Does This Bus Go to the Future?
Some Thoughts on the Future of Urban Public Transit

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The evolution of urban public transportation in the United States has been largely influenced by four factors: nature of urban travel demand (markets), competition from other modes, costs of providing transit services, and mechanisms for financing costs not paid directly by users. About 80 years ago, mechanized transit could efficiently and competitively serve concentrated travel markets, paid for (with little profit) out of user charges. At that point in time, transit began to become the primary means of urban passenger movement.

The automobile, urban sprawl, increasing incomes, and other factors made transit over the last 40 years less competitive in terms of both service and costs and its function shifted from being the primary means of travel to a mode that competed successfully only in specialized, high-density markets, i.e., CBD-oriented radial corridors. In the last 20 years, transit has been focused more sharply on the welfare function, meeting the needs of those without access to automobiles and, to a lesser extent—in times of emergency—serving as a backup for automobile travelers. In a relatively small number of markets, of course, transit continues to compete successfully with the automobile for CBD peak-period trips. The fraction of total travel carried by transit under such circumstances is very small, but the cost-saving impacts for all travelers of this function of transit are quite important.

The nature of the industry itself has changed rather significantly in the past 20 years, largely because it has rolled over from the private to the public sector, with the help of federal subsidies. This change has reduced the concern for covering costs out of the farebox, for cost control and efficiency, and for timely maintenance of the physical plant. Indeed, it can be argued that federal subsidies, first for capital additions and later for operating costs, have encouraged overinvestment in public transit to far beyond the level at which market revenues can sustain services. Public takeovers and subsidies at all levels have resulted in emphasis on the welfare role of transit and have tended to perpetuate managerial myths about the industry that have led to increasingly nonviable actions. Examples of the latter include the myths that (a) decreasing fares will increase revenues, (b) holding fares steady in the face of increasing costs would benefit the industry, (c) new transit services can attract major shares of the automobile travel market, and (d) significant, incremental land development impacts can be readily generated from transit investments. For a while at least, money was easy to come by, and any and all justifications for expenditures became acceptable to pump up our transit systems.

Today, the environment in which urban public transit operates is changing radically again. Rapidly escalating costs, the certainty of federal subsidy cutbacks, and the decreasing ability and willingness of local governments to pick up the subsidy burdens all portend a new era. Markets continue to disperse and renewed competition from the automobile is emerging. Some of our most transit-intensive cities are in a state of economic decline. In the future, we might expect much greater concern for the cost effectiveness of services and a decreased emphasis on the welfare function, at least.
as it might be covered under the transportation budget. Fare increases justified in terms of cost increases, as well as serious cost-control efforts, may well become the norm. Some smaller city services may disappear, or at least change radically in character and efficiency. The user will be asked to vote with his or her fare money and large-scale investment decisions will, or at least should, focus more on likely, cost-effective payoffs to communities.

Still, transit will not disappear by the year 2000. Consider that eight years ago people were saying the automobile would soon become a thing of the past. But technology and economic patterns do not change so rapidly. Furthermore, just as it became clear that the automobile industry, because it has a vested interest in its own survival, adapted to a changing context, we can expect (and demand) that an enlightened transit industry will also respond, change, and improve. Those actors who do not, of course, will see their home systems collapse. But, generally speaking, the vested interests are the exceptions. The drivers of transit--highly localized and personal level are too great, and the options for change are too many to make it likely that the industry will disappear. This paper will identify eight areas for change where we see movement now and can expect more to come.

SERVICE DIVERSIFICATION

Significant diversification of transit services beyond conventional fixed-route, fixed-schedule, line-haul services and toward a wide variety of ridesharing and paratransit options is likely. This is occurring now because conventional services cannot meet travel demands widely dispersed in time and space at reasonable costs—and, in some cases, at any cost. Demand-responsive services, subscription services focused on narrowly circumscribed markets, shared-ride taxis, vanpools, and carpools will not only be increasingly common but also will become more widely accepted as transit services. These will principally serve the welfare function of transit industry, which in the last 30 years has pursued centralized, restrictive regulatory control of directly delivered services. Yet unconventional services most likely to compete with the private automobile are those that are most flexible, personalized, atomistically delivered, and uncontrolled. The management challenge will entail giving up a large share of direct delivery and tight control of services and working to create a supportive environment into which many actors experience the incentives to enter the market.

