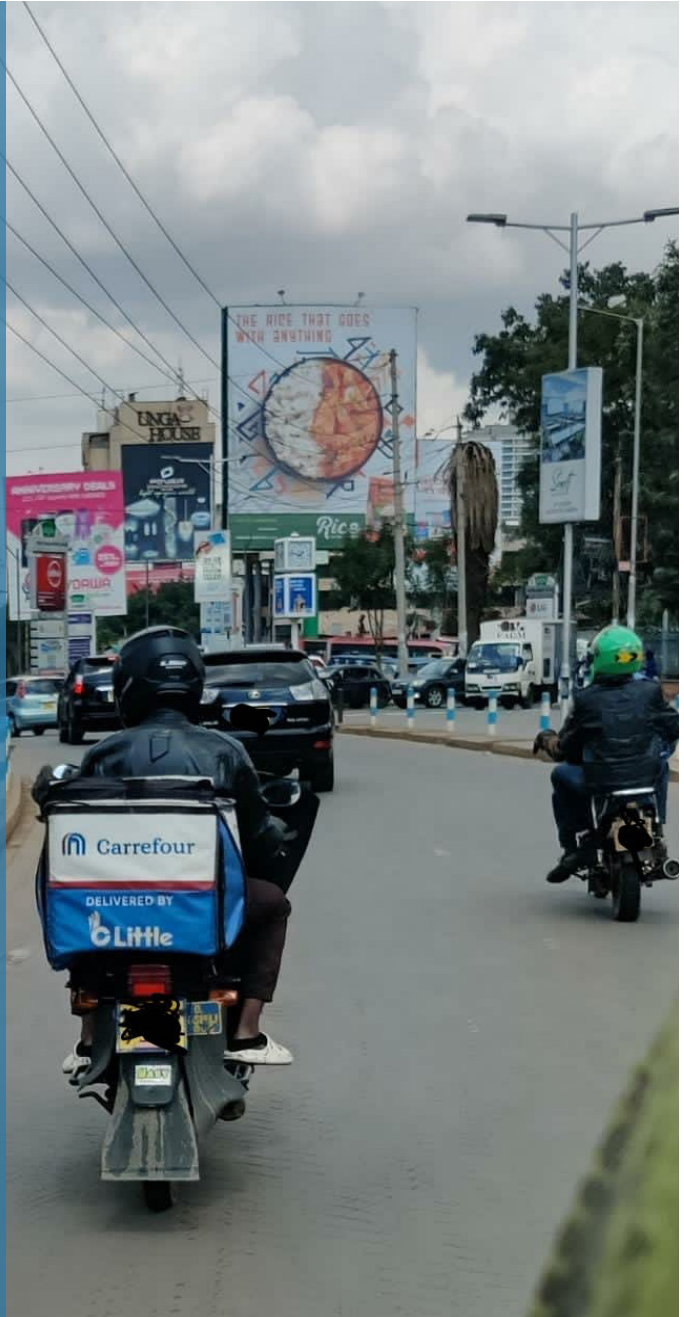
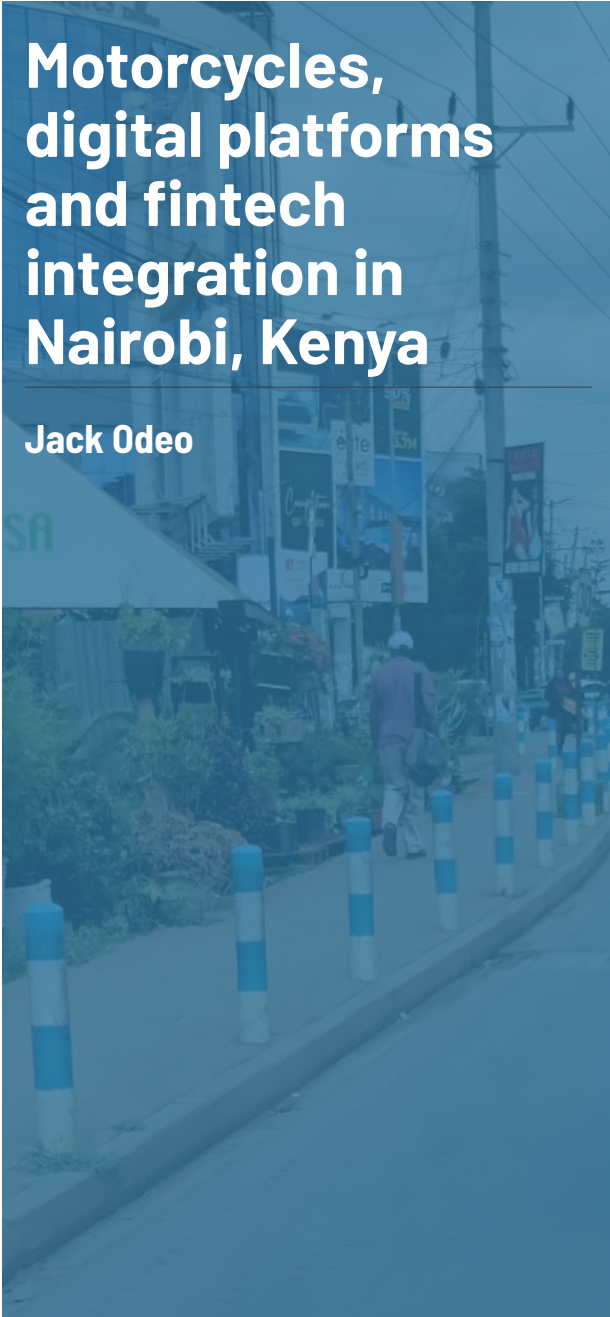


