established norms may change depending on the country's governance landscape, the needs of certain communities, applicable regulations, and the availability of resources. However, organizations and institutions should also include the ability to forge effective links building co-management [96] with other transport organizations and international networks, processes for solving problems, coordination among disparate functions, and mechanisms for institutional learning [12] and knowledge transfer [97]. These approaches can enhance sustainable transportation in Africa at an institutional level. The key to this is to establish appropriate standards and implementation strategies for such learning.

Furthermore, capacity building for active travel at the institutional level requires urgent and targeted actions to enhance the recruitment of professionals in urban planning and transport logistics, in terms of both quantity and quality. This involves coordinating efforts among various regional and sub-regional institutions and strengthening individual and collaborative programs [98] as well as training individuals at multiple levels within a supportive institutional infrastructure [99]. In addition, capacity building for active travel in African cities requires addressing inefficient organizational, administrative, and management structures, as well as overcoming the lack of institutional incentive systems and technological capacities [100]. This is crucial for the successful implementation and sustainability of active travel initiatives, such as the development of pedestrian and cycling infrastructure.

We further argue that despite recent policy changes by some country institutions, execution has been poor owing to a lack of quantifiable results and benefits, which may, in part, speak to a deficit of capacity. For instance, numerous barriers to implementing non-motorized transport policies have been identified, including inadequate infrastructure, poorly designed safety measures, a lack of policies promoting walkways and bicycle facilities, and a lack of cycling skills [55]. Nairobi's Central Business District (CBD) road infrastructure primarily caters to motorized transport (MT), and little consideration is given to non-motorized transport (NMT), making public transportation the primary option for the low-income population. At the institutional level, weak implementation mechanisms also impede NMT system policy implementation and use in Nairobi [67]. According to the literature in this review, transport institutions require strengthening, in particular regarding change readiness, human and physical resources, intellectual resources, inter-institutional linkages, incentives, rewards, culture, leadership, political will, technical expertise, and understanding of people's needs.

4.3. Capacity at the Individual Level

Organizational capacities are built on the foundation of individual capacity, which includes personal competencies, values, and awareness [32]. These competencies are crucial in fostering a culture of active travel. In addition, community engagement provides valuable insights into individual needs and preferences to support the promotion of active travel [101–103]. A community-based network approach can also be a valuable tool for addressing the individual capacity needs for active travel. Communities can provide valuable insights into the needs and preferences of individuals regarding physical activity patterns [104], mode preferences, and space movements.

The importance of partnerships and collaboration is particularly relevant in promoting active travel in Africa at the individual level. We aim to shed light on the diverse range of services offered by community-based tourism networks (CBT-Ns) such as training, funding, marketing, and empowerment. These elements are crucial in fostering active travel initiatives. By highlighting these factors, we seek to build upon the insights of [88] and place a specific emphasis on how collaborative and integrated service approaches at the community level can be effectively applied to active travel in Africa. This perspective acknowledges the vital role of community involvement and support and explores the

potential for leveraging these dynamics to enhance active travel infrastructure, policies, and practices across the continent.

To effectively engage in capacity building at this level, we propose that it is crucial to begin by assessing the individual needs and targeted beneficiaries of a particular capacity-building effort [105]. Once the needs have been identified, a strategic approach should be designed to ensure that beneficiaries are able to benefit from capacity-building efforts. The recommended approach should involve developing skills and strengthening systems within a cultural context [106]. In Africa, the performing arts and culture industry plays a vital role in enhancing human capacity [107]. This implies that incorporating cultural elements into active travel initiatives can increase individual engagement and dedication.

Furthermore, at the individual level, capacity building should encompass knowledge, skills, values, attitudes, health, and awareness. Capacity can be developed through various methods including formal and informal education. We believe that promoting walking or biking for easily accessible activities and engaging in physical activity should commence at an individual level. This dimension is particularly relevant in the context of active travel in which individual mobility is a crucial element.

