

POLICY BRIEF

**The Eyes Have It:
Visualizing the Boda Boda (Two-Wheeler)
Network, (It's Relationships and
Interdependencies)**



Acknowledgements

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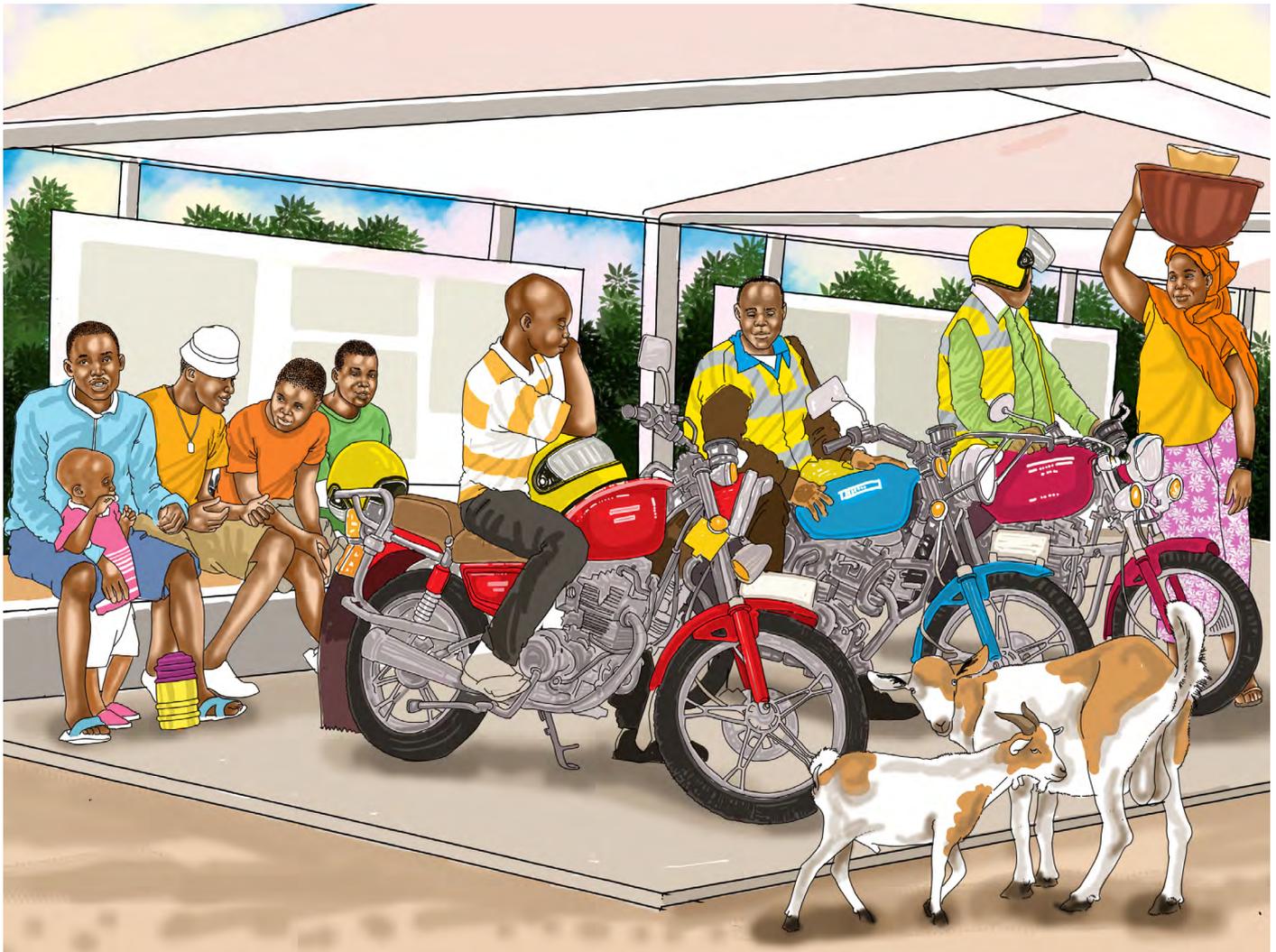
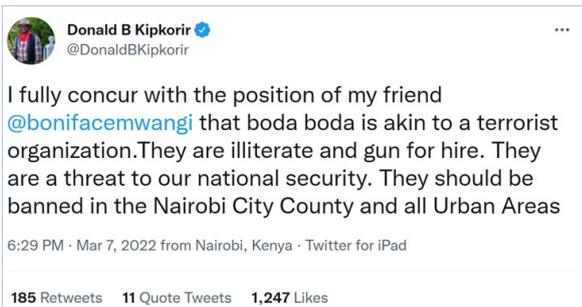


