EQUITY AND EFFICIENCY

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American urban areas (including both inner cities and suburban areas) are faced with serious transportation problems. During weekday morning and evening rush hours, traffic is severely congested, while air pollution, principally from this traffic, threatens the health of many citizens. The increasing price of petroleum has become a financial burden and any prolonged interuption of fuel supplies could bring our urban areas to a halt.

Already, major suburban employers are reporting difficulties in recruiting employees both because they are largely unserved by transit and because of the high cost of automobile commuting. Inner city employers are experiencing similar difficulties because of automobile commuting costs, congestion, and for another reason--the crowded conditions on transit services.

It can be expected that if urban transportation is not improved, large urban areas will decline as commercial and industrial centers, while economic expansion is increasingly directed to small urban and rural areas.

These circumstances underscore the necessity of improving urban transportation in order to preserve our urban life style. Commutation costs must at least be brought under control or even reduced and traffic congestion must be alleviated. The fact that both our expressways and surface streets are choked with traffic in some areas makes it unreasonable to suppose that roadway improvements can result in any appreciable reduction of traffic congestion. There is a strategy, however, by which commuting costs can be reduced at the same time that traffic is relieved, and that is to seek improvements in vehicle occupancy ratios. To take full advantage of this strategy, and to most effectively improve urban

transportation requires better utilization of both public (roadways, transit, and subsidies) and private resources.

It would seem that these transportation problems would generate opportunities for the transit industry, with its ability to move large numbers of people efficiently. However, it is a time of crisis for transit as well. Operating costs continue to rise faster than inflation and operating subsidies are proposed for reduction in the immediate future. In fact, such upheaval has been experienced in the past year that it may be surprising that funding reductions have not yet taken place.

Nonetheless, the vitality of urban areas requires that transportation be improved, and toward that end, transit has a crucial role to play.

This presentation is concerned with improving urban mobility today by better utilization of available resources. This is by no means to suggest that significant capital intensive transit improvements are not necessary. It is critical, however, that sufficient attention be directed to short-term measures which can quickly improve urban mobility.

The transit situation in Los Angeles County will be examined, identifying issues which may be applicable to other urban areas. Measures will be proposed by which transit's impact can be intensified, while also contributing toward improved urban transportation.

While Los Angeles is not generally conceived as a typical urban area, the transit operational situation is very similar to other large urban areas. With a population of 9,500,000 spread

over approximately 1,750 square miles, it is the nation's second most populous urban area and trails only New York in population density. Its core density averages 15,000 to 20,000 per square mile, with some areas exceeding 60,000, while its suburban densities average nearly 5,000 (ranging from 35% to 240% above other large urban areas). Its core, like those of other urban areas, contains large concentrations of transit dependency and low income.

TRANSIT IN THE URBAN AREA

The operational situation of public transit will be reviewed in two important dimensions, service utilization and subsidy distribution.

Service Utilization

Transit serves all of urbanized Los Angeles County, with widely varying patterns of use by the public.

Within the central area (from Santa Monica to Montebello and from the Santa Monica Mountains to Inglewood and Compton) patronage strains the available capacity of local transit services. For example, during evening rush hours, about 40% of peak direction buses achieve loads exceeding 70 passengers (seating capacity varies from 41 to 51) and 53% exceed 60 passengers. Waiting passengers are frequently passed by buses on which there is not even standing room remaining. These overcrowded conditions retard growth, as potential patrons are discouraged, if not effectively precluded from riding. Yet, even these crowded buses operate with excess capacity for significant portions of their trips.

Among local transit services which operate into the central

area, about 11% of peak direction buses achieve evening rush hour peak loads above 70, and 22% above 60.

Local transit services which exclusively serve suburban areas exhibit significant excess capacity, with only 2% of evening rush hour trips achieving peak loads above 60 passengers. The median peak load is below 25.

Peak only commuter express services, operated both by the private and public sectors, carry near capacity seated loads. The public sector serves the most lucrative market (central business district), but service cannot be increased due to the high subsidies required.

