

PITFALLS AND CONFLICTS IN THE INTEGRATION OF TAXIS IN URBAN MOBILITY SYSTEMS.

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1. Introduction

The urban mobility system builds on a set of different elements (e.g. services, stations, institutions, etc.) that should provide the final user the ability to organise its own mobility chain. Taxis are an important element of the system not only because of the connectivity function they can have in the mobility chain but also for their ability to provide an effective proxy of the private car with some distinctive comfort characteristics in their use, such as no need to lose time parking, refuelling, planning and providing maintenance, etc., and still a perception of enhanced security.

Taxis provide thus a very important public service with a degree of availability and flexibility not found in any other mode. For these reasons the taxi industry has developed in many different ways across the world. The approach followed by the several countries can be substantially different, with some cities allowing as much as possible taxi services and others limiting the access and regulating the market through several sorts of entry barriers (Bekken, 2007).

This diversity brings even some difficulties in defining the borders of the taxi market and the service definition. In fact, a taxi in its more simple and traditional view, is no more than a vehicle offering point-to-point services on demand. Consequently wherever there is unsatisfied demand for mobility there is a potential market for formal or informal taxis. Given the potential to abuse clients many countries (developed and developing) have chosen to regulate market entry and tariffs in relatively tight frameworks (Pleijster et al, 2002). Given the fact that this market is, as defined in Beesley's seminal paper (1979), characterised by "competitive cab proprietors and a heterogeneous labour supply, qualified for life by the knowledge, which moves relatively easily into proprietorship", the industry developed also high premium values for licenses, with the corresponding development of monopoly profits for operators eventually at users' expenses.

All this reveals a rather attractive but also controversial market by the different interests of stakeholders and types of services. The conventional taxi service, that is single-passenger or non-shared, operates in the following basic services:

- From pre-defined and fixed taxi stops;
- From direct telephone requests to a coordination central service, or dispatching system;
- From on-street cruising to pick passengers.

In some countries all these services are provided under a single regulatory framework while in others the services on phone demand are regulated under the private hire vehicles regulation. In Brazil the single tier regulation is largely applied although municipalities have the freedom to choose their own regulatory frameworks.

Despite the virtues of a service with such flexibility and availability have been largely recognised in the all world, there is a more recent element of newness when looking at the taxi as a potential partner in the mobility (or accessibility) chain. The integration of taxis requires consideration of several dimensions of integration some of them are visible to the users, which are: physical integration and logical integration and, under some circumstances also tariff integration, and still less visible dimensions, such as organization and legal frameworks which ensure the effectiveness of the former visible dimensions.

This renewed perspective over the taxi market is strongly influenced by the emergence of the shared taxi market, positioned between the conventional single-passenger taxi and the public transport service, very common in developing countries and sometimes legal and regulated and some other cases illegal. Wherever they are regulated the trend is to have a different regulatory framework from the conventional single-passenger taxi service.

These shared services revealed also a high competitive potential since they are characterised by quicker and more direct services than normal bus, with higher comfort standard and better value for money than the traditional public transport. Both shared and single passenger taxi services tend to be seen by public transport operators as undesirable competition and almost never as potential partners.

Observing cities in develop and developing countries there is evidence that taxi services can play a determinant role as partners of traditional public transport by providing the following type of services, as anticipated by well known World Bank report “Cities on the move” (Gwilliam, 2001):

- feeder services linking remote housing areas to formal public transport routes;
- local distribution by areas with poor or inexistent formal services;
- trunk services complementing/competing with formal services;
- direct longer-distance services, in routes which the formal services are weak;
- duplication of franchised services.

The current paper presents the organisation of taxis services in Brazil, where a reform of the regulatory and organizational frameworks of urban mobility systems based on a recently (July 2007) approved Directive focusing on integration of urban mobility systems.

