VARIABLE GEOMETRY OF PUBLIC TRANSPORT SYSTEM DESIGN: ADAPTATION TO LOCAL CONDITIONS

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ABSTRACT:

Looking back to more than one decade of systematic work on Public Transport in several continents we understand that significant differences exist in the solutions adopted by different countries for their mobility needs, as well as in the way the social, economic and legal frameworks act upon the functional characteristics and configurations of the mobility systems. Despite these differences all systems have similar goals of providing satisfactory mobility to all those who might need it, but during the last decades significant changes have occurred everywhere, albeit with different intensities: higher diversity of life styles and consequent diversity of mobility needs; congestion reaching levels never imagined before; pollution and energy prices increasing; much wider reach of information and communication through internet and cellular phones.

The accumulated experience obtained in several studies and experiences provides a large amount of indications on the applicability of the different concepts and operational solutions and enables consolidation of a number of principles, recommendations and measures towards appropriate solutions for good management of urban mobility systems. However, we have also spotted a number of tensions resulting from a complex network of interactions between agents and elements of the mobility system and of its surrounding framework that may hinder the application of those recommendations. Experience also tells that this is an insurmountable problem that can only be solved by better systems dynamics approaches to mobility, even if
the depth of knowledge of the interactions is still weak and corresponds only to exploratory insights.

A major consequence of all this is the need to develop additional and systematic knowledge on the conditions for successful implementation of various types of solutions that satisfy the recommended principles for good leadership, design and management of mobility systems, as well as to identify factors of degradation of interaction between agents and of system performance, so that an improved procedure may be put forward for design and management of locally adapted “best possible” Public Transport system.

The paper briefly presents a number of research and consultancy studies developed by the authors in different countries and proposes a schematic description of that procedure for selection of the optimal configuration of the urban Public Transport system in very different circumstances.

1. Introduction

As cities grow wider and some are transformed into large conurbations, a more restrictive offer of goods, services and even social events within walking distance is one of the results. For large parts of the population, access to many elements of social life is increasingly dependent on motorized transport, frequently on private car. Moreover, concepts of quality of life and ways of living have changed substantially, one of the most significant changes being the valuation of urban places as a function of the diversity of options that they may offer within easy reach.

This necessary recourse to motorized transport as an access tool has led policy makers to the recognition that motorized mobility is a fundamental factor for social integration, without which social exclusion might occur as it is largely confirmed in developing countries, as it is the case of Brazil where the Federal Government
estimates that around 40% of population is socially excluded due to lack of access to place of work.

The definition of the city itself also evolved along the years and the contemporary city is rather ambiguous and complex because it lies on relations of “belonging”, regarding territory, people and even institutions, instead of a rigorous spatial or even demographic definition. Each citizen very often is related with two urban areas or having stronger links to other cities than the ones where she formally (i.e. administratively) has her residence.

In addition, the spread of inter-urban connectivity in the last decades, that is the growing effect of aggregation or continuous network of urban communities often using common supply services, called for a redefinition of the urban concept, emphasizing interactions and functional relations instead of geo-morphological criteria. As reported by (Macário, 2005a) much of the movement that some decades ago was considered as regional is now incorporated in urban agglomerations, sometimes even producing a cut across national boundaries, such as the case of urban areas between Belgium and Netherlands or between France, Germany and Switzerland. Indeed, some authors have defined the city on basis of a functional community area, representing a self-contained labor and social market area characterized by high frequencies of interaction (Frey and Speare, 1995, and Hawley, 1971) calling for the perception of quality of the urban mobility system encompassed in the functionality concept.

