

# Research issues arising from a review of themes at the formal-informal transport interface in developing countries

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## Abstract

Informal urban transport is provided by private operators as a direct service to the market with low or no formal regulation. Formal transport is regulated in some capacity – it officially exists, is registered – through contracts, permits, or licenses. An operator may not just enter the market. The informal-formal transport interface occurs in situations where the two forms of provision interact, typically around the ‘last mile’ – getting from a formal drop off point such as a metro station, to a final destination on an informal mode. Where informal transport is being studied, two typical scenarios present themselves from a supply side. The first scenario is that of a city where there is *no* existing or planned formal transport corridors or spines. In this instance the emphasis is one of accepting informal transport as the sole mode - a given which is unlikely to change due to funding or capacity constraints making formalised mass transit unlikely. In this case understanding the sector’s inner dynamics more and gauging how its outputs can be improved for greater public good, are key focal points. The second scenario is where the formal and the informal coexist or are about to co-exist. In contemporary transport policy these are often due to bus rapid transit systems being introduced into an area where there is existing informal supply. This dualised or hybridised situation is a far more complex avenue of research than accepting informality as the sole provider of transport, as it leads to questions of tradeoffs between the two sectors and presents dilemmas relating to the desirability and existence of the informal and how it should support the formal. This paper discusses literature pertaining to each scenario and concludes with a series of research questions to facilitate the development of further research into this critical area.

## 1. Introduction

Informal urban transport is provided by private operators as a direct service to the market with low or no formal regulation. An example would be the motorcycle boda-bodas in Uganda, where, *theoretically*, anyone can provide transport services to the market without requiring a permit or contract. This does not mean, however, that there are no underlying informal governance dynamics at play – only that they are not enforced through the state. Formal transport is regulated in some capacity – it officially exists, is registered – through contracts, permits, or licenses. An operator may not just enter the market. Examples range from

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contracted bus and rail services, to government operated services, to rickshaws or taxis requiring a permit to operate. The informal-formal transport interface occurs in situations where the two forms of provision interact, typically around the ‘last mile’ – getting from a formal drop off point such as a metro station, to a final destination on an informal mode. An example would be alighting Cape Town’s railway network, to connect to a minibus taxi to convey one to one’s home or place of work.

Informal transportation is prevalent in developing countries<sup>2</sup> where the capacity of government to provide fully formalised, planned and regulated transit to cater to the mobility needs of all citizens is typically absent. As an example, informality in general exists in Indonesia - a combination of individuals not wishing to borrow from formal financial sources, expand their operations, or pay taxes, as well as a gap filler for government services (Rothenberg et al., 2016). Moreover the rapid growth experienced by cities such as Lagos or Lima cannot always be serviced formally –paratransit’s flexibility is essential for developing cities as they are constantly expanding and changing (Ferro et al, 2015) Moreover, paratransit and informality do not typically occur as a consequence of a conscious policy choice, but due to demand not being met by supply, in a process described as ‘consummate gap filling’ (Cervero 2000a); Cervero and Golub, 2007).

Key benefits of informal transport are the provision of on-demand transport *at certain times of the day*, and the creation of jobs, and city wide coverage, but these benefits are often balanced against pollution and safety issues - ‘laissez faire transit in an environment of high unemployment is dangerous’ and often leads to the destructive ‘la Guerra del Centavo’ or ‘the war for the cents’ (Chavis and Daganzo, 2013; Cervero and Golub, 2007). In informal transport natural monopolies with all their downsides usually emerge leading to aggressive driving to fit in as many runs as possible, and ‘cream skimming’ - congregating around the most lucrative places, or only running full to full (Amin, 1981).

Where informal transport is being studied, two typical scenarios present themselves from a supply side. The first scenario is that of a city where there is *no* existing or planned formal transport corridors or spines. In this instance the emphasis is one of accepting informal transport as the sole mode - a given which is unlikely to change due to funding or capacity constraints making formalised mass transit unlikely. In this case understanding the sector’s inner dynamics more and gauging how its outputs can be improved for greater public good, are key focal points.