Thus, purchase-of-service contracts will need to be flexible and reasonable so as to attract small, efficient entrepreneurs. Regulations need to be pared down to the bare minimum needed to protect society and to be clarified to eliminate ambiguities as to who is regulated and how. Market entry restrictions (especially for taxis) need to be relaxed. The private-to-public rollover of the industry during the last 20 years, along with public subsidies, has given rise to major increases in the scale of transit service agencies. Major cities have moved from having literally dozens of carriers to a single regional agency or a few public carriers with a regional coordinating body. Heard to this day are the arguments that trips do not recognize jurisdiction boundaries—an argument for coordination, not agglomeration—and that economies of scale will reduce delivery cost. Although some economies may result from bulk purchases of supplies and equipment, there is little evidence of true scale economies in public transit (3).

Scale, the size of the fleet, the number of seat miles offered, etc., in fact may be our greatest enemy. Scale increases lead to increases in administrative requirements and opportunities for inefficient politicization. Indeed, 17 percent of the cost increase in public transit between 1967 and 1976 has been attributed to expansion of the administrative work force (4). Most important, large-scale operations are more attractive to labor unions and more vulnerable to union actions. In the Chicago area, for example, the smallest carriers are also the cheapest carriers, in part (but not entirely) due to lower labor costs. Finally, large scale makes it difficult to know the needs of travelers and adapt services to them.

The economies that clearly exist are those of density. More people traveling in the same corridor can usually be carried at lower unit cost than fewer people making dispersed trips. This is an economy of scale which we cannot ignore but must use to purchase the service is common but we still do not know how to deliver it cost-effectively or how to get others to deliver it.

The transit agencies that survive in the future may well be those that firmly seize the role of brokers—broadly defined to include providing travel connections (market-making), disseminating information not only about travel options but about how to get into the business, contracting for service, and direct delivery of service. It will not be easy to develop and apply tough criteria about when to pursue which task and when to stay out of the picture and let the market run its course. In fact, one of the few hopeful possibilities in the economic decline of transit in the 1980s is the real opportunity to stay out of markets where the industry in a formal sense cannot succeed. Had this been done in the heyday of the 1970s, the industry might be healthier today.

ORGANIZATION AND MANAGEMENT

The private-to-public rollover of the industry during the last 20 years, along with public subsidies, has given rise to major increases in the scale of transit service agencies. Major cities have moved from having literally dozens of carriers to a single regional agency or a few public carriers with a regional coordinating body. Heard to this day are the arguments that trips do not recognize jurisdiction boundaries—an argument for coordination, not agglomeration—and that economies of scale will reduce delivery cost. Although some economies may result from bulk purchases of supplies and equipment, there is little evidence of true scale economies in public transit (3).

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The economies that clearly exist are those of density. More people traveling in the same corridor can usually be carried at lower unit cost than fewer people making dispersed trips. This is an economy of scale which we cannot ignore but must use to purchase the service in the market, not by the service provider. Indeed, we find exactly the same phenomenon—at best weak scale economies but strong density economies—in other parts of the transportation field (5).

Thus, an efficient industry in the future may once again comprise many smaller providers rather than a few large ones. Achieving such a change may be quite difficult for management, for it means giving up control. It may only be possible at first
under disaster scenarios in which regional agencies appeal for and are granted to fragments. It is interesting to note that moving toward smaller scale is quite compatible with the service diversification options mentioned above.

