Urgent and comprehensive planning for low-income urban areas

Wendell Cox
Conservatoire National des Arts et Metiers
Paris
and
Wendell Cox Consultancy
St. Louis, USA

ABSTRACT: There is an urgent need to raise the incomes of urban residents in lower income nations. Effective transport can assist in this process by expanding the labor market available to workers. Some lower-income nations seek to emulate public transport strategies from high-income urban areas. These strategies, however, have produced counterproductive results. Lower-income urban areas would do well to focus on less expensive strategies that expand mobility and access for larger numbers of people.

RESUME : Il est nécessaire d'élever rapidement les revenus des citadins dans les pays à bas revenu. Un transport efficace peut contribuer à ce processus en étendant le marché du travail accessible aux candidats à l'emploi. Quelques pays à bas revenu cherchent à imiter les stratégies de transport adoptées dans des zones urbaines à haut revenu. Ces stratégies, toutefois, se sont avérées contre-productives. Dans les zones urbaines à bas revenu, on ferait bien d'adopter des stratégies moins onéreuses permettant un large accès de la population au transport et encourageant sa mobilité.

1 INTRODUCTION

Urban mobility has become virtually democratized in the high-income world. The process began in the 19th century with the development of urban passenger transport networks and was later broadened by the near universal availability of the automobile for people living in areas with less than comprehensive public transport service. For example, 2000 census data indicates that 92% of US households outside the city of New York (the only US urban area with high public transport ridership) now have access to automobiles, including approximately one-half of households on public assistance. Certain factors appear to have contributed to greater reliance on auto transport than might otherwise have been the case. Unless these factors are mitigated in lower income urban areas, it would seem likely that greater affluence will bring a similar reduction of public transport market shares.

Urban mobility and access is important to the expansion of affluence and reduction of poverty. Employment and income producing possibilities are enhanced as accessibility to the entire urban area is improved; with the productivity of urban areas increasing 2.4% for every 10% increase in access to urban labor markets (Prud'homme & Chong-Woon, 1998). It is especially important for lower income urban areas to focus on strategies that maximize access, because of their limited financial resources. Transport planning should be directed toward urgent (short term) implementation of effective strategies that provide comprehensive mobility and access throughout the entire urban area. In addition, measures should be in place to evaluate the performance of transport systems and projects in terms of their mobility and access achievements per unit of expenditure.

This paper reviews developments in high-income urban areas with to identify policies in lower income urban areas that might retain higher public transport market shares as greater affluence is achieved. Based upon continuing international trends toward democracy and economic liberalism, it is assumed that citizens of lower income urban areas will largely be free to live and travel, as they prefer, with minimal little public policy compulsion. It will also be assumed that it is an object of public policy to expand affluence throughout lower-income urban areas.

2. HIGH INCOME URBAN AREAS

2.1 *Decentralization of Urban Form*

Few public policy issues receive more attention than urban sprawl (used as descriptive, not pejorative

term). For centuries, improvements in transportation technology have impelled decentralization of urban areas. For example, central Paris arrondissements lost 74% of their population since peaking in 1861, while New York's Lower East Side dropped 70% from 1910. The automobile has replaced the omnibus and tram as the (so far) ultimate facilitator of low-density, decentralized life styles.

As affluence and automobile ownership have increased, both residential and commercial locations have spread widely within the urban area. Virtually all urban growth has occurred outside the core areas since 1950, as is evidenced by the examples of Tokyo, Paris, London, New York, Toronto and Sydney, where core area population losses have occurred. In many urban areas the expanding boundaries of the central city have masked the loss. An exception is Los Angeles, where core area densities have increased, but a rate well below that of areas outside the core (in 1990, Los Angeles had the largest area of greater than 4,000 per square kilometer density in the New World). While the least dense urban areas are in the US (and Australia), the greatest losses in urban area densities have occurred outside the US (Cox, 2002b).