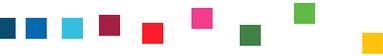
'Are there not subtle forces at work of which we know little?' ~ Sir James Saunders

Introduction

The outcry that followed the revelation of the violence meted out by suspected boda-boda riders against a female motorist along Forest Road in Nairobi in March 2022 was swift and loud¹. There were unanimous calls to quickly apprehend and punish the perpetrators with the President ordering a crackdown on boda-boda operators starting from Nairobi City and across the country. Some netizens recommended a ban of the boda-boda sector.

This incident came at a time when the globe was about to celebrate the International Women’s Day providing a stark reminder of the prevalence of violence against women. According to UN Women, one in three women worldwide experience physical or sexual violence, mostly by an intimate partner. Violence against women and girls is a human rights violation, and the immediate and long-term physical, sexual, and mental consequences for women and girls can be devastating, including death. Violence negatively affects women’s general well-being and prevents women from fully participating in society. It impacts their families, their community, and the country at large and so this incident not only deserved all the condemnation but also a rethink regarding reforming the boda-boda sector.





Background

Kenya's economy is characterized by a formal sector that is experiencing an environment of shrinking employment opportunities and an informal sector that is increasingly expanding and absorbing entrants from schools and training institutions to the labor market². The failure of the formal sector to generate sufficient wage employment to accommodate all entrants to the labor force has led to many young people starting their own businesses or seeking employment in the informal sector. Today, informality is more than ever a complex system. It is so large³, ramified, and intertwined that its organic structure seems like a tangle of activities. Day by day informal sector members contribute to keeping these structures alive with their actions, behaviors, and thoughts. Given that we all rely on their daily practices, the UNDP Accelerator Lab in Kenya⁴ hopes to untangle the network of the informal sector's daily practices through the concept of affinity and the ways to visually represent it. The attempt is to represent the informal sector dynamics to foster new synergies. **How do we design for "ecosystems" of things and agents that are interacting in a networked fashion, adapting and evolving;** what we call complex adaptive systems? Designing interventions for such complex adaptive systems requires a holistic approach to design that goes far beyond just things and end-users but takes a holistic perspective to deal better with whole networks of interacting elements that evolve. To build a shared vision of the informal sector, there is need to apply the approach of systems thinking to help reveal how we have created what we currently have as the informal sector. The concept of affinity maps can thus help us understand and analyze the informal sector as a social network. The first of these maps covers the boda-boda sector.

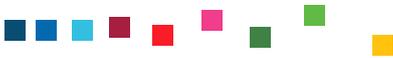
“The boda-boda sector provides one million direct jobs for riders earning Sh1 billion daily”

Context

In his Op-Ed⁵ titled the urgency of boda-boda reforms, the Interior Cabinet Secretary Dr. Fred Matiangi estimates the number of boda-boda operators to be 2.4 million. A study of the sector by Car & General (C&G) – which sells motorcycles, their spare parts, and other automotive and engineering products - shows that the boda-boda sector provides one million direct jobs for riders earning Sh1 billion daily. This underlines the importance of the sector to Kenya's economy. The boda-boda sector can be described as a demand responsive, unscheduled and flexible public transportation system that fills a market need, especially in peripheral areas⁶. The sector's existence is motivated by several factors: From the rider's perspective: even though it is informal employment, the income earned can be more than a minimum wage offering an important source of income and poverty alleviation to a segment of the population that often finds itself superfluous to the formal economy. Additionally, the growth of informal transportation is ascribed to high unemployment, ease of entry and the promise of immediate financial gain. These factors often attract new urban immigrants to this activity in the absence of better alternatives to earn a livelihood. From the user's perspective, informal transport can be ubiquitous, convenient, affordable, especially for low-income populations, and practical given the absence or inefficiency of last mile connectivity to public transport stops and terminals. Evans et al.'s research⁷ in Kampala shows that the city's boda-boda drivers serve as time-space compressors who provide improved mobility and income opportunities, weaving the city and the lives of its residents together. This resonates with studies in Bangkok, where motorcycle taxi drivers operate between four to six million trips per day and keep the city moving during massive traffic jams⁸. Informal transportation is thus seen as crucial to access jobs, goods and services.