Motorcycles, digital platforms and fintech integration in Nairobi, Kenya

Jack Odeo



A platformed e-commerce delivery motorcycle in Nairobi (© Andrea Pollio]

Introduction

Motorcycles for passenger and delivery services, better known as boda boda or simply boda, are everywhere in Nairobi. They are always on the move, sometimes on pavements and pedestrian walkways, and many times on the wrong side of the road, but never held back by traffic. Stories abound where people have got out of cars and hopped onto a boda boda to beat the infamous Nairobi traffic to catch a flight or to get to an appointment in time. Boda boda filled a critical gap at a time when transport infrastructure was limited, thus offering an important mobility service, especially on short trips within the central business district and environs, and in areas of the city far removed from the bus termini or where infrastructure is missing, thus requiring an agile vehicle.

In 2008 the government action of zero-rating import duty on motorcycles up to 250cc led to an explosion in the number of motorcycles in the country, especially in urban centres, without a counter policy framework on their registration, regulation, and designation as public service vehicles (PSVs) (Kariuki, 2020). Owing to this gap it is not clear how many motorcycles operate in Kenya, however the National Transport and Safety Authority (NTSA) reports that nearly 1.4 million motorcycles had been registered as of February 2018 (Opondo & Kiprop, 2018). In recent years the sector has undergone some transformation, driven by innovations and new business models, including the emergence of digital mobility platforms and mobile money payment systems. Platforms for coordinating motorcycles for commuting and deliveries have created a foundation to integrate fintech into the last mile logistics and e-hailing services that use motorcycles for everyday movement.

Sub-Saharan Africa has witnessed tremendous financial innovation in recent years, competing with the USA and China, the leading innovators in financial technology. Fintech startups have emerged, using inexpensive accessible technologies to mobilise consumers and mobile payment systems have become an important tool for financial transactions. Within the proliferation of fintech, Nairobi has distinguished itself as an innovation hub, with several incubators and other entrepreneurial innovation spaces that seek to capitalise on the fact that Kenyans are early adopters, and that with M-Pesa and the availability of affordable phones there is a distributed financial system to which most people have access (Kiamba & Sotiriou, 2022). M-Pesa has played a significant role in catalysing financial development (TheCityUK & PwC, 2022). Initially piloted by Safaricom, the leading mobile service operator in Kenya, as a person-to-person money transfer service in 2007, it has developed into a large ecosystem of mobile payments, demonstrating innovative adaptability and reinterpretation, thus positioning the country as a world leader in mobile money (Guma, 2022). In this context, Nairobi has become a testbed for fintech startups looking to build advanced payment solutions that target the *boda boda* industry.