In this process we need not and should not give up regional coordination and policy development. But regional or large-scale agencies may only be successful in these roles and not in service delivery. Moving service delivery to a more local scale may leave regional policymakers with a real chance to make policy—i.e., to look ahead, to adopt a truly integrated multimodal view, and to become true watchdogs for efficiency and service quality. It has been said that real management has become cost-guaranteed even though the nature of its role has they are not very good at it (6). The industry’s future survival and the future of our cities may well depend on the re-emergence of a policy management role. Who else but such managers will deal with the real future (7).

More successful transit agencies may be more decentralized, focused, and efficient, as well as better coordinated and postured to support the 10- to 20-year future evolution of cities. One way to get past the financial crises of 1982 may be to start looking at 1985 and 1990.

(REE)ENTER THE PRIVATE SECTOR

Service diversification and decentralization of control will improve the environment for the private sector as a major actor in the provision of public transportation services in the coming decades. Moreover, although private operators largely left the bus business of providing conventional, line-haul services over the past 30 years, private enterprise has still maintained an important but invisible role in urban transportation.

Private entrepreneurship is most obvious in the taxi industry, which serves important markets in most cities. The taxi industry, legal and extralegal, serves both rich and poor and provides essential connections to key facilities such as airports and convention centers; this mode is in the market spectrum somewhere between the drive-alone automobile and conventional public transit. Taxicabs remain economically viable, having expanded their services to include (sometimes subsidized) shared riding, transportation for the elderly and handicapped, and small package delivery. And it is not insignificant to note that owner-operators find driving a relatively inexpensive entry into independent business and a stepping-stone up the economic ladder to more lucrative employment.

In addition, entrepreneurs have survived in the charter bus business, providing school bus services and moving the handicapped with subsidies that come from sources other than the transportation budget. If we look more broadly to measure the full impact of the private sector in urban transportation, we must include special services provided by employers, including buses for workers, incentives for carpooling and vanpooling, and free or subsidized parking and transit passes.

Even in entirely public transit systems, service itself is often delivered by contract carriers, profitmaking organizations that are subsidized and regulated by public agencies. The management of transit operations has also remained a profitable private industry, with fleets owned by government institutions. Thus, the private sector has never really left the urban transportation business, although the nature of its role has shifted and its visibility has declined. Still, if all private services stopped today, cities large and small would feel immediate and significant effects.

There is a modest but clear sign, however, that the role of the private sector in urban public transportation is expanding again. Perhaps the strongest sign is the emergence of subscription commuter services, typically charter buses provided by profit-oriented entrepreneurs, which are brokered to travel through volunteer organizers (8). Chicago, for example, has experienced the initiation of some 50 peak-period charter bus runs during the past 18 months, largely as a result of commuter rail fare increases of 100 percent or more. These services compete directly with commuter rail, linking suburban locations with CBDs. Such guaranteed a reserved seat, given fixed (single) departure times, and offered service claimed to be equally fast and more reliable than commuter rail. What is most important, it appears, is that these services are priced at about 50 percent of current commuter rail monthly passes.

This is not a phenomenon unique to Chicago. Our transit agencies at first attempted to minimize the significance of these new market entrants, and then began to predict that community organizers would soon lose interest and the services would collapse. Now they are beginning to feel the effects on commuter rail ridership and revenue. The regulatory status of subscription services is hazy, and it remains to be seen whether the Illinois Commerce Commission and/or the Regional Transit Authority will take action to terminate, or at least regulate, these carriers.

Of course the fear on the part of existing public agencies is natural. Subscription carriers are skimming the cream from peak-period markets, increasing unit costs of carrying remaining rail passengers, and reducing the payoff on investments in public services. They have an uncertain future, may be exclusionary, may be unsafe, and offer travelers only one run each day. Furthermore, the existence of publicly subsidized commuter rail provides a beneficial externality to subscription services, for it assures a backup mode of travel for emergency midday return trips, and makes it possible for a traveler to miss the bus occasionally and still be able to make the trip. Experimentation has shown that this backup service can be essential to the viability of the primary (in this case, subscription) service (9).

