Mobility App and Citizens

Views from Jakarta

Livelihood, Social and Governance Implications of Innovation in Informal Transportation in the Developing World

Ying Gao

Acknowledgements

This study is an independent academic research conducted mainly in July-August 2017 (MIT COUHES Protocol #1707014280 "Understanding and Measuring Citizen Perceptions of Informal Public Service Provision in the Case of Urban Transport in Indonesia"). The fieldwork was funded by MIT D-Lab International Development Innovation Network (IDIN, https://d-lab.mit.edu/idin) and MIT Governance Lab (MIT GOV/LAB, www.mitgovlab.org). This document is a research project output submitted to IDIN.

I am indebted to wonderful colleagues in Indonesia for their kind support. I would like to express special thanks to fieldwork research assistants Alisa Delmafitri, Balqisa Farhani, Efod Pangkerego, Irena Lucy Ishimora, Joce Timoty Pardosi, Malindo Marpaung, Meidyca Febriandila, Nur Ratna Mukti, and Wahyu Widi Astuti, as well as colleagues at Kemitraan Habitat, MIT Urban Risk Lab PetaBencana Jakarta project office, RuangWaktu – Knowledge Hub for Sustainable (Urban) Development, University of Indonesia Faculty of Law Student Council, University of Indonesia Geography Department, and USAID Jakarta Office. Many others also generously gave help and insights, to which I am grateful.

If there are mistakes or inconsistencies of information in this document, they are mine.

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List of Acronyms

BI	Bank Indonesia, the central bank of Indonesia
BPTJ	Transportation Management Agency of Jabodetabek (Indonesian: *Badan Pengelola Transportasi Jabodetabek*), a regulatory agency under MoT
BRT	Bus rapid transit; also called busway
DKI Jakarta	Special Capital Region of Jakarta (Indonesian: *Daerah Khusus Ibukota Jakarta*), a provincial-level status government
IDR	Indonesian Rupiah
Jabodetabek	Jakarta metropolitan area or Greater Jakarta; an administrative definition of the urban area combining the municipalities of Bogor, Depok, Tangerang, South Tangerang and Bekasi, and Jakarta
KRL	Commuter rail in Jabodetabek (Indonesian: *Kreta Rel Listrik*)
LRT	Light rail transit
MoT	Ministry of Transportation
MRT	Mass rapid transit
Opang	Motorcycle taxi (Indonesian: *ojek*) drivers' associations (Indonesian: *ojek pangkalan*)
Satpol PP	Public Order Enforcer (Indonesian: *Satuan Polisi Pamong Praja*), a municipal security and public order authority, not to be confused with the National Police
TOD	Transit-oriented development
USD	US Dollar

I. Introduction

From Innovation to Impact

Innovation in Informal Transport

Much has been studied about mobility network companies, such as Uber and Lyft, and the rise of sharing economy in advanced economies (e.g. Hall and Krueger 2016; Cohen et al. 2016). Similar technologies have made headway into rapidly urbanizing developing countries. But this technological innovation's consequences in development contexts are not fully explored. In particular, whether the policy concerns raised about these apps in developed economies also apply to circumstances of high labor informality and urban inequality so widespread in cities of the global south remains to be evaluated.

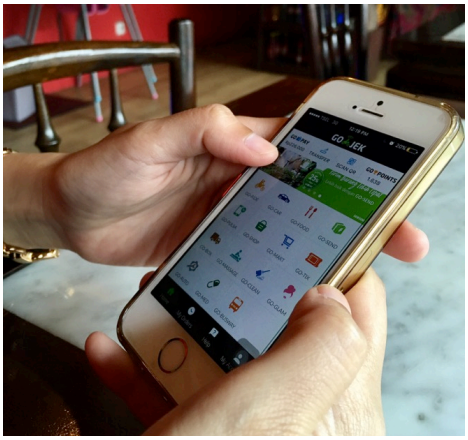

FIGURE 2: APPS OFFER A VARIETY OF ON-DEMAND MOBILITY, E-PAYMENT AND ADDITIONAL SERVICES IN INDONESIA. ALL PHOTOS BY YING GAO.

In Southeast Asia, an additional difference is the prevalence of motorcycles not just as personal vehicle but also as public transport for hire – and the interplay of this informal industry with the mobility apps. Starting from 2015, at least three mobility network companies have incorporated hundreds of thousands of motorcycle taxis in the region into app-based economy. In a short time, the result has been that the app innovation may have transformed citizen behavior on the production (drivers) and consumption (users) of an ***informal public service***, which is urban informal public transport. The massive scale of disruptions has in turn created the need for those in the government to respond, too – though most policy ideas are still only being debated.[1] These impacts are the subject of this research focusing on citizens and actors in Jakarta.

FIGURE 1: APP MOTORCYCLE TAXI, OR "ONLINE OJEK"

[1] For indicators of the scale of the apps' influence, it is sufficient to review publicly available information on three leading service providers: GO-JEK, Grab and Uber. They are respectively Indonesian, Southeast Asia regional, and global companies. All three are "unicorn" startups i.e.

Jakarta: Setting the Scene

Citizens in Rapidly Growing Metropolitan Region

Greater Jakarta is one of the largest metropolitan regions in the global south. It has a population of 28 million and a dynamic and growing economy, with high levels of urban inequality and informality. Throughout Jakarta's history, informal sectors and informal settlements have played a large part in citizens' lives. Greater Jakarta's urban development in the 20th century in different economic periods show informal sectors growing persistently—or, resiliently—together with, and in spite of pressures from, urban formal sectors (Sarosa 1993; Silver 2008).[2]

Jakarta citizens also tend to spend long hours on the road, due to limited mass transit (therefore more road traffic), and poor service quality of public transportation in general. In the past, it has been suggested that citizens experience transport more as suffering than service – a situation that continues, even as national and provincial governments are making significant investments for expanding the TransJakarta BRT system (DKI Jakarta), and MRT and LRT systems scheduled to open in the next few years (national government). For now, traffic jams in Greater Jakarta cost around USD 5 billion in economic losses annually, according to estimates by Indonesia Ministry of

FIGURE 3: SATURATED ROAD TRAFFIC IN CENTRAL JAKARTA

privately held, young companies with over USD 1 billion in valuation. Grab has 45 million app downloads and 1 million drivers providing 2.5 million daily rides across Southeast Asia, as of June 2017. It is harder to obtain information on motorcycle passenger services alone. These services are called GO-RIDE, GrabBike and UberMotor. GO-JEK, which started as an exclusively motorcycle-focused platform, claims 200,000 drivers across 25 cities in Indonesia, as of May 2017. If the Indonesian taxi industry's geographic concentration is any indication, a large majority of drivers can be expected to be working in Greater Jakarta.