Fintech and platformed payment systems

[In] Kenya ... 97% [of payment is] mobile payments. [Out] of that 97%, 99% is M-Pesa. That means you need to have connectivity with Safaricom, and then you can plug it in. The beauty of Safaricom is that they already have open APIs that the engine is able to plug in.

~ A finance expert working on innovative financing models

The adaptation of digital platforms and the integration of mobile money technologies in business processes has been aided by different innovations and multiple (re)configurations of the M-Pesa system to facilitate person-to-business (and vice versa), and business-to-business transactions. These include mobile-to-bank (and vice versa) services, Paybill, Till Number, and *Pochi La Biashara*. These mobile payment solutions have been adopted by players in the two-wheeler mobility ecosystem, ranging from

asset finance companies to mobile lending platforms. Digital payments have helped to reduce costs and improve the speed of collections for asset lenders, while allowing customers to pay anytime, anywhere, and with a system that is already familiar.

M-Kopa was founded in 2011 as a consumer products startup specialising in pay-as-you-go solar energy solutions in off-grid areas, especially in rural Kenya, but has since diversified into other products and services including TVs, refrigerators, and motorcycles (petrol and electric). It runs operations in five African markets: Kenya, Uganda, Ghana, Nigeria and, most recently, Zambia. It operates a different payment model in each market. For Kenya, mobile money (M-Pesa) is integrated into its consumer API-powered platform and accepts payments off-app. Users can make payments in-app or opt-in using a USSD service code. M-Kopa has partnered with Roam, an e-mobility startup, to allow riders to acquire electric motorcycles and pay them off over a period as they earn an income from them. The same pay-as-you-go model powered by M-Pesa has been installed in the motorcycles' IoT batteries.

The M-Kopa example shows how mobile money has enabled financial inclusion through digital credit and ready-made payment solutions, driven by the demand for fast, secure, and simple digital payment solutions. Payments, however, are not the sole or main fintech innovation, especially considering that M-Pesa has a quasi-monopoly over mobile money. Fintech startups are positioning themselves to increase their share in the lending sector and, as a result, lenders and asset finance companies are integrating new tools and platforms into their growth strategies to help clients through the lending experience.

Let me tell you something about fintech in general. Anybody who enters payment processes, that's just a hook ... you can never break even on payments. The margins are so small. ... The essence of any fintech is lending.

~ A financial expert working on innovative financing models

Affordability is one of the biggest impediments to motorcycle ownership as riders are required to make once-off payments. The quoted sums are usually beyond the reach of most people, and particularly *boda boda* riders who belong to the lower income rungs of Kenya's urban classes. The price of a new motorcycle ranges from KES 90,000 to KES 150,000 (USD 680 to USD 1,130) depending on the brand and engine capacity, with Indian brands like TVS, Boxer, and Bajaj dominating the market.¹ It is this gap that microfinance startups working in the asset finance space are working to fill. They target motorcycle-taxi operators, building their business around daily micro-payments using available technologies, thus disrupting the traditional cash-based market. Powered by mobile technologies, innovators are building a modern infrastructure that is changing the mode of payment.

¹ Exchange rate as at 4 April 2023: USD 1 = KES 132.90 (<https://www.xe.com>)

There are various payment typologies in the fintech space including third party aggregators who have built commercial payment systems to facilitate transactions (e.g. Jiji and iPay) as well as entities that have built their own payment gateways (e.g. JumiaPay). However, M-Pesa, notably, has become and remains the backbone of mobile payments.

