

## Chapter 25

### A LOOK AHEAD IN PUBLIC TRANSPORTATION

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When the twentieth century comes to a close, historians will be writing end-of-the-century reports on the changes in transportation that took place during the hundred momentous years just passed. Compared to the automotive revolution and the age of flight, the ups and downs of urban transit are not likely to get top billing. Yet the 1990s promise a turnaround in the fortunes of public transportation that will play a major role in upgrading the livability of city and suburb, in bringing relief to the long-suffering commuter, and in releasing the millions of carless trapped in a society that builds on the assumption that everyone drives.

There are many reasons to anticipate more patronage for urban transit in the 1990s and beyond. They include demographic changes, concerns over energy and the environment, mounting traffic congestion, innovations in technology, better management of public transport, more emphasis on multimodal systems, and new approaches to urban design and regional development.

#### CHANGING PATTERNS OF TRAVEL

Consumers in the late 1980s were spending about 13 cents out of every dollar for transportation. It appears that passenger travel outlays may not rise much above 13% of household expenditures in the future due to the cost of other consumer needs such as housing, clothing, and food. If that should be the case, the traveling public may decide to rearrange its transportation budget in order to accommodate an almost certain increase in the desire for long-distance rather than local travel. People will want

to travel to other countries and to take more vacation trips. Intercity air travel may also be favorably affected by an increase in leisure-time activities and tourism. This may put the squeeze on spending for local transportation since there are other alternatives such as moving closer to the job, doing more work at home, or occupying an office closer to home, such as a neighborhood work station or a branch office of the company. Reducing expenditures for local travel might also be made by giving up a second car and riding the bus.

More patronage for local public transportation is also suggested by demographic trends. The rising proportion of people over 65 may be a factor favoring public transit and making driving less attractive. In addition, minorities will constitute some 55% of new entries into the work force. Historically, new minority groups have had a lower than average income as they become assimilated into the work force, and they may desire to save on local transportation by avoiding car ownership altogether, especially if home and work are both in the center city.

It is also possible that local public transit patronage will be increased by new technology. Magnetic levitation and automated rapid transit are possibilities, but their effect may be more on longer-distance commuting and in the category of intercity rather than local urban transport. The dividing line between what is local and what is intercity is already blurred and will become more so with the expanding radius of the multicentered regional city.

The squeeze on household budgets may be paralleled by shortages of public funds for both highways and transit. At the federal level, budget balancing and urgent needs in nontransportation sectors may combine to impose stricter limits on what can be afforded. About 75% of the federal budget is spoken for by three items: defense, payments to senior citizens, and interest on the debt. Competition for the remaining funds is intensifying with the rising demand for housing, education, bailouts, the war on drugs, and environmental programs. If general tax increases continue to be minimal, reduced military spending may help to finance more domestic programs, but a share in any "peace dividend" will not be easy to come by.

Public transit will hurt the most from a decline in federal support as state and local governments are forced to assume the total burden of transit operating deficits. In many communities, the importance of federal operating subsidies had already diminished during the late 1980s. By 1988, according to the American Public Transit Association, only 5% of U.S. transit operating expenditures were covered by federal grants, while state aid was 17% of the total and localities accounted for 25%. The remaining 33% was revenue from fares. Yet in some cities the amount of federal assistance comprised 20 to 30% of total operating funds, and loss of that support would pose a serious problem.

Additional highway funding from the national government is more likely, in part because the federal fuel tax dedicated to building roads is more properly viewed as a price paid for a service and should not be included in the public's opposition to higher taxes. In addition, private capital can be supplied for highway projects by levying tolls and issuing revenue bonds, an alternative made more attractive by electronic billing rather than cash payments at a toll barrier. Private funding may also be possible for

the extension of paratransit services supplied by taxi companies and other private entrepreneurs.

