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Mapping mobility in Namibia's secondary cities informal settlements: a case study of rehoboth

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ABSTRACT

Many cities in Africa are experiencing rapid urbanization where mobility is a catalyst for change. Road infrastructure, especially highways, is being constructed and expanded to ease the flow of motorized traffic especially in primary cities. Little attention, however, is given to the mobility of inhabitants in secondary cities and more so in informal settlements located in these secondary cities. This research explores how the inhabitants of Block H settlement in Rehoboth navigate their daily mobilities. Rehoboth is a satellite city south of Windhoek in Namibia, that is currently experiencing rapid urbanization and demographic change. Through a participatory mapping approach, the study identifies key areas of access for the inhabitants, the challenges they face in accessing these areas, and the opportunities that present themselves for a better mobility landscape within the settlement and around Rehoboth. Journeys to work and shopping are characterized by longer distances, primarily due to their location in the town center, while journeys to school and leisure activities are relatively shorter, benefiting from their proximity to the Block H settlement. Public transport is provided by individuals who operate shared taxis within the town, although these have limitations in terms of accessibility, affordability, and coverage within the settlements, making mobility altogether costly.

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Informal settlements; mobility; participatory mapping; Namibia

1. Introduction

Urbanization is the outcome of the active involvement of various stakeholders responsible for organizing the flows of goods, services, information, and people within cities and their regions (Marx et al., 2022). Mobility, a pivotal component of these flows, significantly influences both the economic development of the city and the societal advancement of its residents. However, in many African cities, where rapid urbanization often outpaces formal planning, mobility faces significant challenges, particularly in areas dominated by informal settlements (Oviedo et al., 2021). According to UN Habitat (2015), Africa's population is expected to triple with over 50% of the population living in informal settlements. The absence of proper road networks and public transportation within the informal settlements makes daily commuting a significant challenge, limiting access to economic and social opportunities

In several African cities, such as Lagos, Nigeria, Johannesburg, Cape Town and Durban in South Africa, and Nairobi, Kenya, the urban form is characterized by a duality between well-developed urban areas and sprawling informal settlements that are home to

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a significant portion of the urban population (Adelekan, 2010; Huchzermeyer, 2011). The apartheid era of policies of spatial segregation left a legacy of inequality that persists in the spatial distribution of infrastructure in South African cities (Turok, 2016). This is also characteristic of Windhoek, the capital of Namibia, which exhibits a concentration of informal settlements primarily situated in peripheral areas (Weber & Mendelsohn, 2017). This urban configuration finds its historical origins in apartheid planning practices in Namibia, wherein black and colored populations were systematically relocated from the city center to settlements on the peripheries. These areas, marked by a scarcity of quality housing, public services, and transportation options, continue to bear the enduring imprint of apartheid planning, evident in the city's spatial organization and socio-economic disparities (Delgado, 2021). A significant portion of the inhabitants in these areas endure substantial walking distances to reach the city center – where most services and economic opportunities are clustered – as well as to access taxis and scarce bus services (Friedman, 2000). Despite the prevalence and growing number of informal settlements in Namibia, there is a notable lack of comprehensive research, on the mobility patterns of the inhabitants within these settlements.

Namibia is currently undergoing a significant and dynamic urban transformation with its spatial landscape highlighting ubiquitous challenges in urban mobility. Despite a commendable economic growth rate of 4.3%, the country grapples with marked income disparity, evidenced by a Gini coefficient of 59.1 in 2015 (World Bank, 2015). As of 2019, a staggering 35% of the Namibian population were indicated to live in poverty according to the National Planning Commission of Namibia. This demographic growth, together with high poverty rates, has led to changes in the urban landscape, characterized by the proliferation of informal settlements (Weber & Mendelsohn, 2017). The rapid unplanned growth of settlements in Namibia is estimated to outnumber formal urban houses by 2025, accentuating the urgency of understanding and improving mobility within these areas (Weber & Mendelsohn, 2017).

This development pattern is also evident in Rehoboth, a satellite town located 80 kilometers south of Windhoek, with an approximate population of 30,000 residents (Namibia Statistics Agency, 2012). Over the past decade, Rehoboth has experienced substantial growth, marked by a rising number of residents residing in informal settlements and commuting to Windhoek for employment opportunities. The town is spatially delineated into blocks, a significant portion of which comprises informal settlements. By 2009, an estimated 12,000 individuals were reported to be residing in these settlements according to a report by the Shack Dwellers Federation of Namibia (2009). While statistical data, such as modal share, is available for the capital, Windhoek, comprehensive information on the mobility patterns of smaller but rapidly urbanizing towns like Rehoboth, remains elusive. Critical gaps in knowledge also extend to the travel behavior of inhabitants in these informal settlements. This scarcity of data and information regarding the mobility of residents within the settlements, particularly in secondary and emerging towns such as Rehoboth, highlights the motivation behind this research. The study aims to understand the present state of urban mobility in Namibia's secondary cities informal settlements, taking Rehoboth as a case study, and to explore avenues for advancing sustainable urban mobility, within and around the settlements.