Boda boda riders desire products beyond asset coverage, including insurance and micro credit to cover for motorcycle repairs. This is where asset finance companies come in, combining the power of digital payments, risk reduction, and data gathering tools like Internet of Things (IoT) technologies. They finance the purchase of the motorcycles, then create a value-added service including service and repairs, spare parts, protective gear, and insurance. Through a digitised pay-as-you-go (PayGo) model, riders get instant access to motorcycles while building ownership over time through flexible daily micro-payments. Asset companies, such as Moove, employ technology-enabled mechanisms in their operations, including GPS tracking to monitor movement of the assets as well as remote locking to shut off the assets in the event of non-payment. Riders only obtain full ownership after paying the full cost of the lease, but the asset companies retain the ability to repossess the asset in the event of default. Sometimes riders are unable to make the daily payments and resort to alternative credit – mostly digital microloans – to pay their asset loans. This has seen the number of digital credit companies and digital loans disbursed in Kenya grow exponentially since the launch of M-Shwari in 2012. Digital lenders offer instant, automated, and remote credit decisions, removing the need for in-person applications, thus giving borrowers a quick and convenient option for credit. Despite a government crackdown on digital microlending, industry practices around pricing, marketing, debt collection and customer data handling have raised concerns. However, the promise of these fintech business models is also to offer riders additional services that they would not otherwise access.

We have built in the insurance [premium payment] into the daily [asset financing] repayments. [and] it is a game changer.

~ A product manager in a Nairobi fintech startup

Moove, an asset finance company, has partnered with Uber to finance the acquisition of motorcycles by platform riders. Riders operate on the Uber platform, but the motorcycle is monitored by Moove. On signing up, the rider agrees to a certain range/radius of operation, outside of which the engine is automatically switched off, as in the case of non-payment of daily instalments. Moove has also partnered with Car and General to undertake exclusive servicing of the motorcycles for the duration of the loan (covered in the instalments and therefore at no extra cost to the rider), adding a mandatory physical touchpoint with the rider from time to time through the dealership service centres.

Data, risk, and decision making

Most of the e-commerce sites [and other entities] that have some muscles are building their own internal systems. Because if you do, you have control of the float. That is the first thing. The second thing is that you now have 100% control of the traffic data that's coming through, which is a goldmine.

~ A finance expert working on innovative financing models

Many *boda bodas* across the city are acquired on asset financing arrangements. Since motorcycles are notoriously easy to steal, the need for spatial interfaces as a security measure, such as GPS tracking, has become almost a mandatory requirement. In the case of electric motorcycles, there is an added physical interface – charging/swapping stations – ensuring almost daily physical contact between the rider and lender. E-mobility companies such as Roam do not operate charging/swapping stations but digitally and remotely collect data from the assets. A lot of data is collected daily from riders by multiple entities including the platform they operate on and asset financing companies. The data includes geographical coverage in terms of distance, time, number of trips, and amount made, although this is difficult to measure because of sign-ups on multiple platforms. Electric motorcycle data includes the level of charge in the battery, battery temperature, and charging frequency. The data generated becomes an important aspect in the processes of risk identification and assessment in terms of the health of the assets, the condition of the infrastructure on which the asset is operating, the security of a given geographical area, and risk profiling of the riders. Table 1 categorises some of the data collected and their uses.

Table 1: Categories of data collected

Type of data	How	Why	Example
Financial	Third party access to M-Pesa log, rider app	Analyse rider's credit worthiness	Mogo, Watu, Moove
Spatial temporal	GPS tracker on motorcycle, on battery, rider app	Analyse rider's zone and time of operation, and traffic behaviour, possibly for risk analysis	Stimaboda, Roam, M-Kopa
Asset health	IoT technologies in batteries	Monitor asset health and use (level of charge, battery temperature, etc.)	Moove, Stimaboda, Ampersand

Roam, an electric mobility startup, operates on the model of charging a battery anywhere. The charging adapter acts like an interface between the domestic power output (in homes and offices) and three-phase input needed to charge a high-capacity battery for powering a motorcycle. The data collected through the IoT embedded in the battery includes level of charge in the battery, battery temperature, and charging frequency. Such data is useful in developing a profile for individual riders and could be shared with a financial product partner for the purpose of risk rating.

