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ABSTRACT

When provided by taxi firms under contract to public agencies, demand responsive transit is essentially subsidized shared-ride taxi (SRT) service. With taxi firms increasingly seeking, and finding, opportunities to become public transit contractors for the delivery of community level transit services, subsidized SRT seems destined to become an important revenue source for taxi firms and a major form of publicly supported paratransit. In California, subsidized SRT has already become the predominant form of demand responsive transit, with 29 such systems presently operating in the State.

Based on a study of California's experiences with subsidized SRT, this paper analyzes the issues associated with this recent paratransit development. One general set of issues concern service provision, including the institutional reasons for contracting, competition for contracts, contractual arrangements and their effects, and the cost-efficiency of subsidized SRT. A second major set of issues concern the consequences for taxi firms of becoming public transit providers, including legal implications, operational changes, labor-management relations, the impact of subsidization, and the effects of contracting on the firm's financial situation and future plans. This issue analysis provides the basis for a discussion of the policy implications of California's SRT experiences.

I. Introduction

The emergence of the taxi firm as a public transit provider represents one of the most significant developments in urban public transportation of the 1970's. Taxis, of course, have long been a major form of urban transportation, a mode carrying 40 to 60 percent as many passengers as the combined total of bus and rail transit [4,10], but taxi firms traditionally have confined their operations to the private sector of transportation. Within the past several years, however, two key developments have altered this orientation. The advent of subsidized demand responsive transit (DRT) as a major local transit option, and the search for cost-efficient ways of delivering DRT, have provided taxi firms with an opportunity to enter the transit arena. During the same time frame, the steadily worsening financial prospects of conventional taxi services have given taxi firms the motivation to diversify into new markets, among the most important being the delivery of DRT services under contract to public agencies [4, 5, 7, 9]. While this movement of the private taxi firm into the public transit domain is now underway in many areas throughout the U.S., it already is in full bloom in California, particularly Southern California.

In California, the use of taxi firms to deliver community level transit is now the norm, not the exception. As of July, 1979, taxi operators were the service providers for 29 general public DRT systems, representing approximately 60 percent of all such DRT systems in the state. In Southern California, taxi-based systems represent 80 percent of the universe of DRT systems, including most of the largest operations.

When provided by taxi firms under contract to public agencies, DRT is essentially subsidized shared-ride taxi (SRT) service. The two main

differences between subsidized SRT and more traditional forms of publicly supported DRT are taxi firm provision and the use of sedans instead of minibuses or vans, although some SRT providers utilize the larger vehicles as well. As has been common practice with DRT, provider-side rather than user-side subsidy is employed. The SRT provider is compensated directly by the sponsoring public agency by means of either a contracted fee per unit of service (vehicle hour or vehicle mile) or a cost-plus arrangement. Users pay a fare set well below the actual cost of service, usually 25-75¢ per ride. In most systems, vehicles are dedicated exclusively to the SRT operation, and cannot be used by the taxi firm for other purposes.

In addition to these subsidized SRT systems for the general public, California contains a comparable, and possibly even greater number of publicly subsidized taxi-based services restricted to the elderly and/or handicapped. A number of cities provide one or both of these population groups with user-side subsidy for exclusive ride taxi (ERT) travel (no formal shared riding system is created in these situations), while a few areas have established subsidized SRT systems restricted to the elderly and handicapped. Throughout California, then, at least 50 to 60 publicly supported community transit services are operated by taxi firms under contract to public agencies.

California's experiences with taxi-based DRT have the advantage not only of numbers, but of longevity and variety as well. The oldest, El Cajon's SRT system, has been in operation since late 1973, and many other systems have been in existence three to four years. Consequently, most systems have long since passed the point of being experiments, and are now permanent fixtures in their respective community, although they continue to evolve and change in response to ridership growth and the exigencies of funding. These

systems, while concentrated in Southern California, are found in all types of locales--central cities, suburbs, small towns. The services themselves are organized pursuant to several different types of contractual arrangements. Compensation systems, the use of incentives, service parameters, and restrictions on vehicle use vary from system to system. The services, moreover, are provided under contract to different types of local governments--transit districts, municipalities, counties, and joint powers agencies.

