Exploring the Role of Cycling in Promoting Low-Carbon Mobility, Educational Equity & Economic Growth, Case Study of Kenyan Universities & Colleges

***Author Bio**: Sam Rholex Odhiambo-Urban and Transport Planner*

Abstract

This study investigates the role of cycling in promoting low-carbon mobility, educational equity, and local economic growth within Kenyan universities and colleges. Through a mixed-methods approach combining literature review and student mobility surveys, the research examines current travel patterns, infrastructure gaps, and socio-cultural barriers that limit cycling adoption. The findings reveal strong latent demand for cycling, constrained primarily by lack of dedicated infrastructure, safety concerns, and inadequate institutional support. The paper argues that universities can function as living laboratories for sustainable transport by integrating cycling into campus planning, policy, and entrepreneurship ecosystems. The study concludes that strategic investments in cycling lanes, secure parking, bike-share systems, and affordability programs can significantly reduce transport costs, lower carbon emissions, enhance student access to education, and stimulate local economic activity.

Key Words

- Non-Motorized Transport
- Car-Centric Cities
- Safety
- Low-carbon Mobility
- Universities
- Local Economies

Introduction

Invented by Karl Drais in the early 1800s cycling has been one of the most sustainable and affordable ways of locomoting from one place to the other. However, the rise of the car-centric cities in the 20th century saw a significant drop in the use of bicycles. In the contemporary world with awareness of climate crisis, the bicycle has re-emerged as a key tool for sustainable transport, health, and recreation. Globally, city planners and policy-makers have embraced cycling as a key ingredient in solving modern urban problems such as traffic congestion, air pollution and deteriorating public health.

However, this transition is slow in African cities with majority of them still struggling with car-centric cities and rudimentary transport policies. In majority of the African cities, more than 70% of low- and middle-income earners walk to work daily. Kenya is no exception. Similarly, majority of university students, who often live between 1 to 5km from their campuses, walk to class.

The Kenyan government has put in place measures and policies such as the Kenya Roads (Amendment) Bill (2024) and Nairobi non-motorized transport policy to enhance non-motorized transport. However, little has been implemented.

With the ongoing global talks on climate change, education iniquity in Africa and economic potential of African cities, cycling presents itself not just as a solution but as unique opportunity to shape the future of urban mobility, especially for short travel distances.

This paper seeks to understand how we can leverage cycling as a possible key to reducing carbon emissions, boosting university education and unlocking economic potential of our African cities and towns.

Research Gap

Numerous researchers have analyzed and assessed the importance of non-motorized transport. However, most of these researches have not yielded significant impacts on the implementation aspect. Cycling has proven to have significant benefits such as improved health, cleaner urban environments, more social cohesion and boosted local economies.

While cycling's benefits are well-documented, research gaps remain in the Kenyan context. Few studies measure the long-term effects of campus cycling programs on student outcomes. Similarly, carbon savings from modal shift at the campus level remain under-quantified. There is also limited empirical work on the socio-cultural dynamics of cycling among university students, especially concerning gender, class, and safety.

Objectives

The key objectives of this paper include:

i. To assess the current non-motorized transport conditions in Kenyan universities
ii. To identify barriers to cycling in Kenyan universities
iii. To provide possible solutions to scale-up cycling in universities and urban areas.

Literature Review

This review synthesizes evidence from peer-reviewed studies, policy and program reports, university project documentation, and NGO evaluations with emphasis on Kenyan contexts and university-linked initiatives

1. Cycling and Low-Carbon Mobility

Cycling has long been recognized as a critical component of sustainable transport systems due to its low emissions, affordability, and suitability

for short- to medium-distance trips (Pucher & Buehler, 2012). Research shows that replacing short motorized trips with cycling can significantly reduce greenhouse gas emissions and local air pollution, while also easing congestion (Fishman, 2016).