By applying a participatory mapping approach, this study seeks to gain insights from the lived experiences of the inhabitants within the informal settlement of block H in Rehoboth and to provide valuable data for developing mobility strategies that align with the needs and patterns of the inhabitants. The paper continues with a literature review and presents the findings of the participatory mapping exercise.

2. Literature review

2.1. Participatory mapping

Participatory mapping has been recognized as a crucial tool for identifying and conveying development requirements as well as promoting social transformation (Cochrane & Corbett, 2020). The methodologies involve collaboration between researchers and local informants to define the objectives of the mapping exercise and determine the specific environmental elements to be mapped. This process ideally provides an opportunity for the inhabitants of the neighborhoods being mapped to contribute their perspectives and priorities (Puri, 2010). The choice of mapping medium and method, whether it's on the ground, paper-based, or through GIS (Geographic Information Systems), along with the facilitation style and approach, significantly shape the participation levels, outcomes, and power dynamics within the mapping process (Panek & Sobotova, 2015). These factors dictate not only who gets involved but also the type of insights generated and the distribution of influence among participants (Chambers, 2006).

Similar to other forms of knowledge generated through public participation, participatory mapping faces challenges such as the risk of the data not being effectively utilized in planning or implementation phases (Brown & Kyttä, 2018). Beyond symbolic gestures of inclusion, meaningful engagement that empowers participants to shape decision-making processes and directly influence the outcomes of urban planning becomes a fundamental aspect of participatory mapping. This research showcases the utilization of participatory mapping within informal settlements even under resource constraints such as limited funding and time. Additionally, it emphasizes the collaborative design and implementation of the participatory mapping process by the participants themselves.

Participatory mapping methodologies have been implemented in informal settlements in Namibia, specifically, Rehoboth's urban East. Mundia (2013) orchestrated a comprehensive approach encompassing participatory mapping, sketch mappings, and photomapping to highlight the significance of public engagement in shaping effective Integrated Land Use Plans. The evaluation of these methods revealed that the firsthand knowledge of residents regarding their locality proved instrumental in both the mapping process and its utility for land use plans. The mapping process acknowledged the expertise of the residents but also instilled a sense of ownership and agency as residents became co-creators of the knowledge they generated.

2.2. Mobility within informal settlements

Across many informal settlements, mobility is characterized by informal transportation and walking activity that creates desire lines – pathways forged by the collective movement of inhabitants seeking the most direct and efficient routes to places of necessity. Most of the inhabitants grapple with the high cost of public transit (Behrens & Wilkinson, 2003; Salon & Gulyani, 2019). The United Nations Environment Programme (UNEP) reveals that nearly 80% of the individuals across Africa walk for about an hour to access work, education, healthcare, and food. This reliance on walking results in extended journeys, often spanning considerable distances (UNEP, 2022). Despite the challenges posed by these long walks such as fatigue and exposure to environmental hazards from air pollution, walking remains a resilient and indispensable component of mobility within informal settlements. Parallel to this resilience, however, is the risk associated with walking, where pedestrians constitute a significant share of commuter fatalities in many African cities (Mitullah, 2017; Nyamai & Schramm, 2023). This is due to the neglect of safe inadequate infrastructure which poses challenges to the safety and comfort of pedestrians and also perpetuates social inequalities by disproportionately affecting those who rely on walking as their primary mode of transportation, including and especially low-income individuals and residents of informal settlements.

In Namibia, the lack of formal public transportation and the high cost of privately owned and operated taxis provide limited alternatives to mobility among informal settlement dwellers. Walking becomes the only alternative, making it a dominant mode of mobility. As an activity

that is carried out in areas where growth of the urban form takes place organically, pathways also emerge organically as pragmatic solutions to navigating the terrain and to optimize movement to desired destinations (Oviedo et al., 2021). These unmarked paths therefore reflect the practical needs of the inhabitants of the settlements and serve as pointers to the areas where people regularly journey to and the human agency in navigating the built environment.

2.3. Mobility in Namibia

The largest urban agglomeration in Namibia is found in the capital city of Windhoek where transportation infrastructure is more advanced compared to other regions in the country. A significant share of the population predominantly uses non-motorized transport (NMT) due to affordability. Around 20% of the households in Windhoek have the means to afford a personal vehicle (Kamundu, 2019).

Public transportation is insufficient and unreliable in most parts of the city and is complemented by taxi services that are owned and operated by private individuals who provide public transport services. This makes public transportation costly and as a result, many low-income households spend up to 25% of their income on transport (Kamundu, 2019).

Recognizing the large share of NMT users, the City of Windhoek (CoW) administration, in collaboration with the Ministry of Works and Transport (MWT) and the Ministry of Urban and Rural Development, supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), initiated the development of a Sustainable Urban Transport Master Plan (SUTMP) in 2012, subsequently updated in 2018. The SUTMP represents an integrated and long-term strategic plan, specifically addressing the roles of public and NMT modes within the envisioned integrated transportation framework for 2032. The SUTMP aims to alleviate congestion for both individual transport and public transport users while promoting the increased use of bicycles through enhancements to cycling infrastructure, safety measures for cyclists, and higher bicycle ownership rates. Moreover, the plan strives to reduce car dependency by improving public transportation services and prioritizes road safety, aiming to decrease the number of fatalities and injuries. It also endeavors to reduce transportation expenses for low-income households and enhance their access to public transportation. Ultimately, the sustainable master plan generates significant macro-economic benefits by lowering vehicle operating costs, mitigating congestion, and reducing external costs associated with transportation.