If we know the patterns of the riders, we can build a case for the insurer for differentiated rates based on how a rider behaves. The data [we collect] allows us to see the speed and other information about the actual riding. If they drive safely, they can get rebates on their insurance.

~ A product manager in a
Nairobi fintech startup

Regulatory framework

In Kenya Vision 2030, financial services have been identified among the key enablers for national prosperity (GoK, 2007). However, like many countries, Kenya lacks an overarching regulatory framework for fintech, therefore regulation is sectoral based, according to financial activity or product. The National Payments Strategy 2022–2025 aims to realise the vision of a secure, fast, efficient, and collaborative payment system that supports financial inclusion and innovations. As per the National Payments Systems Regulations, fintech companies providing payment solutions are registered and licensed by the Central Bank of Kenya (CBK) as payment service providers, and with the growth of digital lending, amendments to the Central Bank of Kenya Act seek to place the sector under the direct authority and supervision of the CBK (GoK, 2014, 2021).

The growth of digital financial services has also raised important questions about volume, variety, velocity, veracity, and security of customer data. The Data Protection Act was enacted to give effect to the provisions of Article 31 of the Constitution of Kenya that grants every person the right to privacy (GoK, 2019, 2010). The Office of the Data Protection Commissioner regulates the processing of information related to an identified or identifiable natural person. This is key for fintech operators as it is inevitable that they will interact with personal data, like Know Your Customer (KYC) Compliance, and transactional information.

Generally, the regulatory environment in Kenya is characterised by a duality of gaps in regulation, and laxity or non-enforcement of existing regulations. This has allowed for a lot of experimentation, but has also concerned some operators (who have slowed down scaling of innovations fearing their practices might be delegitimised when regulations catch up), and created grey areas for predatory practices, especially around pricing and aggressive collection and recovery practices. The digital lending space in Kenya has been characterised by a lack of transparency on terms and conditions, leading to high default rates.

Speculation/trends/experimentation: Nairobi testbed city

Innovations in the transport and mobility sector are key in contributing to a decarbonising pathway (Eccarius & Lu, 2020). Pollution from urban mobility, making up to 25% of greenhouse gases, with over 70% coming from urban paratransit systems, is one of the greatest challenges to the future of air quality in cities. In Africa, transport contributes up to 10% of greenhouse gases (Conzade et al, 2022). Electric motorcycles, considered a virtuous form of urban mobility, are quickly gaining ground, aiming to offset the negative externalities linked to urban commuting and last-mile logistics. However, the emergence of e-mobility systems presents new challenges. While the Standards Act mandates the Kenya Bureau of Standards to promote standardisation in industry and commerce, and provide facilities for the examination of conformity to set standards of imported and locally assembled and manufactured goods, gaps do exist in the electric mobility sector in terms of the operating standard for imported and locally assembled electric motorcycles and parts. Industry players are divided on an interoperability push but do agree on an incremental push towards standardisation, experimenting with different models for the mainframe and the batteries. While some operators prefer to sell the motorcycle with the batteries, others, such as Stimaboda, sell the motorcycle but retain ownership of the batteries and offer it to the riders as a service. As a new technology being tested to understand what the customer wants, operators are concerned that a hurried move towards standardisation may lock the system into a specific solution that does not meet the demands of the *boda boda* industry.

So far, all these players coming out with their own options are putting out small numbers of bikes, fearing that new laws will come out that will make their bikes non-compliant.

~ A product manager in a
Nairobi e-mobility startup

Standardisation will lead to interoperability and this will hamper scalability, although it is important to standardise safety.