And so, transit patronage is above or near capacity in two markets (central area local services and commuter express), and service cannot be increased due to limited subsidies, while in suburban areas there is significant surplus capacity.

Subsidy Distribution

Just as patronage levels vary throughout the urban area, there are also disparities in the distribution of subsidies.

Central area local service subsidies per boarding averaged $0.22 in 1979, and were as low as $0.07*. Lines serving both suburban and central areas had subsidies of about $0.75 per boarding, 3.4 times that of the central lines.

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*Figures based upon a line-by-line analysis. It is suspected that further disaggregation could yield some line segments with costs fully recovered through the farebox.

Transit lines exclusively serving suburban areas had subsidies per boarding of $1.07 (nearly five times that of central lines), with a high of $3.13, more than 44 times that of the best central line.

Public peak only commuter express services exhibited per boarding subsidies of $1.63, with a high of $3.89. These high subsidies, averaging more than seven times that of the central area, are in stark contrast to the fact that, according to a recent study, express passengers have family incomes averaging three times that of other transit passengers. Private commuter express services are unsubsidized.

And so, transit subsidies are lowest in the central area, where transit dependency is most pronounced and highest in suburban areas and on public commuter express services.

Assessment

It can be concluded from this analysis that transit serves the urban area with varying degrees of effectiveness (see Chart #1). Where demand is highest and growth potential exists, insufficient resources are committed, resulting in a shortage of service. Where demand is low, and potential for growth is low, there is a surplus of service. Subsidies also vary greatly, generally being negatively proportional to both demand and low income transit dependency.

Two issues arise from this analysis. First, shall shortages of service be permitted in some area while others are characterized by surpluses of service? It is the question of whether transit should seek to move people or alternatively, to move empty seats.

CHART #1

SUBSIDIES AND SERVICE UTILIZATION BY SERVICE TYPE

Los Angeles County: 1979

	Service Utilization		Subsidies	
Category	Evening Peak Loads More Than 70/Bus	Evening Peak Loads More Than 60/Bus	Subsidy Per Boarding Wtd. Ave. (Range)	Boardings Per Subsidy Dollar Wtd. Ave. (Range)
Central Area Local Services	40%	53%	$0.22 ($0.07-$1.29)	4.55 (14.28-0.78)
Suburban to Central Area Local Service	11%	22%	$0.71 ($0.39-$1.63)	1.41 (2.56-0.61)
Suburban Local Services	0%	2%	$1.07 ($0.61-$3.13)	0.93 (1.61-0.32)
Public Peak Only Commuter Express Service	(Median Peak Load:	41)	$1.63 ($1.03-$3.89)	0.61 (0.97-0.26)
Private Peak Only Commuter Express Services	(Median Peak Load:	38)	$0.00	

Note:

- Figures derived from 55% of public transit lines in Los Angeles County.
- Service utilization in peak direction.

It will be suggested that such an imbalance is both counterproductive and unnecessary. Second, can exhorbitant subsidies be justified while subsidies are low in areas with concentrated low income and transit dependency? Again, it will be proposed that continuation of this imbalance is neither necessary nor productive.

For transit to make a significant contribution to improved urban transportation, both in inner cities and in the suburbs, public funds and transit resources must be more effectively utilized.

THE URBAN AREA TODAY

Before suggesting means to improve the impact of transit, it is useful to examine why transit achieves such mixed results in today's urban area.

This seemingly inconsistent performance can be traced to the radical changes that urban areas have undergone during the last 35 years, in concert with the fact that transit services have changed very little. Before the ascendancy of the automobile, urban areas were far more compact, and intensive fixed-route services were capable of capturing a great percentage of urban trips.

Since World War II, however, urban areas have sprawled--population densities have plummeted (see Chart #2) as have employment densities.