### MORE ACCURATE PRICING

The bargain prices paid by motorists for the use of high-cost urban roadways has long been a factor in the choice of the automobile over transit. User charges levied by state and federal governments, averaging about 25 cents/gal, are paid by all motorists without regard to where or when their driving takes place. Yet the 1 or 2 cents/mi that such taxes imply are generally far from enough to cover the construction, maintenance, and reconstruction costs associated with multilane expressways in urban areas, to which must be added the social costs of air pollution, accidents, traffic congestion, and the disruption of neighborhoods.

Higher payments need to be charged in order to come closer to covering the costs. Acceptance of much higher charges for needed service is suggested by the fact that an urban toll road in Virginia collects as much as 15 cents/mi, equivalent to a \$3.00/gal gasoline tax. Motorists not only have willingly paid the toll but have promptly overloaded the new road, which had to be widened. Full charges thus failed to dampen the demand. On the other hand, when Singapore levied a price of \$1.00/day on motorists entering the city without the required minimum of four occupants, this charge was sufficient to cut peak-hour auto travel 70% and shift traffic to buses.

In the United States, making urban driving expensive enough to cover its economic and social costs, if politically acceptable, might not reduce congestion, just as making transit free might not encourage its use. A more positive solution to the conflict between cities and cars would be to impose travel restrictions in high-density areas to prohibit cars from entering specified areas at designated hours. The creation of traffic-free zones, pedestrian streets, and bus-only streets has been favorably received as a means of reducing automobile use in European centers. The idea is replicated in American suburbs, where the shopping mall is the vehicle-free zone and cars are restricted to peripheral parking. But the choice of shopping in the suburbs by public transit is generally impractical, except, for example, when a mall such as Pentagon City is served by underground transit, as in Arlington, Virginia.

### SERVING THE CARLESS

The opening of Eastern Europe revealed that freedom for humanity is closely tied to freedom of movement. Millions of Americans saw on television how strongly people objected to being cooped up, unable to travel or make contact with their surroundings and neighbors. The great numbers of East Berliners pouring through the Wall were

reminders of how many of our own people are also cooped up for lack of transportation. America's Berlin Wall is the absence of public transit that prevents so many of the carless from finding jobs and benefiting from many of the services available in the city. These conditions have made it increasingly urgent that this wall should come down.

More and better public carrier services may be necessary to serve the growing numbers of persons unable to afford a car or unable to drive. An added factor may be the shortage of workers available to business firms as a result of suburbanization and the separation of affordable housing from available jobs. Inner-city workers dependent on public transportation are already finding the reverse commute to outlying shopping malls and office complexes either too costly or too inconvenient. Their plight will not go unnoticed as the shortage of workers necessitates steps to provide affordable housing in the suburbs or more convenient public transportation. The latter is cheaper and quicker and avoids the more basic problems of racial discrimination in housing.

### THE SYSTEM CONCEPT

Much of the urban transportation debate between auto and transit priorities has been a discussion of alternatives. But for many commuters the problem is not choosing one or the other but making it possible to combine the two for best results. In a dispersed urban region, the most efficient means of travel between suburb and city is often a drive to public transportation and completion of the trip by rail or other transit facilities. Intermodal transportation, however, requires conveniently located parking at the rail or bus stop, and the absence of such facilities often prevents the intermodal travel that might otherwise take place. (Commuting from suburb to suburb rather than into the city offers less opportunity for intermodal trips.)

The importance of total systems of passenger service is illustrated by commuting between Washington, D.C., and New York. The choice between express rail and air shuttle hinges on what happens at either end of the journey, including parking facilities at the Washington end (at Union Station or National Airport) and taxi or transit service at the New York end. Getting to a 10-o'clock meeting depends not so much on the relative speed of railway and airplane but on the chances of parking, getting a taxi, or using transit.