What is important about privatization of transit for the future—beyond our implicit dependence on existing private-sector activities in transportation—is that in the right environment and with the right incentives private services could expand substantially. Creating this environment is a part of the management challenge to public transit agencies, which will need to see the advantages to them of shedding some responsibilities (4). For if private services can make it while for public carriers to cut services and costs, this means transferring a greater share of the economic burden for public transportation away from government. If the needs of the public can be protected in the process—which can happen if the free market is permitted to function, if a modest and appropriate regulatory structure is created to set the right quantity of public service is retained, and if government agencies are supportive—the beneficial consequences of greater privatization are both feasible and likely.

Determining the right amount of public services to retain will not be easy, but the task will be simplified as the market functions freely. It looks four implications of the limited need that we are seeing in Chicago today is that some people (about 3000-5000/day) are willing to travel on less-intensive
IN SEARCH OF EFFICIENCY

Urban transit systems in the future must find ways to become more efficient; that is, to control the unit costs of services and possibly to reduce those costs. In times of scarce resources, it seems especially important to approach unit costs from the perspective of costs per passenger carried, cost per passenger carried, or cost per trip. When plenty of money was available as subsidies from various sources, it may have been acceptable to think in terms of costs per unit of service offered (per vehicle mile or vehicle hour). But today we must be especially sensitive to real productivity, in terms of operations and passenger travel market patterns. Furthermore, as the cost burden becomes more localized, we will need to be more watchful of total cost per passenger, not simply operating costs alone.

Unit costs from this perspective can be controlled or reduced by increasing market size (economies of density) and/or by making more efficient use of resources in delivering services. The recent history of subsidies for transit, and particularly non-local subsidies, along with the public-sector rollback and politicization of transit, have resulted in considerable growth of unproductive services. Especially in large cities, there appear to be important opportunities for pruning services—i.e., cutting back unproductive services altogether or replacing them with other travel and transportation options such as subsidized taxis or paratransit.

Achieving efficiency through cutbacks and service changes requires procedures that seek out the fat and avoid the muscle and that protect the interests of the welfare segment of the transit market. Many of the contemporary efforts at cutback management are detached from the political and disconnected from facts about the market and attributes of alternative services. Greatly improved, responsive, and apolitical tools for cutback management are needed for the next decades. It would be desirable, for example, for communities to arrive at consensus definitions of essential, or baseline services [14]. These would define minimum entitlements to service, surely a function of area characteristics, beyond which service might only be provided through additional user fees or localized subsidies.

It would also be desirable to establish simplified mechanisms for collecting and maintaining timely data bases that describe current transit use, not merely in terms of maximum and minimum load points, which are very useful in short-term service management but invalid as indicators of the potential benefits of, or needs for, transit [14]. Instead we need to know who is using what services, at what time of day, and for what purpose. That owl service in some cities is very lightly used does not mean that it is not essential; to some individuals and firms it may represent economic salvation. At present, few transit agencies have such data, and those that do find that they are terribly out of date and costly to upgrade. Perhaps we can find ways to collect continuous small samples by using portable digital data recorders that might serve to provide a rolling update to existing data bases. Without such data, sensible cutback management and service planning in general are detached from reality.

The freedom must exist to explore alternative ways to meet specialized service needs not now met efficiently through conventional services. Decentralization, privatization, and contracting are interesting alternatives. Some cities (e.g., Phoenix and Norfolk) have broken new ground in this area; in other cities, service gaps are now filled by extralegal jitney services. It is now time to
bring these options out of the closet and into the open for decision and development.

Efficiencies will also be advanced through better use of resources. This includes the possibility of pruning administrative staffs, systematizing vehicle maintenance, and, most importantly, making better use of platform labor. Labor costs today are anywhere from 60 to 80 percent of direct operating costs. Because driving a bus or a train is not always pleasant, and sometimes is dangerous, and because of the essential (presumably) nature of these services, it is only fair to pay operators reasonable wages. Labor unions, working in implicit cooperation with political leaders, have generally seen to this need.

