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URBAN TRANSPORT PLANNING IN A CONTEXT OF DEMOGRAPHIC, SOCIAL, ECONOMIC AND TECHNOLOGICAL CHANGE

Transport planning necessarily takes into account more than just the immediate time-frame. In the case of urban transport, it needs to come up with solutions in regard to infrastructure, which is expensive to provide, and may have a useful life extending over many decades. Therefore, planning must take note of economic, technological, social and demographic changes that influence trips undertaken.

The purpose of this article is to explore some of the trends that may emerge in upcoming decades. The article arrives at the conclusion that, in a period of considerable change and uncertainty, failure to take heed of recent trends may result in the construction of infrastructure that is not always the most appropriate. Moreover urban development might militate against the efficient operation of public transport and, as a result, jeopardize the sustainability of cities in the long term.

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WHAT FACTORS INFLUENCE US TO UNDERTAKE MOTOR VEHICLE TRIPS?

How, how often, when and where we travel depends on a series of factors, some internal to the transport sector in the narrow sense, others external to it. All have been in continual development throughout prehistory and history. The internal factors vary due to technology. Whenever a significant technological breakthrough has been made, true actors are the transport seem have responded; thus, the load which people originally bore on their shoulders was transferred, first on to the backs of llamas which people had learnt to rear, and from there to the cart, and then to the rail wagon, and more recently from the wagon to the large way truck. External influences on trips undertaken by individuals within cities include football matches and the theatre; which generated trips which otherwise would not have been made. The telephone and the television, for their part, have possibly

had an opposite effect, giving us reasons to stay at home.

In recent decades, a variety of external changes have taken place, and will no doubt continue to do so in the decades ahead. These will certainly influence our travel patterns, beyond the direct impact of technological progress on the transport sector in the strict sense, which continues to move ahead without major problems (and without the acceleration that has occurred in recent decades in other sectors, such as telecommunications). These external changes can be divided into those completely independent of the transport sector and those that interact with it. As regards to urban transport, the independent factors encompass: (i) demographic factors, such as ageing of the population; (ii) social ones, such as the advent of new lifestyles not associated with the traditional family; and (iii) the economic changes, such as greater participation of women in the workforce. As regards interrelated factors, the main one is the redistribution of land use, encouraged by burgeoning car ownership, which in turn promotes even greater car dependence.

GLOBALIZATION AND THE SUSTAINABILITY OF TRANSPORT SYSTEMS IN CITIES

Certain of the changes described above reduce the commercial viability of public transport systems, while increasing citizens' dependence on the car, thereby reducing the long-term sustainability of urban transport systems in environmental, social and economic terms.

During the 1990s, many countries in the region adopted more liberal economic models, which rewarded private sector involvement, promoted deregulation, entailed a scaling back of barriers to imports, and provided for a reduction in subsidies in general, including those for urban public transport. Among the most notable consequences of this have been the following:

- An increase in the cost of public transport fares: for example, in Lima, fares rose by 131% between 1990 and 1997, while the major cities of Brazil recorded rises of 30-60% between the beginning of 1995 and mid-1999, with economic reforms responsible for a significant portion of the increase;
- Reduction in import tariffs applicable to motor vehicles, leading to a jump in imports of such vehicles of up to 3,500% in countries like Ecuador and Peru, which also liberalized the market for second-hand vehicles; and
- Increasing rates of car ownership, a reflection of greater competitiveness in the motor vehicle market and, in some cases, higher incomes of the social classes more inclined to spend the extra money on the purchase of cars; in São Paulo, for example, between 1987 and 1997, average family incomes grew from 10.5 to 14.0 times the minimum wage, and the number of cars per person jumped from 0.14 to 0.21.

In summary, public transport fares increased, car prices declined, and people's incomes grew. In light of these developments, it was obvious that the already noticeable decline in the percentage of trips undertaken using public transport would gather pace, while the number of trips made using cars would increase. In São Paulo, public transport's share of motorized trips declined from 56% in 1987 to 51% ten years later, and other cities have almost without exception experienced the same trend.

Purchasing a car frees a family from its prior almost total dependence on public transport.