A public participation GIS (PPGIS) can enhance capacity building at this governance level. PPGIS uses GPS-enabled devices, such as Strava, to study travel patterns and suggest transportation strategies, providing insights into spatial density, and encouraging public participation. Tools such as Ushahidi and OpenStreetMap enable communities to share their experience and knowledge through mapping. PPGIS can also collect data for transport infrastructure design, allowing the public to submit spatial data, such as points of interest, routes, and accessibility. This process can inform institutional decisions and motivate individuals to share their views on cycling, walking opportunities, and challenges.

4.4. Capacity at the Environmental Level

Capacity at this level embodies the broader sociopolitical and cultural milieu that either facilitates or impedes active travel initiatives. It encompasses formal and informal institutions, sociocultural norms, and a larger ecosystem that can foster or hinder capacity-building efforts [32]. Building environmental capacity is of paramount importance for active travel in Africa. This should involve establishing the necessary structures, systems, and elements essential for creating and implementing transport policies and strategies across a range of organizations. Capacity-building activities at this governance level are significantly influenced by several environmental factors, such as administrative, legal, technological, political, economic, social, and cultural dimensions. Specifically, this environmental capacity also depends on both formal and informal institutions, social capital, and social infrastructure.

Insights from [108] offer a compelling examination of two prevalent narratives in capacity building for environmental climate regimes, which we adopted to promote active travel in Africa at this governance level. The first narrative focuses on developing technical and managerial capabilities, particularly by utilizing standardized data and project-based processes to address climate change in the short term. This approach is highly relevant for active travel. On the one hand, it involves data-driven planning and management of travel infrastructure and policies. On the other hand, it expands the scope of capacity building to include diverse forms of knowledge and engages a wide range of actors, including indigenous people, gender-specific groups, and local communities. This approach favors transdisciplinary and holistic methodologies, which are essential for tackling the complex challenges of active travel in Africa. While the techno-managerial narrative is often well resourced, centralized, and institutionalized, the more inclusive and holistic narrative tends to face limitations in terms of financial, technical, and institutional support. Therefore, there is a need for a more integrated and adequately resourced approach to capacity building for active travel that balances technical expertise with local knowledge and community involvement.

We also proposed systems to assess the impact of transport policies on all environmental systems and structures. Evaluating past and present initiatives aimed at building active travel capacity is crucial for devising future strategies. Those responsible for capacity building should assess their efforts even if the results are subjective. Common techniques for evaluating efforts can include conducting surveys, interviewing stakeholders, and conducting formal examinations [105]. The chosen evaluation method should be as objective as possible given the local context. Evaluations should consider the project's impact beyond its duration, which reflects the capacity-building processes. Impact assessments should be conducted during a project in order to make timely adjustments based on feedback. If this is not feasible or not done during the project, it can be done, at least after each capacity-building initiative. Moreover, sharing these findings is recommended to improve the chances of the success of future active travel initiatives. Active travel outcomes should be documented at all levels for knowledge management, learning, and adaptation.

Some recent developments point toward the possibility of widening the scope of capacity building and strengthening both individual and institutional levels [105]. This is because, in order to move towards a sustainable transport system, both the individual and organizational levels must be given significant attention at the environmental level. Environmental management capacity-building programs can enhance the ability of local authorities to tackle pertinent issues, such as fostering environments that encourage active travel [109]. Understanding urban political procedures and the spaces developed by city-based organizations is vital for improving the environmental level capacity in African cities [110]. This level is crucial for creating environments that promote active travel, where sociopolitical and cultural factors are harmonized with sustainable transport objectives. In our proposed guiding framework (Table 1), we present the governance level, requirements, and actions that need to be considered.

Table 1. Guiding pathways or frameworks for capacity building for active travel in Africa.