Methodology

Like complex systems, the idea of regulating the boda-boda sector calls for looking at the sector from a holistic view and the relationship between the parts instead of just focusing on individual parts. We have attempted to do this through a Social Network Analysis (SNA). The aim of social network analysis is to understand a community by mapping the relationships that connect them as a network, and then trying to draw out key individuals, groups within the network ('components'), and/or associations between the individuals. While the research conducted for SNA is interested in individuals, the analysis itself focuses on connectivity: how individuals collaborate.



In this case, we designed the approach to aid us in the analysis and understanding of the boda-boda network.

We sought to get answers to the following questions:

1. What organizations are formally or informally connected to the boda-boda ecosystem?
2. In what ways do these organizations contribute to the ecosystem?

Methodologically, we adopted the snowball approach by interviewing a core group of 35 (1F:34M) boda-boda network members in Nairobi and Tana River Counties representing their different stages/stops as group officials and collected data on their connections. Several waves of interviews were conducted with the actors mentioned during the first wave, until the same names started to appear again and again, meaning that the boundaries of the network had been reached.

Then, we reached out to the new connections and collected data on their connections as well. Worth noting is that we do not have a complete understanding of the network as we did not interview all the mentioned connections. In addition to individual interviews, group discussions were conducted with a group of young boda boda operators. This method allowed us to capture collective, group-specific orientations of group members. It thus supplemented the narrative interviews.

Sampling a population in which the connections between actors are unknown is not pertinent as, by randomly selecting some of the actors, many relevant connections would be ignored. To address this issue, snow-balling techniques are used as an alternative that allow identifying new economic agents from among the subjects' existing acquaintances⁹. Snowball sampling does not presume that the network is consciously experienced by the actors or that the investigator can impose preconceived boundaries.

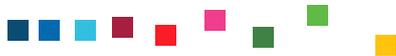
It is particularly adapted to the study of actors such as informal traders, who do not necessarily belong to a formal professional institution in which insiders could easily be distinguished from outsiders, and whose number and activities are difficult to evaluate from the investigator's perspective¹⁰. A snowballing survey will typically start with identifying a first wave of interviewees, who will be asked to name people they are related to in particular ways (family, friends, neighbor, colleagues, organization member), people they can trust or rely on, or people they feel close to¹¹. A few related attribute data, such as age, gender, or education, can be collected simultaneously.

At the end of it, this technique helped us generate a system map in the form of a rich picture visualization to show the relationships between individuals that are contained in the data collected.