[2] The logic of persistent informal sector growth is as follows. Informal sectors grow when the city's formal economy is in boom because they supply cheap labor, goods and services, feeding into formal sectors. Informal sectors also grow when the formal economy is stagnant. In economic downturn, informal sectors play the role of "employment sponge" to absorb those who have fallen off from the formal job market; the ratio of informal sectors therefore rise relative to the formal counterpart. This has been the situation during the Asian Financial Crisis in late 1990s and most recently in the 2008 global recession. In short, a historical pattern has been that Jakarta's informal sectors grow in absolute terms during economic booms, and in relative terms in economic stagnation and downturn. From the stagnation of 1950s and 1960s to oil boom years of 1980s, and to more recent years, there has not been decisive evidence that informal sectors and informal settlements would eventually disappear. Why does economic growth fail to shrink urban informality as much as one might expect it to? Authors such as Sarosa and Silver point out the negative effects of encroachment on informal settlements by development projects during good economic times.

Public Works and Housing (The Jakarta Post 2015).

In recent years, the economy of Jakarta has been upbeat. Transport and communications industry enjoyed the highest growth rate in 2010; but citizens are also hit by higher cost of living in the city, which is producing urban sprawl, with suburban agricultural areas and informal settlements increasingly turned into urban land for development (Mulyana 2012, 5–6). The share of workers in DKI Jakarta employed in informal jobs has hovered at slightly below 30% in 2005-2010 (Mulyana 2012, 22).

Being a driver of one kind or another is one of the top job sources in Jakarta, across formal and informal sectors. Relatedly, Greater Jakarta is one of the largest markets for motorcycle taxi service now incorporated into the digital economy by mobility apps.[3] The popularity of app mobility services, especially app motorcycle taxis, is an indisputable situation on the ground, despite the fact that motorcycles taking passengers and acting as public transport have been, and remain at the moment, illegal under Indonesian law, strictly speaking.[4]

Questions and Motivations for Studying Impacts in Jakarta

In this context, ***my research aims to explore the livelihood, social and governance impacts of a digital innovation on informal urban communities in Jakarta***. The innovation in question is the mobility apps. The focus of my inquiry is to describe the local uptake, adaptation, influence, reactions, etc. in response to a global innovation.[5]

The question of mobility innovation's influences on citizens in urban informality is an important one. Urban transport, particularly its informal variants like motorcycle taxis and shared minibuses, is a major employment sector for low-skilled workers in developing cities – Jakarta being no exception (Khayesi, Nafukho, and Kemuma 2015). It also matters

[3] Citizens rely heavily on motorcycles to get around in Southeast Asia. In 2014, motorcycles in DKI Jakarta outnumbered cars four to one in terms of vehicle registration: 13,084,372 motorcycles were registered, compared to 3,266,009 cars (Badan Pusat Statistik 2017). However, this data does not distinguish between private motorcycles and motorcycle taxis for hire. As a rough reference point, Bangkok metropolitan region keeps data on motorcycle taxis along with car taxis. Four-wheel and two-wheel taxis together represented 18.9% of transport in Bangkok in 2015 (Suparee 2017).

[4] For example, Law No. 22/2009 on Road Traffic states: "Chapter X Transportation: Paragraph 4 Passenger transportation by Public motorized Vehicles not in Trajectories: Article 151 Passenger transportation service by public Motorized Vehicles not in trajectories as referred to in Article 140 letter b shall consist of: a. Passenger transportation by taxi; b. Passenger transportation by certain destination; c. Passenger transportation for tourism purpose; and d. Passenger transportation in certain area." https://www.scribd.com/doc/100587986/Law-no-22-year-2009-on-Road-Traffic. Though the specific wording of the Law No. 22/2009 is not without ambiguities, practical rules of licensing means that motorcycle passenger transportation service, which is found in every street in Jakarta, actually lacks any clearly defined legal basis for existing.

[5] My focus in this research therefore is not on the mechanics of the original technology or its business model, though they are interesting subjects in their own right, particularly the country-by-country or even city-by-city local evolution of the business and innovation strategies of these platforms.

for the welfare of citizens at large. Informal transport provides vital mobility options for poor urban residents, playing a key role in their access to jobs, resources, and services (Cervero 2000; ESCAP and UN-HABITAT 2015; Taylor 2015).

Therefore, key motivating questions behind my inquiry into mobility apps and citizens in Greater Jakarta are:

1. Is the innovation influencing citizens' livelihood, for workers in informal transport sector, and among various subgroups in this sector? And if so, how?

2. Is the innovation influencing citizens' social behavior, for those working in informal transport sector, as well as other relevant informal communities? And if so, how?

3. Is the innovation influencing local capacity for good governance, especially for public service provision? If so, what are the roles of data and information, and different institutions including the government, civil society, and other institutions?

Research Design: Stakeholder Interviews

Research Activities

In this research, I approach the above three broad questions on livelihood, social and governance impacts by:

a) Identifying stakeholders (stakeholder mapping); and

b) Conducting preliminary analysis of a series of qualitative interviews with members of the identified stakeholder groups or categories.

The analysis in this report is based on data from qualitative stakeholder interviews conducted in selected locations in Greater Jakarta, in July-August 2017.

The semi structured interviews are designed to make sense of recent events as of August 2017 by collecting insights and lived experiences of diverse stakeholder groups, both potential winners and losers, while emphasizing the tangible contexts of urban informality and inequality, including any critical institutional conditions.