The geographical scope of the SUMTP extends beyond the municipal boundaries of the City of Windhoek to encompass vital linkages toward Okahandja in the north, Rehoboth in the south, and the Hosea Kutako International Airport to the east. These connections are recognized as key commuter routes, emphasizing the plan's comprehensive approach to regional transportation infrastructure.

2.4. Mobility in Rehoboth

Rehoboth is a residential satellite city to Windhoek. Most of the inhabitants commute to Windhoek by informal and formal taxis according to the City of Windhoek Master Plan (CoW, 2013). Rehoboth is split into blocks as shown in Figure 1, some inhabiting the city's informal settlements which are located on the outskirts of the city. As of 2009, 12000 people were living in those informal settlements (Shack Dwellers Federation of Namibia, 2009). Compared to the total population of 29,000 inhabitants (Namibia Statistics Agency, 2012), nearly half of Rehoboth's residents are low-income earners, relying heavily on NMT, taxis, or public transport.

Pedestrian and cycling infrastructure in Rehoboth is largely overlooked, yet it constitutes a significant share of the modal split. Through participatory mapping, this study aims to analyze the travel patterns of residents in Block H settlement in order to identify their travel patterns, to learn from their daily experiences and to facilitate effective planning for access to desired destinations. This includes measure to improve infrastructure and to implement sustainable transportation options.

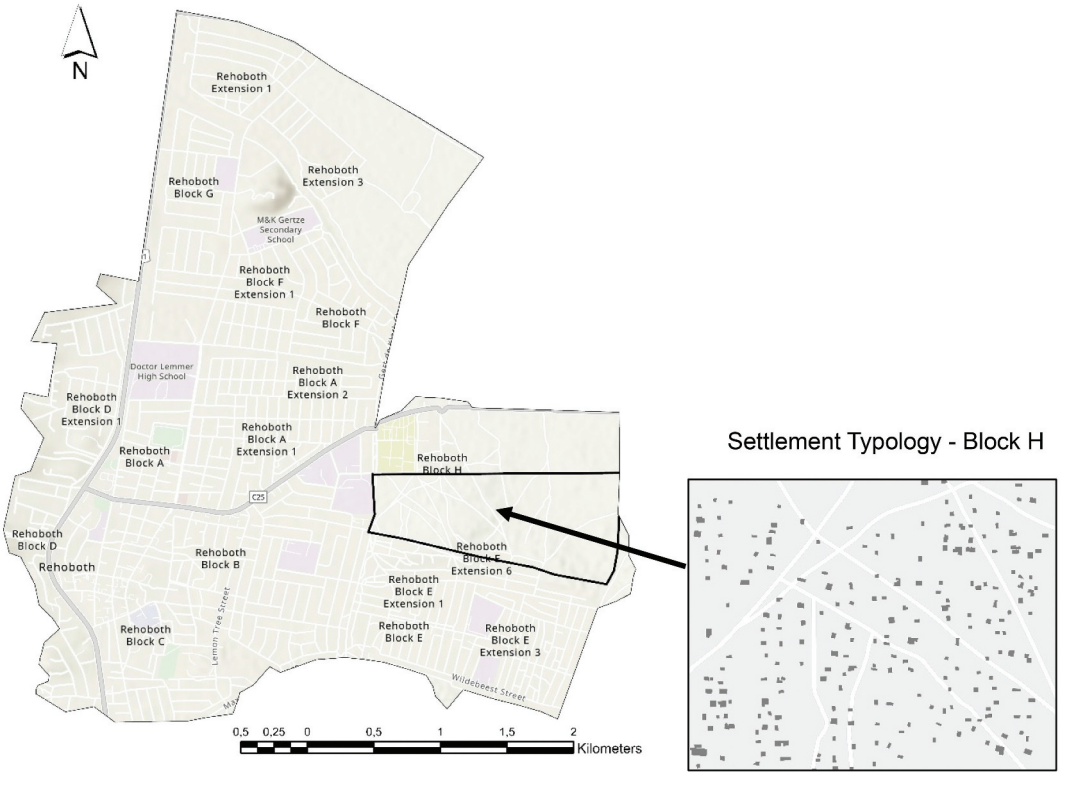

Figure 1. Rehoboth town and block H settlement.

3. Methodology

3.1. Study area

Rehoboth is located south of Windhoek in the Hardap region and is considered an important satellite city of Windhoek conveniently located 85 kilometers south of Windhoek along the B1 national highway. The area is divided into the urban west and urban east regions. The urban east is the most densely populated area with approximately 18,000 inhabitants, while the urban west accommodates approximately 11,000 inhabitants according to the 2011 Namibia National Census. The town's spatial landscape is notably shaped by the proliferation of settlements that expand to the north and east of the city center. The settlements in the east are geographically the furthest away from the center where important facilities such as supermarkets, employment areas, and medical institutions are located. Rehoboth has a low urban density and is predominantly residential. A noteworthy feature of daily life in Rehoboth is the commuting pattern of most of its residents to Windhoek, primarily facilitated by sedan taxis, which function as private vehicles offering public transport services through carpooling. The road infrastructure within Rehoboth is marked by the scarcity of tarred roads and a prevalence of gravel and sand roads.