Just from 1950 to 1970, the ten largest American urban areas decreased in population density by an average of 30%, while population outside the central cities rose by more than 55%. Even urban areas with modest growth experienced extensive urban sprawl. (As an example, Pittsburgh, which had a population increase of

CHART #2

URBAN AREA DENSITIES

Changes Since 1950: Largest 10 Areas

Urban Areas by 1950 Population Rank	1970 Population/Sq. Mi. Urban Area	Central City(s)	Outside Central City(s)	Change In Urban Area Density During 1950-1970	% of Population Outside Central City(s) 1970	Change From 1950
New York	6,683	24,385	3,580	-31.9%	46.6	+56.4%
Chicago	5,257	12,283	3,091	-24 4%	44.9	+70.0%
Los Angeles	5,313	6,135	4,818	+15.8%	56.6	+11.6%
Philadelphia	5,349	15,164	3,325	-43.0%	51.5	+77.0%
Detroit	4,553	10,953	3,350	-30.1%	61.9	+105.6%
Boston	3,992	13,936	3,253	-38.4%	75.8	+18.3%
San Francisco	4,387	10,035	3,252	-37.7%	61.7	+44.5%
Pittsburgh	3,095	9,422	2,450	-48.8%	71.8	+28.7%
St. Louis	4,088	10,167	3,157	-33.5%	67.0	+72.6%
Cleveland	3,033	9,893	2,120	-34.2%	61.7	+82.0%
Mean Average	4,575	12,238	3,240	-30.6%	60.0	+56.7%

NOTE: Based upon U.S. Census Bureau information

20%, a full 14 percentage points behind the national rate, increased its land area by 160%). Early 1980 census information suggests that these trends accelerated during the last decade.

This larger, more sparsely populated urban area is more difficult for transit to serve, and it is not even remotely possible for transit to serve the percentage of trips which it served before 1950. With its vast expanse, today's urban area has transportation needs much different from those of the former concentrated urban area which has since passed into history. Any improvement in transit's impact will require a better matching of services to the needs of today's urban area.

POLICY OBJECTIVES

For transit to better serve the urban area, attention must be directed to the objective of improving urban transportation. This will entail an examination of objectives which should be discarded and of another which should be adopted.

Objectives Which Limit Mobility

One rationale for providing conventional transit services throughout the urban area has been to return tax revenues to subareas within the urban area. This geographical return (or per capita) objective has resulted in disproportionately high subsidies, and poorly patronized services, especially in suburban areas.

Not only has this resulted in unproductive transit, but also inefficient use of public funds. Demand goes unmet in high demand areas; and consequently, pressure mounts for increased public funding, while subsidies, which might otherwise be directed toward

demand, provide service levels in low-demand areas far in excess of those required by even the most optimistic.

To distribute public resources based upon a geographical criteria is at odds with the efficient utilization of subsidies. This can be illustrated by a somewhat extreme analogy: If a geographical formula were applied to the distribution of federal disaster relief, the effectiveness of the program would be diluted if not nullified. Insufficient funding would be directed to areas experiencing disasters, while locales with the good fortune to avoid disasters would have excess funding. This illustrates that, to the extent that public funding is directed away from solving problems, its utility is reduced.

Geographical distribution formulas threaten to fragment society artificially, hindering meaningful efforts to solve the myriad of problems which transcend political boundaries. They encourage a myopia which renders society incapable or unwilling to recognize, much less address common concerns. This weakening of community is a weakening of the social contract itself.

When public funding is distributed on such inefficient criteria, problems are at best only partially solved, while new beneficiaries, who previously provided for their own needs, come to rely on public assistance. So long as geographical distribution formulas divert attention from solving problems, public policy must inevitably achieve, at best, mixed results. In public service programs, funds should be distributed in such a way that maximum utility is obtained. In public transportation, this translates into solving transportation problems regardless of their geographical incidence.

A second, and more subtle objective underlying some transit planning today is that transit should be the catalyst for changing urban land use patterns. As attractive as land use changes may be, the appropriate decision forum is not the transit planning department, and is rarely, if ever, the transit board room (though transit should be a part of the process).

There are two good reasons why this objective must be discarded. First of all, transit does not have a mandate to change urban areas, and any such attempt without a mandate is inappropriate where political processes depend upon the consent of the governed. Secondly, and following from the first, transit does not have the financial resources to change urban areas. Continued efforts, typified by the provision of services inappropriate for low demand market segments, threaten the dilution of transit effectiveness and further separation from the constituency which finances transit.