Timing and Expected Outcomes

The research actually takes advantage of an opportune moment. The disruptions caused by the mobility apps in Jakarta present two kinds of opportunity for research: as a window, and as a shock. For researchers and policymakers interested in understanding the political economy of urban informal sectors, the data from the apps (including qualitative data) is a window into underlying informal sectors, and groups and communities of citizens in that space. Following the traces of citizen behavior in response to the apps offers the possibility

– at least in theory – to trace some of the activities in the social and economic life of citizens where little hard data exists.

The mobility apps are clearly also a shock to the system. Responses from different communities of citizens and various institutions can give helpful information for making predictions and generating recommendations for the future. In particular, this can be useful knowledge for how to (or how not to) manage, govern, and improve mixed formal / informal public service systems at a metropolitan scale. Hearing from various urban communities is a starter in the process.

Finally, it should be noted that this study is preliminary, exploratory, qualitative, and descriptive in nature, and interview protocols reflect it (please see Appendix for details). The findings presented in this document are not meant to conclusively answer questions related to innovation in mobility in Greater Jakarta; that is a situation that continues to evolve rapidly. The hope is for this short report to contribute to open (policy) dialogues and to inform a hopefully greater variety of different ways of framing questions on this topic, including future quantitative research that stakeholders may wish to conduct.

Definition of Informality and Informal Transport

Next, I clarify key definitions or concepts, and the scope (i.e. Who? What?) of investigation. To start off, the first assumption of this research is that urban informal communities can be spatial or non-spatial. This is to say communities can be place-bound, network-based, or of a variety of other forms. One way to explain this definition of informality is that it is (group) activity-based, and not based automatically on intrinsic characteristics of a place or person. In Jakarta, formal and informal sectors and settlements tend to operate closely together, with overlaps and symbiotic links, and a flexible working definition informality may be suited (Sarosa 1993).

An example of spatial or place-bound urban informal community is slum neighborhood communities, which are generally called *kampung* (literally, village) in Indonesia. Examples of non-spatial urban informal communities can be work-related associations, including drivers' groups, religious or ethnic groups, etc. Thus, I will extensively discuss informal transport drivers' membership associations as an occupation-based informal community in the main chapter.

The definition of informal transport should also be explained. The seminal UN report on informal transport in the developing world gives a flexible definition of "informal", emphasizing the contexts of operation rather than physical attributes. The report says, "this sector operates – informally and illicitly, somewhat in the background, and outside the officially sanctioned public transport sector" (Cervero 2000, 3). The degree or pattern of deviation from formal public transport may vary, as the report describes:

> In some instances, operators lack the necessary permits or registration for market entry in what is a restricted, regulated marketplace. In other instances, operators fail to meet certification requirements for commercial, common-carrier vehicles – such as minimum vehicle size, maximum age, or fitness standards. Other violations include lack of liability insurance, absence of a commercial driving permit, and operation of a unclassified or substandard vehicle. (Cervero 2000, 3)

The actual physical forms of informal transport (e.g. vehicle types, route patterns) can come in many flavors, then. This definition thus encompasses informal transport modes of all sizes and shapes, and equally embraces "paratransit", which usually refers to vehicles offering fixed or predictable routes (e.g. various "shared taxis"), as well as smaller, door-to-door vehicles (e.g. *tuk tuk* in Thailand and motorcycle taxis in many regions). In addition, the definition describes the informal by relating it to the formal. It suggests some gradation of informality; an informal public transport can be more or less informal, compared to another service.

Extending the definitional guidelines to the plethora of public transport on offer in the streets of Jakarta, below partial list of modes will be the focus of this report.

- [*Becak* – pedicab (informal / prohibited)]
- *Ojek* – motorcycle taxis (informal)
    - *App-based*
    - *Traditional*
- Bajaj (informal / semiformal)
- Angkot mikrolet – shared taxis (semiformal / formal)
- Kopaja bus (semiformal / formal)
- Taxi (formal)
- [TransJakarta BRT, KRL commuter rail (formal)]

Without going into extreme details, it should be noted that motorcycle taxis in Jakarta represent a bona fide informal transport for purposes of this research; other transport options have mixed formal characteristics. Those in square brackets are not directly the focus of this research.

Another thing to keep in mind is that even though I begin with Cervero's definition, the interview findings presented in the later sections may call into question the assumption that informal transport is "unsanctioned" by government authorities.

Scope of Impacts

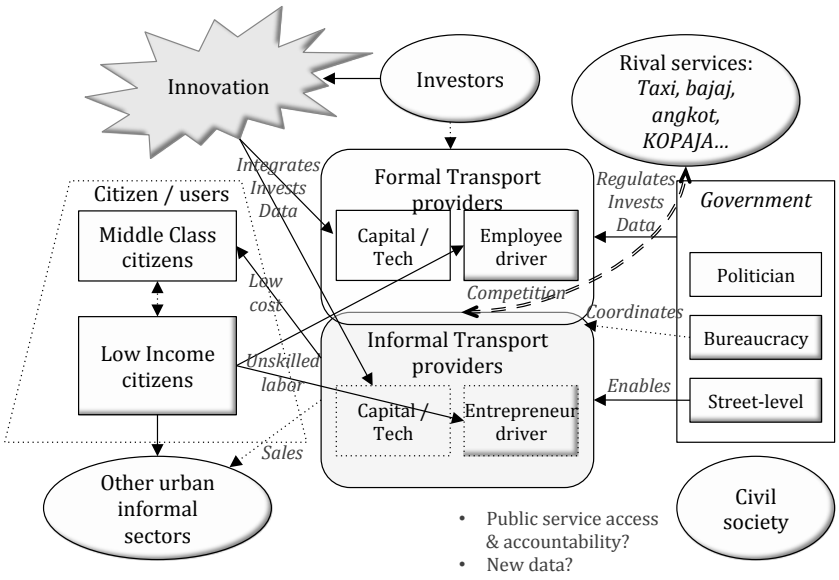

FIGURE 4: PRELIMINARY MAP OF STAKEHOLDERS ILLUSTRATING POTENTIAL IMPACTS FROM INNOVATION IN INFORMAL TRANSPORT, AND GROUPS AND INSTITUTIONS WHO MAY INFLUENCE OR BE INFLUENCED BY ANY DEVELOPMENT IN THAT SECTOR

Who (which stakeholder groups) and what (what kind and extent of impacts) are covered in the scope of investigation, exactly? In addition, impacts from the mobility apps can be direct or indirect, and can be positive or negative.