This research specifically focusses on the Block H settlement located in the most dense area of the urban East. Block H, delineated by the black continuous boundary in Figure 1 is currently located furthest from the center of the city implying that its inhabitants undertake longer journeys to access essential opportunities and services that are clustered in the center. The primary objective of this study is to identify and analyze the mobility patterns of the inhabitants of Block H, including the destinations they frequently journey to and the predominant modes of mobility used to access these vital locations.

3.2. Methods

3.2.1. Spatial assessment and participatory mapping

The research began with a spatial assessment using satellite imagery to understand Rehoboth's developmental patterns. This provided an overview of the town's spatial extent and growth. Subsequently, the study narrowed down to Block H settlement where a participatory mapping exercise was conducted. Over two consecutive days in March 2023, participants engaged in mapping activities, complemented by pre- and post-mapping focus group discussions as shown in Figure 3. These discussions aimed to extract information on daily mobility challenges, key destinations, and perceived safety concerns.

Eighteen participants, equally distributed into males and females, engaged in mapping activities each day. The age of the participants ranged between 23 and 54 years of age and all of them constituted volunteers who are mainly involved in activities conducted by GIZ (German Agency for International Cooperation) in Namibia. The participants collaborated in small groups to map areas of personal significance and routes to their regular destinations as shown in Figure 2.

The dialogs sought to extract information concerning daily mobility challenges experienced by the inhabitants of the settlements, the predominant destinations that necessitate travel, and the perceived safety associated with movement within the settlement and in the broader city space. The

Figure 2. Participatory mapping exercise.

Figure 3. Focus group Discussion.

mapped data were consolidated into comprehensive maps, revealing hierarchical route structures for key activities, such as employment, education, leisure, religious activities, and shopping. The maps provide a visual representation of these key activities and the mobility patterns of the inhabitants of the settlements.

The researchers intended to carry out a larger online survey of the residents of Block H settlement in order to get a broader understanding of the mobility challenges faced by different groups. However, this was not feasible due to the poor infiltration of smartphones and limited internet access and connectivity in the area.

3.2.2. Physical assessment

In addition to participatory mapping, a physical assessment of Rehoboth town and Block H settlement was conducted on two consecutive days in March 2023 to evaluate existing infrastructure and observe movement patterns. The assessment involved a drive with intermittent stops, from Block H to the town center, assessing the available infrastructure and the crucial destinations pointed out by the participants. The assessment within Block H involved interactive walks facilitated by the inhabitants as shown in Figures 4 and 5.

These walks provided insights into the frequently traveled routes within the settlement as well as the daily experiences of navigating the settlement. Factors such as terrain, weather conditions, and landscape characteristics contributed a comprehensive understanding of the daily mobility challenges experienced by the inhabitants of the settlement.

Figure 4. Physical assessment of the block H settlement.

Figure 5. Interactive walks with the inhabitants.

4. Research findings and discussions

The participatory mapping exercise, physical assessment, and the focus group discussions provided useful information on the mobility patterns of the inhabitants of Block H settlement and highlighted their key destination areas within the town. It is crucial to note that the ensuing mobility patterns presented here are representative of the 18 participants engaged in the research and therefore constitute a sample-based depiction.

Initially, given the significance of Rehoboth as a satellite city of Windhoek, the researchers assumed that the B1 highway, which cuts through the city, was an important mobility route for the residents of Block H to look for employment opportunities in the capital. However, the B1 national highway was found to play a smaller role for the inhabitants of the Block H settlement than assumed. The highway is located far from the key destinations for most of the inhabitants and therefore does not play a major role as a mobility corridor for major activities except as an occasional travel route to Windhoek. The residents of Block H predominantly conduct their daily activities within the settlement and within the town of Rehoboth.

The most essential facilities for the inhabitants are located within the town center, and the most frequented destinations were indicated to be employment areas, hospitals, post office, police station, religious centers, and shopping facilities. Within proximity to the Block H settlement, schools and religious centers emerged as the regular destinations for the participants. The main shopping mall in the north of the town is also regularly frequented but primarily accessible by use of motorized mobility. The industrial area north of Block H also stood out as a crucial employment area for some of the inhabitants.

4.1. Journeys to work and school

Most of the employment opportunities are concentrated in the town center, while schools are located in the neighboring Block E settlement. Throughout the mapping exercise, school-related trips as indicated by most participants in Figure 6, primarily involved dropping off and picking up their children on foot. However, some participants acknowledged occasional use of sedan taxis for school journeys, particularly due to safety concerns. In addition to serving the school commute, taxis also serve as an alternative mobility to and from work, contingent on individual financial capability. Notably, gender disparities in mobility emerged. A larger proportion of men leave the settlement to seek employment opportunities, primarily traveling on foot. Conversely, more women expressed a preference of looking for employment opportunities within or in close proximity to the settlement. However, in instances where job opportunities were found outside the settlement area, they were more inclined to use taxis especially during evening hours due to perceived personal safety. This highlights a pattern in female mobility behavior, where proximity to home and perceived safety considerations influence employment choices and mobility decisions.