But the territorial definition of the urban mobility system remains important and even indispensable for its organization as we need to define the boundaries within which the power of institutions that are in charge of its governance is set. As noted by (Viegas and Macário, 2008) the system boundary is indeed a rather unstable definition, dependent on too many factors, such as: the judgment of the observer on what she takes as being the system; legal and technological competencies that underpin respectively the actors’ territorial and spatial competences (authorities and operators); and the actors’ technical capabilities. Besides, in reality what we have is two sets of decision-makers, one on the supply side that rarely addresses the decision at system level, even where there is a good organizational framework; and another one in the demand side which is characterized by hundreds of disorganized decisions.

Transport is one of the policy areas where there is a greater split of competencies across levels of the Administration, and if this decentralization is largely related to the recognition that mobility problems are better identified and dealt with if the decision-
maker is closer to the source of problem, there is also a strong motivation in the domain of fiscal responsibility, leading local and regional administrations to take the hard and publicly accountable decisions on the application of public money (Viegas, 2003).

But even after defining these vertical and transversal boundaries the diversity of segments of the citizens is wide with different mobility needs and also with citizens giving different quality values to each attributes that characterizes an urban mobility system. The consequence is that the same service does not obtain the same quality evaluation from all segments of citizens and the wider the city in both space and functionalities the more likely it is that a wider diversity of solutions is needed to obtain an adequate level of satisfaction from the population.

During the last decades significant changes have occurred in many places, albeit with different intensities, but all to a certain extent conditioning the solutions adopted to satisfy mobility goals:

- higher diversity of life styles and consequent diversity of mobility needs; congestion reaching levels never imagined before;
- pollution and energy prices increasing;
- much wider reach of information and communication through internet and cellular phones.

In fact all systems have similar generic goals of providing satisfactory mobility to all those who might need it but here, like in any system, that depends on quality perceptions, since “satisfactory” may well mean very different things in time and space within a very same city but also between cities, regions or countries. Consequently, significant differences exist in the solutions adopted by different places for their mobility needs. Despite this heterogeneity it is still possible to transfer whole experiences from one place to the other, or simply use upgrading elements learned in another place and transferred in the process of improving the mobility system of a given city or place within it.

To fulfill those satisfaction goals several forms and levels of intervention have been adopted in public-private relations. Usual targets for these interventions have been system elements such as: service definition; prices; market access; etc.
2. Different settings and associated frameworks

The evolution of information and communication technologies substantially changed the configuration and processes of our societies. Business processes are becoming more and more spatially dispersed, costs of knowledge fosters co-operation between business and institutions and more and more people work with information as their main productive resource, while workers of physical production are becoming a minority. The intensity of change along these lines varies in line with the life cycle stage of the urban area under observation but it seems to be clear that the trend is quite general. The economy is not only global but it is also transforming into a network economy both at international, national and regional scales, challenging all former physical concepts associating space and time dimensions.

Business and social trends have consequences on the different spatial strata, the reverse being also true. Network societies are built over the emergence of urban networks where spaces are conceived according to the new social paradigm of a highly differentiated and selective society. Some years ago cities used to be clearly recognized by their hard boundaries or the simple landscape discontinuity. Today, as we already referred urban sprawl has multiplied centers, which compete to attract citizens, fostering motorized zigzagging across distanced centers as one of the most appealing weekend leisure activities for a good part of the population.

Current and future societies are characterized by high individualization and with most developed countries showing a trend to early social emancipation, where the individual becomes the basic reference unit, instead of the family or group of friends. Consequently, individual freedom of choice is expected to increase as well as social mobility, as transitional work increases and quick up and down turns in social circumstances are seen as a normal characteristic of individuals’ evolutionary paths. Co-existence of different social groups and heterogeneous areas, from the social and spatial viewpoint, should thus be a consequence of the modern way of living and an attribute of new societal configurations.
Societies, like any living being, go through an evolutionary life cycle and from one stage to the next there is a continuous trend towards sophistication, with increased complexity in the relation between agents aiming to balance between the permanent need of control and the increased need of freedom of action for the different co-existing economic agents.