2. The integration challenge

The development of cities is usually accompanied by increasingly complex mobility needs, which is largely caused by the multifunctional way of living of current societies. This evolution of the logistic organization of our societies places new demands on the mobility system requiring it to fulfill a number of attributes, such as:

- Good levels of spatial, temporal and economic accessibility (i.e. element of efficiency in consumption);
- Reliability of the services offered (i.e. element of robustness);
- Organization of services in such a way that allow the user to improve its range of reachable destinations

To achieve this level of quality the transport network and sub-networks – formed of services (arcs) and interchanges (nodes) - supporting the mobility system has to assure the complementarity and compatibility of services. We recall here that the design of the mobility system, and the articulation of the different modal sub-networks to create an integrated urban network, is within the main functions performed at the tactical level of decision (or planning level). A poor performance at this level results in a fragmented urban mobility system, characterized by a profit maximizing behavior by all parties, with little or no concern with the performance of the all system and, consequently, without offering a network that effectively provides reasonable quality of service for all users with overall acceptable production costs (Macário, 2005)

The relatively reduced capacity of each mode to serve by itself all mobility needs associated with a scarce urban space calls for the need to build the network based on service complementarity and compatibility, that is a synergetic approach to the mobility system, where each mode has the mission to serve specific markets needs according to its best vocation. Within this structured network the several modes and services will feed each other allowing different perceived configurations for the possible mobility chains (or service mix), according to the different intensities of demand (peak, off-peak, night services, week-ends, etc).

The door to door mobility chain is thus obtained through complementarity between all mobility services previously identified. Besides, the service offer provided by the different modes and services runs in competition between these services, provide the system with some degree of redundancy and thus making it less vulnerable to the underperformance of any of his elements

An important factor for the success of this integrated approach is that customers must perceive the existence of effective alternatives to the complete journey based on individual motorized mobility. That is, the dichotomy between private car and public transport should be replaced by the competitive perspective offered with the concept of alternative mobility chains where the private car is also one of the elements. To compete with the attributes of the private motorized mobility the alternatives involving public transport must be seen as an equally available, easy to use, flexible, and comfortable option, with low perceived costs, that is offering a good relation between quality and price (the so called good “value for money”).

Integration should thus be seen as an organizational process through which the different elements of the mobility system are conducted to a closer interaction, with higher overall productive efficiency and enhancement of quality of services, resulting also in improvement of efficiency in the utilization (i.e. consumption) of the mobility system. (Macário, 2005)

3. Regulation of the taxi market

The regulation of taxi services as caused in-depth discussions along the years. In fact, the large number of customers and suppliers, provides the contour, at first sight, of a perfect market competition that requires no economic regulation. However, it has been argued that the taxis market is an excellent example of market failure, in particular the so called cruising market, due to asymmetry of information, leading to a quantity of supply and to tariff level that tend to exceed

what should be considered has a socially optimum. Schreiber (1975) argues that regulation is necessary to secure stability of supply by ensuring that committed long-term providers of taxi services stay in business. Gwilliam (2001) reinforces this perspective by stating that protecting long term providers from temporary market entrants during recessions, when unemployment is high, provides stability in taxi service provision. At the opposite, many other authors, stand for the deregulation of the taxi market arguing on the advantages obtained in lowering real costs (Beesley, 1979) as a consequence of the adjustment of labour supply.

Irrespective of the arguments in favour or against regulation, this is usually done through one or more of the three following elements:

- Quantity of supply;
- Quality of supply;
- Tariffs

Quantity of supply is applied by limiting the number of licenses, in terms of number of operators or vehicles. Quality of supply usually combines a set of elements, such as: quality of the vehicle and of the driver, financial capability of the operator and, sometimes, also the efficiency of the dispatch centres. Tariffs can be regulated through one of the following forms (Bekken, 2007): fixed tariffs, that are observed all times; posted tariffs, also designated by declared tariffs, that are calculated by the operator but once declared and posted in the vehicle, correspond to the maximum chargeable tariff; maximum tariffs, that are declared and posted but subject to downward negotiation; and, finally, negotiated tariffs that allow variations by day and time of the day (e.g. late night, week-end, bad weather, special event day, etc).

