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Artificial Intelligence in Urban Mobility: A Theoretical Account of Optimisation, Equity and Informal Transport in African Cities

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ABSTRACT

Artificial intelligence promises cities fluid traffic, predictable transit and seamless mobility, and the promise is now being sold to African cities whose transport is dominated by minibuses, motorcycle taxis and shared cabs operating outside formal regulation. This theoretical paper examines what AI in urban mobility can mean where most mobility is informal. Drawing on transport-planning and transport-equity theory, on the paratransit and informal-transport literatures, and on recent research on digital platforms, ride-hailing, transit data and bus rapid transit in African cities, it distinguishes three applications of mobility AI, traffic optimisation, transit planning and platform matching, and shows that the first serves private vehicles that a minority own, the second depends on data that informal operators do not produce, and the third formalises informal transport on platform terms that shift risk to drivers. The paper develops a framework in which the equity effect of mobility AI depends on whose trips are measured, whose time is valued and whose vehicles are prioritised, derives seven propositions about the conditions under which AI improves mobility for the majority who ride informally, and considers three alternative models, data cooperatives with operator associations, hybrid formalisation, and public mobility platforms, through which informal transport might be improved rather than replaced. Lagos, with its danfo minibuses, its contested bus rapid transit corridor and its history of motorcycle-taxi bans, anchors the analysis. The paper closes with implications for transport authorities, platform regulators and African transport research. It concludes that a mobility AI which cannot see the trips of the informal majority is not, in any meaningful sense, smart, and that measuring those trips, valuing their passengers' time and prioritising their vehicles is the condition for the technology to serve the many rather than the few.

Keywords: urban mobility; intelligent transport systems; artificial intelligence; informal transport; paratransit

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1. INTRODUCTION

In most African cities the majority of motorised trips are made in vehicles the state neither owns, schedules nor routes: minibuses known by local names, danfo in Lagos, matatu in Nairobi, trotro in Accra, daladala in Dar es Salaam, together with motorcycle taxis, shared saloon cars and three-wheelers. This informal or paratransit sector is not a residual awaiting replacement. It is the public transport system, carrying far more passengers than the formal bus and rail services that governments have built alongside it, and it has survived decades of policy designed to formalise, regulate or remove it (Durant et al., 2023; Asimeng & Jauregui-Fung, 2025).

Into this setting arrives artificial intelligence. The smart-mobility industry offers adaptive traffic signals, congestion prediction, demand-responsive transit, ride-matching and routing algorithms, and the national and city strategies of Nigeria, Kenya, Rwanda and others now promise them (Mhlanga, 2026; Egba et al., 2026). Platform companies have already deployed matching algorithms at scale in ride-hailing and motorcycle-taxi services across the continent. The question this paper addresses is what these technologies do, and can do, in cities where the mobility system they are designed to optimise is largely informal.

The argument is that mobility AI as currently conceived serves three distinct functions, traffic optimisation, transit planning and platform matching, and that each has a characteristic equity failure in the informal city. Traffic optimisation improves flow for private vehicles that most residents do not own. Transit planning requires schedule, route and ridership data that informal operators do not produce and that the state does not collect. Platform matching formalises informal transport on terms set by the platform, improving service for riders while shifting risk to drivers and extracting value from both. These are not implementation problems; they follow from the design of the technologies and from the question of whose mobility they are built to improve. The paper therefore proposes a framework in which the equity effect of mobility AI is determined by whose trips are measured, whose time is valued and whose vehicles are prioritised, derives propositions from it, and examines alternatives in which the informal system is the object of improvement rather than the obstacle to it.

The analysis begins with the smart-mobility model and the assumptions on which it rests, and then characterises informal transport as the mobility system of African cities rather than a deficit awaiting replacement. It develops the three-application decomposition in detail before presenting the equity framework and the propositions that follow from it, and it closes by examining alternative models in which the informal system is improved rather than displaced and by applying the framework to Lagos.