These evolutionary stages in the development of societies bring changes in the living patterns and consequently require adjusted solutions to satisfy mobility needs as the strict dependence from mass transit also changes with this evolution. When we try to develop a systematic approach to how Public Transport systems are “designed” in different parts of the world, we cannot escape associating the differences, both of process and of result, with the different levels of societal sophistication and institutional capacity.

In this evolutionary context, with a growing accent on individual actions as we move from one stage to the next, the steering role of local governments gains more prominence than ever before, with management control systems being achieved through clear rule setting, close supervision of planning and implementation processes. The aim is to avoid functional conflicts and inconsistencies between interacting sub-systems, and to carry out an assessment of the evolution of systems (and sub-systems) and the associated decisions of when and where to act in order to ensure a good match with societal needs, that is the so called “citizens’ satisfaction”. This has to be done preserving an adequate balance between efficiency and effectiveness of the decision processes that brings sustainability to the all process.

Institutions are indeed one of the most powerful instruments for implementation of principles and policies (TIS et al., 1997). A semi-rigid institutional design can cope with the flexibility to adjust the institutional design to the solution of a given problem. This could potentially be a way out for the problem of power trade-offs. Normative institutions and back office support can be permanent and lean using functional flexible structures to manage and apply a certain program (Macário, 2005b).

To benefit from the complementarity of all modes and provide citizens with alternatives that match the different market profiles, an integrated management (and
organization) of the whole system is required, as proposed by (Carey and James, 2004), so that consistent signals can be communicated to the population, such as the adequate use of relative prices of private and public transport (TIS.pt et al 2001). However, from the cities observed in the research projects we also conclude that some key requirements exist regarding the institutional design of the urban mobility system, which reflects also in the regulatory framework of public transport, if we want to benefit from the advantages of such an integrated system (TIS et al, 1997, 1998, 2003). We elaborate on these requirements in the following lines.

Strategic definition of the system is a function of political nature, so it should be done by an entity with political representation of the citizens served by the mobility system at stake, who should also have the capacity to allocate financial means to support the system, either by direct or indirect sources of finance. This function can be done either by a single entity (e.g. political body of a metropolitan entity) or by a partnership between several entities (e.g. consortia of municipalities) through concertation of interests and objectives, in particular ensuring political conditions for horizontal consistency between transport, land-use and environment (Viegas and Macário, 2008).

Planning in turn must be executed preferably by a single entity, under the political surveillance of the strategic entity. That is, a Managing (organizing) Authority, with technical competence and sufficient financial means to undertake all tactical functions, such as: the definition and implementation of steering instruments, the deployment of quality plans and standards, the design of the configuration of basic supply (networks) based on those plans and standards, the contractual arrangements for the operation of services and infrastructures of all means and modes, the performance monitoring and consequent adjustments needed, the criteria to accept additional services proposed by the operators or requested by the citizens and subsequently promoted by the authorities.
This Managing Authority can be selected on a competitive basis, since it has a
technical character, and partnerships may also be admitted in the constitution of this
body, but the executive power should be clearly allocated to a single body to ensure
adequate levels of accountability. Theoretically, we could propose also, as an optional
alternative, building this entity out of concerted decision mechanisms (Macário,
2005b), to avoid concentration of the planning function, however there is not enough
knowledge on effective instruments to ensure good performance, system adjustment
and due accountability with such an institutional design, that could offer a good
guarantee of overcoming barriers raised by problems of superposition of powers
between the political-administrative entities involved, some examples have been
analysed by (Viegas and Macário, 2008): the Metropolitan Planning Organizations in
the United States, or the consortium of municipalities in Portugal or Brazil.

Service and infrastructure operation should be contracted out, under a regime of
controlled competition, with incentives for development of additional and innovative
services as well as incentives to promote patronage of public transport (Macário,
2005a).

Each option adopted represents a different relational setting between authorities and
operators and consequently existing tensions within each setting will also change. The
evidence provided by the cities observed in the research projects referred confirm that
no unique solution exists and that each setting will produce different tensions and
consequently different levels of efficiency.