The second scenario is where the formal and the informal coexist, or are about to co-exist. In contemporary transport policy these are often due to bus rapid transit (BRT) systems being introduced into an area where there is existing informal supply. This dualized or hybridised situation is a far more complex avenue of research than accepting informality as the sole provider of transport, as it leads to questions of tradeoffs between the two sectors and presents dilemmas relating to the desirability and existence of the informal and how it should support the formal. It is notable that the academic literature is divided on this topic. On one side are scholars concerned with transport planning and policy formulation, a discipline that generally seeks to formalise systems in order to achieve particular outcomes, such as integrated ticketing

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<sup>2</sup> Classifying countries into generic blocks is disputatious yet common practice within the academic literature. The homogenising terminology can often be contentious, clumsy, and potentially misleading (Solarz, 2014). Nonetheless, the term ‘developing countries<sup>2</sup>’ will be used in this paper in order to comply with the literature base when defining nations which are *broadly* similar in terms of education, life expectancy, infant mortality, public health, personal income and poverty levels (Khaled, 2017).

and timetabling. On the other side are scholars of informality who seek to understand and celebrate the nuances of informal systems in their own right, without being mindful of the broader policy goals such as universal modal shift.

This paper presents a summary of issues arising from the informal-formal transport nexus within developing countries, focusing on normative issues, sole provision, and the hybridised model. It concludes by presenting key questions emanating from each line of enquiry so as to facilitate an expansion of a research agenda. Noting the ‘dearth of public transport research’ in this area (Godard, 2013), the paper will be of relevance to transport practitioners including government and non-government organisations, development financiers, operators, industry and scholars, and other entities seeking to fund and/or improve public transport provision within developing countries. The manuscript also presents a significant bibliography for scholars to draw upon when developing further work in this area.

## 2.1 Informal supply as the sole mode

It is likely that transport will continue to be provided by the informal sector in situations of extreme capital scarcity, corruption, government failure, a poorly developed financial sector, or where geographic conditions make the building of infrastructure extremely challenging. This is the case for most of Sub-Saharan Africa, and parts of Asia and South America. When informality is likely to remain the sole mode of provision research tends to focus on optimising the current model. Typically, the emphasis is on safety. Road safety relates to accidents and injuries due to speeding and poor vehicle maintenance, which occur to pedestrians as well as travellers inside the vehicles. Personal safety relates to assaults inside a vehicle or within the pickup areas, as well as health outcomes caused by the pollution from the various modes.

Much research to date focusses on normative issues or stances. Some commentators *celebrate* informality being the sole mode of provision, seeing indigenous, informal paratransit as ‘something to be proud of’ leading to outcomes such as labour flexibility and movement, and complex cooperation alongside competition (Daramola, 2018; Kumar et al, 2016; Khayesi and Nafukho, 2016). Informality can generate a net revenue tax gain for the formal sector through ancillary activities – for example someone accessing a rail station on an informal mode may use shops at the station which are registered tax-paying businesses (Bento et al., 2018). Sometimes parallels are drawn with decolonising a nation and freeing up its entrepreneurial spirit through deformatisation - the example of Jommo Kenyatta’s policy to deliberately deregulate the urban transport market to foster Kenyan ‘entrepreneurship’ is one possible example (Mutongi , 2006). In other cases, in cities where unemployment is high, industries such as Kampala’s boda boda motorcycle taxi industry can provide not only essential mobility but also employment (Evans et al.,2018).

*Others* disagree by critiquing aspects of informal transport; with some even seeking to regulate it completely. Potentially, an informally based model can simply indicate the lack of a *decent* transport system in some cities, leading to calls for greater formality to meet policy objectives (Arimah, 2017); the lack of a regulated model can be seen to disempower consumers (Chavis and Daganzo, 2013). Some see considerable flaws in the business model in East Africa’s matatu sector leading to poor services and corruption– to rectify this there would be a need for industry consolidation, salaries, monitoring and formal accounting (Behrens et al, 2017). Informality in the transport sector can also sometimes be linked to tax evasion, high rates of accidents, and driving over the distance threshold (Kassa, 2014). Some scholars have recently turned their attention to motorcycle taxis, noting the huge growth in their volumes and how

safety issues have driven the public debate towards regulating and potentially banning these services (Ehebrecht et al., 2018). Frequently there is an articulated desire to see full modal integration by absorbing the paratransit into a formal arrangement to ensure best outcomes, to tackle the last mile problem – how to get from a formal alighting point to one’s final destination which may not be served by formal feeder service (Hidalgo and Gutiérrez, 2013).