Journeys on foot from Block H to the town center take on average 50 minutes, with variations among individuals. For some of the inhabitants, covering these distances of 3.5 to 4 km, prompts a preference for taxis, albeit at a substantial economic cost. The taxis are privately owned and operated, leading to costs of travel that are deemed unaffordable for many inhabitants. As a result, the utilization of taxis is occasional and used only when necessary. Furthermore, the accessibility of taxis, both in terms of their high cost and spatial distribution (located at specific areas closer to the town center) makes it challenging for many to access motorized mobility.

4.2. Journeys to shopping activities

Shopping destinations are primarily located in the town center, creating a spatial challenge for residents of Block H. While a few shops exist in proximity to the settlement, in the neighboring Block E, these establishments mainly cater for smaller shopping needs, supplemented by visits to the

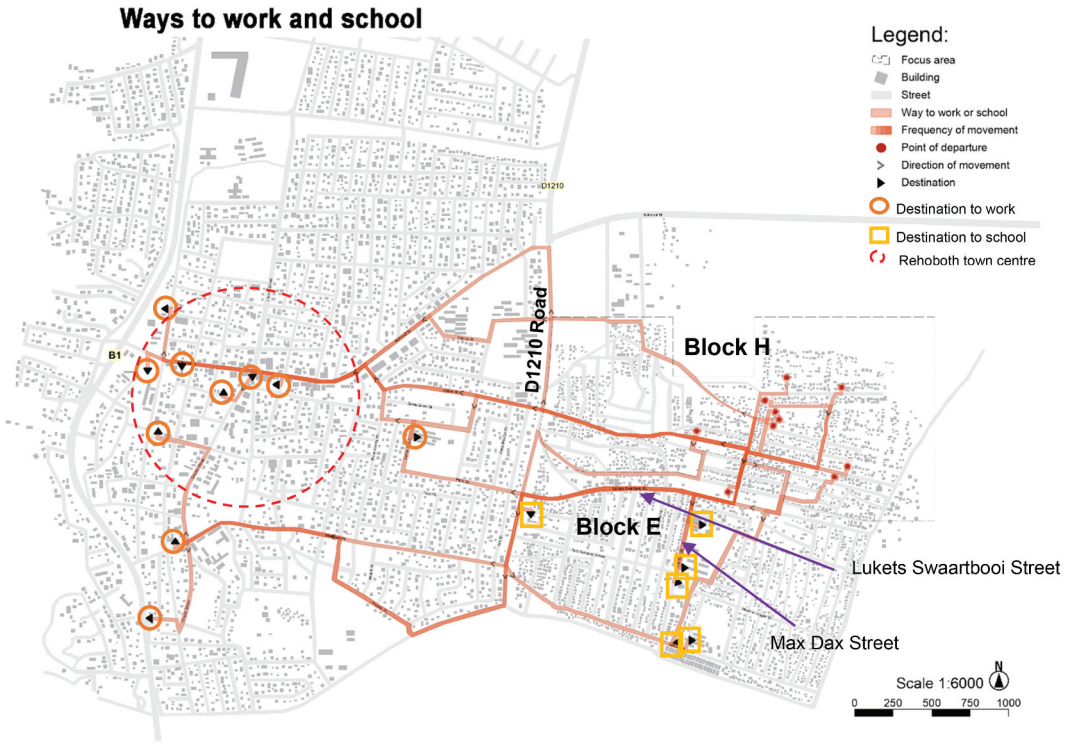

Figure 6. Ways to work and school. The darker routes are more frequented corridors in accessing these destinations.

local markets. Most of the inhabitants opt for shopping in the city center and in the mall, northwest of the town as shown in Figure 7 where purchases can be made in bulk.

The shopping journeys mainly happen on foot especially for trips to the town center and nearby shops. Return journeys from the town center often necessitate the use of taxis to alleviate the burden of transporting purchased goods back home on foot. This presents a trade-off that individuals from the settlement make to manage the spatial challenges inherent in accessing essential goods.

Taxis may at times offer door to door services; however, this service has to be explicitly requested, and in many cases, an additional fee is incurred. Monthly taxi subscriptions range from 350 Namibian Dollars (NAD) (~18USD) to NAD 520 (~28USD), while the average daily cost of a taxi ride is approximately 13 NAD (~0.70 cts USD). In profiling the multidimensional poverty in Namibia, a report by UNICEF (2021) revealed that the highest deprivation levels were reported in Transportation Assets (proportion of people from households that do not own at least a car, bus, or bakkie) at 76.2% of the national level. Accessing taxi services typically requires residents to request pickups from designated locations outside the settlement, primarily along major transportation corridors surrounding Block H, namely the extension of the D1210 road to the west and the Lukets Swartbooi Street in the south of Block H. The taxis seldom traverse the entire length of the Lukets Swartbooi Street, often turning halfway to proceed toward the extension of the D1210. Consequently, customers often need to walk toward the intersection of these two streets where taxis are most frequently available. However, the availability of taxis is inconsistent, as they tend to be present primarily during periods of high demand, notably in the morning hours between 7 am and 9 am and in the evening from 5 pm to 8pm. Beyond 8pm, taxi services ease to operate on the streets.