In an urban mobility system, network and service efficiency are fundamental criteria
to achieve the level of service that produce the so called “citizens’ satisfaction”. A key
question at the outset is to define the best allocation of roles between the agents, that
is who does best each of the functions required. This rationale leads to the first
decision on how much state intervention we need and where.
Looking at the economic theory we can find the classical assumptions underlying Musgrave’ theory (Musgrave, 1959) that the general role of the state is to ensure the improvement of the efficiency of the economy and for this function three objectives may exist in state intervention, being: correction of allocation, of distribution, and of business cycles. In all of them as noted by (Karlson and Karlson, 2002) there are the implicit assumptions that free markets are normally efficient and that the state intervention is also normally efficient.

At the opposite, views from the public choice school consider this last assumption as rather naïve, since their departure point is that the state, like all agents, has a microeconomic behaviour and thus, a self-seeking maximization of its own utility, leading to the government failure that can only be overcome through the better structuring of the governance model. However, we should also recall that any market needs several institutions to work as emphasised by the institutional theory (Hodgson, 1988)

The real world, lies somewhere in between these two extreme theoretical postulates and in each moment we must understand when an where state intervention should be applied for the sake of improvement of the overall efficiency and effectiveness in the provision of an adequate level of service. But, as made evident in (Macário, 2005a) in a system with several agents acting in the same market (e.g. urban mobility market) it is the interaction of its elements that leads to an outcome, largely driven by the market dynamics whenever no hierarchy exists to enable a formal coordination.

The lighter the regulation in force the looser is the real coordination capacity and the agents will move through induction mechanism largely based on microeconomic incentives. Globalisation substantially reduces state capacity of effective inducement since often the strategic behaviour of an agent in a given market (e.g. city) may well be a consequence of the situation in another market where she also operates.
Even the market capacity and potential to innovate has a direct relation with the regulatory and institutional framework as made evident by (Firth and Mellor, 1999), in their analysis of the telecommunications markets in Sweden and Australia, they conclude that innovation builds on market knowledge acquired in each step of the market maturation process. When new knowledge becomes accepted it is then internalised as the new standard against which subsequent learning will be measured. If the institutional framework restricts interaction between parties it will simultaneously influence the way each party will value knowledge. This means that regulation should promote innovation by influencing through standard settings what will be learned in the subsequent step, and create incentives to change the context where agents interact.

As a given society develops, a stronger differentiation of forms of wealth creation and a wider variety of service requirements will be occurring, in a dialectic process. This is visible in all walks of life, and also in transportation. And, frequently but not always, institutions develop more or less on par with economic growth, although with a rather rigid evolution of institutional design. It is today largely accepted that institutional change is not enough to generate economic growth (Glaeser et al., 2004; Engerman and Sokoloff, 2008), but it seems clear that a large gap between the level of economic development of a society and its governing institutions is not sustainable.

Although from a public service other than transport view (but even more important from a life quality point of view), the question of institutions is also very much present in water supply, as seen in (Bakker et al, 2008). In the case described in that paper, the issue of universal service (in Jakarta) is analysed in quite some detail, and the main conclusion is that the debate about public vs. private provision has diverted attention from the real problem of the feasibility of universal service provision under a unique normative system, as the authors find that there are multiple barriers to this kind of one-level solution.

Naturally, institutional capacity development is seen as a necessity whenever the desired framework for the provision of services is not feasible for lack of competencies from the authority side. But even here, interesting lessons are coming from the richness of conditions throughout the world, as described in (Anjum and Russel, 1997) in which the authority role for Public Transport regulation was
delegated to a NGO, or the case reported in detail by (Carey and James, 2004) of the merging of the Western Australian Government’s planning and transport agencies done in 2001 to achieve sustainable travel behaviour pushing integration of land use planning and transport planning upstream in the decision-making process.