2. LITERATURE REVIEW

2.1 The Smart-Mobility Model and Its Assumptions

Smart mobility is the transport component of the smart city: the use of sensors, data and algorithms to manage movement. Reviews of smart governance identify data integration, analytics and real-time control as its core (Almulhim & Yigitcanlar, 2025), and artificial intelligence has become its leading edge, promising prediction and optimisation across traffic, transit and logistics (Mhlanga, 2026). The model has three layers. The first is sensing: cameras, loop detectors, GPS traces, mobile-phone records and transaction data that describe how vehicles and people move. The second is inference: models that predict demand, detect incidents, estimate travel times and learn patterns from the sensed data. The third is control: signal timing, dispatch, routing, pricing and matching decisions made or recommended by the models.

Four assumptions

The model assumes, first, that the vehicles whose movement matters are detectable, that they carry transponders, that their drivers use navigation apps, that their trips are recorded. Second, that the transit system is scheduled and routed by an authority that can act on predictions, that there is a timetable to adjust, a fleet to redeploy. Third, that the road space to be optimised is used by a population whose time has roughly comparable value, so that minimising aggregate delay is a defensible objective. Fourth, that the data generated by movement belongs to, or is available to, the public authority responsible for transport. In the cities where smart mobility was developed these assumptions hold approximately. In African cities each fails, and the failures are related.

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The critical literature

The critical smart-city literature has established that imported models fit African and Southern cities poorly and that the fit is forced at the expense of the informal majority (Bandauko & Nutifafa Arku, 2023; Alizadeh & Prasad, 2024). Sen et al. (2026) argue that informal urban systems subsidise the smart enclaves built beside them. In transport specifically, Azeez et al. (2025) propose an Afrocentric urban mobility model whose premise is that African cities are overwhelmingly structured by informal transport and that smart-mobility visions which ignore this are planning for a city that does not exist. Acheampong et al. (2026), in a systematic synthesis of evidence on platform-mediated mobility in African cities, characterise the relationship between digital platforms and existing mobility systems as parasitic: platforms depend on, draw value from and reconfigure the informal and conventional transport they enter, and the governance of their effects has lagged well behind their spread. Firzan et al. (2025), reviewing paratransit in the digital era, find that models developed for formally regulated systems in high-income countries transfer poorly to the lightly regulated paratransit of developing countries, and that sub-Saharan Africa is both a major site of paratransit research and a context in which the developed-country models fit least well.

These critiques establish that the problem exists. The sections that follow try to specify its structure.

2.2 Informal Transport as the Mobility System

The informal-transport literature has moved decisively away from treating paratransit as a deficit. Durant et al. (2023), comparing five sub-Saharan African cities, show that informal public-transport operations are subject to differing degrees of regulation and that the relationship between city authorities and operators ranges from antagonism to negotiated partnership, with the more productive arrangements treating operators as parties to reform rather than targets of it. Asimeng and Jauregui-Fung (2025) argue that bus rapid transit must be tailored to the complex realities of African cities, including the dominance and resilience of paratransit, and that fare and physical integration with existing operators is among the critical issues on which projects succeed or fail. Chetty and Venter (2025) trace the evolution of bus rapid transit concepts in the region toward lighter design and incremental deployment, noting that the exclusion of the paratransit industry from early projects, as in Dar es Salaam, was a source of conflict and that incorporating incumbent operators is increasingly seen as a step toward integration. Venter (2026) asks directly whether bus rapid transit remains relevant in Africa and concludes that its future depends on integration with paratransit and on institutional arrangements that can coordinate the multiple functions involved.