In African contexts, however, cycling uptake remains constrained by limited infrastructure and cultural perceptions. Studies in Nairobi reveal that over 75% of major roads lack continuous sidewalks or cycling paths, creating unsafe conditions for non-motorized transport users (Mitullah & Ogot, 2022). Nairobi's Non-Motorised Transport (NMT) Policy (2015) acknowledges this infrastructure deficit and advocates for investment in cycling lanes, pedestrian walkways, and integrated transport planning (Nairobi City County, 2015).

Universities offer micro-environments where cycling could thrive as a low-carbon alternative, given the short distances students and staff travel within and around campuses.

2. Cycling, Educational Equity and Gendered Impacts

Beyond environmental benefits, cycling enhances access to education. Evidence from Sub-Saharan Africa shows that providing bicycles to students reduces travel time, increases punctuality, and lowers dropout rates, especially among girls (Porter et al., 2012; World Bicycle Relief, 2020). Bicycles mitigate these risks and improve attendance.

In Kenya, programs like the "*Bicycles for Girls*" initiative have demonstrated marked improvements in school performance and retention (World Bicycle Relief, 2020). University-level cycling programs could echo similar outcomes, improving reducing travel time for students who walk to class and reducing students' dependence on costly motorized transport.

3. Economic Effects of Cycling

Cycling also has measurable economic benefits. At the household level, bicycles reduce transport expenditures, freeing up resources for education, food, or savings (Howe & Bryceson, 2000). For students, reduced travel costs translate into improved financial stability and greater access to academic and social opportunities (Njenga & Davis, 2003).

At a broader level, cycling generates local employment in bike assembly, repair services, and rental enterprises. For instance, the emergence of community bicycle workshops in Nairobi and Kisumu illustrates the potential of cycling-related micro-enterprises to sustain livelihoods (Mitullah & Ogot, 2022). Universities can amplify these effects by linking cycling programs with entrepreneurship training and local supply chains.

4. Barriers and Behavioral Factors

Despite its potential, cycling adoption faces persistent barriers. These include lack of infrastructure, road safety concerns, theft, and entrenched cultural attitudes that stigmatize

cycling as a "*poor man's mode*" (Howe & Bryceson, 2000; Mitullah, 2003). Gender norms further inhibit women's participation in cycling, as riding a bicycle is often viewed as socially inappropriate for young women in parts of Kenya (Porter, 2014).

Behavioral change frameworks such as the PRECEDE-PROCEED model suggest that cycling adoption requires a holistic approach with analysis of both behavioral and environmental agents, incorporating predisposing, enabling and reinforcing factors before coming up with changeable and adaptable strategies (Green & Kreuter, 2005).

Universities as Testbeds for Cycling Innovation

This paper positions universities, being innovation hubs, as ideal testbeds for cycling in Kenya's urban environments. Universities can act as "living hubs" for low-carbon transport. By embedding cycling into campus planning and curricula, universities can influence both student behavior and urban mobility policies.

Methodology

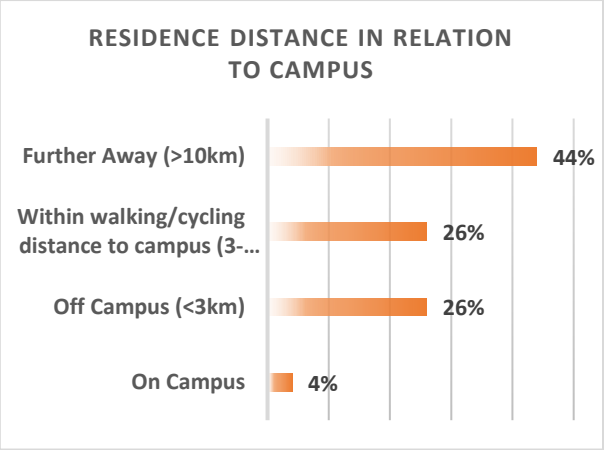
The research methodology integrates both qualitative and quantitative approaches with in-depth secondary data review and online survey questionnaires.