The value of the operating licence as an high correlation with the degree of regulation. The experience in both developing and developed countries (Rijkswater AVV, EIM, 2002, in CEMT 2007) reveals that where regulation addresses the three regulatory elements simultaneously the license to operate, often referred as “plate”, became an highly valuable asset¹. In some countries these licences can be sold or transferred between operators. These licenses are often related to specific areas of operation and specific stations (or stops) to board passengers, and in some other cases can not serve kerb-side hail requests. Licences can also be limited to one or several vehicles. To have a better idea on the economic value of a license, it is worthwhile to report that in the Netherlands, in 2005, the average turnover per taxi amounted to €29.954 (Bakker, 2007, in

¹ In the Netherlands in 2005, the average turnover per taxi amounted to €29.954 (Bakker, 2007, in CEMT), for an average price per 5 Km taxi ride of €11.2. Also in 2005, the market value of a conventional taxi license was

CEMT), for an average price per 5 Km taxi ride of €11.2. Also in 2005, the market value of a conventional taxi license was USD 300.000 in New York, and €150.000 in Paris.

4. Organization and regulation of taxis market in Brazil

In Brazil taxi service is classified as a service of public utility, of local interest, which administrative and legal competencies and duties are left to the local authorities – the municipalities - to regulate and provide. All three types of conventional taxi services , previously referred, are provided within a single regulatory framework.

Across the Brazilian country we can find many alternative ways of providing this service, namely direct operation through the municipality, or transferring it to a third party through delegation. However, by imposition of the Union², both through Federal Constitution (articles 30 and 175) and the Law of Concessions and (single-passenger) Licensing (Law 8987) and the Law of Tendering (Law 8666) the transfer of the right and duties of provision of services by third parties can only be done through tendering processes. There is also a wide variety of quality standards across the country, with the cities of Belo Horizonte and Curitiba ranking first and second best cases in quality and performance of taxi services. In both cases planning is centralised by the organizing entity and regulation addresses quantity, quality and tariffs.

In addition, a new Federal Law, designated as “Framework Law for the organisation of Urban Mobility Systems” was recently (July 2007) approved by the President of Republic, Mr Lula da Silva, for immediate implementation, focusing on the systemic character of urban mobility system and envisaging (in its article 11) that individual public transport, i.e. conventional taxi, must be supervised directly by the municipality and based on minimum safety and security standards, overall quality standards, and settlement by the municipality of maximum tariffs. According to the spirit and purpose of this law³ taxis should be integrated as one of the services contributing for the fitness of the mobility chain. This integration raised a number of difficulties, as we will highlight later.

² Brazil is a Federation of 27 States, where both States, Municipalities and Federal District are members of the Federation on equal basis.

³ The author was directly involved in the development and implementation of this law in Brazil, and also in the capacitating program to prepare the municipalities for its implementation, as well as in the public participation sessions held within the Council of Cities and other fora. The project was undertaken by the Secretary of State of Urban Mobility within the Ministry of Cities and corresponds to a very important landmark in the reform of urban mobility systems in Brazil.

Role of authorities

Under this upper level legislative and organizational framework, where the entrepreneurship in the creation of services lies with authorities, the following attitudes are expected in their role of public managers of these services.

- Consider taxis as a transport service component of the Passenger Public Transport sub-system, and not as a social group representing a given professional economic activity, as it was commonly done;
- Give taxis the adequate priority given its role in public transport. That is give it priority in relation to the private car but give the collective public transport priority in relation to the taxi.
- Monitor its performance as a public service in line with the users interest, ensuring quality, safety and security

For the management of the taxi service with good quality levels it is assumed that the following functions have to be accomplished from the side of the authorities:

- Regulation, defining market access conditions
- Planning and programming, which includes size of the fleet and level of engagement in the service; location of stops, implementation of equipments for distance call, and ultimately the creation of new services (e.g special access taxi, luxury taxi, collective “lotação”)
- Monitoring (the service, the driver, the vehicle);
- Monitoring general transport systems for taxi tariffs adjustment

In most cities the service is planned and organised by an organising agency, often the same that organises public transport, which makes integration of services much easier. In Belo Horizonte and in Curitiba, the taxi service is assumed by regulation as a public transport managed by the organizing agency, hereinafter designated OA (BHTrans in Belo Horizonte and URBS in Curitiba), who provides the licenses for operation of taxi service (conventional and collective).