On the other hand, an increasingly inordinate share of transit resources is being absorbed into lucrative fringe benefits, unnecessary and antiquated work rules, rampant absenteeism, and workmen's compensation claims (15). In the face of impending crisis, labor in the private sector has shown some willingness to trade compensation for job security, although the threat to the transit industry is no less serious than that to the automobile or steel industries. We argue, however, that the very fact that transit is in public hands gives labor strong incentives—having learned well from recent history—to hold the line at the bargaining table.

The time has come, and signs in Boston and Philadelphia confirm this, to recognize the possibility and the opportunity of striking new, more efficient agreements with organized transit labor. Political decisionmakers must negotiate sustain service shutdowns in order to stake out a strong position for efficiency. Indeed, shutdowns of major transit systems, although they will produce large economic impacts in the short term, may be important investment for the future of the industry and the cities they serve. The experience with the PATCO strike may offer a reasonable example for us. Furthermore, brief shutdowns may help show society what the real benefits of public transit are (or are not), which may lead to better decisions regarding subsidy levels in the future (16).

Wage and benefit increases for platform labor in the future must be tied firmly to productivity increases, or these costs alone will kill the industry. Work rule changes implemented years ago on the Florida East Coast Railroad and the recent contract between United Airlines and its pilots (greatly boosting salaries but introducing massive flexibility into work rules) offer useful precedents. Decentralization, fragmentation, and privatization are also paths toward more effective and aggressive labor cost control. It is not a matter of beating the unions, but a matter of saving the industry.

TECHNOLOGY FOR THE FUTURE

What will or should future transit technology be like? There appears to be a wide diversity of opinion on this issue. Many would argue that relatively little change should be expected; future trends will represent gradual extensions of what has been observed in the recent past. Most service will continue to be provided with conventional buses. Some diversification of the characteristics of available bus technology will continue: smaller, more flexible vehicles; articulated vehicles for high-density markets; and battery-electric and perhaps even flywheel vehicles for some applications.

Others argue for considerable expansion of rail systems, suggesting that this technology offers the promise of better, more attractive service and thus can attract more riders. They suggest that, at least from a distance, rail systems appear less labor-intensive and offer greater possibilities for automation. North America in recent years has seen the welcome home for only a few urban rail transit systems; yet now at least 19 cities (12 in-place systems, 3 under construction, and 4 very likely to be implemented) have existing or about-to-exist forms of rapid transit, including light rail but excluding commuter railroads.

This is an odd trend in the face of the well-developed literature that argues that, under most circumstances in all but the most dense markets, it is cheaper to deliver transit services with buses than with rail of any form (17-19). In part, a high degree of political commitment is behind the expansion of rail transit in the United States, a commitment that accepts what some call the myth of the efficiency and attractiveness of rail systems. In addition, some cities have invested in rail systems by taking advantage of unique "targets of opportunity". San Diego picked up its right-of-way at a very low cost. Portland seized the financial advantages of Interstate transfer, and Dallas may cut costs through private contributions of land. Perhaps, ultimately, we will find that, contrary to the research literature and recent past experience, these new rail investments will pay off for communities in important ways. We must carefully evaluate and learn from these new implementations.

However, it does not appear likely that the labor-saving benefits due to automation will produce a major advantage from new rail. For while platform labor may be reduced, requirements for maintenance labor seem to be greater for such systems, not only in terms of numbers but also in terms of sophistication. This may lead to higher, not lower, unit costs.

In times of scarce resources, serious justifications for new investments in conventional rail technology must be in terms of improvements in the economics of operations. It does not seem that such economies are necessarily associated with rail transit, although the newest systems may teach us something about the reality of this promise.

Finally, there are some who argue convincingly in favor of newer technology—highly automated people movers and AGT systems that promise to provide ubiquitous transportation efficiently, reliably, and cheaply (20). These might function like horizontal elevators, adding beauty and efficiency to cities. An increasing number of successfully functioning examples of such technologies exist in major activity centers such as airports, which should increase confidence in their promise for the future.