Research Findings

An online survey questionnaire was issued to 51 university affiliates (students and lectures) from 10 different universities and colleges across Kenya. The survey results provided a strong insight into the mobility patterns stressed the potential for cycling as a sustainable and equitable transport mode.

1. Current Travel Patterns & Distance to Campus

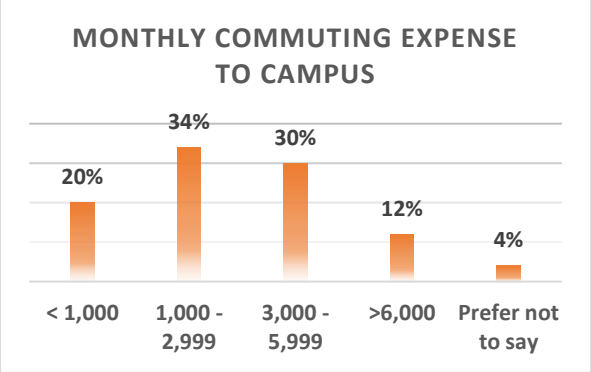
From the survey, most students commute to campus daily from off-campus residences. Only 4% live within the campus boundaries, and an additional 26% stay within a close radius of under 3 km. Importantly, 26% live within walking or cycling distance (3–10 km), representing a highly feasible range for daily cycling. Meanwhile, 44% stay more than 10 km away, making them heavily dependent on motorized transport. See the chart below.



This demonstrates that over half of the student population could realistically adopt cycling if supportive infrastructure and programs were in place.

2. Transport Expenditure Challenges & Equity Concerns

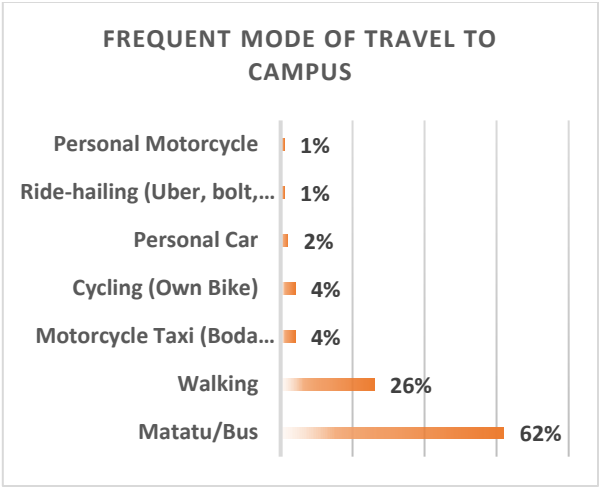
The financial burden of commuting is notable from the survey conducted. Most students spend between 1,000 – 5,999 KES monthly on transport, with 12% spending more than 6,000 KES as shown in the graph below. This is a significant portion of student income that could otherwise support other academic or welfare needs.



By comparison, cycling offers drastically lower recurring expenditure, making it a key solution for promotion of educational equity and affordability.

3. Dominance of Motorized Transport & Low Cycling Usage

Motorized modes still dominate travel behavior, particularly matatus and buses, used by 62% of the respondents. Only 4% currently cycle, and 26% walk as shown in the following graph.



When examining frequency of cycling**,** 76.9% of the respondents rarely cycle, showing that bicycles are not yet a mainstream mobility choice.

This gap between potential (distance-friendly) and actual cycling behavior signals major untapped capacity for low-carbon mobility adoption.

4. Barriers in Infrastructure & Services

The reluctance to cycle is closely linked to structural constraints in the campus travel environment. From the 51 respondents, 52% reported no secure bicycle parking on their campus and a significant 80% pointed there are no dedicated bicycle lanes/routes connecting their homes to campus.

Safety concerns and poor road quality therefore suppress demand for cycling. The data suggests that institutional and county investment in safe cycling corridors, secured parking, and traffic calming measures would significantly shift travel choices toward greener mobility.