The number of licences per type of service and area are defined by the OA and any change to the quantity of supply of taxi services requires the presentation of studies to the Mayor, for formal approval, to ensure technical and economic feasibility.

Tariffs

The OA is also responsible for the definition of tariffs and presentation of proposals of yearly adjustment to the Mayor. Tariffs are set according to a calculation method developed by the organising agency and also approved by the Mayor. This calculation method is very similar across the country and dependent on investments and operational costs associated with the vehicle and driver.

Currently the calculation method (“Planilha de Cálculo Tarifário”) developed in Belo Horizonte by BHTrans in 1999 is the benchmark reference for the all country (ANTP, 2003), where the operational parameters (e.g fuel cost / km, tire unit cost, driver wages, insurances, etc.) and technical indices (e.g. fuel consumption, tire consumption, labour working days, etc.) correspond to a city of around 4 million inhabitants. The cost items considered are the following ones:

- Fixed costs:
 - Remuneration of operator;
 - Depreciation of assets (vehicle, taximeter, communication devices)⁴;
 - Capital remuneration;
 - Insurances and taxes;
 - Vehicle Cleaning.
- Variable costs:
 - Fuel;
 - Lubricants;
 - Tires;
 - Maintenance of fixed equipments.

Besides the differentiation per type of service (i.e. conventional, collective, luxury, etc.), tariffs are also differentiated by hour of the operation, where tariff type 1 is the regular tariff and type 2 applies in the night period and week-ends (from 22h to 6h in week days, Saturday after 14h or 13h⁵ and Sundays). Night and week-end tariff (2) has an increase of 20% over the regular tariff.

The tariff is broken down in three parts: a minimum tariff; a rate per kilometre; and a time rate, which replaces the kilometre rate when the vehicle is stopped or the vehicle speed drops below the

⁴ Usually 7 years is the life time period considered.

⁵ Saturday morning is a normal working day in Brazil

so called “changeover speeds”. Depending on the city tariffs (in 2003) typically fall within the intervals indicated in table 1 below.

Fare type	Minimum	Maximum
Minimum tariff	0.89 R\$	1.96 R\$
Tariff 1 (per km)	0.76 R\$	1.03 R\$
Tariff 2 (per km)	0.91 R\$	1.24 R\$
Time rate tariff	7.06 R\$	7.09 R\$
Contribution of minimum tariff in construction of total tariff	25%	
<i>Table 1 – Types of Tariffs (ANTP, 2003)</i>		

Service Operation

The service can be operated by individual drivers or companies. In the city of Belo Horizonte, in the first case only 1 license can be conceded and in the later case a minimum of 6 and a maximum of 30 are allowed.

The vehicles used in the provision of taxi services are subject to very specific requirements of colours, identification, comfort, safety and security devices, etc. These standardisation allows vehicles to be easily recognisable. In some cities more than one alternative colour is allowed but even though regulated.

Drivers are also subject to very restrictive conditions for their admission to the profession as well as to regular training. Competencies required entail:

- Ability to deal with clients (communication skills);
- Defensive driving;
- First aid;
- Legislation related to traffic rules and provision of services;
- Capacitating competencies as tourism agent with local knowledge only

For these competencies regular training is required and for a typical training course for driver (beyond driving licence requirements) a total of 42 hours is recommended (ANTP, 2003) with the following blocks: interpersonal skills (6h) ; defensive driving (16h); first aid (10h); city knowledge (4h); regulation of public transport by taxi (6h). The amount of hours per block should be adjusted according to the main vocation of the city (i.e. tourism, etc)

Dispatch centres for on-call services are also managed through licence given by the organising agency and have to comply with quality standards.

Finally, also stops and stations are regulated in Belo Horizonte and Curitiba for the location, positioning (for easier boarding and alight), capacity (for the quantity and rotation of vehicles), and type of services allowed at each stop.

Overall assessment

Monitoring the performance and compliance of the services is a main task of the organising agency to ensure quality control. This is done in a regular scheduling but also using on street non-scheduled monitoring to the vehicle and to the driver. Besides, regular surveys to clients are undertaken. The aggregate effects of these instruments contribute to the operators and drivers strong motivation for quality in both Belo Horizonte and Curitiba. Citizens in both cities recognise the quality of the service although it is considered as an expensive and, thus, rather selective service.