What the informal system does well and badly

Informal transport is demand-responsive, dense, cheap to enter, and reaches areas that formal services do not. It also carries costs: unsafe vehicles and driving, unpredictable fares, exposure to extortion, poor conditions for women and other vulnerable passengers, and emissions. Mchunu et al. (2025), in a scoping review of public transport and the safety of female commuters in low- and middle-income countries, find that harassment and insecurity in both formal and informal systems constrain women's access to essential services and that cities in Africa and Latin America report higher rates. Vanderschuren and Lane-Visser (2025) assess two decades of transport equity in South Africa and find that progress has been uneven and that the informal minibus sector remains central to the mobility of the poor while largely outside the equity instruments that policy has deployed. Oviedo et al. (2025) show that affordability, rather than physical access alone, determines whether transport serves the poor, and that the growth of informal settlements at the urban periphery with little formal transport makes informal services the only affordable option for many.

Data in the informal system

The defining feature of informal transport for the purposes of this paper is that it generates almost no data of the kind smart mobility requires. There are no timetables, because routes are served when demand warrants; no ridership counts, because fares are paid in cash to a conductor; no fleet records, because vehicles are individually owned; and no GPS traces, unless a platform or a research project has installed them. Bruwer et al. (2023), critically reviewing commercial floating-car data in sub-Saharan African transport planning, find that such data is sparse, commercially controlled and unevenly representative, and that paratransit operations have been investigated only through proof-of-concept projects rather than systematic coverage. Vergel-Tovar et al. (2023), adapting the Digital Matatus methodology developed in Nairobi to map Bogotá's unmapped transit, show that smartphone-based mapping of informal routes is

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feasible but labour-intensive and requires the cooperation of operators. Nakalembe et al. (2026) benchmark informal mobility in Kigali using detailed motorcycle-taxi trip data and argue that such data is a precondition of inclusive transport planning, which cannot plan for trips it cannot see. Booysen et al. (2025), planning the electrification of minibus taxis in South Africa, note that the sector is lightly regulated and that planning must rely on passenger-side rather than vehicle-side data.

The informal system is, in short, the mobility system of the African city, and it is data-sparse by construction. Any account of mobility AI must begin from that fact.

3. CONCEPTUAL FRAMEWORK

3.1 Three Applications of Mobility AI and Their Equity Failures

Mobility AI is not one thing. It is applied in three distinct ways, each with its own data requirement, its own beneficiaries and its own characteristic failure in the informal city.

Traffic optimisation

The most mature application is the optimisation of road traffic: adaptive signal control, incident detection, congestion prediction and dynamic routing. Its data comes from cameras, detectors and the navigation apps of drivers. Its objective is almost always to reduce aggregate delay or increase throughput, and its beneficiaries are the vehicles that occupy road space. In African cities those vehicles are disproportionately private cars, which a minority of households own, while the majority ride in minibuses and motorcycle taxis that carry many more people per unit of road space but are often treated by traffic engineering as obstacles to flow, stopping unpredictably, loading at junctions, occupying lanes, rather than as the system's most efficient users. An optimisation that minimises vehicle delay will, in such a city, prioritise the few; one that minimised passenger delay would prioritise the many, but it requires occupancy data the informal system does not provide. This is the first equity failure: traffic AI optimises for the vehicles it can see, which are the vehicles of the better off.

Transit planning

The second application is the use of data and models to plan and operate scheduled transit: forecasting demand, designing routes, allocating fleets, integrating fares. Its data requirement is the highest of the three, routes, schedules, ridership, origin–destination patterns, and in African cities that data exists only for the formal services that carry a minority of passengers. Bus rapid transit illustrates the consequence. Mwesigwa et al. (2024), evaluating access and equity of the Dar es Salaam system, find that its benefits are unevenly distributed and that integration with feeder systems, including existing paratransit, is what would extend them. Alem Gebregiorgis and Greiving (2026) analyse the same system's systemic criticality in a city whose transport is dominated by informal and paratransit services, and find that its vulnerability derives in part from its isolation from the system around it. Diallo (2025) describes the Lagos bus rapid transit as infused with a socio-technical imaginary of modernity, a sanitised transport system free of paratransit, that pre-existing modes of regulation in the transport industry have made impossible to realise. The second equity failure follows: transit AI plans the formal system in detail and the informal system not at all, and because the formal system serves corridors rather than the periphery where the poor live, planning precision accrues to those already best served.