Institutional capacity is no doubt a main factor in developing an urban mobility system but the main instrument to steer agents’ behaviours in favour of system performance are the regulatory frameworks, contracts and prices, which in turn are very dependent on institutional design and power sharing structures. As Hayek notes “In a system where the knowledge of the relevant facts is dispersed among many people, prices can act to co-ordinate the separate actions of different people in the same way as subjective values help the individual to co-ordinate the parts of his plan.”(Hayek, 1945)

Agents’ own utility function plays an essential role in the principal-agent mechanisms, in which the agent should pursue the interests of a principal. In urban mobility systems there are several levels of nested principal-agent relations, the topmost level being the one between the government (principal) and the regulator (agent) and the second level the one between the regulator (principal) and the organizing authorities (agent), and a third level between each organizing authority (principal) and the several agents acting in the operational level, in which the private citizen, who has the capacity to use common mobility facilities on self-service basis, is also one of those agents. Moreover, even the operator of mobility services can play the role of principal whenever part or the totality of productive services is subcontracted (Macário, 2005a)

The institutional allocation of responsibilities within each decision level depends on the political and administrative organization of the city (or metropolitan area or relevant territorial space) and consequently can never be the object of a model meant to be of general application. Besides, as noted by (Kulhmann, 2007), the political and administrative organization of a city is in most cases dependent on historical evolution and not context or purpose oriented. Indeed, we have observed a bit all over the world an intense change of institutional roles and responsibilities within the urban
mobility systems in the last two decades, which has had a strong impact on the structure of these systems.

In some places functions which were previously performed by authorities have moved to the hands of operators (e.g. fare-box revenue collection), and in other places some planning skills that were retained by public operators, under monopoly concessions, have been shifted into the hands of organizing authorities (e.g. network planning or market studies), and so forth.

These movements have been largely accompanied by organizational and regulatory reforms\(^1\) and the asymmetry of information together with the dynamics of principal-agent relationships required an adjustment of institutional structures in order to enable governmental agencies to shift their roles, from direct control of state-owned service providers to indirect guidance through influence of agents’ behaviour in the market.

From the four networks that form the urban mobility system – walking, cycling, private motorized transport and public transport, with associated infrastructures – the public transport network is one of the components of the system where the market access regimes represent an instrument of articulation between agents and where regulatory issues gain prominence. Another element where market access issues can be raised is in the access to infrastructure (e.g. limits to circulation of some vehicles in certain roads), although here the constraints to market access are not related with reason of competition or market contestability.

The organization of public transport networks needs the upstream decision of who should be responsible for the overall network design and who should be responsible for the individual entrepreneurship of the diversified services that can form the links and nodes of that network, knowing from the outset that in an city an effective and efficient urban mobility system will provide an harmonised level of service by best fitting each type of service to the characteristics of each zone (e.g. geographical,

demographical, sociological, economic) and to the final outcome of the network service. This means that each service and infrastructure element should have a specific mission in the network, starting by the trunk services with high demand in dense areas served by heavy modes (e.g. trains, light rapid rail, bus rapid transit, etc), that will be fed by lighter modes (e.g. Minibuses, collective taxis, carpooling services, individual taxis, etc) serving the less dense areas with higher capillarity.

Depending on the regulatory option, public transport services can be performed directly by the transport authority, contracted out to an operator (private or public) by direct negotiation or through a tendering procedure, or directly in the market by an operator in deregulated regime. The network design (that is the planning) is also a service on its own and can be outsourced with or without tendering, although it is usually seen as a separate market from the one on provision of transport services.

Today network design is a rather technical work that can be easily driven by a set of pre-established attributes defining the desired level of service for the different urban areas and for each zone. Rules and regulations for creation of services have to be clear and built over transparent processes where standards should be used as an incentive for quality (in production and in consumption) improvement, fostering innovation and serious contractual engagement from private agents in the provision of services.