The eyes have it - visualizing complexity

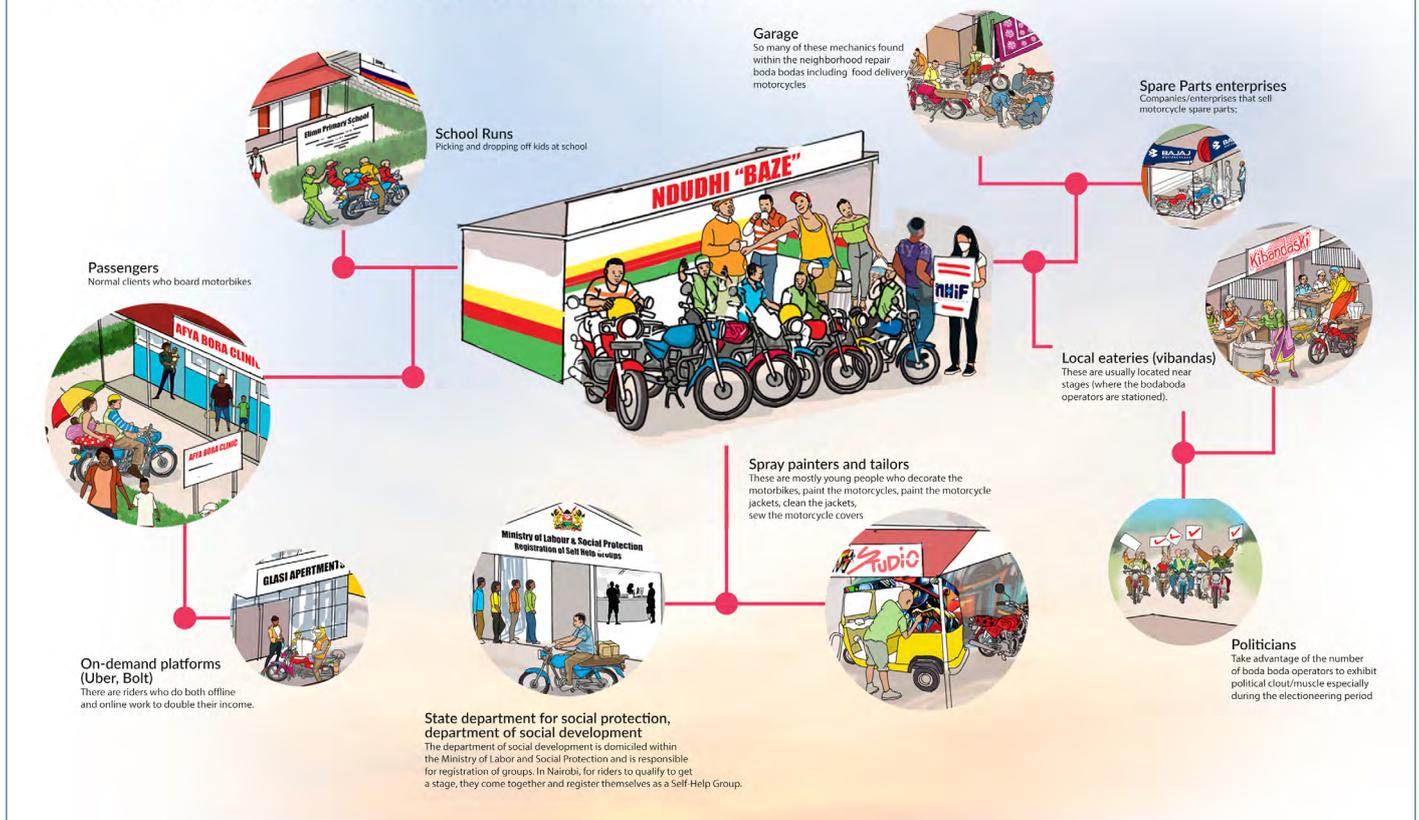
The boda-boda sector epitomizes a complex network. Visualizing networks can help us navigate complexity. Network mapping lets us quickly find patterns and deeper meaning. Thus, we sought to create a structured visualization to allow many people to visualize, comprehend and interact with the complexity that is the boda-boda sector. To achieve this, we adopted a system map to visually represent the main constituents of the boda-boda system and enable systematic, deep and broad exploration of challenges and opportunities in the boda-boda sector. Our system map illustrates the various stakeholders involved in the boda-boda ecosystem, helping us understand who is involved and how these people and organizations are connected, their relationships and interdependencies. Additionally, we have illustrated the network of value exchanges between stakeholders to help us understand the flow of values such as money, goods, services, information or trust.