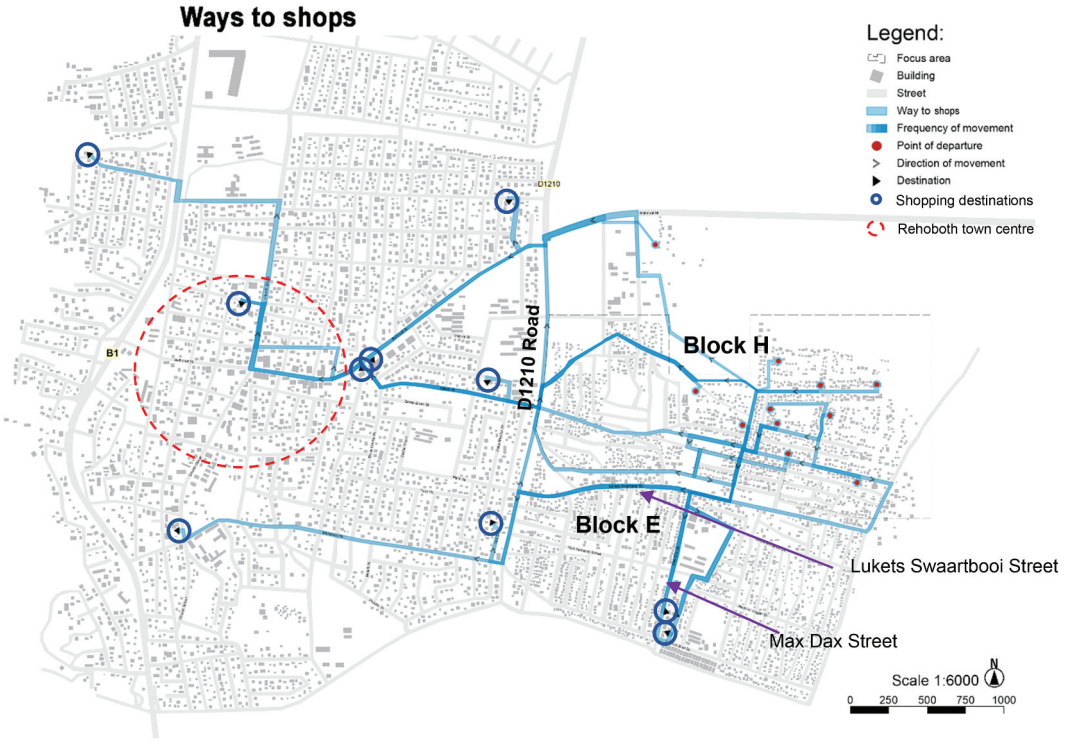

Figure 7. Routes to shopping facilities. The blue squares indicate the shopping destinations.

4.3. Journeys to leisure activities

Leisure activities for the participants included journeys to church, access to fields for playing soccer and visiting friends and family.

As shown in Figure 8, most social destinations are located within Block E, except for the mall in the northwest. The mall is more than an hour away on foot and serves as an intermittent destination for leisure activities on weekends. Generally, leisure activities do not require extensive travel as most destinations are located within proximity to the settlement.

4.4. Mobility patterns and safety

The streets close to the town center, namely Bahnhof Street and Willow Street, and the main streets around Block H, namely Lukets Swartbooi Street, the extension of the D1210, and the Maharero Street are characterized by high pedestrian activity. The pedestrian flows are directed toward the city center, reflecting the vital role these streets play in facilitating daily commutes and access to essential services.

Max Dax Street serves as a vital corridor for primary school children traveling to and from educational institutions. The street, however, registers several unsafe spots as illustrated in Figure 9.

This is largely due to the lack of pedestrian crossings and infrastructure that delineates the motorway from the pedestrian ways as shown in Figure 10.

The street is regarded further unsafe due to high vehicular speeds along narrower transport corridors. The absence of street lighting compounds safety concerns, particularly during nighttime movements. This safety issue at night prompts many women to rely on taxis, leading to an additional financial burden. Throughout the physical assessment, it became evident that many