Platform matching

The third application is the one that has actually reached informal transport at scale: platform matching, in which ride-hailing and motorcycle-taxi companies use algorithms to match riders to drivers, set prices, route trips and rate performance. Here the data problem is solved by the platform itself, which generates GPS traces, fare records and ratings for every trip. The equity failure is of a different kind. Acheampong et al. (2026) show that platforms enter existing mobility systems, draw value from them and reconfigure them, and that the governance of the resulting effects on paratransit, conventional taxis and drivers has lagged. The labour literature documents the terms. Anwar et al. (2023) describe the pandemic-era hustle of Nairobi ride-hailing drivers who bear the costs of vehicles, fuel and risk while the platform sets the price, and who conclude there is no future in it. Ekdale and Aidoo (2024) show drivers navigating platform work through solidarity and hustling, building collective strategies to recover agency the algorithm removes. Omolo (2025) finds that e-hailing in Kenya has changed the nature of work through contracts that classify drivers as partners rather than employees, and that women are a very small share of registered drivers. Finck Carrales (2025), reviewing the conceptual movement from paratransit to platform-mediated and micro-mobility services, notes that regulation

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and policy have not kept pace with the transformation. The third equity failure is this: platform AI formalises informal transport, but it does so on the platform's terms, improving reliability and safety for riders who can pay while transferring risk to drivers and extracting a margin from a sector that previously retained its earnings locally.

The pattern

Across the three applications a pattern emerges. Traffic AI serves vehicles it can see; transit AI serves systems that have data; platform AI serves whoever controls the data it generates. In each case the informal majority is either invisible to the system, outside its scope, or inside it on terms it did not set. The pattern is not a failure of any particular deployment. It follows from the question of whose mobility the technology is built to improve, and that question is answered, implicitly, by three design choices examined next.

3.2 A Framework: Whose Trips, Whose Time, Whose Vehicles

The equity effect of any mobility-AI deployment is determined by three choices that are usually made by default rather than by decision.

Whose trips are measured

A mobility system can only optimise the trips it observes. If observation comes from private-vehicle navigation apps, formal transit smart cards and traffic cameras, the trips of the informal majority, paid in cash, made in unregistered vehicles, on routes no authority has mapped, are absent from the model, and the model will allocate road space, signal time and planning attention as though they did not exist. Nakalembe et al. (2026) make the point from the other direction: once informal trips are measured, they can be planned for. The first design choice is therefore whether the system invests in measuring informal mobility, through operator partnerships, passenger-side surveys, participatory mapping of the Digital Matatus kind, or regulated access to mobile-network data of the sort Bruwer et al. (2023) call for, or treats the absence of data as the absence of trips.

Whose time is valued

Every optimisation has an objective function, and in traffic engineering the objective is usually vehicle-delay or vehicle-throughput. A vehicle-based objective values the time of a single-occupant car equally with that of a minibus carrying eighteen passengers. A passenger-based objective would weight the minibus eighteen times more and would reorder every signal-timing and lane-allocation decision in the city. The choice is rarely made explicitly, because the data for a passenger-based objective is rarely available; but the consequence is a systematic bias in favour of those whose time the system can count. Oviedo et al. (2025) and Vanderschuren and Lane-Visser (2025) show that transport equity depends on affordability and access for the poor; an optimisation objective that does not value their time cannot deliver either.

Whose vehicles are prioritised

The third choice is which vehicles the system treats as the mobility system and which as interference. Bus rapid transit with dedicated lanes is an explicit prioritisation of formal buses over everything else, including the minibuses that may carry more passengers on the same corridor. Diallo (2025) shows that the Lagos corridor was conceived as a space free of paratransit. Chetty and Venter (2025) and Venter (2026) show that lighter, incremental designs that incorporate incumbent operators are both more feasible and more equitable. The AI layer inherits the prioritisation of the physical design: a signal-priority algorithm for formal buses that treats minibuses as general traffic encodes a political choice in software.