Level of Capacity	How to Meet the Requirements	Elements (Indicators)
Individual	Improving perceptions of cycling and walking as activities that are not limited to those with lower socioeconomic status. Encouraging the advantages of cycling for health, including enhanced cardiovascular wellness and weight control. Providing education and skill-building opportunities for safe cycling practices. Encouraging a shift in attitudes towards considering cycling/walking as an eco-friendly means of transportation.	Knowledge: Understanding of cycling safety rules and the benefits of cycling. Skills: Ability to cycle securely under various traffic circumstances. Value: The recognition of cycling as a sustainable and eco-friendly means of transportation. Attitude: Positive mindset towards cycling as a viable means of transport. Health: Improved physical fitness and wellbeing through regular cycling. Awareness: Recognition of cycling's/walking's role in reducing carbon emissions.
Organization	Strategies that will influence an organization's performance.	Physical resources: facilities, equipment, materials, etc. Intellectual resources: organizational strategy, strategic planning, production technology, program management, process management, inter-institutional linkage. Organizational governance structure and management methods which affect the utilization of resources (human, physical intellectual assets).
Environment	The environment and conditions necessary for operating capacity at the individual and organizational levels.	Formal institutions (laws, policies, decrees, ordinances, membership rules, etc.) Informal institutions (customs, cultures, norms, etc.). Social capital, social infrastructure, etc. Capacities of individuals and organizations under the environment.

Table 1 displays a guiding framework designed for the government and urban planning authorities to adopt and promote active travel. This framework recognizes that each country's implementation may differ depending on the nature of the problem. For instance, if the problem is a lack of motivation for cycling or walking, the focus should be on the individual level. However, if a country lacks institutional capacity, the model should address this issue at an institutional level. It is crucial to understand how these levels are interconnected and how they can be applied either individually or simultaneously. This multilevel approach enables the government and urban planning authorities to develop a tailored strategy that addresses the unique challenges of promoting active travel in a specific context.

5. Conclusions

In this study, we (a) explored what capacity building means for Africa's transport systems, (b) summarized and positioned transport issues in Africa in the context of sustainable transport under four themes, and (c) discussed ways to improve capacity building for active travel in a three (3)-level governance framework. The process of building capacity involves not only imparting knowledge or experience to individuals in isolation (e.g., workshops and trainings). Capacity building requires long-term, systemic efforts in multilevel governance of a city's capacity system. Thus, its organizations and institutional arrangements, environmental/systemic structures, and capabilities and resources at all levels must be addressed simultaneously in a way that is appropriate for each context. Although Africa's efforts to promote sustainable transportation are lagging, this paper shows that African cities are gradually realizing the importance of active travel in promoting walking, cycling, and non-motorized transport systems. This requires certain modifications and actions to enhance the capacity at different levels, as articulated in this study.

We expect that capacity-building activities in these countries will be diverse, require customisation and not all will be suitable for a specific strategy. The framing of transport issues is crucial in this regard, as how a problem is framed significantly influences policy formulation and implementation [111]. Those involved in capacity building must recognize their strengths and weaknesses, as well as those of the target, for better and more sustainable results. This requires cooperation, strategic alliances, and partnerships. Networking among capacity builders will prevent duplication of efforts and help understand the target's needs. Understanding socioeconomic factors is also crucial for successful capacity building, and it is essential to comprehend the characteristics, behaviours, and customs of the beneficiaries for the success of the intervention.

Furthermore, it is crucial for institutions to recognize that the outcomes of capacity-building interventions for active travel will vary depending on the type of intervention(s). This means that capacity building is an agile process that benefits from rigorous and continuous evaluation—particularly involving qualitative indicators that operationalise and measure changes in skills, resources, knowledge and learning. Such concepts fall outside the traditional domain of transport and thus require an interdisciplinary approach.

Worldwide acknowledgment of climate change is shaping transport policies. Consequently, the focus of transportation policies in Africa and African cities must shift from relying on cars to encouraging environmentally friendly and sustainable modes of transportation. We argue that this requires a combination of infrastructure investments at the *environmental level*, policy incentives/disincentives at the institution/organization *levels*, and behavior change at the *individual level* to encourage people to adopt more sustainable modes of transport. The guiding framework for capacity building for active travel presented in this study can serve as a checklist for diagnosing active transport needs, which areas require capacity building, and what can be done. Future research should focus on the impact assessment of any capacity-building initiative on active travel in these countries to understand how local and regional governments build their capacity.

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