In the freight business, fast delivery of documents and small parcels by integrated systems of air and truck transport was a multibillion dollar success story in the 1980s. In the 1990s, getting passengers all the way by a combination of public, private, urban, and interurban transportation will be the passenger travel success story of the decade. Symbolic of that achievement will be the joining of Washington's National Airport to Washington's Metrorail system, which until the 1990s left the traveler stranded a hundred yards and four traffic lanes short of the check-in counter. The integration of the two methods of transportation will be achieved by extending the airport terminal building to meet the trains.

Other intermodal alliances will include ample parking and bus connections at rail

stations and the integration of bus and rail schedules. Multimodal movement in urban areas will also be aided by the use of communications to activate electronic bulletin boards that tell the passenger what bus is going where, over what route, and when. People deserve the same consideration accorded packages.

Integrated intermodal travel in the metropolis also presents jurisdictional problems that call for regional organizations capable of promoting areawide transportation management. At the same time the concept of a physically integrated transportation system suggests the merits of a financially integrated system, with all revenues pooled to create the most workable as well as the most socially and environmentally acceptable system. Motorists would end up helping to finance better public transit, but the overall service benefits for all users, including automobile drivers, might make such a solution worthwhile.

### CONSERVING TRANSPORTATION

The future of urban public transportation, as well as that of automobile use, will be affected by growing attention to the demand side of transportation and the influences that can be brought to bear on the factors generating the traffic. To what extent is it possible to accomplish the goals normally achieved through travel by means other than travel?

A possibility is to substitute the transportation of information and of information-processing workers by transmitting information electronically. In earlier times, almost all communication required transportation, either in the form of a written message or through the travel of a messenger. The ability to move information by telephone began the process of separating the two fields. Although the overall effect was to generate much more movement of information and add to our radius of activity, in many cases use of the telephone made it possible to forego a trip. Communications became a potential or actual substitute for transportation.

Developments in fiber optics and computers have added new dimensions to communicating that further the possibilities of taking over some of the functions previously performed by transportation. With an increasing percentage of work functions involving information processing, many tasks can be performed wherever there is a computer terminal and a telephone connection.

Some professionals find it convenient to do part of their work at home or in a nearby office, and many businesses looking for ways to reduce costs are dispersing activities to save on rent and parking and on wage rates that reflect commuting costs. The incentive to substitute communications for travel will be supported as more homes and businesses are connected to global fiber-optic networks, permitting major advances in the use of voice, data, and picture transmission.

Working at home or in work stations close to home reduces the demand for both automobile travel and public transit services, but transit riding may be more vulnerable.

The shorter trips made possible by having offices dispersed in locations closer to residences may favor the automobile, especially if a by-product is more flexible work schedules. Serving flexible travel needs is a special attribute of the private car.

Another means of transportation conservation is to be found in the design of whole communities that include housing and jobs as well as services and that reduce the length and frequency of trip taking for a substantial number of families. Urban development and redevelopment trends are moving in this direction.

### URBAN REDEVELOPMENT

The desire for more livable cities can be expected to promote efforts to overcome blighted neighborhoods and to introduce more open space and amenities into uninviting center-city environments. In many obsolete urbanized areas, the rehabilitation of run-down housing and the introduction of green space and play space will depend to a considerable degree on making changes in the street system. Streets often comprise one-third to one-half of the public space available in cities, and some can be vacated or converted to other uses. Traffic that disrupts the quiet and safety of neighborhoods needs to be diverted to major commercial streets, while curbsides in residential areas need to be made off limits to all-day parkers. Many streets could be narrowed to make room for wider sidewalks and for planting strips for grass and trees.

Redevelopment may also suggest the abandonment of some street mileage in order to make possible the creation of inner-city shopping centers and campus-type housing estates only accessible to pedestrians. It may also be feasible to convert some streets to pedestrian ways or to linear parks or neighborhood playgrounds. The street may well turn out to be the key to redesigning urban areas and creating more livable and attractive community environments.

Disruption of the street patterns dedicated to the movement of motor vehicles would require an adjustment in the way people move around in cities. Local use of the automobile would be reduced by supplying more convenient substitute forms of collective circulation. This would call for various types of short-haul people movers, including vans or other paratransit, connecting peripheral off-street parking facilities with worker and shopper destinations.