Commercial areas were decentralized along with residences. This is evident in the declining share of employment located in central business districts. From 1960 to 1990, CBD employment market share losses averaged 14% per decade among 29 urban areas. In 1960, CBDs contained up to 50% of urban area employment. By 1990, average CBD share had declined to 14.5% (Cox, 2002b). An obvious trend was the suburban "edge city," employment centers, which came in rival CBD job numbers in, for example, Denver and Detroit. These developments were occurring throughout the high-income world, in locations like La Defense in Paris, the Arlanda corridor in Stockholm and along the MacDonald-Cartier Freeway in Toronto. Yet, generally, the number of jobs neither in the CBD nor the "edge cities" tended to be the greatest. For example, 75% of employment in Atlanta, renown for its "edge city" development, is outside the major centers.

The combination of residential and commercial dispersion represented a two-front challenge to public transport. Dispersion of residences meant that public transport would need to provide additional services throughout the urban area to maintain its market share. But the problem became even more complex with the dispersion of commercial locations, because public transport is most effective where it can serve concentrated destinations (the best examples are the declining CBDs). The urban form in which public transport carried large numbers of people from dense residential neighborhoods to dense employment centers represented less and less of the urban area.

At the same time, a large number of people continued to live in dense urban cores, especially in Europe and Japan and in a few New World urban areas, such as New York, Chicago, Toronto and Sydney.

2.4 *Rising Affluence*

The average household income in virtually all high-income urban areas has risen since 1960. Greater affluence allowed middle-income households to afford cars and detached or semi-detached residences in the suburbs (used herein to denote outside the historic core, rather than non-central municipalities).

2.3 *Competition from the Automobile*

The new, more dispersed travel patterns required a more ubiquitous form of transport, a role that was effectively served by the auto. The automobile offers at least these advantages over public transport:

- Span of service: The auto is available 24 hours. Public transport service is often not available during certain hours of the day.
- Service frequency: The auto is available "on demand," in contrast to the schedules on which public transport operates.
- Origin Access: The auto often more closely accesses trip origins than public transport.
- Destination Access: The auto often more closely accesses trip destinations than public transport. Indeed, public transport service may not be available to certain locations in the urban area.
- No-transfer service: The auto allows a direct trip from origin to destination, while public transport may require transferring from one vehicle to another to complete a trip.
- Travel time: All of the advantages above combine to make the auto a quicker mode of transport for most trips.

As a result, the effective size of the urban travel market is enlarged, for employment, education, shopping and other trips. With respect to shopping, this led to development of larger establishments, such as "hyper-markets" and "big-box" retailers, which have improved the quality of life by reducing consumer prices. In the United States, the geographical labor market area available to automobile users is 5.3 times that available to public transport users (Cox, 2002a).

2.4*The Public Transport Market Situation*

The majority of travel in most high-income urban areas is now by automobile. On average, barely 20% of motorized travel in Europe is by public transport, with 6% to 8% in Canada and Australia and 2% in the US. The highest public transport market shares outside Japan are less than 30%. In contrast, Tokyo-Yokohama and Osaka-Kobe-Kyoto retain public transport market shares of 50% or more (Cox, 2002b), representing exceptional circumstances that will be outlined later. The present discussion relates to public transport in high-income nations that have relied heavily on government subsidies (in Western Europe and the New World).

In most urban areas, public transport's market share has fallen sharply. Since 1960, share declined more than 50% in Australia, Europe and the US. Recent data indicates losses averaging 1.5% annually in Canada and Japan. Even urban areas that have implemented strong public transport and urban containment strategies have seen little progress toward attracting people from automobiles. Examples are Perth, where market share has remained unchanged and Portland, where market share declined 14% since before opening two light rail lines (Cox, 2002b).

By the 1990s, public transport's market in high-income urban areas was limited to a comparatively small market of "captive riders," who are unable to afford automobiles, and "choice riders," who choose public transport despite being able to afford autos. In the US, the "captive" market represents 70% of public transport ridership (Center for Transportation Research, 1998). Captive riders are appropriately thought of as a residual market, which is gradually disappearing as auto availability improves.

For public transport to keep and attract the continually larger "choice" rider market requires service that competes with the auto, especially with respect to travel time. In most high-income urban areas, "choice" riders include two broad categories, based upon residential location.

