

A Platform to Deal with New Mobility (Seriously)

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The term “New Mobility” is the most recent fad in transportation studies. After “Smart Cities” lost ground giving its overwhelming use as a marketing mechanism for companies attempting to sell their solutions, this is the “new girl in town”. Despite the incredible advances in computation power and storage capacity that were actually applied to mobility, it is still not clear what are the social gains, if any, from these innovations. Of course, e-hailing is indeed generating welfare gains for consumers that can now pay less or have a better quality service than taxi rides. Furthermore, in principle, not owning a car will make the person more likely to use sustainable modes to commute.

On the other hand, gains for society are, at least, debatable. Congestion is not getting better off and it might be worsening. Public transit is loosing the most profitable users (users doing short trips) making it less sustainable. Consequently the poor are probably getting nothing from all these innovations except for e-hailing drivers (and it is not clear if there would not be another option for a subsistence wage if driving an e-hailing car for 14 hours a day was not in the menu). There is also a relevant issue of labor rights losses associated with the industry of Transport Network Companies (TNCs).

The main claim in this note is that there are mainly two reasons why gains for society have been so modest. The first one is the lack of sound governance to deal with all the innovations that are taking place. The second reason is the myriad of solutions that are not based on a problem but represent an end in itself. In this note I briefly describe the proposal of a public platform that will be contracted out by the City of São José dos Campos, SP, Brazil dealing with those two issues mentioned above. It sketches up a new governance scheme and attempts to buy just solutions to concrete problems the city faces. For didactic reasons the platform will be split in five but all of them should be totally integrated and that is the reason why I believe that it should be tendered altogether although it would be possible to tender them separately. Tendering them altogether is a challenge since, to the best of my knowledge, there is not a single company that provides all the services listed bellow. However, a consortium of companies might be able to provide all the services listed bellow.

A side problem is that solutions available from large tech companies are usually closed. It requires spending considerable resources in licenses and any minor change requires new resources. In general in this call we will ask for open sources and free software whenever it is possible. This will certainly involve adding capacity to the secretary of transport from São José dos Campos (SEMOVI/SJC). We do not intend to have the capacity of developing full solutions but we do believe that it is possible to make small adjustments without the need to rely on the outsourced company for any change.

Platform 1: Clearinghouse for transportation services

Any public transit system that has a smart card needs a clearinghouse to manage its payment system. There are currently two main governance schemes for providing this service: 1. The city fully assumes responsibility and/or 2. Bus operators assume responsibility. In both cases the bulk of technological services are almost always outsourced. Neither the City nor Bus Operators have the capacity to deliver technological services. As in most Latin American cities, São José dos Campos currently adopts the second scheme.

I propose a different governance scheme. In this proposal a private company will be responsible for the clearinghouse but this company **cannot** be the bus operator. The private company will be responsible for receiving payments and distributing them according to the rules settled up by the City and consistent with the financial legal framework defined by the federal laws. The clearinghouse **cannot** provide the means of payment. It should provide all the resources for any mean of payment to be part of the operation. It includes the hardware installed in the buses and all the software that will allow the payment to be processed, received and distributed. The clearinghouse must allow any company providing the means of payment to participate in the system as far as it provides financial guarantees to their operation. The clearinghouse company will be fully responsible for the system's security.

Besides this financial role the clearinghouse is also responsible for receiving, protecting and selective publishing the data it is managing. The City will establish the main guidelines compatible with Brazilian Data Protection regulation so the data will be released guaranteeing privacy but at the same time allowing the use of data for planning and transparency purposes. It will feed other platforms as described later in this note. The City may be able to access all the transactions performed in the platform including the exact time they occurred. Some of the data, guaranteeing that it is not possible to identify the user will be also granted to anyone in the society and some specific information will be released to companies using the platform to perform services to the City or to the society.

Platform 2: Public Transit Management

This platform will be responsible for providing all the data needed to manage the bus system. This includes the position of the bus in intervals defined by the City, diesel consumption, and others to be defined by the City. It will provide the instant speed of the vehicle in three dimensions. It will also guarantee that it is possible to match bus information with data coming from the clearinghouse described above. It will also guarantee that the privacy of the user is granted.

There are three main functions that this data might be able to provide: a) monitoring the system; b) operating the system and; c) planning the system. The functionality a) will make it possible at least to monitor the frequency (number of buses per hour) and the reliability of the system (variance of the headway). Functionality b) will help the operation including, for instance, a deep learning system that will avoid bunching of buses. Functionality c) will allow the planner

to evaluate current or proposed routes and its frequency as well as the efficiency of the system as a whole.