“In his Op-Ed titled the urgency of boda-boda reforms, the Interior Cabinet Secretary Dr. Fred Matiangi estimates the number of boda-boda operators to be 2.4 million”



'The purpose of art is to lay bare the questions that have been hidden by the answers.' ~ James Baldwin

An ecosystem map visualizing some of the involved actors within the boda-boda network



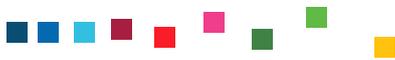
A system map is a collective term for different visualizations that are often based on systems thinking. This includes a huge variety of constituents such as people, stakeholders, processes, structures, services, physical products, digital products, channels, platforms, places, pathways, and more. A visualization of a system usually takes a specific perspective at a specific moment in time. By visualizing all the main components of a system, the interplay between these can be analyzed and designed. Complex problems become more comprehensible when they are visualized, which is particularly useful for wicked design problems. System maps can be used to map out not only existing ("current-state") systems, but also various scenarios of future ("future-state") systems to understand the impact of decisions, new components, or changed relationships. A system map can be used to find or predict intended or unintended benefits as well as disadvantages in the system.

Findings

In the first wave, we identified key nominals to begin the process with by selecting thirty-five persons who were officials representing their boda boda stages/stops in Kangemi (Nairobi County) and Hola (Tana River County). Each boda boda stage/stop had an average of 10-15 members. Out of the thirty-five interviewees, one member was a female operator while thirty-four were male. Three of the thirty-five operators were riders operating not only at their stops but also ride-hailing motorbikes. Twenty-five interviewees were below the age of 35 and five were married. Interviewees were asked to describe in the last six months who they had communicated with, learnt from and how often this person had provided them with information they had used to do their work, who they had collaborated with and how often they had worked together and who they had sought out while indicating the primary benefit they had received from their membership in the network.



Map the mess! Rich picture of the boda-boda network



Vital cog in the value chain wheel/Boda-boda's knock-on effect

Being able to step back and see an entire landscape of the network participants surfaced design opportunities previously obscured by a limited perception of the boda-boda sector. We have highlighted a few of the connections and their relationships and interdependencies to boda-boda operators.

Several repair shops/garages and spare parts shops have mushroomed near the boda-boda stops, thus opening both employment and apprenticeship opportunities for unskilled, unemployed youth, **“without boda-boda, I am unemployed,”** said one of the garage attendants. In Nairobi, we discovered that the repair shops' income streams involve not only servicing boda-bodas but also repairing delivery motorbikes from companies such as Glovo and Art Caffe. We were also informed that the garages are good apprenticeship grounds for most of the unemployed young people. Some of the established mechanics who went through this model (on the job learning/apprenticeship) perceive the Technical and Vocational Education and Training institutions (TVETs) as theory-oriented and not helpful. According to a garage mechanic in Kangemi, Nairobi County, joining a TVET helped him with getting a certificate, **“Shule kunisaidia kwangu ilinisaidia mambo ya kukua na hiyo certificate tu.”** The mechanics advised the need to start out as apprentices before joining the TVETs. Informal transport workers are **essential allies to other urban informal economy sectors** such as street vendors.

We were also informed that many vibandas (eateries) had come up next to these boda-boda stages/stops to serve the riders. By meeting this demand, the boda-boda operators had supported the livelihoods of the proprietors of these vibandas. Hawkers, mostly young women were also benefitting from the stops as they moved food items from one stop to another.

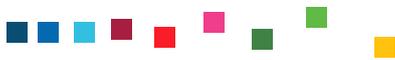
Most of the riders do not own the motorbikes, **“Wale boda boda wako Tana River 80% piki piki ni za watu, wanalipa mia tatu per day, na wale 20% ambao piki piki ni zao, 3-4% of the 20% piki piki ni zao, the remaining ni wale wamechukua pikipiki za loan.” – (Approximately three to four per cent of the boda-boda riders own the motorbikes),** boda-boda rider, Hola, Tana River County. Kenyans/local investors who decide to start a side hustle, buy a motorcycle and employ a rider who brings back an agreed amount at the end of the day. They make it easy for riders who cannot afford to buy a motorcycle to join the

trade. In Tana River for instance, we were told teachers were the main investors/employers. Fintech companies such as Watu Credit¹² have reverse engineered this approach with the incentive of motorcycle ownership after a while. They have set up branches in major towns to democratize motorcycle ownership and have partnered with motorcycle manufacturers. All one needs to pay is a deposit of around \$150 before issuance of a motorcycle. The balance is subsequently paid on a weekly basis for up to 18 months.