Assessing quality on the whole urban mobility system has to do not only with the absolute metric resulting from the application of sets of indicators, but also with the variation that can be measured through comparison of indicators along time, and with the performance constrains caused by the contextual urban conditions where the mobility system is embedded, namely the interaction between land use and transport. This means the performance or the urban mobility system has to be interpreted in the city context (or urban area, conurbation or metropolitan area) profile that is served by that system.

For an urban mobility system to maintain its value driven character along time, despite its complexity, degree of internal conflict, and instability inherent to the perception of quality, the following properties (Macário, 2005a) are indispensable and the public transport network is the main contributor:
• Robustness, meaning long term stability and sustainability;
• Adaptability, meaning the dynamic capacity to adapt services to evolutionary demands or new technological opportunities
• Efficiency, meaning high productivity, in the capacity to transform basic resources into service outcomes, and these into consumption units, providing the best results at the lowest possible cost;
• Diversity, capacity to respond to respond to the aspirations of the different segments of customers with different types of services in a continuous adjustment between supply and demand for urban mobility.

A very interesting finding in the already mentioned (Bakker et al, 2008) is that, by insisting on a single, well defined set of rules for provision of service, poor societies will often accept to have (large) parts of their inhabitants out of reach of those regulated services, whereas it would be better to accept that a certain diversity of standards and rules could co-exist, designed to make universal access to decent service feasible, in a system of greater transparency and fairness.

This means that transferability of experiences should not be considered exclusively between cities or regions but also within different areas of the same city or region, implying that equivalent levels of service can be obtain with different mobility solutions. Experience exists in some cities (e.g. Paris, Toronto and some Dutch cities) where intermediate transport done with vans (typically 9 places) and taxis provide the equivalent level of service in low demand areas to the traditional metro and bus services provided in denser areas.

In fact, the main problems today, both in the developed and developing worlds, in the interaction between transport and environment, lies with the inertia of the social and economic activity system and its high dependency on mobility solutions developed at the time environmental problems were not yet a major concern (Viegas, 2005).

Recurring to knowledge management science this means undertaking the difficult task of “creative destruction” of the mobility systems, where we need to change the natural evolution of those heavy and complex systems, without breaking them or cause serious damage to any of its several stakeholding agents, and obtain an overall result
clearly perceived as better that the initial situation, so that public acceptability of the change process can be achieved. This is an extremely difficult compatibility exercise between all sides of the problem (technical, economic, social and political)

3. Learning and transferring from experiences elsewhere

Patching up solutions based on transferability of some elements from other cases, not necessarily from more developed countries, can be an effective way of improving the mobility system in any of its dimensions. This is what we commonly call learning from a good practice. But while monitoring demonstrations in several cities (NEA et al., 2006) and evaluating the potential for transferability of pricing measures, among others, we have also perceived that packaging of measures was a condition influencing the good performance of any measure or element transferred (Macário and Marques, 2008) and that transferability was not devoid of risks in the implementation process.

Good practice dissemination is much debated around the world today. In general we can find this reference as a method to enhance the implementation of policy measures. It has however a rather fuzzy definition of what can be seen as a good practice and a general trend is to understand it as the export of a program or of a whole political measure.

In fact these methods emerge as a by-product of the transition in the ways of governance and in general of state intervention in markets. Today, the abstraction that we call market is filled with actors and networks of influences that reject the direct old way of command and control, consequently when this reality is ignored interventions often produce unexpected results, with the action that aims to solve a barrier being itself the generator of another one. All this called for the development of new governance paradigms, largely emphasising proactive adaptation, sharing of knowledge, learning and participatory approaches.
Using a method of dissemination of good practices requires the ability to generalise across complex contexts and understanding fitness conditions, that can be by themselves conflicting goals or at least tensions generating goals. Some mechanisms are often considered to enhance clarity and comparability, such as: adoption of common language (e.g. concepts like life long learning); of common knowledge bases (e.g. information systems); of common operational classifications (e.g. key performance indicators); of comparisons as a strategic tool (e.g. benchmarking, peer reviews, etc); and finally of tools for dissemination of knowledge (e.g. web sites, etc).