~ An e-mobility startup founder

Stimaboda is an e-mobility startup in Kenya, in partnership with an Indian manufacturer, that produces electric motorcycles targeting the *boda boda* industry. The company operates on a battery-as-a-service model, where riders lease-to-own the motorcycles through an arrangement with asset finance companies, while the batteries remain the assets of Stimaboda on a pay-per-use basis at any point in a network of battery charging/swapping stations.

The e-mobility push in Kenya comes against a backdrop of current power generation that is relatively small for a country of more than 50 million people, but is higher than actual demand (in part because of low access in rural areas) and mostly coming from renewable sources. The promise of these startups is that,

in buying the extra capacity to power motorcycle batteries, they will contribute to the state fiscus by reducing its dependence on fuel imports. These imports are highly subsidised and therefore constitute a constant budgetary headache for an indebted nation like Kenya, where a big proportion of revenue goes to servicing external debt.

We see Nairobi as the future of e-mobility. All the benefits of e-mobility can be found enhanced in Kenya: cost of fuel is high, there's very intensive usage of motorcycle taxis, high renewable energy content of the grid, and a couple of other things like ease of doing business, presence of big multinationals like Bolt and Uber that can support the growth of the sector, asset financiers, the existence of M-Pesa ... It is the perfect storm.

~ An e-mobility startup founder

Table 2 shows some of the experiments taking place within the two-wheeler e-mobility space across different players in Nairobi.

Kenyans are very receptive to new technology. They adapt to and embrace new tech very fast. Likewise, if something doesn't work, they'll drop it tomorrow. So that has provided a good platform to come and test ideas for Africa. Something may work here and not work elsewhere, but if it doesn't work here, it's not going to work anywhere else. Since Kenya provides a good platform, there has been this rush to come and experiment.

~ A finance expert working on innovative financing models

Table 2: Experiments in e-mobility

Experiment	Description	Example
Charging Model		
Swapping/charging station	A network of purpose-built infrastructure for charging and exchanging batteries	Stimaboda, Ecobodaa
Charge anywhere	A charging device is provided that allows riders to charge at any point	Roam
Tracking		
Track motorcycle + battery	Tracking devices on motorcycle and battery	M-Kopa
Track battery	Battery is fitted with an IoT that tracks its GPS location and its health (level of charge, temperature, etc.)	Stimaboda, Powerhive
Product Model		
Sell motorcycle + battery	Rider gets to own motorcycle and battery	Roam
Sell motorcycle + lease battery	Rider owns the motorcycle, but the battery remains an asset of the company and is leased on a pay-per-use in a swapping model	Stimaboda, Powerhive
Other		
Smart cabinets	To navigate the challenge of locating an address in the last mile, smart cabinets are strategically placed where riders can drop off deliveries for clients to pick up	Speedaf

Conclusion

Motorcycles, more robust and agile to navigate through Nairobi's traffic and access the unconnected last mile, have become a modal choice for reliable passenger and delivery services. The sector interfaces with several other urban economies, including digital payments, thanks to high mobile phone penetration in the country and novel innovations in mobile telephony and financial technology. M-Pesa, a disruptive fintech innovation, has created a new market and value network that has expanded financial access in the country. Its role in catalysing financial development with its fast, secure, simple distributed digital payment solution cannot be underestimated. Indeed Nairobi is a leading centre of innovation on the continent, with a growing number of tech incubators and a population eager to try out and adopt new innovations. Lack of data trails, however, has been cited as an impediment to the development of more robust digital financial services. Fintech platforms and other mobility platforms can bridge this gap by collecting and sharing [responsibly] vital data that can revolutionise digital finance services and improve their value proposition. Platformisation of motorcycles has expanded the scope of fintech beyond payment gateways to digital credit and related added services like insurance. Finally, thanks to new and enhanced regulations in Kenya, including the requirement for digital lenders to obtain licences and disclose all conditions including fees and charges, issues such as data privacy and consumer protection are being addressed. This shift in the regulatory landscape is geared towards building consumer confidence, fostering growth of the sector, and curbing financial crime.

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