Many communities are already focusing on the need for mixed use urban areas that afford an opportunity to live and work or shop within short distances covered easily on foot or by van shuttle service. Curb parking is being restricted to vehicles owned by adjacent property owners or their visitors, and the designation of one-way streets and other traffic regulations often suffice to protect housing and residential areas from the unwanted encroachments of traffic. Parallel measures aimed at designating exclusive bus lanes or all-transit streets can help to revitalize the community and make possible a quality of life impossible to realize in high-density areas dominated by the automobile.

In the suburbs the automobile will continue to prevail, aided by demand-responsive bus or van services. But suburbs striving to become total communities in the years ahead could be combining transportation management strategies with free bus services and convenient parking to make public or collective transportation an important adjunct to the use of private cars. Redesign and rearrangement of the suburbs plus growth management policies could also help to delineate rapid transit corridors and make it easier to provide better public transit networks throughout the urban region.



*Figure 25-1 Bangladesh—the need for better public transportation—a global problem. (courtesy of World Bank)*

### THE REGIONAL CITY

Predictions of a possible doubling of urban traffic by 2010 measure the importance of finding ways to reverse the trends. In most urban areas there is no room to build more roads and, in any case, new highways intended to bring traffic relief are often overloaded almost as soon as they are opened. Building new rapid transit also has limitations, since it encourages high-density development and generates still higher levels of congestion.

There is plenty of evidence that supplying more capacity may fail to solve the problems of moving in the metropolis. Try driving in rush hours in Los Angeles or

commuting by subway or train in Tokyo. But there are moderate-size communities around the globe where public and private transportation succeed in serving the community's needs fairly well. Given the fact that major urban concentrations are getting still bigger, why not begin a process of dividing up the megacity into partially self-sufficient smaller communities to create a series of moderate-size communities instead of one amorphous mass? Transportation and communications could then be used to connect the multiple centers along well-defined travel corridors. What is needed is a partnership of regional developers, city builders, and the transportation and communication industries to help carry out a new growth strategy. Such a strategy would avoid the built-in transportation difficulties of planless urbanization.

The process of dispersal is already under way, but the trend needs to be redirected to create whole communities offering a mix of activities that, at a certain scale, create a more manageable urban environment. A total community context allows a certain percentage of the population to live and work in closer proximity. The noncommunities of the sprawling metropolis have imposed a kind of perpetual motion on residents. Efforts to avoid this are already under way throughout the world, and the role of public transportation has proved to be critical.

## SWEDEN

In Sweden five major rail and rapid transit lines reach out from Stockholm into the surrounding region to supply fast, convenient travel to the planned suburban towns ringing the capital. Following the end of World War II, the regional plan for the Stockholm metropolis led to the construction of housing, shopping centers, and community facilities in multiple town centers removed from the crowded city. Good public transportation was part of the design, to assure easy access to locations 10 mi or more from downtown Stockholm. A network of modern highways was also constructed to serve those who opted for private transport, especially to destinations outside the old city.

Suburban towns such as Farsta, Kista, and Solna are among the many mixed-use communities that provide attractive residential areas, town centers for offices and shopping, good pedestrian walkways to nearby housing, and plentiful open space and recreation. Outmigration from the old city has reduced densities and made it possible to redesign and rebuild the historic downtown. Sweden ranks in the top half-dozen countries of the world with respect to per capita income and is one of the most highly motorized countries, with one vehicle for every 2.5 persons. It could thus afford both modern expressway and rapid transit systems. It also had the planning tools needed to combine transportation and urban development in a skillfully executed model of how a transit-friendly metropolitan growth strategy can work. Being able to reserve open space and low-density land uses surrounding the separate suburban towns helped delineate transit routes and assure convenient commuting.