Since this is an exploratory study, I opt for casting a wide net for potential categories of stakeholders, as the above map shows (Figure 4). Something that is also implicit in the above definition of informal transport in terms of operational contexts is that there are more stakeholders besides the operator and passenger, affecting informal transport. Who makes it possible that a service is illegal, but not so illegal as to be purged from streets? Who (or what) influences the sector to have somewhat predictable price and service standards, or sufficient availability throughout the city? Are these aspects determined through pure laissez-faire market mechanisms as suggested by some studies of urban informal sectors, or could there be intervening actors, groups, organizations, etc., with a mix of economic and political motivations? These are all open questions for this research.

Reflecting audience feedback during the preliminary findings presentation in Jakarta (3 August 2017), analysis of interview results from this research in the next section will focus on two or three particular stakeholder groups, their relations, and how they view or are viewed by institutional actors, especially related to governance at the street level. These groups are "entrepreneur driver" and their peer (or comparative) drivers in rival services (Figure 4).

II. Drivers and Street-Level Governance

Pangkalan: Solidarity Groups in Indonesia's Streets

FIGURE 5: A LOGO OF APP MOTORCYCLE COMMUNITY SPELLS "BIG FAMILY," "UNITY"

App Is a Layer on Existing Social Systems

The first point of departure when it comes to app *ojek* (motorcycle taxi) drivers in Jakarta compared to drivers of car sharing services in developed countries is how highly organized Jakarta drivers seem to be. Though precise percentage could not be obtained, a high proportion of fulltime app *ojek* drivers belong to a membership-based drivers' community. And these fulltime drivers fulfill most rides, since they are far more frequently on the road.

The preeminence of organized drivers flies in the face of the notion that mobility apps create gig economy, which is like a marketplace populated by part-time, individualistic freelancers making deals with individual user / citizens in a decentralized manner. The deals are still decentralized in Jakarta, but providers are organized informally, at grassroots level. Soon, however, it becomes obvious that Jakarta drivers in other types of informal transport are just as organized as the app motorcycle taxis, if not more. There are many variations of local drivers' communities, including traditional *ojek* drivers (motorcycle taxi drivers *not* enrolled with the apps) and bajaj drivers. Even individuals driving hire cars or cargo trucks socialize in groups.

In streets of Indonesia, these drivers' communities are ubiquitous, and they are called *pangkalan* (literally, "base camp"). Expert interviews suggest two reasons for why *pangkalan* communities exist widely in Indonesian society. The first is to say that *pangkalan*-like groups have always existed since the dawn of public transportation in Indonesia with the colonial *becak* (pedicab) drivers. The second is that these communities are the primary tool for workers in informal (and low-end formal) transport sectors to cope with what is basically difficult conditions of work.

Membership, Leadership, and Functions of *Pangkalan*

What are the typical membership, leadership selection, and functions of *pangkalan* communities? Concrete examples in this section are mostly from app motorcycle *pangkalan* communities, which are the groups most often interviewed in this research. But the characteristics are shared with *pangkalan* communities of other transport modes, and insights from *pangkalan* communities of other modes will be brought in later, too.

A *pangkalan* is a local work-based community in transportation sector(s), with common benefits and useful features for member drivers. The physical "base", i.e. fixed location for queuing and resting, can be pinpointed to specific (and often tiny) physical spot: e.g. train station X's gate Y, part of a certain street under a shady tree, a residential neighborhood's northeast corner, etc. Members of a *pangkalan* are made up of drivers of the same transport mode. Hence, bajaj, traditional *ojek*, and app *ojek* (in fact, each brand) drawing on the same stream of passengers in an area will each form their own base camp. The origin and basis of socialization of *pangkalan* is therefore economic and occupational. It is emphatically not the case that there are preexisting social groups, which then decide to start a *pangkalan* together.

FIGURE 6: SOME APP MOTORCYCLE DRIVERS ARE WOMEN

Diverse, Horizontal Groups

In terms of membership, the drivers' communities are inclusive groups and the standards for joining are to be working in the job, to follow the rules or norms of doing that job in the area, including queuing norms, and, more often than not, to make small weekly contributions to a communal saving. In my interviews, the size of a *pangkalan* and *pangkalan*-like drivers' ranges from five to around 70; most frequently they were 20-40, and a *pangkalan* with more than 50 members may be considered large.

Members belong to diverse ethnicity, religion, migration status, etc. For instance, one relatively large app *ojek pangkalan* includes members who are originally from Java, Sumatra, Papua, and so forth, and who are Muslims and Christians. Traditional motorcycle *pangkalans* have been exclusively male due to that occupation being dominated by men (Cervero 2000). As a new development, app *ojek pangkalan* tend to include around 10% women drivers.[6] How matter-of-factly women drivers are incorporated into app *ojek pangkalans* is a testament to these communities being work-based.

Though member drivers' backgrounds are thus quite diverse, what we can expect to be similar among *pangkalan* members is their income. This is a function of location and size of the *pangkalan*. In traditional *pangkalans* of *ojek* and bajaj, an egalitarian queuing norm all but ensured this within-group income equality. For app drivers, there are no longer queues, and there can be income differences from, algorithms prioritizing experienced drivers. But the specific location of base camp will still likely have an equalizing effect on earnings among drivers belonging to that community (i.e. they spend their "idle time" in the base camp, waiting for nearby ride requests).

Qualities of a Leader

In addition, a *pangkalan* always has a leader; the leader is often called coordinator, implying a nonhierarchical, horizontal feeling of these communities. According to app motorcycle *pangkalan* drivers, there are three criteria that make a good coordinator. The criteria are: seniority, experience, and indigenousness.