To the extent that geographical distribution and urban reconfiguration objectives interfere with solving the transportation problems of today, they retard the ability of the urban area to obtain improved mobility--mobility which is crucial to urban vitality.

An Objective Which Promotes Mobility

Transit, therefore, must meet the transportation needs of urban markets as they are today, by seeking the objective of maximizing vehicle occupancy ratios. This would involve maximizing the transit rides provided per each dollar of subsidy, while seeking maximum utilization of supplemental resources which require little or no subsidies.

Not all transportation needs are best served by traditional fixed route services, and alternative services should be promoted where they better contribute more efficient resource utilization and improved urban transportation. In short, all available resources should be committed to the objective of improving urban mobility.

APPLICATIONS

Directing the resources of transit to improved transportation requires matching services to the very differing needs of potential markets.

High Demand Local Markets

In high demand markets, characterized by low per boarding subsidies, modifications could result in growth potential and better utilization of resources. Services should be increased where demand is high (by means of shortlining, etc.) and reduced where it is not. Such an effort, while not technically uncomplicated, would yield increased passenger revenue from which increased service levels and increased transit employment could be financed, while increasing the passengers carried per subsidy dollar.

High Demand Express Markets

Suburban areas exhibit strong transit demand most notably for express work trips to the central business districts. These express services, however, are characterized by extremely high subsidies, even with premium fares. Yet, the strong patronage trends of such lines suggests significant growth potential--

potential which remains untapped because of the high subsidy requirements.

There are means, however, to provide for growth in this market, while improving the utility of public funds. This involves turning these services over to private operators. In Los Angeles County, nearly half of the daily commuter express trips are provided by the private sector. Fares are comparable to public transit fares, and there are no subsidies, not even for vehicle procurement. Not only could the private sector increase service by reinvesting profits, but the subsidies could be redirected to increase patronage in high demand areas and to increase transit employment.

A hypothetical example of such a service transfer is illustrated in Chart #3. The better productivity of the local line would result in a twelve fold increase in patronage, utilizing the same amount of subsidy. Public transit revenues (fares plus subsidy) would be increased by 60%, amounting to an annual increase of about $360,000. From this process, many would benefit--new riders from increased service, the private sector from the instant market made available and the potential for additional profits from expanded service, potential transit employees for whom new positions would be created from the increased transit revenue and services, and taxpayers, whose contributions would be more efficiently utilized. In general, urban transportation would be improved without the necesssity of additional public funding.

This seeming paradox, that public transit service can be increased as a result of reducing or eliminating services which require high subsidies, results from the fact that high demand lines, to which released subsidies would be directed, carry so many more passengers per subsidy dollar and the fact that their

Chart #3

HYPOTHETICAL EXAMPLE OF EXPRESS SERVICE TRANSFER FROM PUBLIC TO PRIVATE SECTOR

(Scaled to Fiscal Year 1981-1982 Costs and Revenues)

Before Transfer:	Oper. Ratio	Tot. Pass.	Fare/ Pass.	Subsy/ Pass.	Cost/ Pass.	Total Fares	Total Subsy.	Total Revs.	Pass/ Subsy. $
Peak Only Express	40%	450	$2.12	$3.22	$5.34	$954	$1,449	$2,403	0.31

After Transfer:	Oper. Ratio	Tot. Pass.	Fare/ Pass.	Subsy/ Pass.	Cost/ Pass.	Total Fares	Total Subsy.	Total Revs.	Pass/ Subsy. $
Augmented Local	62%	5,573	$0.43	$0.26	$0.69	$2,396	$1,449	$3,845	3.85
Private Express	100%+	450	$2.12	$0.00	$2.12	$954	$0	$954	-
TOTALS		6,023		$0.24		$3,350	$1,449	$4,799	4.16

EFFECTS OF TRANSFER:

1. Express passengers continue to be served by private sector service, and expansion of service becomes possible as a result of profits earned.
2. Passengers carried increases 12.4 times.
3. Passengers carried by public transit increases 11.4 times, with the same subsidy.
4. Public transit fare revenue is increased 1.5 times.
5. Total public transit revenues increase 60% (based upon a 255 day service year, annual revenues increase by $367,710, from $612,765 to $980,475.)