One potential area of applied research for the solely informal model, is in the field of geospatial mapping of the transport network. To address the lack of route information or basic data on paratransit, Williams et al. (2015) created a database for semi-formal routes to be used for planning purposes. Vahidi and Yan (2016) suggested that the lack of informal trails or networks in GIS systems is hampering the incorporation of the informal into the planning debate and process but raise the question of informality being organic – does field information become quickly obsolete in cities that are growing fast? Even on the road the sector has its own unique dynamic and this can impact modelling exercises based on conventional, culturally non-specific road behaviour (Dumba et al., 2017). Nevertheless, inclusive, collaborative mapping can render informal transport modes minibuses more visible in planning and provoke more grounded and inclusive “planning conversations” on multi-modal integration, passenger information and minibus upgrading (Klopp and Cavoli, 2019). Moreover, within the Global North there have been significant attempts to bring forward feed specifications for on-demand, 'route-less' transport systems based on open data standards, in recent times, and it may be possible to apply these systems within the Global South, to alleviate the long terms impacts of the Covid 19 pandemic, by means of technology, on informal paratransit (Klopp et al., 2021).

A final comment for this section relates to the role of the private sector in the provision of transport. If commercial interests may be undermining the planning process in the global north (Legacy et al, 2018), what is the normative position to adopt when considering the private sector in the global south, where there is often little or no planning function or public services, and the market fills this gap? Is ‘digital disruption’ not disruptive in such instances: Disruption has negative, detracting connotations, but what if the status quo is already sub-optimal and the ‘disruption’ improves utility for the travelling public?

### **3. Regulatory model hybridity**

The second scenario is where the formal and informal sectors interface, typically as an attempt to bring a formalised system – a BRT or metro – into an informal marketplace. One example would be when someone is alighting from a metro station in Delhi to connect onto a battery electric rickshaw which is operating informally without a government permit. This hybrid situation, including the dynamics at the interfaces between the sectors, offers a more complicated avenue of research than where informality is the sole model of provision. It also raises questions about when the informal sector should be regulated.

Within the urban transport academic literature relating to developing countries, regulatory hybridisation is a prominent topic as are the latent processes by which this duality functions in practice. Within such environments it is typical that a formalised entry mechanism such as a permit to operate is needed to enter the market, but the market itself remains self-governing with ‘turf issues’ being negotiated (Rye et al., 2018). The mediators between informal transport operators and government are often route associations or collectives funded by membership fees. When little effective formal regulation is present these collectives can control market entry (Schalekamp, 2017). Moreover, the line between criminal behaviour and operator unions is not always clear. Kurosaki et al. (2012) highlight the involvement of the local mafia in

Delhi's cycle rickshaw industry; a major impediment to formalising Harare's minibus taxi industry was revenue being generated through both legal and illegal means (Mbara and Dumba., 2018).

Within hybrid models, interface points can occur at the formal-informal level, such as where the rail services of Cape Town interchange with the minibus taxi industry at stations, or the informal-informal nexus such as when the matatus of sub-Saharan Africa link with motorcycle couriers to convey passengers to a final destination (Ehebrecht et al., 2018). It is this 'last mile'- and the potential for integrating an often informal access-egress leg into the formal network through contracting, that has driven a great deal of the discussion on the hybridised regulatory model. Paratransit operators often resist being regulated through operator cooperatives as formalised feeder services, for fear of losing control of their business (Del Mistro and Behrens, 2015; Mateo-Babiano et al., 2020; Ferro et al., 2013). Venter (2015) states that the formalisation of BRT in Johannesburg was largely successful but notes the opposition of the industry to formalisation as the operators saw little benefit in moving into a structured model. Of the 1996 aspiration to contract bus services under a holistic model, by 2012 only 32% of services had been absorbed into a network (Walters and Heyns, 2012).