- Core Residents: Core residents include people living in the dense cores of the urban areas that have high levels of public transport service. These two factors facilitate a high quality of life without an automobile, something generally not possible in the rest of the urban area. The ville de Paris, inner London (former London County Council area), the city of New York (except Staten Island), inner Chicago (adjacent to the "Loop" and the north side), Tokyo (23 wards), the city of San Francisco, central Toronto and central Sydney are examples of dense urban cores with high levels of public transport service. Dense urban cores often occur in the urban areas of Western European, but they tend to represent a comparatively small part of the urban area because of the suburbanization that has occurred over the past one-half century. Most new world urban areas simply do not or no longer have dense urban cores.
- Outside Core Residents: The outside core residents include people living outside the dense cores, who take public transport, principally for work trips to the central business district (CBD). Because little auto-competitive service is provided to employment locations outside the CBD (Cox, 2002b).

In Houston suburbs, the suburbs of Paris, Portland or Perth, it can be virtually impossible to get to a job in another suburb by public transport that is auto competitive. Indeed, for all practical purposes, it is only to downtown that public transport can attract substantial numbers of people that would otherwise travel by car. Where public transport is auto-competitive, market shares can be substantial. More than 70% of downtown workers use transit in New York, London, Paris, Tokyo and Sydney. Even smaller urban areas in the US, such as Portland, Denver, Minneapolis and Houston have downtown transit work trip market shares of more than 15%. However, the rational choice of public transport is generally not available to employment locations outside the CBD because little auto-competitive service is provided. As a result, non-CBD public transport commuters tend to have low incomes (captive riders). For example, in the US, non-CBD commuters have incomes 40% below average and only 20% above the poverty line (Cox, 2002b).

As a result of the demographic and economic trends since World War II, most travel is in markets poorly served by auto-competitive public transport. The dilemma is illustrated by a prototypical high-density urban area (Table 1). With 13% of the transport demand in the dense urban core, and another 16% of demand between suburbs and the core, 70% of the demand is elsewhere. This 70% of trips is generally not available by auto-competitive public transport service. Overall, 69% of trips would not be served by auto-competitive public transport.

Table 1. Auto Competitive Market Segments: Prototypical High Density Urban Area

Trip End Categories	Paris Trip Volume (1998)	Auto-Competitive Service	Market Served by Public Transport
1 Core (Both Trips Ends)	13.2%	90%	12%
2 Core & Suburb	16.4%	75%	12%
3 Outside Core Except Core (2)	70.4%	10%	7%
Total	100.0%		31%

Auto-competitive service factor assumed for analysis.
Paris data from INSEE & IAURF, 2000.

The situation is even less favorable in public transport markets without dense urban cores. For example, Portland, has implemented strong policies to increase public transport use. Virtually none of the urban area's jobs are accessible by public transport service that takes the same or less time than traveling by auto. At an auto-competitiveness definition of 1.5 times the travel time of the auto, 17% of the jobs in the urban area are accessible from the average residential location. However, there is a big disparity --- 69% of CBD jobs are accessible, but only 4% of non-CBD jobs are accessible. Further, work-trip auto-competitiveness is likely to be considerably greater than for other trips, since many express services are provided to the CBD during peak commuting periods (Cox, 2002a). In this weaker market, public transport provides auto-competitive service only to a niche market.

Summarized, a principal reason that public transport has suffered substantial market share losses is that auto-competitive service has not been provided for such a large share of urban travel demand. Put in marketing terms, public transport resembles a producer driven firm that "takes people where the system goes," In a consumer driven economy, this leads to lower market shares.

Admittedly, the changing urban form and democratization of personal mobility have made public transport's challenge more complex. But, at least two factors under the control of public transport, excessive operating costs and distorted infrastructure investments, have made results much less favorable than they might otherwise have been (Japan is an exception, where most public transport is self supporting, both infrastructure and operations).

2.5 *Non-Market Operating Costs*

Throughout Western Europe and the new world, public transport systems became government owned monopolies from the 1930s through the 1970s. The original intention, express by London Transport founder Herbert Morrison, was that employees and managers of government enterprises, without a profit motive, would place the interests of riders and the community first. The opposite occurred, as the lack of market discipline led to inordinate cost escalation. US expenditures rose 215% from 1970 to 1999 (real), while ridership rose 11%, for an increase of 182% per passenger kilometer. This declining productivity was in contrast to the improved productivity that occurred in virtually all competitive transport industries in the United States In Canada, operating costs rose 180% from 1970 to 2000, while passenger journeys increased 50%, for an 89% increase in operating cost per passenger (Cox, 2002b). London Transport bus costs per kilometer rose 70% from 1970 to 1984, just before that system began its transition to competitive tendering (Cox, 1993).