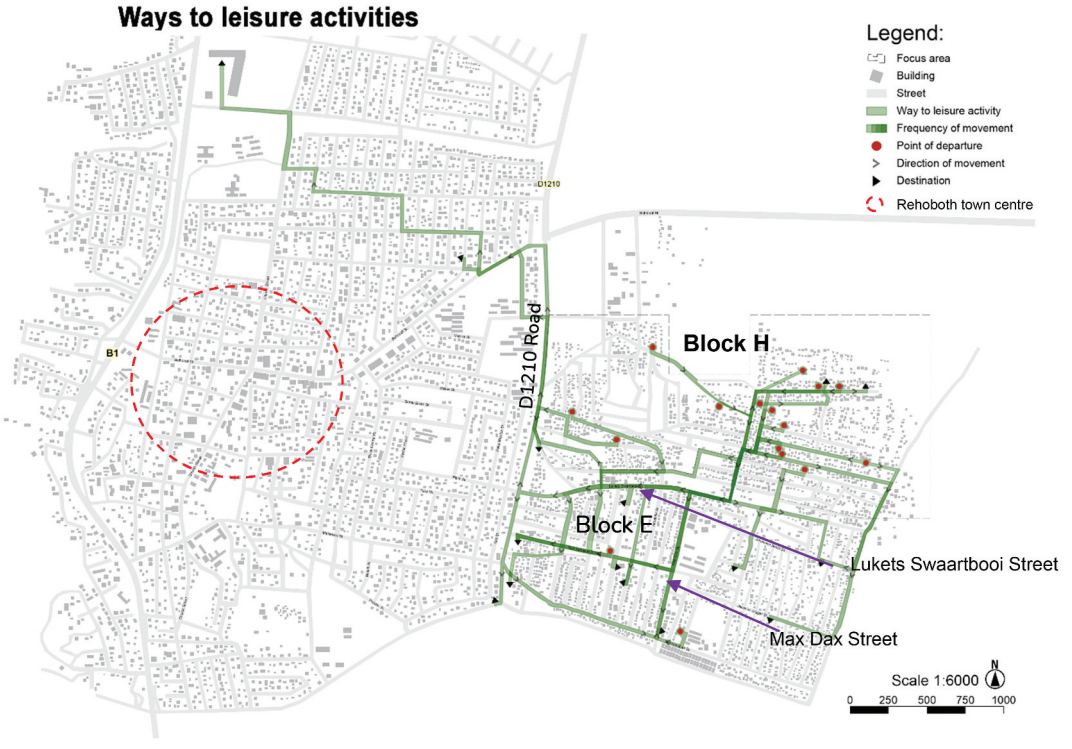

Figure 8. Journeys to leisure and recreational activities.

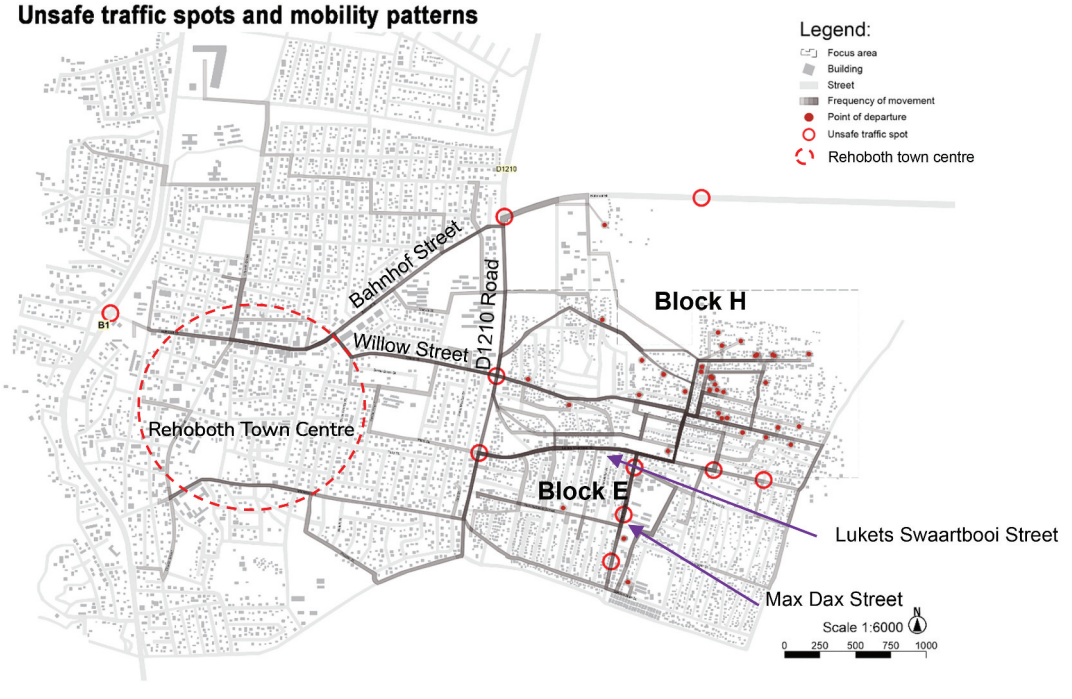

Figure 9. Unsafe spots indicated by the inhabitants of the settlements these are mainly located along the major transportation corridors in the town. The red boundary indicates block H.

Figure 10. School children along Max Dax Street, Rehoboth.

streets, similar to Max Dax Street, lack proper sidewalks and pedestrian crossing. Along the limited corridors where sidewalks are provided, they are inadequately maintained.

We further investigated the prospects of cycling as an alternative mode of mobility to reduce the travel distances to the town center that are currently primarily made on foot. The study found that the deep sandy soils in Block H pose significant obstacles to cycling, walking, and even driving a vehicle. The challenging conditions, exacerbated by swirling sand in windy weather and extreme heat in the absence of trees, particularly impact pedestrians and people with physical disabilities. Encouraging cycling within the settlement would require financial investment to level out the ground and establish pathways conducive for bicycle use. In the current context, motorized vehicles become the preferred mode of transportation but mainly in operation at the edges of the settlement along the main transportation corridors.