In terms of regulating the last mile issue, generally paratransit operators do not like the concept of being regulated to feeder services. Even though it may be more lucrative for the ones who remain in business, and enable greater renewal and maintenance, it does reduce overall fleet size because operating efficiencies may come at the expense of jobs (Del Mistro and Behrens, 2015). It seems that the transport sector in some cities *can* be improved by forming operator cooperatives but it is difficult; it may be easier to recognise hybridisation from the start and design systems around it (Ferro et al., 2013). Ferro et al. (2015), however, *do* see eventual contracting in the paratransit feeders as required if the performance of the long-haul trunk service is not to be undermined – integrated feeder services serving the last mile will boost ridership. Progress in integrating the bus network in Cape Town *has* been made, however, offering lessons for partnering with paratransit operators within a consolidated system; it appears that a focus on collective meetings and summits to attempt to gain operators' support may not be as successful as detailed individual negotiations (Schalekamp, 2017).

Harding et al. (2016) undertook research into the dynamics of Delhi's regulated auto rickshaw industry, functioning of the supply and demand side of the industry, and the economic imperatives of needing to 'not use the meter'. It was concluded there needs to be further investigation into the ability of the industry to further integrate into the city's network with formal fare regulations, a movement away from two stroke engines, and access to formal credit. This compliments work undertaken by Harding and Kandlikar (2017) on the eventual absorption of the e-rickshaw – short range battery powered rickshaws into Delhi's regulated model suite. Other technologies such as ride-hailing platforms have significantly transformed the informal transport sector in the Global South in many cases not been seen as a disruptor but an aggregator of a chaotic market and a facilitator of opportunity (Harding et al., 2016; von Vacano, 2021). Within the growing body of literature around digital platforms in the Global South 'disruptive' business models are generally not flagged as problematic - in many cases the ride-hailing industry may be seen as a significant improvement on the poorly regulated and often safety-plagued taxi industry (Giddy, 2019; Vanderschuren and Baufeldt, 2018). There also remains the issue as to whether for profit MaaS applications can emerge to service informal markets in developing cities by fostering equity and choice; not for profit MaaS apps are emerging in the cities of the Global North but how customisable they are for developing countries remains unclear – an example would be Feonix (Feonix - Mobility Rising, 2021).

## 4. Research questions

There are a plethora of research questions emerging from the above, for scholars of urban informality, transport planning, and development studies. Some of these are normative or theoretical; others are applied and deal with practical measures as to how a sector may be improved. For ease of presentation these research questions will be presented in bullet point form. The goal of the exercise is what might be termed *theoretical fertility* espoused by ‘good theories’ are fertile, and possess scope for generating premises to guide further research (Newton-Smith, 1981). A valid theory provides scope for further development and findings - being able to guide, control and expand further research (Swanson, 1988). In addition to these research questions, a considerable bibliography is provided at the end of this paper, to aid the process by which scholars can rapidly access salient journal publications.

Normative research questions deal with ethical positions and the work of scholars in this area tends to focus on matters of neoliberal influences and the legacy of colonialism. The trade off between these, and the practicalities of simply improving the lot of the travelling public, and their right to define their own symbolic norms even if they are aligned with the perception of westernisation as progress, offers the potential for strong ethical debate:

- To what extent is it ethical for scholars in western environments to applaud hardships that they do not have to live on a daily basis?
- Is it distasteful to tell people what they should seek in terms of symbolic capital? It is not for people to define their own aspirations?
- To what extent are local politicians obliged to reject informal ‘local’ solutions to show ‘progress’?
- What practical purpose does the description of technology transfer from western nations as ‘colonial’ or ‘neo-liberal’ serve?
- Is there something more laudable about the agility of private enterprise in places where people are poor, and governments are seemingly defunct, than where they are far less so? Why admire the enterprising matatu driver but see shared mobility and market led solutions in the global north as usurping government? Is it a consistent position to admire the matatu driver’s acumen and commercial agility, but also dislike entrepreneurial global companies seeking to export solutions to developing countries? Why should the basic principles differ?
- Does formalism have greater symbolic capital in developing countries than informality, within the context of transport; to what extent does this influence travel behaviour? Is western informality, e.g. ride hailing apps seen as ‘cool’ but local informality ‘backward’ or embarrassing on the global stage?
- To what extent is exploitation manifesting itself in various forms in the informal transport industry of the Global South – ranging from crushing rates drivers face ‘hiring’ vehicles from collectives, the way in which collectives often maintain their turf (transit service areas) through violence in unregulated systems, the more beneficial self-regulating and sharing out of passengers amongst drivers in non-app based systems such as the older Indonesian pangkalan, through to the new forms of dog-eat-dog “insta-serf” exploitation introduced by Uber-like apps, such as Indonesia’s Gojek and China’s Didi?
- If commercial interests may be undermining the planning process in the global north what is the normative position to adopt when considering the private sector in the global south, where there is often little or no planning function or public services, and