These features of the California experience in contracting with taxi firms for DRT service yield an ideal data base for analyzing the results and assessing the future prospects of this paratransit innovation. This analysis focuses in particular on California's subsidized SRT services, since this service model most nearly resembles traditional DRT. The analysis itself is based upon qualitative and quantitative information obtained from California's 29 subsidized SRT systems, and from several of the taxi-based elderly and handicapped services in the state.

In analyzing the outcomes of California's SRT experiences, it is useful to divide the issues into two major categories. First, there is a set of service provision issues which concern the why and how of SRT contracting. These include such issues as institutional reasons for contracting, the cost-efficiency of SRT, contractual arrangements and their effects, competition, and the influence of institutional situations on the above. The second set of issues concern the consequences for taxi firms of becoming public transit providers. Among these issues are the legal implications for taxi firms of receiving government funds, operational changes stemming from SRT provision, labor-management relations under SRT, the impact of a new, subsidized service regime on operator cost-efficiency, and the effects of contracting on the firm's profitability and future financial game plan.

II. Service Provision Issues

Why SRT Contracting?

The most obvious question raised by the widespread use of subsidized SRT for community level transit in California is why this development has occurred. The answer has four elements.

First, in most areas of California, funds for community level transit are readily available from sources other than local general revenues. California's Transportation Development Act (TDA) levies a sales tax on gasoline, and distributes the revenues back to local government for transportation purposes. In all but the largest counties the bulk of TDA funds find their way into municipal hands, where they can be used for either transit or highways, but must be used for transit if "unmet transit needs" exist. In the largest counties, TDA funds can be used only for transit, and often are allocated directly among transit operators, not going through municipal hands at all. In such counties, however, a provision in the legislation provides for up to 5 percent of TDA funds to be used for innovative projects in community level transit. Thus, not only are external funds available for community level transit (federal transit subsidies and revenue sharing funds are also available, and have been used, for this purpose), but local governments have a mandate to provide some type of transit service.

Second, service contracting with private firms is a well-established and pervasive practice on the part of local governments. In California, about 20 percent of all municipal services are provided in this fashion [8]. Since local government--in the form of municipalities, counties, and transit districts--is the level at which transit service and financing decisions are

made in California, one would expect that the factors which shape local government attitudes toward contracting generally would influence decisions in the transit arena as well. In making contracting decisions, the following factors seem significantly important to local governments: the "efficient" production of (transit) services; minimal to acceptable cost levels; a comfortable interface between government control and service production [8].

These factors are not perfectly complementary; clearly, some tradeoffs are required as local decision-makers seek to strike a balance among all three in contracting with private providers for public services. Whatever balance local governments in California reach among these three elements however, yields a strong preference for contracting when DRT services are at issue. As of July, 1979, approximately 80 percent (39 of 49) of the general public DRT systems in the state were contract operations. Moreover, nearly 75 percent of these contract operations are subsidized SRT systems (see Table 1).

TABLE 1
MODE OF DRT DELIVERY IN CALIFORNIA

<u>Public Agency Provision</u>		<u>Contracted Provision</u>	
Transit Agency	4	Taxi Firm	29
Municipality	<u>6</u>	DRT Management Firm	8
		Private Non-Profit Organization	<u>2</u>
Total	10	Total	39

The third factor in the equation, and the principle reason most local governments opt for subsidized SRT rather than other types of DRT

service, is the perceived cost-efficiency of this service option. Ordinarily, one might think of "cost-efficiency" as the relationship between service output and economic input. From local government's perspective, however, cost-efficiency takes the form of a complex of cost, service, and political advantages that local decision makers perceive to be connected with their choice of SRT as the means of delivering community transit services.

Quite clearly, the perceived cost advantages of SRT are a major reason for its prevalence. Based on data collected from California's DRT systems, it is possible to compare the operating cost per vehicle service hour (VSH) of three basic modes of DRT service delivery: SRT, direct municipal operation, and DRT management firm operation. As Table 2 indicates, in dollars per vehicle service hour, the local taxi operator is able to provide DRT service significantly less expensively than either local government itself or a DRT management firm.