FIGURE 7: VARIOUS EXPRESSIONS OF COMMUNITY IDENTITY IN APP MOTORCYCLE PANGKALAN LOGOS

[6] This is a very rough and unscientific guess, though it came up in company interviews as well as driver interviews. Observations at *pangkalan* hangout spots generally supported it. Some news reports have quoted the ratio of women app motorcycle drivers to be as high as 20%.

Seniority, or respect for wisdom of an elder figure, is easy to comprehend. For app motorcycle *pangkalan*, the second criterion is particularly important because it means that a coordinator should be someone who worked previously as a traditional motorcycle taxi driver, and who knows the ins and outs of that trade. Multiple interviewees both from driver groups and some from private sector suggest that diffused, horizontal interaction between leaders of traditional and new app *pangkalans*, enabled by more and more traditional drivers participating in app *pangkalans*, helped reduce extreme competition and atmosphere of conflict that were prevalent in 2016. Another driver interviewee simply says that a coordinator is someone who knows other coordinators, and therefore can have a new *pangkalan* recognized by others.

This suggests that there exists inter-*pangkalan* coordination mechanisms, and that such mechanisms are highly horizontal and network-like, and effective institution of solving problems. Indeed, app *pangkalan* coordinators have set up information infrastructures in the form of closed social network groups, for all coordinators in DKI Jakarta, and Greater Jakarta, to conduct coordination. One interviewee quoted the number of coordinators as 700 for Greater Jakarta (for one service).

The third criterion of leader, indigenousness, or a native (Indonesian: *asli*) person, i.e. born and raised in the surrounding community, is also an interesting one. It is not enough that a coordinator should be from Jakarta and not recent immigrant. The criterion of "native" is based on a much smaller circle. In fact "native" or *asli* is a recurrent theme in conversations with drivers. In larger *pangkalan* groups, the leadership seems to go through a regular and democratic process. Sometimes the leader may be informal or implicit – a "champion," a figure of experience, seniority and respect who can use his personal charisma to solve problems and conflicts.

Social Functions of *Pangkalan*

So far, *pangkalan* communities seem to be an important system of labor solidarity in informal transport, a large employment sector in Jakarta's informal economy. But these communities are not purely instrumental. "Fulltime" drivers work extremely long hours. Typically, this may be 15 hours a day (e.g. 7am to 10pm), with 1-2 hour break, and perhaps 1-2 rest day(s) per month. And drivers spend most "idle time" at the base camp of the *pangkalan* they belong to, and the level of social interaction is naturally intense.

Many interviewees are eager to say that they think about their *pangkalan* as "second family", "big family", or "brotherhood" (though also inclusive of women). These words imply meaningful connections. Almost all app *ojek pangkalan* groups invest in names, logos, banners, stickers, and so forth (Figure 7). Family events are a typical way of spending the communal saving, as well as paying for accidents or injuries of members.

How *Pangkalan* Affects Spread of Innovation

To recap, to the untrained eye, *pangkalan* member drivers may look like drivers who happen to be queuing, relaxing, or charging their phones together at the moment. But these informal communities are essential for understanding the speed and scale of the influence of mobility apps in Greater Jakarta. *Pangkalan* communities enable drivers to learn and adapt to new technology, while reducing social friction.

Understanding economic and social solidarity of *pangkalan* helps one to grasp what may be the necessary conditions for the apps to become accepted in a short period of time despite conflicting economic interests on the ground. Mobility apps thrive in Greater Jakarta not *despite* these informal communities at the grassroots, but partly *because* of them.

In fact, mobility app companies' operations in Indonesia pay considerable attention to these informal communities, from initial recruitment of drivers when entering new city, to ensuring that sufficient number of drivers are actively on the apps to meet demand.

FIGURE 8: VARIOUS GROUPS OF DRIVERS

Solidarity within Inequality

Differences among Drivers

What does comparing interview results from driver communities of different modes tell us about the larger picture? How may it help to illustrate additional characteristics of *pangkalan* and informal transport sector from the point of view of drivers? Comparisons of different *pangkalan* groups bring home the uniqueness of *pangkalan*'s ability to channel occupation-based solidarity in the face of high levels of inequality in the sector (transport) by location and by mode.

For brevity, I limit comparison to between app and

non-app *ojek* drivers, though it should be noted that many bajaj drivers shared similar opinions as traditional *ojek* drivers.

A frequent question I encounter in my conversations with the business community, especially with expats who are familiar with how Uber and Lyft work in the United States, is about motorcycle drivers who refuse to join the apps. "What is preventing them from signing up for free, and having more options to earn money? They can even switch different apps on and off, maximizing the bonuses they can win." Indeed, what may be the reasons?

Part of the answer is structural. The setup of *pangkalan* as an informal institution already discussed can prevent, or at least add cost to, casual participation in multiple informal transport types. Tech companies also add cost by asking drivers to wear branded jackets and helmets, making it hard to switch on and off, and between, apps and traditional services. In all of our driver interviews, one respondent said he had tried all three main services, and therefore was in a position to share his experience of attempting to switch the apps to maximize earning. In short, this approach is impractical since the driver has to return home to change into different gears. The cumbersome helmet for customer poses major challenge for nimbly changing the app platforms.

Besides structural barriers, there are individual-level reasons for traditional *ojek* drivers not to join the bandwagon of app motorcycles. In fact the process of joining the apps is highly self-selective. Driver interviewees who had switched from being a member of *opang* to app platform were ready to share insights. "There are three reasons," says a respondent who downloaded the app two years ago (i.e. early adopter) after being an *ojek* driver for nearly a decade. The first is that they may not have driver's license. The second is that they may not have paid proper taxes for owning their motorcycles. For example, they may have paid the taxes when they first got the vehicle, but neglected to renew. Thirdly, some old-timers simply "don't want to learn new tricks."

An *opang* old timer, who has a career of 17 years driving *ojek* and continues to do it the old way at a major train station, confirms the last point. He is dismissive of the earning potential from the apps. In the heyday of motorcycle taxis (presumably relatively recent), he was able to earn 500 thousand rupiahs / day. Now his income is down to a revenue of around 150 thousand rupiahs / day. But he suspects, correctly, that it is not much different from an app driver's daily income. Given the decline of sign up bonuses over time, joining the apps implies more effort for the same money. Hence, there is some logical and behavioral support for *ojek* drivers who refuse to join the app bandwagon.