The new technologists have said that these systems are needed for the future, and they must be implemented now. Continued investment in conventional technology of all forms is wasteful and misdirected. But there are some problems with this argument.

First, ubiquitous systems that compete seriously with the automobile will not only be exceedingly complex and expensive but are also likely to introduce a massive intrusion on the urban landscape—if they are to enjoy the benefits of exclusive guideways. As we move from architects' renderings to the reality of concrete and steel, the resistance to these impacts is likely to grow exponentially.

Second, the costs of large-scale implementation of such technologies is likely to be astronomical. In a sense, we are caught in a bind. On the one hand, only large-scale implementation will lead to real competition with the automobile, and thus serious proof-of-concept testing of new technologies. On the other hand, large-scale implementation really means total replacement of, or at least total rein-
vestment in the transit system for a region or a major part of it. Who will undertake such expenditures, particularly in the face of the risks associated with new technology? The downtown people-mover program with heavy federal support has not yet shown that even under a risk-sharing arrangement communities are rushing to acquire new technologies. Possibly, if we are to advance the new technologies for urban transit at anything more than a snail's pace, we need to find ways to share costs and risks.

Finally, new technology presents a significant problem of phasover: How can we move from old to new in a relatively painless way? What will life be like in a community with a fragment of a people-mover system built and operating, perhaps for periods as long as 5 or 10 years? How will transit operators cope with a fleet mix including the newest and the oldest?

I am not optimistic about new transit technology, at least on a large scale, in the foreseeable future. Of course, innovations must and will occur on a small scale, and these will surely benefit the industry. Increased use of microcomputers will make maintenance management, service and manpower planning, and travel market analysis more efficient and effective. Information systems based on such computer technology may once again make it possible for transit managers to manage.

More easily maintained vehicles will also help us control costs and make better use of cheaper maintenance labor. Major improvements are possible in fare-collection technologies that will not only facilitate the collection of distance- and time-based fares but will also capture and maintain a timely data base on service use and vehicle productivity. Technological innovations of this smaller type may seem to be marginal, but they offer the prospect of producing major efficiency improvements in the transit industry of the future.

**GETTING THE MONEY: PRICING AND FINANCING**

The future of urban transit systems must see the users assuming a larger proportion of total costs, with fares routinely adjusted to mirror changes in operating costs. Major declines have occurred in markets because of "saw-tooth" fare increases: fares held constant to suit special-interest needs for a period of years, followed by large increases. Routine increases tied to cost changes are more natural and more acceptable to passengers. Even more important, they signal cost changes to the traveler on a routine basis, and thus serve to put more pressure on carrier management to be efficient.

It will be unpopular to implement such a fare adjustment policy. For example, in Chicago, which has faced a recurring crisis in the financing of its regional transit system and which has been in the past few years (because they had been held constant for some years prior), there is still resistance on the part of appointed leaders of transit agencies to support modest, regular, and readily justified fare adjustments. Indeed, despite the fact that no additional subsidy monies have been secured, and current operating budgets cannot be met, there is talk of fare decreases. If we are to retain any credibility, and thus any reasonable amount of public support for the transit industry, we need to be realistic about costs, fares, and the relationship between them.

In general terms, we should continue to expect the users to pay a large share of the costs, with the actual sharing determined through local consensus decisions. Users should be given this responsibility not only to signal them about carrier efficiency, as stated above, but also to signal them about resource costs and thus to promote an improved allocation of those resources.

Prices charged to users generally must be made more equitable, more reflective of true costs of services, and more productive in revenue generation. Available evidence indicates that this will require shifting to distance-based fares, or at least zone fares, as well as peak-period pricing and premium service surcharges (21).

There are at least two obstacles in the path toward more rational pricing. The relatively small one is the task of defining sensible zone fare systems that strike a reasonable balance between extracting a cost-related price from the users and retaining users on the system. Preliminary efforts suggest that this analytic challenge can be met through a modest investment in research (22). The more serious problem lies in developing technologies for collecting such fares, especially on "open" bus systems. The honor fare system, common in many other countries and proposed for the new Banfield light rail line in Portland, might solve this problem, but the difficulties associated with enforcement in large cities may be insurmountable. Thus, we may need to push hard for the development of truly automated technology in order to implement better fare policies. In the absence of such developments, we will be forced to retain an inequitable fare system that fails to generate all of the revenue which should and can be extracted from the users.