Propositions

Proposition 1. The equity effect of mobility AI in an African city is determined primarily by what the system measures, and a system that does not measure informal trips will worsen the relative position of informal riders regardless of its algorithmic sophistication. Proposition 2. Traffic optimisation with a vehicle-based objective function will, in cities where most passengers travel in high-occupancy informal vehicles, reduce aggregate passenger welfare even while reducing aggregate vehicle delay; the sign of the effect reverses when the objective is passenger-based. Proposition 3. Transit-planning AI will improve equity only to the extent that formal transit is integrated with paratransit in data, fare and physical terms; applied to isolated formal corridors it concentrates benefits on those already best served (Mwesigwa et al., 2024; Asimeng & Jauregui-Fung, 2025). Proposition 4. Platform matching improves rider outcomes and worsens driver outcomes in proportion to the platform's control over price-setting and data, and the net effect on the informal sector depends on whether the platform's margin is retained locally or extracted (Acheampong et al.,

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2026; Anwar et al., 2023). Proposition 5. The safety and inclusion benefits of mobility AI for women and vulnerable passengers, tracking, identification, rating, are real but accrue to platform-mediated services that most such passengers cannot afford, so that without extension to the informal mainstream the technology widens rather than narrows the safety gap (Mchunu et al., 2025). Proposition 6. Data generated by informal transport, where it is collected, will be used for the functions that require least institutional capacity, enforcement, taxation and removal, unless its governance is settled in advance with operator associations; this is the mobility analogue of the legibility problem in informal settlements. Proposition 7. Incremental, hybrid approaches that improve informal transport in place, vehicle renewal, route rationalisation, cashless fare collection, electrification, will deliver larger equity gains per unit of investment than formal systems designed to replace it, because they reach the majority directly (Chetty & Venter, 2025; Booysen et al., 2025).

The framework does not reject mobility AI. It specifies the three design choices that determine whether it serves the many or the few, and it insists that the choices be made visibly.

4. ANALYSIS AND DISCUSSION

4.1 Alternative Models

If informal transport is the mobility system, then the appropriate object of mobility AI is its improvement, not its replacement. Three models visible in current practice and research show what that could mean.

Data cooperatives with operator associations

Informal operators are organised: unions, route associations and owners' associations govern access to routes, loading points and terminals in most African cities, and Durant et al. (2023) show that the more productive city-operator relationships treat these associations as partners. A data cooperative would extend the partnership to information: operators install low-cost GPS and passenger-counting devices, the data is held jointly by the association and the transport authority under agreed rules of use, and both parties use it, the association to rationalise routes and defend its members' interests, the authority to plan and to prioritise. The Digital Matatus lineage (Vergel-Tovar et al., 2023) and the Kigali benchmarking of Nakalembe et al. (2026) show that the data can be generated; Bruwer et al. (2023) show the gap that regulated access to mobile-network data could fill. The cooperative model answers Proposition 6 directly by settling governance before collection.

Hybrid formalisation

The bus rapid transit literature has converged on hybridity. Chetty and Venter (2025) describe the regional shift toward lighter designs and incremental deployment that incorporate incumbent operators; Asimeng and Jauregui-Fung (2025) identify fare and physical integration with paratransit as critical; Venter (2026) ties the relevance of the mode to its integration. Hybrid formalisation applies the same logic to the AI layer: signal priority extended to minibuses on designated routes, fare integration through mobile money rather than smart cards that require a formal fleet, and route rationalisation negotiated with associations and supported by shared data. Booysen et al. (2025) show that even the electrification of the minibus fleet can be planned as a system of systems that takes the sector's structure as given. Hybridity trades the imaginary of a sanitised system (Diallo, 2025) for improvement of the real one.