2.6 *Non-Market Infrastructure Investment*

Investment, like operations, became the province of government enterprises. The lack of market discipline has led to sub optimal, if not distorted investment decisions favoring projects inherently more expensive and as a result, less mobility and access producing.

Many older high-income urban areas have rail systems that have continued to carry substantial volumes of passengers in and to dense cores (such as Tokyo, Osaka, Paris, London and New York).

But new urban rail systems (light rail, metro, regional or commuter rail) have been built in urban areas without the urban form that justified the historic rail systems. This is especially true in the United States and Canada, where interests advance new rail systems on the claim that they will reduce auto traffic congestion and improve mobility. In fact, new urban rail systems generally tend to provide service to virtually the same market already served by auto-competitive service, the CBD (most new rail urban areas do not have dense urban cores).

New urban rail systems have proven to be comparatively expensive. For example, rapid bus can generally deliver the same level of public transport service for one-fifth the cost per passenger kilometer of urban rail strategies (Kain et al, 1992). Moreover, rapid bus systems tend to operate at higher speeds (US Government Accounting Office, 2001). The policy distortion arises from the fact that perhaps five times as much mobility and access could be provided with technologies other than urban rail.

The distortion of US investment is fed by the unique characteristics of the local political system, with its special interest influence and generous central government funding. This provides incentives for pro-rail interests to seek new matching local taxes to pay for urban rail systems.

The new urban rail systems have thus resulted in over-investment of scarce financial resources. The over-investment extends to the physical characteristics as well. For example, light rail systems generally have a top capacity of 15,000 to 20,000 riders per hour, peak direction. Demand in US light rail corridors is so slight that hourly peak one-way service levels generally accommodate less than 3,000. Similarly, metros can carry 40,000 per hour, peak direction. But metros in Baltimore and Miami carry fewer that 50,000 riders all day in both directions. This is despite the fact that both systems serve the CBDs, the largest employment centers in the areas. This illustrates the declining importance of corridors in the modern, dispersed urban area.

In pursuing urban rail strategies, public transport has been preoccupied with development of corridors. Corridors may be an obsolete term in many urban areas. It is true that geographical boundaries and very large CBDs influence demand into corridors. This is true with CBDs approaching or exceeding 1,000,000 jobs, such as in Tokyo, New York, London and Paris. Geographical barriers, such as the rivers in New York, with their limited crossing points, also focus traffic into corridors. But these circumstances are not typical of most modern urban areas. The majority of employment is outside the CBDs to which traditional corridors lead and commuting is no longer generally corridor based. One might observe motorways with congested traffic throughout an urban area, but travelers are headed for widely dispersed destinations that may begin and/or end far from the motorway corridor. Because autos are able to quickly and conveniently access the motorway from much greater distances than a patron can walk to a public transport station, corridors have become much wider (Gerondeau, 1997). In fact, the urban motorway or high capacity arterial has become a conduit for virtually millions of mini-corridors represented by the individual origin and destination patterns a higher dispersed residential and commercial urban form. Wider, less intense auto-oriented corridors have rendered expensive and necessarily narrow high capacity public transport corridors less suitable for most urban travel demand.

Over-investment in high capacity systems has, like excessive unit costs, resulted in rationing of public transport service. Because more than necessary has been spent to build high capacity rail corridor systems, fewer corridors have been built, and less auto-competitive service has been provided. In consequence, more customers have chosen to travel by auto than might have otherwise been the case.