The welfare function of transit cannot be forgotten in this process of fare restructuring, of course, but this is perhaps best handled through user-side subsidies, which are likely to be more equitable and more efficient than equal subsidies for all users, rich or poor. When monies were plentiful, it made more sense to distribute subsidy monies in shotgun fashion. Today, focusing subsidies on needs, to the extent feasible, makes a lot more sense. We are not prepared to go all the way and argue that users should pay full costs; it is simply suggested that all users should pay a reasonably large share, and those who cannot afford it should be subsidized by society.

Under the best of all worlds, those welfare subsidies should not come out of the transportation budget—just as the cost of food stamps are not merely extracted from the U.S. Department of Agriculture's budget for farm subsidies. Transit subsidies for low-income travelers should not be hidden in transit operating subsidies. Otherwise, under the current situation, we are making resource allocation choices knowing neither what we are spending or what we are getting in return.

Who else should pay the transit bill, in addition to the users, is a difficult question that must be answered. The novel concept that costs should somehow be allocated in proportion to benefits received is suggested. Users should pay the most; but nonusers living in the service area of transit systems receive some benefit and should thus share the costs. Indeed, one might argue that the farther one lives from the service area, the smaller the benefit. Still, most states benefit economically to a significant degree through efficient urban systems, and thus there is a state role and should be a state share in the costs. It becomes more difficult to argue for federal support for transit costs, although the federal role in support of research on technologies, tool development, and information dissemination is clear. In the short term it appears that the federal role will be determined at high levels on the basis of philos-
ophy rather than defensible analysis, and so the merits of pursuing this argument are limited.

Generally the allocation of subsidy responsibilities would be improved if we had a clear idea of what the benefits of subsidy are and how they are distributed (7). Research on these issues may pay off by reducing the intensity of political arguments on the issue, and perhaps even introducing an element of rationality into the transit finance picture.

Whatever the size of any federal subsidy, the case has been made very strongly in favor of block grants as the most appropriate form (6). The logic of local flexibility in the use of funds is all-powerful; the lessons learned from the counterproductive incentives implicit in existing categorical subsidy programs should encourage local agencies to make decisions—and to expect them to live with the consequences.

MANAGING DEMAND

As stated at the start of this paper, the nature of travel demand is a key determinant of the state of public transit systems. In particular, the economic difficulties faced by the industry today are largely associated with dispersion of demand in space and concentration of demand in time. Perhaps the most certain source of change for transit in the future will come from changes in the character of travel demand (23).

Some changes will occur through natural forces and the incentives of the marketplace; people will make location and relocation decisions that will shift the nature of their travel requirements. And, the nature of technology will make possible important changes in the processes of working, shopping, and even socializing, all of which will place different demands on our transportation systems.

Current evidence on shifting locational patterns seems mixed. Some cities are experiencing decentralization and regentrification, yet the trend toward suburbanization of not only residences but also employment seems to remain strong (or at least as strong as the current state of the economy permits). In general, it seems extremely likely that the current patterns of spatially dispersed demand for travel will continue, perhaps modified by increases in nucleation of growth as developers take advantage of scale economies and as the costs of energy increase.

Systematically directed changes in land use patterns could be beneficial to transit economics under certain circumstances, e.g., where they result in densification of demand sources into nodes and corridors. However, in the United States at this time it seems fruitless to strive for policies in this direction. This is because (a) there is precious little evidence that we have much control over land use through public policy and (b) where control opportunities for control exist, it is not clear that governments can get together to agree as to how to apply it. Yet the possible advantages of land use control as a means to decrease our total transportation budget may be implementable at some time in the future.