NOTES: -Daily figures based upon typical peak-only express and high demand local lines.

-Assumes the existence of overcrowded conditions on the high demand local line (such as currently exists on many such lines around the nation), resulting in patronage on the augmented service to be at a level similar to the rest of the line.

operating ratios are relatively high.

Low Demand Areas

In extremely low demand areas, a variety of approaches are available to meet transportation needs while improving subsidy utility. Conventional transit itself can become more cost effective by developing timed-transfer systems, which permit reduced service frequencies while generally improving access to trip generators.

Fixed or flexible route paratransit services, taxi-user subsidies and coordinated dial-a-ride programs may be more cost effective than conventional transit in some areas. Substituting less costly modes for transit services, again paradoxically, permits overall increases in transit service and employment.

Low and Medium Density Employment Markets

Another market currently has little or no public transit service, and no prospect of any: work trips to low and medium density employment areas. Some of these areas, such as Route 128, Northeastern New Jersey, the Santa Clara Valley, and the Los Angeles Airport/El Segundo area have relatively high employment densities, but not high enough to support intensive transit.

The objective of increasing vehicle occupancy ratios can be addressed in this market by increasing carpooling and vanpooling. Forward looking transit agencies, such as the Peninsula Transportation District (Hampton-Newport News) and Houston Metro are promoting this approach.

Transit can provide matching services and promote incentives where conventional transit services cannot adequately serve the need.

Indeed, it is only carpooling and vanpooling which can effectively serve all urban markets. It can even supplement transit where demand exceeds supply, in addition to its unique qualifications for serving low and medium density employment markets. Because peak hour automobile occupancy ratios are so low, even a modest increase in carpooling and vanpooling can significantly reduce congestion and improve travel times.

The transit experience in low demand markets should suggest, however, that conventional transit services achieve, at best, mixed productivity. The automobile can be expected to continue its dominant role, in such areas, and more cost effective approaches must be adopted. In these markets, as in the rest of the urban area, public expenditures should not exceed that which is necessary to provide for the transportation needs.

CONCLUSION

For urban areas to retain their relative importance and to facilitate the development which their future requires, urban transportation must be improved. More efficient traffic movement and reduced commutation costs can be obtained by increasing vehicle occupancy ratios. Yet the ability of the public sector to provide this increase is very limited, and significant progress requires a partnership between the public and private sectors in which public agencies not only provide transportation, but also facilitate the efficient utilization of private transportation resources.

Transit overcrowding can be relieved, returning growth potential and maximizing patronage by increased utilization of demand as