The governance proposed for this platform attempts to deal with the issue mentioned above about solutions looking for a problem. There are already many companies offering integrated solutions for functionalities a) to c) above. It often includes the hardware as well. Our proposal is to develop the software dealing with each functionality necessary for the City to monitor, help the operation and plan the bus system using startups and hackers programming using open software and codes. The developers will be hired through an open competition where the City establishes the main requisites of the applications, the amount and the timeline. The most innovative proposal will win the competition for each application. Each application needs a problem (defined by the City) it will be solving. New problems may appear in the future so there might be competitions starting every year. The main point here is not to create applications that are not solving a real problem that the City is currently facing.

Platform 3: User's Communication

There is a two-way relationship between public transit users and the City. The user might have suggestions and complains about the quality of the service and the City knows when a problem (e.g. flooding in one area of the City) is happening. The public transit system may profit from receiving user's comments and having the capability of communicating unexpected issues that can happen on a daily base. This platform intends to provide the conditions needed to add this functionality to the system.

Some cities in the world already have such a channel provided by the city itself and some cities allowed private companies to provide the service directly. The governance proposed in this platform is such that any company interested in furnishing this service to users will be able to do so as far as they open a channel through which the city will be able to post information to users whenever it is needed. Since this kind of functionality generates fidelity it is not necessary to pay the company to perform it. One way to monetize "fidelity apps" is using advertisement what would have to be regulated by the City. The company will need access to bus location in order to propose routes and inform users when the bus is arriving at a bus stop. It will need access to unidentified payments so it can provide information on bus level of occupation. So, this platform will compile information generated by platforms 1 and 2 and make an API for companies interested in providing the service.

In principle, competition among providers will likely guarantee that all the information needed will be delivered to users. The City might have their own system if it believes that private companies will never be interested (or able) to provide all necessary information for the user. However, it is crucial that there is a possibility for any company to provide this service free of charge for the City as long as they open a channel of communication in their app between the City and final users.

Platform 4: Demand responsiveness transit (DRT) system

One of the main innovations in transportation was the capacity of matching demand and supply. Using mobile technology, and processing capacity of large databases, companies have been providing those services and changing the way people commute. This innovation is recently being applied to collective trips in addition to individual trips where it is well established already. Many cities are now experimenting with the so-called Bus on Demand that is one kind of DRT.

The business model adopted by most cities that are experimenting with DRT in the world is providing the service for scatter demand on one hand or for the densest part of the network on the other hand. Scatter demand includes paratransit, night services, rural areas, etc. The need for a DRT is connected to the low frequency needed to attend the demand in these services. The logic of providing DRT in dense areas is one way to compete with e-hailing that is stealing passengers from public transit. The service is often used as a way to bring back to the public system those passengers so the same operator of the public transit sometimes provides it.

The business model proposed for this platform is to provide the service in the periphery. The public transit network in São José dos Campos was redesigned dividing the system in local and structural. The local part of the system will be provided using this platform and it was designed with this characteristic in mind. The platform must provide an app to users. However, most routes will not be totally flexible. Most of the local system will run with fixed routes and bus stops. Few routes will be totally flexible in terms of routes and stops except that those routes might respect initial and end points as well as a minimum frequency defined by the city. On the fixed routes there will be some flexibility but not in real time. The idea is that the platform will have the capability of proposing new routes; changes in the current routes; changes in the frequency and other changes in the network. The City will have the capacity of analyzing the proposed changes using Platform 2 applications. In terms of incentives it is important that this platform will receive part of the tariffs' revenue from the local system so they will have an incentive to attract as many users as possible.

For the fixed routes the platform will be allowed to surpass some bus stops and make small changes in the route depending upon the demand revealed by the app but also respecting users that will take the bus but are not using the app for that. The main rationale behind this is that a public transit system must be universal and there are still users that do not use smart phones because they do not have one, do not have a data plan, do not know how to use apps or any other reason. In other words, it will be possible to reserve a seat through this platform but there will be some seats available to users that did not reserve the seat through the app. In buses where it is allowed to commute standing there will be no guarantee of seating if the seat was not reserved through the DRT app. To make the use through an automated system broader it will require a bot in apps that are currently very popular in Brazil such as WhatsApp.

The platform must be open in the sense that any company willing to reserve a seat using a different app might be able to do so. For instance, the companies providing communication with users as described on Platform 3 might also provide this service to users as well as payment services if they comply with the requirements of the clearinghouse (Platform 1). The DRT platform will provide its own app but it will have a system running on the back office to guarantee that any app can use the system to reserve a seat. We do not need to ask for free software or open codes in this case since it might be embedded in the asking price to perform the service in a period of time defined by the City. However, the data should be fully open to the City as well as the possibility to share this data in a possible new tender.

Platform 5: Mobility as a Service (MaaS)

The main innovation of these groups of platforms is the MaaS platform. The term is also hot in the market but none has actually significantly advanced in integrating different modes with some very constrained exceptions. The MaaS platform should be able to integrate operationally and in terms of tariffs any mode that is willing to join the platform. In exchange, an external platform joining the MaaS platform will need to share their information to make it possible to anyone to actually integrate the other modes in the platform.