## SINGAPORE

Another version of much the same regional strategy was begun in Singapore soon after that small island republic gained its independence in 1959. At the time, one-third of Singapore's population was living in slums and squatter settlements, and its per capita income of some \$550 (U.S.) per year posed the question whether the country could pay for rapid transit to reduce the traffic congestion of the old city. The decision was reached to make housing the number one priority and to move people out of the congestion rather than trying to accommodate the congestion. The necessary transportation connections would be provided at first by buses and new roadways.



*Figure 25-2 Singapore—downtown redevelopment. (courtesy of the Government of Singapore)*

Today Singapore, like Stockholm, is surrounded by some 20 large suburban new towns, and reduction of center-city densities has permitted the redevelopment of downtown to the most modern standards. Suburban new towns such as Woodlands, Ang Mo Kio, and Jurong have become important residential and employment centers, equipped with modern apartments, schools, markets, and recreation. In the process of training the unemployed to enter the building trades, income per capita was increased more than twelvefold in two decades, and families were able to use their earnings and to borrow on their social security accounts to buy their own flats. After two decades the increase in national product made it possible to launch a rail rapid transit system

to link major parts of the regional city. The leasing of public lands adjacent to the Metro helped to pay for the construction of the new transportation system to achieve a more close-knit regional metropolis.

Both Stockholm and Singapore are models of how the arrangement of a city for greater convenience can reduce travel needs, organize transportation flows, and at the same time provide a superior urban living environment. They are exceptions, however, not only because they have different political systems, but because they are relatively small (2.5 million population) and because they do not have to anticipate any substantial amount of population growth.

## JAPAN

More relevant to the problems of large American cities, perhaps, is Japan's experience with public transit and suburban settlements outside Tokyo, Osaka, Kobe, and other urban concentrations. Tama, for example, some 20 mi (32 km) from Tokyo, is a planned suburban community of some 300,000 persons that is served by two private rail lines that make the trip to Tokyo in 35 min. The railways were constructed as an integral part of the new town project. Transportation within the town is mainly by private car and taxi, with excellent pedestrian and bicycle circulation among attractive greenways that connect with schools, shopping areas, and playing fields. Compared to the crowding of conventional Japanese cities and their lack of open space, the new suburban mixed-use towns and their accessibility provide a welcome alternative to old-style urban living. Magnetic levitation for high-speed trains and the completion of a national fiber-optic communication network should accelerate the planned dispersal of the Japanese population.

## UNITED STATES

The feasibility of rearranging urban areas in the United States and of making suburban growth more workable has been demonstrated by new cities such as Reston, Virginia, and Columbia, Maryland. These very large undertakings are now being followed by a variety of efforts to redevelop sections of older cities and to create smaller multipurpose suburbs. New York's Roosevelt Island in the East River illustrates what might be accomplished elsewhere. It is a residential development 2 mi long for 5000 people, where living, shopping, and recreation are available in a pedestrian environment. Public transportation plays an important role in this planned community, with its one main street served by a free minibuss service connecting the automobile storage area with the rest of the community. Buses and an aerial tramway provide public transit to Brooklyn and Manhattan. This pedestrian community is a reminder that the college campus, with adequate parking on the periphery, provides a useful prototype for the kinds of neighborhoods that could be achieved in central cities.

Another model is New York's Battery Park City, housing some 6000 people along the Hudson River adjacent to the Trade Center. Here again a pedestrian-oriented

enclave of housing, shopping, and recreation is located where residents can walk to jobs in lower Manhattan or commute by bus, rail, or ferry to more distant locations. In both these examples, nearby employment opportunities minimize commuting for many residents.

The same type of moderate-size, mixed-use community is being introduced in suburban areas. In Arlington, Virginia, for example, developments at the stations of the Metrorail line balance residential and commercial land uses and include recreational facilities and a variety of services. At the Ballston station, apartments, town houses, and single-family dwellings are located within walking distance of offices and shopping, in an area zoned to permit no more than 50% of the land to be used for commercial purposes. Ballston aims not only to be an attractive community day and night, but also to afford good access to alternative destinations in Washington, D.C., and outlying suburbs. The Washington, D.C., metropolitan area has 15 to 20 large mixed-use developments dependent to a considerable degree on rail transit to bind together a series of separate but related communities.