In a rather general appreciation we can say, and it is recognised by most international agencies, that dissemination of good practices accrues from the need to promote change.

A practice in urban mobility is by definition local and context dependent, that is locally embedded. So the essence of a good practice lies in the local culture and framework that uses the tool and the innovation, reason why the concept of “community of practice” comes in association with it as a facilitator for the introduction of an idea into the local system. What is a good solution, is of course relative. But the minimum requirement to be good seems to be the ability to produce a positive change in the overall value of the system where it is being embedded. And this should be noticed within a limited, or controlled, time-span otherwise it simply dissolves within the hosting system without being noticed and, consequently, without perceived added value.

Good practices can of course have several degrees, depending on the level of ambition. A continuous improvement of an urban mobility system is certainly a less ambitious target than achieving world class recognition or being a benchmark for other urban areas. However, in the long term, continuous improvement is very likely to produce more sustainable results. Good practices are by nature open cases, as they are prone to modification or even radical transformation, and this makes the developing process relevant. So, a simple good idea, that is something not yet proven but dialectically robust can be the first stage of a good practice, the last being a best practice validated by industry and clients.
A first start into this method is to organize a process of learning and knowledge transfer that can gather target and contextual information from these modification and transformation processes and be a support framework for its implementation. Based on this framework transferability can be operated at any level (i.e. policy, program, packages of measures, projects, institutional designs and structures, methods, or single elements)

In general, evidence from the cities observed (Macário and Marques, 2008) suggests that transferability of measures cannot be predicted from the analysis of key characteristics of what we have designated as origin and target cities. All results from research projects support the opinion that transport practitioners at city level are in the best position to screen the measures based on their in-depth knowledge of the local setting. However, in other to take full advantage of their potential they need to be provided with information about possible measures, be supported by a structured way of decision and be aware of the objectives to achieve.

In these research projects different components of the transferability process have been identified, namely: the scale of application of a policy (e.g. local measure or nationwide measure); degree of transfer (e.g. within a city, between cities, between countries, etc.); horizontal translation of a policy, where a policy is transferred from one institution/territory to another, without changing the scale of application; ‘vertical’ transfer, or ‘scaling up’ or ‘scaling down’ a policy (e.g. from local application to a nation-wide policy, or vice versa).

The departure hypothesis underlying the analysis of transferability is that if a measure or package of measures has been successfully implemented within a given geographical, demographic, socio- economic, cultural, technologic, institutional and organizational setting, then comparable results in terms of the degree of achievement of objectives can be obtained in areas characterized by a similar setting. For the above hypothesis to become operational, it is necessary to account for preconditions for transferability.

The definition of what is considered a successful implementation of a measure or a package of measures is of great importance, in order to qualify it as a candidate
initiative to be transferred elsewhere. The definition of success will naturally depend on the objectives set. The following are examples of objectives set for a given measure, with the indication of a target, hence, of a success criteria that must be measurable:

- 5% reduction on the number of high polluting vehicles on the network will be achieved by setting up of city centre clean zone;
- Reducing congestion by improving 5% in journey times
- Achieve 5% modal shift in favour of public transport

The transferability process requires also an ex-ante / ex-post comparison, including a do-nothing reference scenario, enabling effective assessment of the impact of the measures adopted. Besides such quantitative approach, opinions of experts preferably with experience in similar implementations elsewhere are required to validate preliminary assessment and discuss possible correlation with other measures. Indeed, the greater the number of measures, the more complex the scenario for evaluation.

Benchmarks may also offer a further source of information for quantifying the objectives associated with measures and enable the effectiveness and efficiency of the actions to be compared. Such data should be used with caution, however, and are no substitute for the types of indicators generated by a local monitoring system.