Who Benefits? Inequality as Critical Context of Impacts

The above discussion raises a cautionary point for conducting evaluation of the new innovation's causal effects on a number of outcomes we might care about, such as increased driver earning, social patterns (e.g. level of social activities and networks in *pangkalan*), or

behavioral change (e.g. safer driving, better customer service, different attitudes). Since drivers voluntarily sign up for apps, app drivers tend to be noticeably and predictably different in basic personal attributes, such as age, education, and previous jobs (and gender, as mentioned earlier), than drivers of traditional *ojek*, bajaj, etc. Any evaluation of driver-level outcomes must take into account, or "control for", the self-selection and baseline differences that exist among drivers of different modes, and in different micro locations.

Concretely, these points of caution mean that there are various potential or possible effects when it comes to livelihood, even when the general trend seems to be that mobility apps are creating more jobs. The apps may be increasing or reducing inequality in various direct and indirect ways, or may be qualitatively transforming the kinds of inequality faced by workers in low-skilled job sectors. It may be that drivers are earning more, or less on average; it may also be that with more or less the same take-home income, drivers are finding it valuable to have intangible improvements in livelihood, such as financial information benefits (e.g. earning and credit history in the app), skills, predictability of income, or social status. The bottom line is that any hypothesis testing of the apps "effects" can benefit from careful identification of comparative groups among the enormously diverse driver communities within Jakarta (or elsewhere).

Informal Sector as "Coproduced Public Good"

Other Informal Actors and Their Roles

As central as they are for the social life of member drivers, *pangkalan* groups alone do not make informal transport happen, and drivers alone do not participate in producing informal public service. For vehicles like motorcycle taxi and bajaj to be a *public* service, i.e. a mobility option widely available for hire throughout the city in pretty much the same format, it takes four key stakeholders. Interview results based on the wider cast of stakeholders, as shown in Figure 4, provide information on these actors' roles. These are:

1) A community of informal labor, i.e. *pangkalan*-like group;

2) Informal capital and technology; and

3) A broker, who arranges:

4) Street-level government non-intervention, tolerance, or collaboration.

For 2), a driver may own his or her vehicle, such as in the case of motorcycle drivers, or may drive for some owner of the vehicle and pay a rental fee. In the case of app motorcycle taxi, the service is subsidized by the tech startups that provide the app platform. Moreover, when asked about the origin of their *pangkalan* groups, drivers tend to describe negotiations with

The arrangements between 4) street-level bureaucracies such as the police and 3) broker is one of the most fascinating aspects. There exists a class of street-level brokers called *preman* whose role seems highly ambiguous and critical in shaping urban informal services sector. Elsewhere in political science literature, research interests on *preman* have focused on their outright political activities, such as acting as tools of intimidation during election campaigns (Wilson 2010), while urban anthropology works have described the *preman* in extremely multi-dimensional terms, such as "figures of street authority and charisma" and "criminal, entrepreneur, philanthropist, enforcer, local political leader, gambler, sage, mercenary, guerrilla, mediator, broker, entertainer, conciliator, historian, insider, and outsider" (Simone 2014, 13; 232).

However, interviewing drivers and civil society experts in Jakarta suggested these actors' everyday function in facilitating informal service provision. For example, a bajaj driver pays 9,000 rupiah per day for the local *preman*'s service, or around 5-10% of his revenue, and the *preman* in turn "handles" the police, municipal enforcers, etc. A *preman* can also help the police to "secure the area" when needed, sometimes with the help of informal transport drivers. Drivers are useful for law enforcement officers for being able to serve as eyes on the street (Jacobs 1961), but mobile. What is being traded, then, is a mixture of private, clubbed, and public goods, and the transaction connects the formal and the informal at the street level. To further complicate the picture, the links of transaction or brokerage is not through official bureaucratic hierarchy, but through patronage-like brokering (Scott 1972). These certain, key, non-driver actors tend to be involved from the get-go, shaping the origin of *pangkalan* and the availability of informal transport service in a given location.

Interviews with civil society groups familiar with urban informal sectors point out other informal sectors likely to involve activities of similar state-society brokerage, as: street vendors, traditional markets, parking, water, and waste management.

Who Governs? Informal Sector as "Coproduced Public Good"

Informal transport is famous for being "gap-fillers" (Cervero 2000, 3). It has also been suggested that the sector is "about as close to laissez-faire transportation as can be found," and "it is only because regulations and rules are laxly enforced that unlicensed operators are 'informally' able to step in and pick up where public transport operators have left off" (Cervero 2000, 3). The separation between formal and informal transport may seem like an accurate picture from an operator-centric point of view. It seems to be that whenever BRT or commuter rail do not provide the last leg of the trip, various services show up and are ready to pick up the remainder of the trip. It is clear enough that most semiformal and informal transport services were not in the government's master plan of transportation for Greater Jakarta.

Yet it is also the case that government authorities treat similar informal sectors, or subsectors within a broad informal sector (e.g. the various different modes within informal

public transport), differently. Reviewing the 20th century development of Jakarta, Sarosa remarks:

> [T]he government's treatments of different jobs in the informal sector varied considerably. And by looking at those policies, we may conclude that the government has been ambivalent in its attitude towards informal sector. Harsh treatment without real alternatives indicates that the government actually looks at the problems created by the informal sector above the solutions it offers. Yet in other occasions, some informal sector activities are supported, if not encouraged, as potential job absorbers (Sarosa 1993, 149).

Might it be that the variations in informal sectors reflect no more than accidental differences in the limits of formal government services? Or, could it be that the degree of informality, availability of informal services, and similar outcomes reflect a certain decision or intention on the part of stakeholders (including state actors) connected with each other in a pattern of informal governance? The interview responses from this research bring me to interpretations in the direction of the latter. Informal transport in the streets of Jakarta apparently reflect the contributions of multiple, different stakeholders – and even the new app mobility services share this hybrid nature. The picture that emerges, then, is that urban informality, at least some variants, may be thought of as coproduced public good.