Public mobility platforms

The third model takes the platform-matching function out of private hands. The algorithms that match riders to motorcycle taxis and set fares are not technically difficult; what is scarce is the market position that allows a private platform to capture the margin. A public or cooperative platform, operated by a transport authority, a drivers' association or a municipal enterprise, could deliver the rider benefits of matching, tracking and rating that Proposition 5 identifies, retain the margin locally, and set terms for drivers that the labour literature (Anwar et al., 2023; Ekdale & Aidoo, 2024; Omolo, 2025) shows private platforms do not. The model has risks, public enterprises in African transport have a poor record, and it depends on the regulatory settlement with private platforms that Acheampong et al. (2026) and Finck Carrales (2025) find lacking. But it names the alternative that the current platform model obscures: the technology is cheap, the market power is not, and the market power is a policy choice.

4.2 Lagos as an Anchoring Case

Lagos is the largest city in Africa by most estimates and the one in which the contest between formal and informal mobility has been most visible. Its mobility system is the danfo minibus, tens of thousands of privately owned yellow buses

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operating on routes governed by unions and loading-point associations, supplemented by motorcycle taxis (okada), three-wheelers, shared cabs and, on a small number of corridors, formal bus rapid transit, rail and state-regulated buses. Lagos has also adopted the smart-city vocabulary with enthusiasm, including intelligent traffic management, and has become one of the continent's largest ride-hailing markets (Egba et al., 2026; Azeez et al., 2025).

The corridor and the imaginary

Diallo (2025) reads the Lagos bus rapid transit as a symbol of urban reform and institutional modernity whose founding imaginary was a transport system free of paratransit, and shows that the pre-existing regulation of the informal industry, its unions, its route governance, its political embeddedness, has made that imaginary impossible to realise. The corridor carries a small share of the city's trips; the danfo carry the rest. Any transit-planning AI applied to Lagos today would plan the corridor in detail and the danfo not at all, exactly as Proposition 3 predicts, and would thereby concentrate planning attention on the minority of trips the formal system serves.

Prohibition as policy

Lagos has repeatedly responded to informal transport by prohibition rather than integration: bans on motorcycle taxis in large parts of the city, restrictions on danfo routes, and the promotion of formal alternatives that the prohibited modes' passengers cannot afford or reach. The pattern illustrates Proposition 6. The state's growing capacity to see the informal system, through cameras, enforcement data and registration, has been used for removal, the function that requires least institutional capacity, rather than for upgrading, which requires most. Mobility AI deployed in this institutional environment will amplify the pattern unless the governance of its data is settled first.

The platform market

Lagos's ride-hailing and motorcycle-taxi platforms demonstrate Proposition 4. They have delivered reliability, tracking and cashless payment to riders who can afford them, and have organised a segment of the informal sector under algorithmic management whose terms the drivers did not set. The labour outcomes documented in Nairobi (Anwar et al., 2023; Ekdale & Aidoo, 2024) have close parallels in Lagos, where drive-to-own and vehicle-financing schemes bind drivers to platforms through debt. Regulation has oscillated between tolerance and restriction without settling the questions of driver status, data ownership and local value retention that Acheampong et al. (2026) identify as the governance gap.

The possibility

Lagos also possesses the elements of the alternative. The danfo unions and route associations are among the most organised informal transport institutions on the continent, and could be partners in a data cooperative. The state's transport authority has the planning capacity to pursue hybrid formalisation, signal priority for high-occupancy minibuses, mobile-money fare integration, negotiated route rationalisation, rather than corridor-by-corridor replacement. The city's technology sector could build a public or cooperative matching platform. The framework specifies what would make any of these an equity gain: measure the danfo's trips, value its passengers' time, prioritise its vehicles, and settle the governance of the data before collecting it.