Anyone without a car is forced to live in a neighbourhood, frequently in the centre of town that is well served by public transport. When someone acquires a car, they also acquire, for the first time, a new residential option: in effect, they can now shift to the suburbs, where residential property is cheaper and more plentiful, and the surroundings perhaps more pleasant, but where, conversely, there is less access to public transport and the prospects of operating such a service profitably are reduced. In Santiago, population density grew for decades until 1990, when it started to decline. A bus service cannot operate profitably unless it carries a minimum of around 20 passengers, a level not attained in well-to-do suburbs of cities like Buenos Aires, Caracas, Santiago and São Paulo, to name a few; the result may well be an inadequate service, which exacerbates the poor accessibility inherent in suburbs, which tend to be far from potential destinations such as places of work and study.

Having one car does not mean that a family living in the suburbs stops using public transportation, since the car is not available to all members of the family whenever they might want to use it. Family members remain partly dependent on public transport, normally in the form of vehicles of reduced passenger-bearing capacity, such as minibuses or shared taxis, since services operated by larger vehicles are not commercially feasible due to the low demand. Remoteness from potential destinations combined with the inadequate public transport means that there is greater pressure from family members to buy a second car. Once this purchase is made, the family forgets almost completely about public transport.

The trend described in the foregoing paragraph, and which is in evidence in many Latin American cities such as Buenos Aires, Lima and Santiago, poses a challenge, and indeed even a threat, to traditional modes of public transport. The authorities could head it off in a variety of ways, such as curbing the growth of suburbs through the imposition of strict land use controls, or restricting car usage, for example by means of parking restrictions at destination points. However, such policies rarely find favour with people in Latin America, who show a marked preference for travelling by car rather than using public transport. In a world where economic liberalization or globalization hold sway, any city whose authorities do not heed the preferences of its residents may slip back in the competitiveness stakes and, over the medium term, begin to lose relevance. Setting aside the case of Cuba's capital, Havana, which has hardly been affected by globalization, only in a small handful of cities of Latin America have the authorities been able to limit the use of cars and exercise decisive influence over land use, without, on the other hand, reducing the city's attractiveness to its inhabitants and to investors.

Though cities, which have managed to reconcile such frequently contradictory objectives, are few and far between, such cities do exist. The most well known amongst them is Curitiba, capital of the Brazilian state of Paraná, where the key to success has been the development of a public transport system which is good enough for people with the option of going into the city centre by car to have nothing against leaving their car behind, and travelling by bus. The example of Curitiba proves that it is possible to successfully reconcile the potentially conflicting objectives, but the dearth of comparable cases indicates that this is not easy to do.

Urban authorities in Latin America know that a lifestyle based around the private motor vehicle is not sustainable over the long run, but equally they recognize that measures designed to make citizens who prefer using cars take public transport instead are politically costly in the short run. Those authorities, which are elected for relatively short periods in office, are unlikely to consider it

one of their main tasks to make the city sustainable over the long term. Deviating the cities least likely to adopt a long-term view are those made up of a number of municipalities competing among themselves to attract investment by, for example, providing plentiful parking in office buildings, which promotes the use of private cars for commuting.

THE INFLUENCE OF TECHNOLOGICAL ADVANCES IN THE IT SECTOR

Beginning in the last decade of the 20th Century, cable TV and the Internet have become widely available in people's homes, a development that will certainly have an impact on the production of trips, as well as their distribution over the day. It is logical to think that people will be less prone to leave their homes for visit entertainment centres, since they will have more options for entertaining themselves without venturing out. Orders made via the Internet to a home delivery service may make some shopping trips unnecessary. Moreover, an Internet connection provides scope for flexibility as when many trips to the workplace are made, as well as enabling the replacement of some of these trips by electronic exchanges. Insofar as all this makes it possible to reduce the peaking of travel demand, the result may be to undermine the social and economic viability of expensive mass transport systems, whose very purpose is to transport people between homes and places of work or education establishment in the rush hour. Surveys on travel have recently begun to include a series of question, which permits identifying the impact of cable TV and the Internet on the number and nature of trips undertaken.