4.5. Policies and regulatory framework

The planning office of Rehoboth was recently established in 2022. Hitherto, the there was no office that was specifically addressing planning issues in the town. With this establishment, there has been a focus on settlement upgrading and discussions around possible bus stops for the potential establishment of a public transport system. The timeline and implementation details, however, remain uncertain.

Overall at the country level, the government's long-term development framework, Namibia's Vision 2030, recognizes the importance of transport infrastructure for overall economic development. The vision aims for safe and cost-effective transport infrastructure, urban transportation that is friendly to pedestrians and cyclists, and accessible transport in both rural and urban areas by 2030. While the plan includes expanding road networks and developing a railway system, there is limited emphasis on improving mobility within and around settlements. The document acknowledges the high cost of transportation for low-income residents and outlines plans for public transportation services, primarily underway in the capital city of Windhoek.

The Namibia Transport Policy, designed to be effective until 2035, also strives for an integrated, sustainable, and inclusive transport system. The policy supports sustainable mobility through public transport, rail transport, and non-motorized transport. It also acknowledges gender and social aspects influencing mobility. However, the existing challenges in mobility suggest that the aspirations outlined in these policies are yet to be fully realized.

Despite the ambitious goals outlined in Namibia Vision 2030 and the Namibia Transport Policy, the findings from the Rehoboth study indicate that significant work remains to be done, particularly in secondary cities and informal settlements. These areas, often overlooked in national development plans, face unique challenges that hinder mobility and, consequently, economic and social development, yet the urbanization rate in these cities is also taking place quite rapidly.

The primary focus of current initiatives in the vision appears to be on expanding major road networks and developing a railway system, with limited attention to non-motorized mobility and the specific needs of settlements such as Block H in Rehoboth. The study's findings on the difficulties faced by pedestrians and cyclists in Rehoboth highlight the disconnect between policy aspirations and on-the-ground realities. Furthermore, the high cost of transportation for low-income residents, as acknowledged by the vision, remains a significant barrier to enhancing the livelihood of the inhabitants of settlements

In summary, the findings from the study in Rehoboth are not unique or different from the mobility challenges that researchers have documented in informal settlements across various African cities. While the specific mode of transportation in Rehoboth may vary in capacity from the minivans that dominate the transport scene across various African cities (Behrens & Görgens, 2019; Onyango, 2018; Salon & Gulyani, 2019), they share a commonality. These services are predominantly operated by private individuals who step in to fill the gap left by inadequate formal transport systems. The informal nature of these transportation system often results in inefficiencies, higher costs, and safety concerns for the users.

In the absence of reliable and affordable public transport options, walking remains the dominant mode of mobility among the inhabitants of informal settlements. However, the reliance on walking is largely a reflection of affordability constraints rather than a preference. As with Rehoboth, where most of the residents of Block H settlements are compelled to walk long distances due to the lack of affordable alternatives, similar patterns have also been observed in other settlements in Africa (Okyere et al., 2021). Namibia, however, stands at a critical juncture. With its relatively low population and informal settlements emerging in secondary cities, such as Rehoboth, Gobabis, and Helao Nafidi, there is an opportunity to learn from the challenges faced by other African cities and take proactive measures to prevent similar outcomes before the population growth presents complex challenges. This includes investing in integrated transport infrastructure that prioritizes safe pedestrian pathways, and affordable public transportation.

5. Conclusion

The participatory mapping exercise was useful in collecting data on the lived experiences of the inhabitants of Block H settlement. The findings highlighted the destinations that are of significance to the inhabitants of the settlement as well as how they get access to these destinations. Notably, journeys to work and shopping are characterized by longer distances, primarily due to the concentration of services in the town center. Conversely, journeys to school and leisure activities are relatively shorter, benefiting from their proximity to the Block H settlement. These findings, however, go beyond mere points on a map. They uncover underlying issues that significantly impact the quality of life in Rehoboth. The difficulties in cycling due to deep sandy soils and the lack of safe pedestrian sidewalks and crossings are spatial manifestations of significant infrastructural deficiencies. Public transport is not a feasible option, and taxis serve as the main means of mobility, although they have limitations in terms

of accessibility, affordability, and coverage within the settlements. It is clear that mobility, although very necessary, is a stressful endeavor as most of the inhabitants incur a high cost of mobility in terms of time and safety. The prevalence of walking in daily life, although integral, becomes problematic due to inadequate infrastructure, introducing risks and stress into a necessity that is inevitable for people to advance their livelihoods. Investing in high-capacity public transport as well as attractive and safe walking infrastructure as an essential component of sustainable mobility may potentially mitigate the current stresses associated with mobility.

Overall, this research serves as a resource to comprehend the common urban mobility challenges within Namibia's growing settlements. It serves as a foundation for future research and focused interventions, aiming to address the existing sustainable mobility concerns and implement targeted measures accordingly. We posit that exploring the role of gender in mobility, as well as the impact of technological advancements, such as mobile-based transport services, could offer a more nuanced understanding of urban mobility challenges and opportunities for research on the mobility of inhabitants of informal settlements in African cities.

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