Finally, there is little, if any evidence that new rail systems have reduced traffic congestion (Cox, 2002b). Automobile work trip market shares have increased in 13 of the 15 new rail urban areas, with the average motorized share rising from 92.0% to 93.9%. The two decreases (Los Angeles and Salt Lake City) were modest, at less than 0.5%. In the new rail urban areas, public transport shares declined an average of 23.4% (from 8.0% to 6.1%). Overall auto commuting increased an average of 27.5%, while public transport commuting increased 8.5%. Public transport captured 2.5% of new commuting trips. The additional commuting by public transport was so slight that in each urban area it would have been less expensive to lease a new automobile in perpetuity for each new commuter (Cox, 2002b)

While historic market share information is less readily available in Canada and Australia, public transport per capita journeys have been level or declining in urban areas that have constructed new rail systems. To have materially reduced traffic congestion would have required large per-capita increases in public transport ridership

- The Perth regional rail system has been expanded approximately 50% in the last decade. Yet, per capita public transport ridership is lower than 10 years ago.
- Per capita annual journeys have fallen 7% in Calgary, 15% in Vancouver and 42% in Edmonton since before new rail systems opened.

2.7 *Lack of a Comprehensive Vision*

Even in the auto-oriented US, the high public transport market shares to employment locations with significant levels of auto-competitive service demonstrates the attractiveness of public transport. But in most urban areas, public transport had no overall vision for competing with the automobile beyond what might be termed "on the margin." The new rail services generally served the same CBD markets as already existing services, with little or no new service to the newer residential and employment areas. The excessive operating costs and distorted infrastructure policies made delivery of an auto-competitive vision even less feasible.

The result, at least in Western Europe and the New World, is that auto-competitive public transport service is available only to residents of dense urban cores (which do not exist in many urban areas) and CBD commuters. Dense urban cores represent a declining share of urban area population, while CBDs represent a comparatively small and declining share of urban area employment For example, the New York CBD represents 20% of employment, while Paris and London are less than 20%. The world's

largest CBD, in Tokyo has less than 15% of urban area employment (Cox. 2002b).

A starting point for an auto-competitive vision would have been a regional service specification. An auto-competitive service specification could be stated in terms such as the following examples:

- The ultimate specification would be for public transport to provide auto-competitive service from 100% of the origins in the service area to 100% of the destinations.
- Another alternative would be for public transport to provide auto-competitive service from 80% of the residences in the service area to 80% of the jobs.

For the purposes of the service specification, auto-competitiveness could be defined as origin to destination service as fast as the auto, or 1.5 times as fast as the auto. Further issues would include a maximum distance from each origin and destination (such as a walking distance of 400 meters), minimum service frequencies and minimum hours of service.

Nearly as important as a service-specification based public transport vision would be an evaluation system to measure the extent to which the policy objective is achieved. An auto-competitiveness index similar to that illustrated for a prototypical urban area above would be appropriate.

While there are few, if any adopted service specifications, they can be inferred from existing service designs.

- In stronger public transport markets such as London, Paris, Toronto, and New York the inferred service specification appears to be to provide auto-competitive service within the dense urban core and for travel from outside the core to CBD employment. This specification may accommodate a majority of the trips within the dense core, but excludes most trips to destinations outside the dense core, which tend to represent a majority of travel.
- In weaker public transport markets, such as Portland, Adelaide and Winnipeg, the inferred service specification appears to be to provide auto-competitive service to CBD employment, and little more. This specification excludes most work trips and an even larger percentage of trips for other purposes.

Auto-competitive service is a prerequisite to maintaining or materially increasing public transport market shares. Without it, expectations that public transport can transform the urban form can mislead both governments and the public.

2.8 *The Exception: Japan*

The much higher public transport market shares in Japan reflect much different environmental and operating conditions. The large Japanese urban areas are much more dense than their Western European or New World counterparts. This makes it possible to provide much higher levels of service. Both Tokyo-Yokohama and Osaka-Kobe-Kyoto have extensive rail systems, including central city metros, regional rail provided by privatized elements of the former national rail operator (JNR) and extensive privately owned systems. There is little public subsidy, especially with respect to the former JNR and private services. Because such a large part of the public transport market is self supporting (from commercial revenues), public transport is able to provide a better match to the travel demands of consumers. Public transport ridership is so high that the Tokyo-Yokohama volume is more than double that of the entire US, while the Osaka-Kobe-Kyoto ridership is nearly the same as the US.