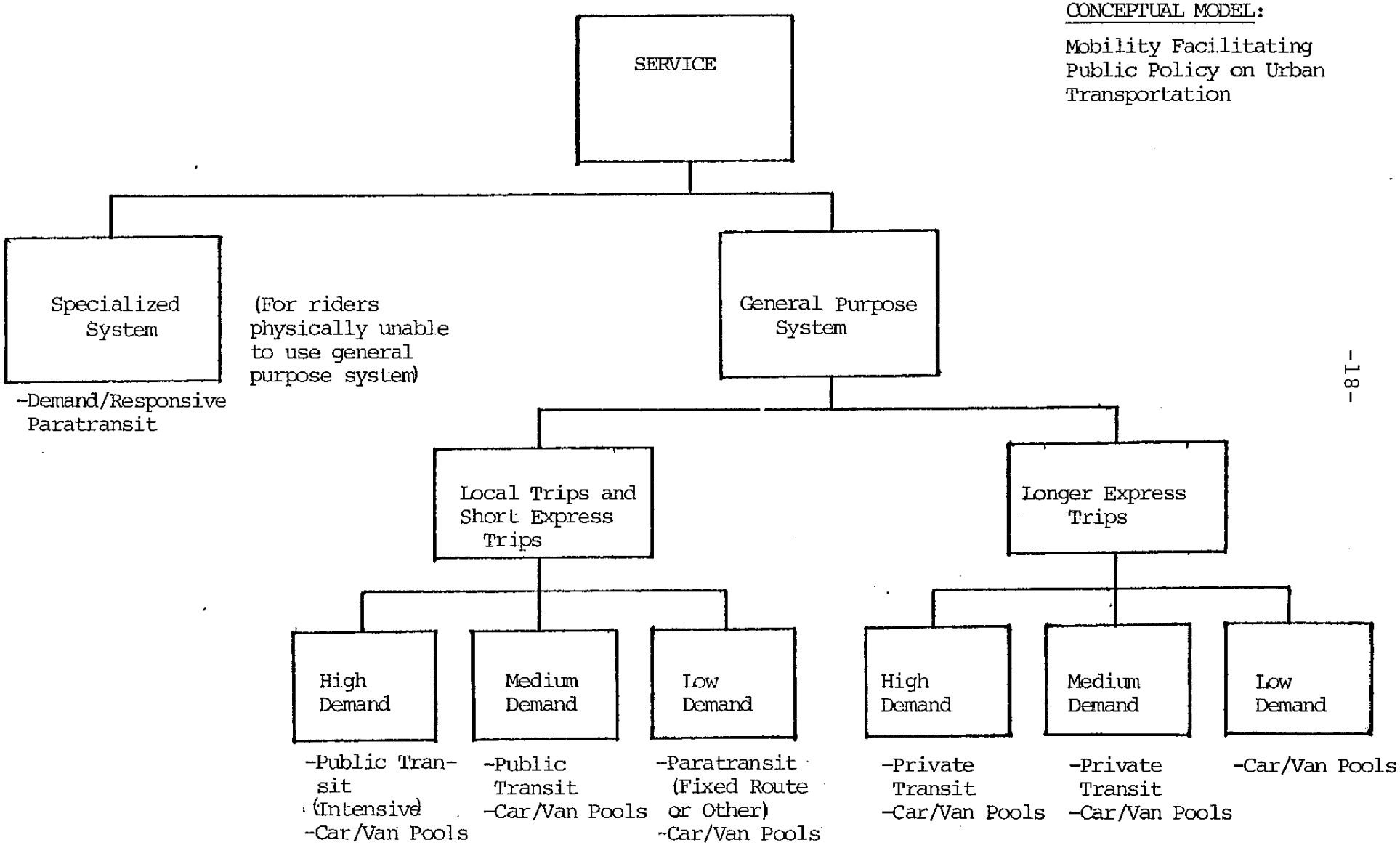
the criteria for service distribution, while low demand and commuter markets are served by approaches better matched to their needs and potentials (see Chart #4). By maximizing public transit patronage within resource constraints, while seeking private sector, carpooling and vanpooling supplements, vehicle occupancy rates can be increased, facilitating urban transportation improvements of a magnitude which would be unachievable through conventional means, short of public resource commitments many times those of today.

And so, the urban area of the 1980's is characterized by a complex set of transportation needs which require a new dimension of public policy and focused upon maximizing urban mobility within the very real constraints upon public resources.

The future of transit will depend upon its effectiveness in promoting improved urban transportation. The transit agency which defines its product in terms of improved transportation and mobility, while rejecting the narrow definition limited to conventional transit services will well serve its patrons and its constituency. Paradoxically, it will also provide more conventional transit service than it would have otherwise. Conversely, the future of the urban area depends in large measure on the performance of transit.

In today's dynamic and rapidly changing urban society, organizations unwilling or incapable of adjusting to new conditions will degenerate and perhaps even disappear. The choice is clear: given a finite level of public resources, shall transit serve the needs of today and promote vitality or shall it continue to have

CHART #4



CONCEPTUAL MODEL:

Mobility Facilitating Public Policy on Urban Transportation

its efforts diluted by the provision of services irrelevent to current demand? The future of our urban areas, inner cities and suburbs alike, may well depend upon that choice.