The future role of public transportation in the regional metropolis appears to be twofold. At the local level, traffic management strategies will favor public conveyances plus a combination of automated people movers, moving beltways for pedestrians, and other aids to walking in vehicle-free pedestrian enclaves and shopping malls. At the regional level, the longer hauls to connect with the many separate centers of the region will be supplied by automated roadways for buses and by guideways for high-speed magnetically levitated vehicles. The latter can be expected to expand the radius of the urban region yet make it feasible for many common services to be shared.

There are obviously opposite factors that will continue to influence the future of urban transportation and public transit. For the majority of Americans, the desirability of having one's own automobile will continue to be a dominant factor, given the necessary shift to nonpolluting energy sources. Electric cars, electronic guides to driving, and other technologies may increase the attractions of private travel. At the same time there will be a greater need for public carriers as urban growth, the aging of the population, and other demographic changes combine with congestion, pollution control, and energy conservation to favor substitutes for driving. There will also be a growing sentiment in support of more equitable treatment for low-income families and for those who are carless for many other reasons. The city will also be the main focal point in a global economy of expanding international investment, business travel, and tourism. Competition among cities for a share in global economic activity will compel greater attention to assuring visitors ready access to the community by internationally acceptable standards of public conveyance. This will include the need to serve widely dispersed metropolitan regions with the high-speed, congestion-free transportation not possible by private car.

## CONCLUDING OBSERVATIONS

There are promising alternatives to today's perpetual motion. We are learning that the urban transportation task is not simply to supply more capacity, but to solve the problems of mobility and accessibility that often arise from the nature of cities themselves. This means influencing the factors that generate the demand for travel. Some of our daily chores now requiring transportation might be accomplished without traveling and in ways that are easier and less expensive. Two possibilities on the demand side offer the greatest promise. One is the growing ability to move information to people instead of moving people to information, heralding an era of telecommuting, teleconferencing, telemarketing, and other trip-saving communications. The other is the design and redesign of city and suburb to substitute convenient location of urban activities for the travel that inconvenient land-use arrangements have imposed on urban residents.

With improved communications and more convenient communities, transportation would stand a better chance of operating more effectively. Transit, taxis, and automobiles, viewed as a total transportation resource, could play complementary roles in furthering mobility and enhancing urban environments.

In the dispersed regional city of the future, public transportation will be needed to carry out five essential functions:

1. To guarantee citywide mobility for the growing number of people who are nondrivers by choice or necessity.
2. To supply the exclusive means of travel in high-density areas where private cars are prohibited.
3. To complement the services rendered by the automobile on trips that require both methods.
4. To provide local extensions of the intercity and global public transportation networks.
5. To help create a more satisfying, manageable, and pollution-free urban environment that maximizes the ability to move while minimizing the necessity for movement.

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## EXERCISES

- 25-1 What are some of the inequities experienced by the carless living in urban areas poorly served by public transportation?
- 25-2 Who pays for urban transit and urban highways, and what changes in current policies would you suggest?
- 25-3 How could the transportation sector contribute to upgrading the urban environment?
- 25-4 What are some of the factors that can be expected to increase the role of public transit in American cities over the next decade?
- 25-5 Describe the supply side of transportation and some of the elements governing the demand side. How can communications help reduce the need for mobility?
- 25-6 What transportation technologies and what technologies outside the transportation field may alleviate the problems of moving in urban areas?
- 25-7 How will the global economy influence the quality and availability of public transportation in American cities?
- 25-8 What is meant by transportation systems, and what system approaches could make it easier to move around in urban areas?
- 25-9 Suggest the various elements of an urban transportation strategy that you would recommend to improve the mobility and livability of cities in America.