2.9 *Assessment*

If public transport productivity had been maintained or improved, much higher levels of service could have been provided, which could have made it possible for public transport to retain more of its market. Significant progress has been made toward improving public transport's cost performance through competition in recent years, but the decades of poor economic performance have exacted a heavy toll. It seems likely, for example, that public transport's failure to provide auto-competitive service outside historic markets was at least a factor in monopolization of the new markets by the auto.

It has been suggested that a ten-year conversion to competitive tendering in the US could have financed a 74% increase in service and a 64% increase in public transport market share. This illustrates the extent to which higher than market operating costs have limited service levels. The analysis did not consider infrastructure investment distortions (Cox, 1993).

For lower-income urban areas to avoid the failures of their high-income counterparts will require avoiding the following characteristics that have typified high-income urban public transport, and which are also under industry or government control.

- Excessive operating costs.
- Distorted infrastructure investment
- Lack of a comprehensive vision

3. LOWER INCOME URBAN AREAS

3.1 *Background*

Urban areas outside high-income nations are both similar and different from their high-income counterparts. The most obvious difference is that they are less affluent. Their residents, however, seek affluence as surely as those in high-income urban areas. Automobiles are already plentiful in most lower-income urban areas, though their market penetration remains comparatively small. With a large part of the public transport market "captive," high ridership levels are possible with little auto-competitiveness. However, as people become more affluent, more cars will be available, which will add to the traffic congestion that may already be serious.

3.2 *Urban Development Trends*

Urban areas outside the high-income world are remarkably like high-income urban areas with respect to urban development trends. Generally, urban areas are sprawling rapidly, some for decades. Densities tend to be greater, but residential and job locations are already decentralized to a great degree.

In some lower-income urban areas, like high-income urban areas, virtually all population growth has been outside the core for decades. For example (Cox, W, 2002b):

- Since 1970 suburbs of Mexico City have accommodated 80% of growth The core districts of Cuauhtomec and Miguel Hidalgo have lost 45% of their population since 1960.
- Since 1947, all growth in Buenos Aires has been outside the city. The 2001 Census indicates that the central city sustained an 8% population loss in the last decade.
- Only 50,000 of Mumbai's nearly 8,000,000 new residents since 1981 were added to the core city districts. Over the period, more than one-half of the new residents were added in the suburbs outside city of Mumbai. From 1981 to 1991 two central districts lost more than 20% of their population (Marine Lines and Sandhurst Road: the 2001 data is not yet available).
- During the last two decades, even the world's most dense urban area, Hong Kong, has seen central area declines, with all growth occurring in suburban areas. The core of Kowloon has lost more than 20% of its population since 1981.
- The Seoul area continues to grow strongly, yet during from 1992 to 1999, the central city of Seoul lost 600,000 residents.

Moreover, as in high-income urban areas, lower-income urban areas have decentralized commercially. The average CBD employment share is approximately 25% in nine lower-income urban areas for which data is available. They range in size from under 11% in Buenos Aires to 46% in Surabaya. Singapore lost 26% of its central business district market share per decade from 1970 to 1990 (Kenworthy & Laube, 2000). Like urban areas in the high-income world, lower-income urban areas are developing "edge cities," such as Navi-Mumbai and Santa Fe in Mexico City;

3.3 *The Limits of Density*

Population density thresholds are often cited in urban transport analysis, especially US research (Pushkarev, Zupan & Cumella, 1982). But this analysis is limited to CBD oriented trips and does not deal with broader access to other locations throughout the urban area. While density thresholds may be useful for some analytical purposes, the simple fact is that if public transport to have any hope to compete with cars, it must take people from where they are to where they want to go at an auto-competitive travel time. What the particular density is where their trip begins or ends matters little.

For example, a commuter to the eastern fringe of Shanghai's Pudong business district (an "edge city" on the east bank of the Pu River, across from downtown) and lives in the Changling ward of western Shanghai, (less than 20 kilometers) is likely to use an available car if public transport takes considerably longer. It does not matter that the worker's residential density may be more than 40,000 per km2 or that the employment density may also be high. The worker may not have the car today, but as China's economy improves, is likely to in the future.

As affluence improves, providing auto competitive service only to the CBD or within the dense core of Mexico City, Buenos Aires, Mumbai, or other lower-income urban areas will be as destructive to public transport market share as it has been in high-income urban areas. Like in high-income urban areas, the concept of transport corridors is likely to become less relevant in lower-income urban areas.