4.3 Implications

For transport authorities

The first implication is that mobility-AI procurement should be evaluated against the three design choices before any system is bought: what will it measure, what objective will it optimise, and which vehicles will it prioritise? A system that measures only private vehicles and formal transit, optimises vehicle delay and prioritises formal buses should be recognised as a regressive investment in a city where most people ride informally. The second is that the data problem of the informal sector should be addressed through partnership with operator associations rather than through surveillance, because the former produces data the sector will cooperate in generating and the latter produces data the sector will evade. The third is that the integration of formal and informal systems, in data, fares and road space, should precede or accompany any AI layer, since AI applied to an isolated formal system amplifies its isolation.

For platform regulators

Platform matching has reached informal transport faster than regulation. The framework suggests three regulatory priorities: driver status and the allocation of risk, which the labour literature shows platforms have resolved in their own favour; data ownership and portability, so that the trip data platforms generate is available to transport planning

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and to drivers' associations; and local value retention, through licensing conditions or through support for public and cooperative alternatives. Finck Carrales (2025) and Acheampong et al. (2026) both find that policy has not kept pace; the framework indicates where it should catch up first.

For research

The propositions are testable. Proposition 2 can be examined by simulating passenger-based and vehicle-based signal optimisation on corridors with measured occupancy. Proposition 3 can be tested by comparing equity outcomes across bus rapid transit systems with different degrees of paratransit integration, extending Mwesigwa et al. (2024). Proposition 4 can be studied through comparative analysis of driver earnings and rider outcomes across platform and non-platform informal services. The data-cooperative and public-platform models need design research and pilot evaluation. And Lagos itself, despite its prominence, is under-researched in the peer-reviewed transport literature relative to Nairobi, Cape Town and Dar es Salaam; the propositions offer an agenda.

Limits

The framework treats informal transport as a sector with shared interests, when owners, drivers, conductors, union officials and passengers have divergent ones. It treats the three applications of mobility AI as separable when deployed systems combine them. It is built from a literature concentrated in a few cities. And it does not address freight, walking or cycling, which carry much of the mobility burden of the poor. Each limit marks a direction for extension.

5. CONCLUSION AND RECOMMENDATION

Artificial intelligence in urban mobility was built for cities in which vehicles are detectable, transit is scheduled, road users' time is comparably valued and movement data belongs to the public. African cities are none of these, because their mobility system is informal, and the informal system is not a problem to be solved before smart mobility can begin but the thing smart mobility must serve. This paper has decomposed mobility AI into three applications, traffic optimisation, transit planning and platform matching, and shown that each fails the informal majority in a characteristic way: by optimising for the vehicles it can see, by planning the systems that have data, and by formalising on the platform's terms. It has proposed a framework in which the equity effect of any deployment is decided by whose trips are measured, whose time is valued and whose vehicles are prioritised, and has derived propositions from it. And it has identified three models, data cooperatives, hybrid formalisation and public platforms, in which the technology improves the informal system rather than replacing it.

The conclusion is not that African cities should forgo mobility AI. It is that they should ask of every deployment the question the technology does not ask of itself: whose mobility is this for? In cities where the majority rides in danfo, matatu, trotro and daladala, a technology that cannot see them is not smart. A technology that measures their trips, values their time and prioritises their vehicles would be the first smart mobility built for the cities Africa actually has.

6. CONTRIBUTION TO EXISTING KNOWLEDGE

The paper contributes a decomposition of mobility AI into traffic optimisation, transit planning and platform matching, and shows that each fails the informal-transport majority in a characteristic way: by optimising for the vehicles it can see, by planning the systems that have data, and by formalising on the platform's terms.

It further contributes an equity framework in which the effect of any deployment is determined by whose trips are measured, whose time is valued and whose vehicles are prioritised, giving transport authorities and regulators a basis for judging mobility-AI investments by their consequences for the majority who travel informally rather than by the sophistication of the technology.

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