What is more interesting, and certainly more challenging, are the changes in the travel market likely to take place because of shifts in technology. As I type this paper on our word processor, I realize that, when the cost of the technology becomes low enough, I will be able to have such a unit at home, work from my den or my bed, and eliminate a work trip. It is apparent that some office workers have already adopted such a lifestyle, and their travel requirements are different than under a prior technology.

Computer technology and cable television can be expected to make shopping from the home (or workplace) easier, more convenient, and probably a lot more efficient for some items (20). We would not argue, necessarily, that the milkman will come back, but advanced technology could make certain kinds of shopping trips obsolete. Of course, this means putting more resources into the delivery of commoditiess, but presumably this is an activity that can become highly organized, take advantage of economies of density and optimal routing and scheduling techniques, and make goods movement potentially much more efficient than the people movement it replaces.

We are not arguing that everyone will stay at home for all but a few functions. Shoppers still need to squeeze the tomatoes, workers still need to interact on a face-to-face basis, and people need to travel for social connections or just to "get away". Still, the travel market can be expected to change in ways that will be important to urban public transit systems.

We can expect a decrease in the peak-to-base ratios for the market as a whole as technology begins to increase its effects on the work activity. On the one hand, this may make it possible to even out transit service, and thus to get better use of fewer resources. On the other hand, a reduction in peak may make it possible for more travelers to use their automobiles, particularly if overall levels of congestion are reduced. So the consequences for transit could be good or bad.

It seems most realistic to expect that technological impacts on travel may broaden the market for a wider variety of paratransit and "quasitransit" services, while probably reducing the efficiency of high-capacity, line-haul systems. It is important to recognize the likelihood that the overall costs of travel may be decreased as this technological revolution takes hold—and this is a worthwhile outcome, although it may spell the ultimate demise of some conventional transit forms.

These technological changes, and the accompanying social and economic shifts, are coming. Their precise nature is unclear, but that there will be change in these dimensions is certain. What this means for transit is less obvious than what it means for transportation in general. In the meantime, it makes sense, through policy changes and other incentives, to encourage the kinds of shifts in demand likely to make it most efficient to serve it with public transportation.

For example, flextime and staggered work hours, if concentrated in dense travel markets, can reduce peak service requirements, as well as producing social benefits for workers and their families (24). Peak-period transit pricing and automobile disincentives make sense as mechanisms for shifting travel patterns in socially cost-effective ways.

We need to anticipate, observe, and respond to demand changes in the future, making special efforts to encourage those that benefit the most efficient transportation and to take advantage of those that allow us to eliminate unproductive service.

INSTITUTIONS FOR THE FUTURE: A FINAL NOTE

Probably the most important and difficult change the industry will have to make is adopting a posture of survival. This means remaining honestly open to change in terms of services needed and offered, who should offer them, and how they should be structured. The traditional concept of transit services may have to be abandoned in favor of a broader per-
spective on transportation supply and demand. The services that are given up entirely or those yielded to others—the private sector, smaller public carriers, or travelers themselves—may be more critical to the industry's future than those services retained. Giving up control, as suggested earlier, may be the most difficult management action ahead.

To accomplish this, transit institutions must change, and we must change with them. There is a need for more serious concern for urban transportation policy, not only in our cities but also in our regions. In a period of scarce resources, governments must learn that they often share a common future, and thus must find ways to share today's resources and responsibilities. This means giving up an element of local autonomy in order to get a better future for everyone.

Transit agencies will need to accept the perspective that they can play an important role in determining the economic and social character of regional futures. This requires devoting more attention to matters of long-term policy. It means being prepared to invite consideration of all reasonable solutions to transportation problems, including doing nothing at all, as well as letting others do something better than we can. It also means looking at the problems of urban transit as problems of urban transportation, at least and probably also as problems of urban management and development.

Broadening perspectives on the issues, preparing for change, and adopting a willingness to change in productive ways together will help assure that "this bus does take us to the future". If it does not, we can provide an alternative mode that will!

REFERENCES

11. Savas, 1981 (query author)