TRENDS IN URBAN TRANSPORT COSTS

Greater use of the motor vehicle may be expensive from society's standpoint, but individuals often find it more convenient or pleasant to travel by car than to use public transport. However, the individual citizen fails to take into account considerations such as increased delays experienced by others as a result of congestion caused by his car, or a long-term decline in the frequency of public transport due to reduced demand for it caused by less travelling by car. Currently transport in Latin America's cities with over 100,000 residents consumes around 3.5% of Gross Domestic Product (GDP), with this proportion slated to rise owing, among other factors, to a trend towards greater use of private transport. The cost of personal time taken up in trips made in cities with over 100,000 residents equates to 3% of GDP, though this cost does not figure in GDP.

Families on higher incomes allocate a higher percentage of their income to transport than those on lower incomes, for constant conditions of accessibility, since they make a greater number of trips, and they use modes of transport that are more expensive to operate on a per person per kilometre basis. These two contributing factors are related to greater rates of ownership and use of private motor vehicles. However, although a general rise in incomes is projected to occur during coming decades, this will not necessarily result in proportionate increases in tax costs and time consumed by urban transport, as it may be that families in virtually all income brackets embark on fewer trips.

The net effect of cable TV and the Internet may be to reduce the number of trips made. Other factors may already be having the same effect including the territorial of cities, which increases the mileage involved in each trip, while also acting as a disincentive to travel. In São Paulo, the Latin

American city for which relevant data has been compiled over the longest period, the number of trips made per capita per day rose from 1.01 to 1.53 between 1967 and 1977, before beginning a downward trend which has yet to be reversed; the figure dropped to 1.32 in 1987, and again to 1.21 in 1997. The impact of the reduced number of trips undertaken per capita has been to counteract the greater overall distances involved, with the result that mileage per person has remained practically unchanged, as shown in Table No. 1.

Table No. 1. Unit mileage of trips undertaken in São Paulo, Brazil (1977, 1987 and 1997)

Year	Mileage per person	Mileage per trip
1977	11.90	7.78
1987	10.80	8.18
1997	11.60	9.43

Sources: (i) The Integrated Urban Transport Plan for 2020 (PITU 2020), Government of the State of São Paulo, February 2000; and (ii) E. Henry and J. Hubert, Motorization and Mobility Contrasts in Mega-Cities, Research Institute for Development (IRD), France, no date.

The ratio of 3% of GDP, which represents the cost of time spent in trips, also depends on the speed of traffic flows. Over the years, these speeds have tended to drop, with the impact felt by public transport and private motor vehicles alike, but it would be premature to say that that this figure of 3% will necessarily increase since account must be made shift between one mode of transport and another. Any shift from an ordinary bus to a bus using segregated lanes or to an underground railway will cause the figure to drop, as will a change in mode, say from bus to car.

DEMOGRAPHIC AND SOCIAL CHANGES

Demographic and social changes are set to impact on the number and nature of trips made in different ways. First off, changes to the traditional concept of the family mean that the number of people living in each household is on the decline, leading to a reduction in the number of trips per household, but an increase in terms of trips per person. The increase in women's labour force participation will boost the number of trips per person, and will lead to increased use of private motor vehicles.

In recent years, a gradual reduction in the retirement age has also led to a decline in the number of trips made per person, especially to places of work during peak periods. However, in view of factors such as ageing of the population, greater life expectancy and the problems governments are having in funding pensions from taxes paid by the economically active, there is no guarantee that the retirement age will continue to fall. In the event that the retirement age does not continue to fall, one of the factors bringing downward pressure to bear on the production of trips would be removed.

The net effect of demographic and social changes is difficult to gauge, and adds an additional element of uncertainty to the urban transport planning process. One of the conclusions reached by a study recently prepared by ECLAC is that it is in the interests of the governments of the countries of the region to plan the urban transport system in a way that provides for flexibility. (See ***Impacto de las tendencias sociales, económicas y tecnológicas sobre el transporte público: investigación preliminar en ciudades de América Latina*** ***("The impact of social, economic and technological trends on public transport: a preliminary investigation in the cities of***

Latin America"), Serie Recursos Naturales e Infraestructura No. 41, March 2002).