FIGURE 9: A SPATIAL EXAMPLE OF URBAN INFORMALITY AS "COPRODUCED PUBLIC GOOD"

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Appendices

Interview Tools

Driver or Operator Questionnaire

Basic Information

Ask or note these personal details to the extent possible, during the course of natural conversation.

1. Age / are you married?
2. Gender
3. Migration / residency situation
    a. Are you originally from this city?
    b. Do you live near this area? Which community or area?
4. Work situation
    a. Is driving (or operating transport) your main occupation? How long have you been doing this work? How many hours per day do you work on this job?
    b. What was your job before?
5. Education attainment

Transport Services / Work / Operations

6. Do you own the vehicle?
    a. Did you buy a new vehicle for this, and did you get a loan (and if so, how long does it take to pay back)?
    b. What is the vehicle age?
7. Do you participate in a drivers' association? Why do you participate?
    a. Describe the origin, the role and membership rules of the association. What's the size of membership, and location of "base"?
    b. Is there a "higher organization", such as alliance of associations?
    c. How is the relationship between your drivers' association, with other drivers' associations (in the area) / company (app) / government, etc.?
8. What are the typical length and destination you drive (popular destinations of customers)? How much money do you make on an average trip? How many trips do you make on an average day?
    a. If you are an app driver, how much of your trips are for transporting goods vs. passengers vs. other services?

   b. Do you always wait for customers out of here:_____? Do you operate out of or make trips to Transjakarta, train, or bus stops? Or, do you cruise around to get customers?

   c. What is a typical customer like? Do you get diverse customers?

9. Impact of apps:

   a. If you drive for app, do you make more money, or find more passengers because of the app? What is the best part, and worst part, about driving for app?

   b. If you don't drive for app, has it impacted your work or earning? Does it compete with you?

   c. Has the popularity of the apps affected you in other ways? (E.g. e-wallet and cashless payment, etc.)

Opinions on Transport

10. Besides your personal interest as a driver, what's your opinion on the apps?
11. In your opinion, what is the main problem of transport in this? What's the main cause of that problem?

   a. In your opinion, do the government's transport policies benefit everybody in this city?

12. Does government have good policy for transport services?

   a. In your business (your specific transport type), is there a problem that you wish the government would solve?

Knowledge of Transport Governance – Extra

These are extra questions if you find yourself with talkative driver. Alternatively, you could ask questions about the history community, or any detail about conflict with other drivers.

13. Does the city government regulate your transport service? How?
14. Does the national government regulate your transport service? How?
15. To make transport work better in this city, drivers / operators should:

   a. Improve service quality, such as safety and schedule

   b. Vote in elections

   c. Submit opinions to city or national government

   d. Follow traffic laws

   e. Organize a protest in the streets

   f. Complain on social media

   g. Other: please explain

16. Is there anything else that you would like to say about any of the issues we discussed?

Citizen Questionnaire

Basic Information

Obtain information to the extent possible:

17. Age
18. Gender
19. Education attainment
20. Migration / residency situation
    a. Are you originally from this city?
    b. Have you always lived in this area, or know many people in the community?
21. Work situation

Transport Usage

22. How often do you use the following transportation modes, every week? (E.g. every weekday, a few times a week, once a week, only weekend, etc.)
    a. Transjakarta bus rapid transit (BRT)
        - From where to where do you ride it most often?
    b. Commuter rail
        - From where to where do you ride it mostly?
    c. Buses: Angkot, KOPAJA, Metromini, Bus Besar, other
    d. Motorbike taxi (ojek / app ojek)
        - From where to where do you ride it mostly?
    e. Bajaj
    f. Taxi
    g. My own vehicle (if you have one): Car, Motorbike
    h. Other (e.g. boat, bicycle, I just walk, etc.)
23. What are your purposes for using the different transport modes you mentioned? Please tell us which transport you use for the following purposes, if it applies.
    a. Commuting to workplace or school
    b. Entrepreneurship activities (e.g. to sell or move goods, to reach customers, etc.)
    c. Access to public facilities and services, or community activities, such as:
        - Hospitals, Government offices, Places of worship (e.g. mosques, churches, temples), Community centers (other than religious institutions), Parks or other public facilities
    d. Access to commercial activities (e.g. grocery shopping):

- Market
- Shopping mall (in city center?)
- Other

e. Leisure activities (e.g. visit friends or family, etc.)

24. Which transport mode would you use if you were:
    a. In a hurry?
    b. Having to carry large baggage?
    c. Going alone vs. as group (e.g. with friends or family)?
    d. Going for short distance vs. long distance (more than 1 hour travel time)?
    e. Have to go somewhere late at night, etc.?
25. Do you use any of the transport apps (e.g. Grab, GOJEK, Uber, etc.), especially app ojek?:
    a. As passenger? If yes, how often, and for which transport? Do you use the transport more often because of the app, and if yes, why (e.g. cost, safety, availability, etc.)?
    b. As driver or car owner? If yes, is being a driver your (main) job? Do you make more money, or find more passengers because of the app?
26. Who did the apps benefit or affect, in your opinion?

Opinions on Transport

27. Are you satisfied with transport in this city, or in this area? Why or why not?
28. In your opinion, what is the main problem (e.g. traffic jam, traffic accidents, environment, bad service, etc.)? What's the main cause of that problem?
29. In your opinion, do the government's transport policies benefit everybody in this city?

Knowledge of Transport Governance

30. Do you know about the LRT or MRT (or other transport plan) affecting where you live? What do you expect to happen?
31. Is there anything else that you would like to say about any of the issues we discussed?

Policymaker or Expert Questionnaire

Transport Usage

Ask them to answer these without thinking too much!

32. Roughly how much, in terms of %, do this city's citizens depend on the following transportation modes? (This can be very rough, just your personal impression – everyone can have different impressions, though please also let me know if you know there is hard data somewhere.)
    a. Transjakarta bus rapid transit (BRT)
    b. Commuter rail (KRL)
    c. Buses (KOPAJA, Metromini, Angkots, etc.)
    d. Motorbike taxi (ojek)
    e. Bajaj
    f. Taxi
    g. Own vehicle (car, motorbike)
    h. Other (e.g. walking, bicycling, boat, etc.)
33. Around how many percentage of this city's economy do you think is "informal"?
34. Also in your impression, how many % of citizens in this city use the transport apps (e.g. Grab, Ojek, Uber, etc.)?