Informal transport is seen as more than just transport, it represents a **cultural phenomenon** with considerable political clout. Due to the huge membership, politicians associate with the members to pull crowds especially during elections. Some of the politicians have used this platform to enroll operators in motorcycle driving schools paid through the Constituency Development Fund (CDF). The huge membership has ensured government recognition and established bargaining and consultation structures. The Boda-boda Association of Kenya has provided valuable access to politicians, the media, NGOs, development agencies and other organizations in civil society, unions and associations representing other workers (both informal and formal economy), and international labor federations and agencies. This has enabled some of the operators to benefit from externally funded education and development programmes.

Digitization has introduced a degree of formality to informal transport. By requiring drivers to submit credentials and submit to GPS-based tracking and surveillance, motorcycle ride-hailing firms such as Uber, Bolt and Little and mobility fintech companies such as Watu Credit have clearly instituted some formalization of the sector.

Registration: There are calls to register all boda-boda riders in Savings and Credit Co-operative Societies (SACCOs). The National Transport and Safety Authority (operation of motorcycles) Regulations, 2015, mandates any person engaging in business of motorcycle taxis services to be a member of a body corporate which shall have a minimum of one hundred motorcycle taxis. Worth noting is that many riders within their stops/stages are already organized in self-help groups or community-based organizations but are not necessarily formally registered in associations, cooperatives or corporate bodies.



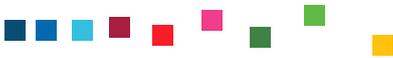
According to the riders in Nairobi and Tana River County, official channels are pursued before one gets the go ahead to operate in a particular stop/stage. This approach differs with the National Transport and Safety Authority Act as members are registered as either Self Help Group (SHG) or Community Based Organizations (CBOs) members as opposed to SACCO members which boils down to the exorbitant costs associated with registering a SACCO and past SACCO membership being dogged by misappropriation of funds. In Nairobi and Tana River, for instance, riders are frequently organized into stages with their own identities, defined territories, and pricing, and whose members pay dues and elect their own leaders. There is a system that currently works for the operators and has been sanctioned by authorities such as the area Chief, and national police service officials.

Recommendations

Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan. – Eliel Saarinen

1. Authorities could consider **adapting safety practices** from the ride hailing platforms like Uber and digital lenders like Watu Credit to address gaps in urban transportation networks. Studies have been undertaken that demonstrate the positive effects on boda-boda operator behavior from deploying digital monitoring devices. Local authorities can work in partnership with existing and new start-ups to provide new and better mobility options, while continuing efforts on formalization and regulation of informal services.
2. Money lenders can **utilize new kinds of data** available through digital transactions to profile the social and economic background of the boda-boda borrowers. Banks and micro-financial institutions (MFIs) may, thus, practice cash flow-based lending by mapping beneficiaries with digital platforms and building fintech-enabled credit-scoring systems to ensure and scale new models of financing. They could combine the voluminous data points gleaned from riders' wallets, payments, locations, and trips to build their own credit scores.

3. The siloed approach to regulation means there is an inadequacy of knowledge and capacity to know what's best and to undertake solutions that fit. Besides the usual suspects, the system map reveals who else needs to be involved in the discussions around the regulation of the boda-boda sector. For instance, the National Transport and Safety Authority (operation of motorcycles) Regulations, 2015, mandates every owner of a two-wheeled motorcycle to provide the rider and passenger with the protective gear, not cause or permit any person to ride their motorcycle unless such person is the holder of a valid driving license or a valid provisional license and ensure that motorcycle has a Third-Party Public Service Vehicle Insurance. Given the weak enforcement of the regulations, owners who buy the two wheeled motorcycle taxis also need to be involved in the discussions around regulation and the government needs to devise a mechanism to **engage them and other unusual partners**.
4. From the system map, it is apparent that the **effects of regulation are wide and deep** for the ecosystem with knock-on effects not just on the operators but on the entire boda-boda ecosystem. Authorities could approach market participants to help create regulatory sandboxes where new approaches to regulation can be tested.
5. **Listen to Voices Unheard:** Policymakers need to envision and build participatory scenarios with all stakeholders by streamlining communication channels between regulators and boda-boda ecosystem players to create an appealing vision of the informal transport system. A leverage point identification activity with all stakeholders identified through the system map can help identify where the places the network might focus its efforts to shift the system, what actions could most make a difference and where has some new opportunity opened that could make change easier and more likely.
6. There is need to **better collect, make use of and embed boda-boda operators' insights** to develop policy to stem the weak and biased enforcement of policies and regulations. Through this, actions are enabled in which the various potentials and knowledge of riders can complement state policies, that are geared towards increasing the common good for all citizens and the environments in which they live.