Operators and drivers, as stakeholders of the systems, do have a strong influence at the political and technical level as both cities have a rather participatory approach to decision making, which is a characteristic of Brazilian society that leads to a certain degree of capture of the authorities at the expense of increasing the acceptability to slowly change and improve the system.

So, planning and regulation usually builds on consensus with stakeholders, and high importance is given to the experience of the taxi drivers as advisers of the organising agency. For the operators and drivers the system provides them with a level of stability that fully justifies adherence to quality standards and regulation.

5. Regulatory and political difficulties

However, despite all the characteristics pointed out in the previous chapter, there are serious difficulties in the integration of taxis with the other public transport services, and this was particularly felt when discussing the new regulatory framework for urban mobility system, where the original aim was to integrate these services.

When discussions were held with representatives of taxi services, regarding the integration with other transport services, the main reactions were:

- For physical integration no major problems were raised by professionals operating in cities of high quality standards and strict regulation, since it was already in their usual routines to respect stops and stations, and typically these cities (like Belo Horizonte and Curitiba) provide good levels of demand. In cities where demand was lower and rules are more relaxed, taxi drivers tend to react in a rather negative way to any imposition of physical integration in the boarding points for the passenger as they feel this rule as a constraint for making business and unfair competition with informal transport that is not forced to the same type of rule, and often provides services of identical quality and lower price;
- For logical integration, taxi service providers acted in general with a very neutral position as they considered themselves as a passive element. It was their understanding that the effort of providing logical integration should fall in the hands of the organizing agency or even in the other public transport operators;
- For tariff integration, this was clearly the most difficult element which ended by being the main reason to leave the taxi services almost out of the new regulatory framework. Taxis were only contemplated in a brief article addressing the need for definition of quality standard for these services in harmonization with the rest of the mobility system. Taxis see the tariff integration as a threat to their income and are reluctant to understand the bus operators (conventional or alternative) as a potential partner of the mobility chain. Most likely due to a culture of strong regulation their thrust in the system is very correlated with their perception of imposition over the other operators, to ensure protection of their market. As odd as it may seem, this situation revealed as reciprocal since the bus operators are equally reluctant to consider the possibility of a win-win partnership with taxi for areas and periods where demand does not justify the operation with large buses. Similar reaction exists towards other informal services that continue to emerge as a result of unsatisfied demand, such as informal collective taxis and moto-taxis.

6. Conclusions

The experience reveals a high potential of taxis for services of good quality standards and also that integration of taxis into the mobility systems has to be initiated by the organizing agencies, who is expected to support the most part of the costs of integration. This is in line with similar evidences obtained in European studies⁶.

The innovative conclusion of the reported experience lies mostly on the expectations of regulators, organisers and operators in the regulatory and organizational framework. Stakeholders of the public transport system do seem to rely that a well designed and implemented system requires an effective regulatory system built on a fair balance between competing interests of the stakeholders. But, if this is not achievable, then their second best easily shifts towards relaxing regulation to give room to fair competition with informal economic agents providing similar services.

Of paramount importance for the stability of the taxi service system is a good balance between quantity of supply and demand across the city to prevent emergence of informal services that raise complains of unfairness from formal incumbents and force the system towards its economic limits of feasibility⁷. This happens through the confront of a formal service, regulated and stable, that enables good service quality but relatively high tariffs to user, with informal service that through a better quality-price compromise satisfy demand lost by the formal services.

Across the world and in the developing countries in particular there is evidence on the potential of the taxi to complement other public transport services in the mobility chain, enable to provide an integrate service that effectively competes with the quality standard offered by the private car. However, the economic and market evidence is overcome by cultural resistance of operators, highlighting the need to foster the development of forward-looking entrepreneurs in public transport and resourceful organisers and regulators to enable more customer-oriented services. A critical element to facilitate the envisaged cultural change is the existence of constructive relations between taxi and bus operators and the regulators.

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⁷ A good example is the recent (2007) emergence of informal taxi service in Brussels as a consequence of too strict limitations in quantity of supply