5. Bicycle Ownership, Cost & Security Barriers

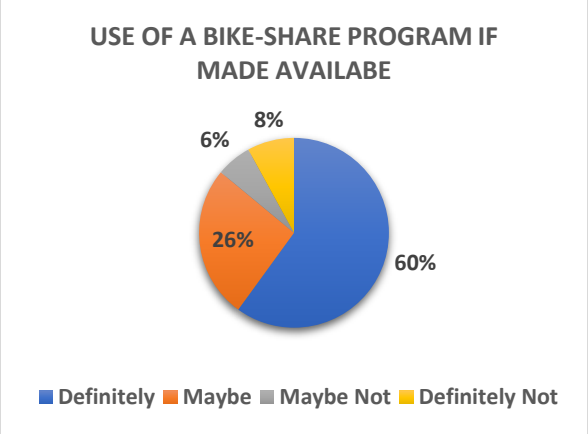
Ownership is extremely low as a significant 90% of the respondents do not own a bicycle.

From the feedback, 40% said bicycles are too expensive and 22.2% cited theft concerns.

These results show that improved affordability (e.g., subsidies, financing, refurbished bikes) and secure campus storage could break down ownership barriers significantly.

6. Strong Support for Bike-Share Programs

Despite low ownership and usage, the future outlook is highly positive. 60% would definitely use a campus bike-share program while only 8% would definitely not participate in the program.



This demonstrates strong latent demand as students show interest in cycling, but lack the tools, security, and supportive infrastructure to do so today.

Conclusion

With targeted interventions—especially cycling lanes, secure parking, bike-share services, and affordability programs—Kenyan universities can activate cycling as a transformational mobility solution that supports climate goals, student welfare, and local development.

Recommendation

To unlock the full potential of cycling as a low-carbon, affordable and equitable mode of student mobility, Kenyan universities should prioritize the development of safe and continuous cycling infrastructure both within and around campuses, including dedicated lanes, clearly marked routes, and traffic-calmed access roads.

Institutions should also invest in secure, well-distributed bicycle parking facilities and integrate theft-prevention measures to address major concerns discouraging bicycle ownership

Introducing campus-based bike-share schemes and affordable bicycle acquisition programs—such as subsidies, installment purchase plans, or refurbished bicycles—would significantly improve access for low-income students while reducing reliance on costly motorized transport.

Moreover, partnership with county governments and local bicycle service providers should be strengthened to enhance maintenance services, stimulate entrepreneurship, and promote cycling culture through awareness campaigns and cycling safety training.

Collectively, these interventions can improve educational access, reduce monthly transport costs, and contribute to sustainable urban mobility and climate goals.

References

- Fishman, E. (2016). Cycling as transport. Transport Reviews, 36(1), 1–8.
- Howe, J., & Bryceson, D. (2000). Poverty and urban transport in East Africa: A case study of Nairobi and Dar es Salaam. IHE.
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. Implementation Science, 6(42), 1–11.
- World Bicycle Relief. (2020). Impact report: Bicycles for educational empowerment program (BEEP).
- Mitullah, W. V., & Ogot, M. (2022). Kenya country report on non-motorised transport: Walking and cycling in urban areas. African Centre for Technology Studies (ACTS).
- Nairobi City County. (2015). Non-Motorised Transport Policy. Nairobi: Government of Kenya.
- Njenga, P., & Davis, A. (2003). Urban transport in Nairobi, Kenya: Integrating non-motorized transport into city planning. Transport Reviews, 23(2), 197–216.
- Porter, G. (2014). Transport services and their impact on poverty and growth in rural Sub-Saharan Africa. Transport Reviews, 34(1), 25–45.
- Porter, G., Hampshire, K., Abane, A., Munthali, A., Robson, E., & Mashiri, M. (2012). Child porterage and Africa's transport gap: Evidence from Ghana, Malawi and South Africa. World Development, 40(10), 2136–2154.