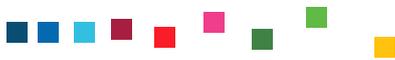


7. The question of what is going on here and how we got here is key. The emergence of motorcycle taxis as a mode of transport is a bottom-up response to the larger problem of mobility demands that are not sufficiently met by public services. The nature of urban mobility developments over the years, which is largely car centric, promotes informality. Mobility is an intrinsic need yet most urban and rural dwellers in Kenya cannot afford a car, hence they must find other means to move. This calls for **identifying ways to shape urban mobility development** and engaging built environment and urban design practitioners to reduce informality.
8. The system map indicates that regulation alone is not a silver bullet to the challenges dogging the sector. Consequently, there is need to **design a portfolio of solutions** that takes into consideration operators' working conditions such as hazardous conditions, social security and protection, long hours, high threat of robbery, road safety, poor mental health, poor physical health (pollution, hearing loss, back pain), low wages/earnings; high daily expenses (fuel, co-op fees, boda-boda rent, phone credits).

Conclusion

Social Network Analysis and ecosystem mapping provide useful approaches for helping us see the interrelationships within complex systems such as informality. Through both approaches, we can get a sense of how the minute parts fit into the big picture and opportunities for process innovation that have not yet been addressed on either the downstream or upstream side. To be effective in regulating the boda-boda sector, we need to take a step backward, observe thoroughly and intervene only after having made sense of the big picture and determined the leverage point where authorities can focus their efforts about regulation.

“According to 2019 Economic Survey, the informal sector created 83.6 per cent of total employment”



ENDNOTES

¹ <https://www.standardmedia.co.ke/nairobi/article/2001439606/update-16-arrested-after-bo-da-boda-riders-harass-motorists>

² Informal Sector Skills and Occupations Survey (ISSOS), Basic Report 2020

³ According to 2019 Economic Survey, the informal sector created 762,800 new jobs in 2018 compared to 795,400 new jobs in 2017.

This constituted 83.6 per cent of all new jobs created outside small scale agriculture sector and pastoralist activities.

⁴ <https://acceleratorlabs.undp.org/content/acceleratorlabs/en/home/locations/Kenya.html>

⁵ <https://nation.africa/kenya/blogs-opinion/blogs/urgency-of-bodaboda-reforms-3745948>

⁶ Hein Tun, T., Welle, B., Hidalgo, D., Albuquerque, C., Castellanos, S., Sclar, R., & Escalante, D. (2020). Informal and Semiformal Services in

Latin America: An Overview of Public Transportation Reforms

⁷ Evans J., O'Brien J., Ch Ng B. Towards a geography of informal transport: Mobility, infra structure and urban sustainability from the back of a motorbike. *Trans Inst Br Geogr.* 2018;43:674-688. <https://doi.org/10.1111/tran.12239>

⁸ Sopranzetti, C. (2017). *Owners of the Map: Motorcycle Taxi Drivers, Mobility, and Politics in Bangkok*, University of California Press Books

⁹ Frank O. 2012. Survey sampling in networks, in Scott J, Carrington P.J. (eds) *The SAGE Handbook of Social Network Analysis*. London, SAGE: 389–403.

¹⁰ Walther O. 2015. Business, brokers and borders: The structure of West African trade networks. *Journal of Development Studies*

¹¹ Kadushin C. 2012. *Understanding Social Networks. Theories, Concepts and Findings*. Oxford, Oxford University Press.

¹² Watu Credit is a mobility fintech that provides revenue-based motorcycle financing to mobility entrepreneurs across Africa.



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