The integration process needs the information of all trips both for monitoring as well as to make it possible to program a multi-modal trip. This is the difference between a simple integration and the integration that defines MaaS. The user may be in using any platform (e-hailing, public transit, bike share, etc.). Let us assume that the user is open to use the most efficient mode in each part of the trip. The platform in use must be able to compare for each part of the trip the relative efficiency of performing this part of the trip walking, biking, by public transit, car, scooter, etc. And it also needs to be able to book and pay for all parts. This is the reason why any platform should provide APIs that allow this kind of integration to actually happen.

It is worth noticing how this platform integrates with the previous platforms. To make all payments using any platform the clearinghouse should be settled as described in platform 1. Transit management and communication with users gain a new dimension with the MaaS platform since it would be possible to use information from all modes that join the platform to manage public transit and it would be able to exchange information with users in any platform participating in the MaaS (well beyond public transit users if the platform is successful). The DRT platform could be just another platform joining MaaS but we want to keep it separately given its relevance to the operational model proposed for the public transit network in São José dos Campos.

Any external platform can join the MaaS platform but evidently the most likely platforms will be e-hailing. Those companies have a lot to gain from integrating with public transit. TNCs are famous for not being very much interested in open their data. This typical behavior might be a challenge to the MaaS platform but we believe that it will also be a way to encourage TNCs to open their data. In this

case it is evident the need to open the data to make the MaaS platform work. It is also not mandatory to open the data. If the company does not want to participate in the platform it does not need to open their data. There is a risk that TNCs will just decide not to join the MaaS platform.

However, given network externalities, TNCs with a larger market share has a great advantage over smaller players: there are more drivers in the platform and, consequently, it is more efficient to the client to use this platform and more profitable to the drivers to stick to the larger player since it has more clients. This virtuous cycle is actually a problem in regulating TNCs around the world. If a TNC join the platform, it might attract more users and, consequently, be more attractive to more drivers which would make it more efficient to clients. So, if one TNC join the MaaS platform, the other players will have to join it as well. Although there are few players in the market the competition is high among them and this is the reason why we believe that the TNCs will indeed join.

TNCs including e-hailing as well as bike and scooter share are the most obvious players joining the MaaS platform. It is not clear if it will be possible to have relevant players joining the platform such as people commuting walking (around one third of the trips) or using private cars (more than one third of the trips). It will be also tough to include people commuting with their own bike that, although representing a very small share of the trip, is relevant for the sustainability of mobility in any city. Biking with their own bike, however, could be included in the platform just allowing companies such as Strava to join the platform. This app would be able to report how many miles were biked by any of its users.

What would be the incentive for a platform like Strava to join the MaaS platform? One way to incentivize this kind of platform to join the MaaS platform would be "paying" a certain amount per mile biked to the user as a credit in the public transit system. It is exactly the same logic applied for the TNCs. TNCs might be willing to give discounts to bicycle riders themselves. If this kind of policy is implemented other apps helping those that commute walking could do the same. Apps helping cyclists are more demanded than apps helping walkers. However, this mechanism can make apps for walkers more attractive and will also leverage apps for cyclists. This is a strategy to foment active modes using just the price system.

One group that is more complicated to include in the system are drivers using their own car. One way to include this driver in the system would be making the street parking system platform join the MaaS platform as well. Since street parking is under the City management this will be relatively easy. Once again, the driver may benefit from using her car to perform the first or last mile with a discount in the public transit system. However, to actually bring a considerable share of car users into the MaaS platform it would be necessary for the city to actually manage the demand for the individual mode: parking in the street might never be free (even if the cost is negligible); there might have some form of congestion tool; private parking in companies located in dense (and congested) areas should be subject to excise taxes as well as private parking lots. It is very

likely that chains of private parking would be interested in creating a platform that will have the right to join the MaaS platform.

Of course, this level of integration will not happen immediately. It will take some years to consolidate so many players joining such an inter-operable platform. However, just adding City's platforms such as public transit, paratransit, street parking, public bike share, would already make it attractive to other platforms. When a new platform joins the MaaS platform it becomes more attractive to the platforms that have not join it yet. So, we will be using the price system and the network externalities to give the correct incentives to manage all modes in one platform. In the limit it would be possible to make auctions inside the platform for any commute. Just to give an example, the City itself might need to displace a person with disabilities from her home to a hospital. This trip might be auctioned in the MaaS platform and whoever offers the best price, given a minimum standard set by the City, will perform the trip. Consequently, this platform might be the core of the mobility going on São José dos Campos integrating all modes and providing information for the City, citizens, and all mobility companies operating in the area.

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