3.5 *Appropriate and Inappropriate Strategies*

Some lower-income urban areas are emulating or seek to emulate the transport strategies of higher income urban areas, with particular emphasis on high capital strategies, such as new Metros. There are notable examples, such as Curitiba, Belo Horizonte and Bogota, where less costly busway strategies are extending higher quality public transport service to

much larger markets than would be possible with more expensive rail systems.

3.6 *Applying the Lessons*

For lower-income urban areas to preserve the highest possible public transport market shares as affluence increases will require strategies consistent with the following principles.

- Competitive administrative and operational frameworks (such as commercial services and competitive tendering) should be adopted that make it possible to produce service for a cost no higher than necessary. This will make it possible to maximize both service and the effectiveness of any government financial resources.
- Infrastructure investment should be determined based upon the maximum transportation benefit. This means that, all things being equal, systems relying on buses, smaller vehicles and perhaps personalized rapid transit are likely to be adopted instead of higher capacity, more expensive urban rail systems. This will also make it possible to maximize public transport service.
- Service should be designed and implemented based upon a service specification that maximizes the trips can be rationally considered auto-competitive. The public transport system must be consumer oriented, rather than producer oriented. It must, to the greatest extent feasible, "take people where they want to go." System performance relative to the service specification should be regularly evaluated and the results made available to the public.

Because of the natural tendency of the commercial market to more efficiently allocate operating and infrastructure resources, service designs that do not rely on government subsidy are likely to be more successful.

Summarized, this means that, for public transport to maximize its potential and retain the highest possible market share:

- The commercial consumer oriented policies that drive public transport in Japan would be best emulated
- The producer oriented policies of Western Europe and the New World should be avoided.

4. CONCLUSION

Application of theses principles would maximize present service availability and access to labor markets within the urban area, thereby contributing to overall and individual economic progress. Further, such designs would position the public transport system for development of auto competitive services as automobile ownership increases. And, as greater amounts of auto-competitive service are provided, public transport will have the potential to retain higher market shares than has occurred in the higher-income world, where the scarcity of such service has contributed, at least to some degree, to the rapid market dominance of the automobile. Higher market shares could be retained both because people with autos will find public transport convenient for some trips and because others will simply decide not to purchase autos because the quality of public transport service makes them unnecessary.

For urban transport to achieve its potential for contributing to the economic advancement of lower-income urban areas, it will be necessary for public policy to focus on a simple objective --- the provision of the highest level of urgent and comprehensive public transport service possible within resource constraints.

REFERENCES

Cox, W. & Love, J., 1993, *Reinventing Transit: Putting Customers First*, (Washington: American Legislative Exchange Council).

Cox, W., 2002a, *Smart Growth and Housing Affordability*, (Washington: Millennial Housing Commission).

Cox, W, 2002b, *Urgent and Comprehensive Planning for Low Income Urban Areas: References* (Internet: Urban Transport Fact Book www.publicpurpose.com/ut-codatu2002.htm).

Center for Transportation Research, 1998, *Public Transit in America: Findings from the 1995 Nationwide Personal Transportation Survey* (Tampa: University of South Florida).

Gerondeau, C., 1997, *Transport in Europe*, (Boston: Artech House).

INSEE & IAURIF, 2000, *Atlas des Franceliens.*

Kain, J., Gitte, R., Daniere, A., Summerville, T., & Zhi, L., 1992, *Increasing the Productivity of the Nation's Urban Transportation Infrastructure*, (Washington: United States Department of Transportation Federal Transit Administration)..

Prud'homme, R. & Chong-Woon Lee, 1998, *Size, Sprawl, Speed and the Efficiency of Cities*, (Paris: Observatoire de l'Economie et des Institutions Locales).

Pushkarev, B.S. with. Zupan, J.M. &. Cumella, R.S., 1982, *Urban Rail in America An Exploration of Criteria for Fixed-Guideway Transit* (New York: Regional Plan Association).

U.S. Government Accounting Office, September 2001, *Mass Transit: Bus Rapid Transit Shows Promise* (Washington).