the market fills this gap? Is 'digital disruption' not disruptive in such instances: Disruption has negative, detracting connotations, but what if the status quo is already sub-optimal and the 'disruption' improves utility for the travelling public?

Other research questions are more practical in nature and deal with applied outcomes so as to improve the utility of the travelling public in environments where the informal sector is strong: In terms of questions pertaining to situations where there is only informal provision:

- In some settings, given the monopoly of informal modes, how can they be better understood and improved through initiatives such as cooperatives and emerging technology, to foster improved safety, reliability, off-peak coverage, cleaner air, and provide a more pleasant experience for the captive customer?
- How can a better understanding be obtained of the inner workings of the informal transport sector? What incentives are motivating different types of operators and how are they clashing? How can these incentives be harnessed to improve the adoption of new technologies and safer practices?
- How do researchers obtain deep insights into the social relations and networks, power mechanisms, and existing governance structures that characterise the informal transport space?
- What is the role for new technology in this area: geospatial mapping and Mobility as a Service (MaaS) platforms which could foster greater integration and reliability and improve the customer experience?
- Could MaaS in some developing nations perform the integration role governments cannot and what hurdles lie in the way?
- Can a non-profit MaaS and/or ride-hailing provider emerge suited to the cities of the Global South and informal transit context – ones that can deliver less-exploitative transport services and apps that meet local needs, service underprivileged communities or 'no-go' areas afflicted by crime (which the formal taxi/transit sector often refuses to service), *and* also provide a meaningful wage and conditions for drivers (note that non-profit MaaS providers are emerging already in the Global North).
- How can the behaviour of the informal operators on the road be better understood and incorporated into demand modelling tools?

Hybridised environments offer a richer environment for exploring the interface and governing dynamics of the situations presenting themselves on the ground in many cities where formal solutions are being introduced. Arguably research in this environment will foster a situation where the formal modes are more likely to be successfully implemented:

- Can informality solve the last mile problem to offer an integrated solution to foster modal split away from rising car ownership? How is this possible given the commercial incentives? What speed can this integration take place?
- How can the governing dynamics of the informal industry be harnessed to help the formal succeed?
- To what degree is the lack of capacity, capability, and funding at the state level a major hurdle to fostering a fully contracted or hybrid solution, rather than recalcitrance from the market itself?
- To what extent do local conditions hamper the transfer of best practice dualised regulatory models from one local to another?

- To what extent are the consequences for the incumbent minibus operators, drivers and workers in supporting the activities of a formalised line haul mode understood and how can these be incorporated into the evaluation frameworks used for formal projects?
- How can research help define a healthy hybridised relationship with appropriate governance and will it be possible (given seen resistance) to persuade operators of the benefits of a structured model?
- What role can MaaS and other technologies play in regulating the formal and informal?
- To what extent have ride-hailing apps transformed the informal transport sector in the Global South, not as a disruptor but an aggregator of a chaotic market, and a facilitator of opportunity?
- If the performance of the long-haul trunk service is not to be undermined, must feeders be eventually formalised following a dualised/hybrid model at first, being cogniscent of the contrasting incentives?
- Can total sector reform ever be possible therefore in contexts such as the jeepney industry in Manila, and what are the ramifications for transport planning, when solutions are contextualised or partial rather than systemic or whole?
- To what extent can the state assist the informal sector in improving the overall level of service when market entry is regulated but the pickup and drop off points are not?
- How can the development of driver cooperatives pump prime new informal markets to be opened up as a consequence of formality?

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