Another difficulty is that transferability depends – to a large extent – on the characteristics of measures themselves in relation to the target city. This means that often there is no alternative than run a full process of preliminary checking for transferability, which of course has associated costs.

A direct consequence from the research work undertaken is that, instead of trying to find a universal solution for transferability analysis based on a quantitative methods, it is more relevant to apply efforts in collecting and processing the knowledge produced by successful initiatives in order to strengthen the consistency of the information available to undertake ex-ante assessments on the process of transferability. The following steps provide a logical sequence for the transferability process used:

- Diagnostic of the Problems
• Characterisation of the City
• Analysis of the city context and implications of problems identified
• Look Around for Similar Contexts
• Selecting Good practices of Source Urban Contexts
• Identify measures with potential for transferring
• Packaging and Dimensioning the Measures for Transferring
• Ex-ante Assessment of Measures to Transfer
• Identify Need for Adjustment
• Implement Measures and Steer Results

4. Recommendations

This paper provides the underlying logic and the evidence that variables like socio demographic characteristics, density of housing, employment and service of each area, condition the operational definition of mobility system and induce the development of differentiated service concepts. This differentiation builds on elements of level of service like: frequency; comfort; price; formality of contracts. A major attribute for the success of these solutions is an adequate institutional setting, transparency and justification of the differences as a way of providing effective services to all demand segments. This is especially important for the situations where that would not be economically feasible if provided by traditional mass transit.

Quality of the urban mobility system is complex due to its multi-agent environment and diversified set of public and private services that can be envisaged. But the network remains as the structural element over which the desired level of service is built upon in any mobility system, irrespective of the weight shared between public and private services.

A good practice is a concept that requires demystification and to a certain extent downgrading it from a major endeavour to a very simple element that can have a good fitting into your system while substantially improving its performance. Good practices can be found almost everywhere, sometimes even in your own country in another
public or private sector area, or in some other times in past experiences. However, transferability of good practices may have serious pitfalls, in particular if context related performance elements are ignored.

The territorial definition of the urban mobility system is indispensable to define the boundaries within which the power of institutions that are in charge of its governance is exercised. But we often observe a mismatch between the spatial insertion of the urban mobility services and the administrative organization of the institutions with responsibilities over the system. In fact this is a major source of underperformance for institutions and systems. The static concept of institutional territory is necessary, and often historically insurmountable, but clearly insufficient to deal with the dynamics of modern societies. Relational territorial dimension is required to deal with the networkwise dynamics of urban communities. In brief, the territorial definition of the urban mobility system requires the use of variable institutional geometry so that the interaction between land-use and mobility can be effectively achieved. Institutional design should thus be guided by a network logic providing service related (and associated decision-making) continuity in the administrative and jurisdictional setting of the institution holding responsibility for the territorial management of urban mobility.

In almost every city we will be faced with the double mission of solving the current mobility problems (i.e. the corrective mission) while adjusting the existing institutional and organizational setting (i.e. the preventive mission), as well as the management control processes, in such a way that the system, as such, starts to exist from the managerial and functional point of view. This means that there is no other alternative to fixing the system while running it and bringing its structure as close as possible to the one that best fits its urban purpose and needs. Transition costs should be considered at each step of the sequential change process and success of implementation has to be assessed more by the importance of the incremental change than by the absolute results in each moment.

Institutional frameworks are typically resilient and their change is usually a complex task from the political, social and economic views, and thus lengthy. Recurrence to the so called “soft system governance mechanisms” of dissemination of good practice,
fostering acquisition of knowledge through capacitating all parties and emphasizing meaning and purpose of the different measures and policies, proved to be an effective “virus spreading” type of tool in several places and sectors of public policies that induces convergence to common compromises and produces catalytic effects on the adoption of innovation with the associated advantages.

References


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