Opinions on Transport and Transport Governance

35. Could you explain to me your organization's role and tasks? (Overview / introduction)
    a. As for details if there has been recent action, institutional change, new policy, etc.
36. Are you directly familiar with any drivers' associations or any trade groups in the transport sector? How would you characterize their working relations with the government (or regulators)?
37. In your opinion, what is the main problem of transport in this city (e.g. traffic jam, traffic accidents, environment, bad service, etc.)? Do you expect improvement?
    a. If yes, what is the cause of improvement?
    b. If not, what is the main obstacle?
38. In your opinion, what is the top priority in government's urban transport policies now?
39. Is there a clear policy (or policies) towards:
    a. Informal transport (i.e. transport that are not fully regulated or are "gray"), such as ojek, bajaj, etc.? (Are informal transport, still public transport?)
    b. Is there a clear policy (or policies) towards transport apps? (Are app transport, still public transport?)

40. Overall, who has the main responsibility to provide good transport in this city? Another way to phrase this question is: who is responsible for delivering on the priority?
    a. City government
    b. National government
    c. Private companies (market mechanism)
    d. Citizens themselves (change of perceptions?)
    e. Other: please explain
41. Suppose ordinary citizens in this city wanted better public transport services. Effective actions ordinary citizens can take are (pick the ones you think are effective):
    a. Use only good transport services
    b. Vote in elections
    c. Complain to drivers or companies
    d. Complain to city or national government
    e. Follow traffic laws
    f. Organize a protest
    g. Complain on social media
    h. Other: please explain
42. On the topic that we discussed, if you had one question you could ask or one thing that you want to know (if you could ask interview questions instead of answering), what would be your question?

Service Organizations and Private Sector Questionnaire

Transport Usage

Please answer these without thinking too much!

43. Roughly how much, in terms of %, do this city's citizens depend on the following transportation modes? (This can be very rough, just your personal impression – everyone can have different impressions, though please also let me know if you know there is hard data somewhere.)
    a. Transjakarta bus rapid transit (BRT)
    b. Commuter rail (KRL)
    c. Buses (KOPAJA, Metromini, Angkots, etc.)
    d. Motorbike taxi (ojek)
    e. Bajaj
    f. Taxi
    g. Own vehicle (car, motorbike)
    h. Other (e.g. walking, bicycling, boat, etc.)
44. Around how many percentage of this city's economy do you think is "informal"?
45. Also in your impression, how many % of citizens in this city use the transport apps (e.g. Grab, Ojek, Uber, etc.)?

Opinions on Transport, Transport Governance, & Informal Sectors

46. Could you explain to me your organization's role and tasks? (Overview / introduction)
    a. As for details if there has been recent action, institutional change, new policy, etc.
47. Are you directly familiar with any drivers' associations or any trade groups in the transport sector? How would you characterize their working relations with the government (or regulators)? (or other producers' associations?)
48. In your opinion, what is the main problem of transport in this city (e.g. traffic jam, traffic accidents, environment, bad service, etc.)? Do you expect improvement?
    a. If yes, what is the cause of improvement?
    b. If not, what is the main obstacle?
49. In your opinion, what is the top priority of providers now?
50. Is there a clear policy (or policies) towards:
    a. Informal transport (i.e. transport that are not fully regulated or are "gray"), such as ojek, bajaj, etc.? (Are informal transport, still public transport?)
    b. Is there a clear policy (or policies) towards transport apps? (Are app transport, still public transport?)

51. Overall, who is the main beneficiary of organized services provided by your constituents?
52. On the topic that we discussed, if you had one question you could ask or one thing that you want to know (if you could ask interview questions instead of answering), what would be your question?

Consent Form

You have been asked to participate in a research study conducted by Ying Gao, from Massachusetts Institute of Technology (MIT) Political Science department. The purpose of the study is to understand the issues of public transportation and innovation, their relations to aspects such as governance and impacts on different groups of people and communities, in Jakarta.

You should read or listen to information below, and ask questions about anything you do not understand, before deciding to participate or not in this study.

- Voluntary participation: Your participation in interview or focus group for this study is completely voluntary. You can choose to answer or not as many questions as you wish. You are free to stop or leave the interview or focus group, or withdraw your participation at any time, even after the participation.

- Confidentiality: Your opinions and answers to questions will be kept anonymous. During this interview or focus group, written notes will be taken. These notes will be anonymous – who said what will never be attributed individually, in notes, conversations with other people, or in research reports or presentations. Your names and contact information will never be shared with other people, except if required by law or if you give separate, written permission for sharing. Research data such as interview notes will be kept in secure computers and will be protected with password.

- Risks and benefits: The study is an independent academic research, supported by USAID through IDIN (d-lab.mit.edu/idin), and MIT GOV/Lab (www.mitgovlab.org/). Since it is an academic research project, the outcomes of the study is not linked to any economic benefits or development projects or actions. There will not be monetary compensation for your participation in this study. Generalized findings from this study may be summarized in an outcome report. In addition, findings from this study may be reported in scholarly journals, at academic seminars and research association meetings, and on sponsor institution outlets (e.g. IDIN website, MIT GOV/Lab blog, USAID office). If you wish to obtain these public outcome reports or presentations, just let me know. The project is expected to be completed by 31 August 2017.

- Further questions or concerns: For any questions or concerns about this research, you can reach me at ying_gao@mit.edu or +62 (0) 857-7766-4057.

- If you feel you have been treated unfairly during your participation in this study, or you have questions regarding your rights as a research subject, you may contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, MIT, Room E25-143b, 77 Massachusetts Ave, Cambridge, MA 02139, USA; phone +1 (617) 253-6787.

Based on above information, please indicate whether you are willing to participate in this research.

I agree to participate in this research: YES / NO

Name: _____ Date: _____