TABLE 2
COMPARATIVE COSTS OF THREE MODES OF DRT SERVICE DELIVERY

<u>Operator</u>	<u>Cost/VSH</u>
Taxi Firm	\$12.41 ^a
Municipality	14.23 ^b
DRT Management Firm	17.24 ^a

- a. Total operating costs, including administrative costs and any other related costs (i.e., insurance, fuel) increased by the sponsoring agency.
- b. Total operating costs as reported by municipal agency (likely to be understated).

As suggested by the fact that more local governments contract with a DRT management firm than provide DRT themselves, despite ostensibly higher service costs in the former case, the "cost-efficiency" of contracting, and SRT, goes beyond simple direct dollar considerations, particularly for municipalities. The local taxi firm is in a position to sell the city a "packaged" service, in which the former assumes primary responsibility for service design and complete responsibility for system operation. This enables the city government, usually lacking in transit expertise, to avert a typically unwelcome planning and managerial burden. When local governments assume the costs of DRT vehicles, as most do, it obviously is far less expensive to capitalize taxi sedans than minibuses or modified vans. This leaves more money for operational purposes or for alternative transportation uses. SRT systems can be established in a very short period of time, a matter of weeks. The needed service planning is relatively minimal, and sedans can be readily purchased or the taxi operator's own vehicles used until new vehicles arrive. This lack of lag time permits constituents to connect service provision with the political decision to implement it. Contracting with a local taxi firm provides the opportunity for a comfortable, relatively informal relationship between funding agency and service provider. It is politically advantageous, moreover, to give business to a local company, particularly when the latter may create legal difficulties otherwise. Overall, SRT represents a low cost method of providing a new community service without requiring that local officials, elected or bureaucratic, learn or practice novel modes of behavior.

Last, but most assuredly not least, taxi firms in California have actively sought out opportunities for SRT service provision. Feeling the

financial pinch caused by declining ERT profitability, they are seeking ways of bolstering their revenues, and contract operations represent an important diversification strategy. In general, there seems to have been a combined "push-pull" motivational character to the decision to pursue SRT contracts. The "push" was supplied by the imminent prospect of public sector initiation of a subsidized transportation service that would directly compete with and eventually destroy their operation. The "pull" came from the operator's perception of an opportunity for guaranteed profitability through provision of public transit services under contract. Some operators actively wooed sponsors for contracts; others responded to informal feelers or formal requests for proposals. In a few instances the initial response of the taxi operator to the spectre of subsidized DRT was to threaten legal action, and a lawsuit was actually pursued (unsuccessfully) against the Orange County Transit District. Whatever their initial reaction to proposals for DRT in their service area, the affected taxi operators ultimately made every effort to insure that they, not some other organization, would be the provider for the new system.

Competition

The cost advantages of public-private sector contracting are assumed to result not only from the greater efficiency of private firms relative to public agencies, but also from competition among potential contractors which enables service to be purchased at the lowest possible cost. Competitive bidding is required for many government contracts for just this reason. Even when competitive bidding requirements do not exist, wise public agencies attempt to insure that alternative service providers exist, and

avoid locking themselves into a single supplier of service in an effort to maintain incentives for cost-efficiency.

Despite these well-known benefits of competition, there has been relatively little competition for SRT contracts in California. In only about half of the cases was there any sort of competitive process for the award of SRT contracts, and in several instances of formal competition there was but a single bidder. Meaningful competition, in which at least two potential providers submitted bids in the realm of financial feasibility, occurred in less than one third of all cases.

These findings are in stark contrast to the perceptions of some transportation analysts that numerous potential paratransit providers exist in many communities, and that by appropriate government policy (such as user-side subsidy) substantial competition can be encouraged, with corresponding public benefits. Two major factors account for the particular competitive situation in California.

First, there is a genuine paucity of potential, capable providers in many areas. It is quite common for communities to be served by only a single taxi firm, and some of the larger firms have a quasi-monopoly on service in several adjacent cities. Only one DRT management firm is presently operating in California, and it does not compete for all DRT contracts. Other potential providers, notably non-profit organizations (usually human service agencies), school bus companies, and medical transportation firms, have only belatedly recognized that DRT contracts are an opportunity for them as well. However, such providers lack the extensive demand responsive experience of taxi companies, and some sponsors do not consider them capable contractors. In many instances, therefore, the local

taxi firm is considered to be the only serious candidate for service provider.

Second, local governments are less interested in encouraging competition than in getting the type of DRT system they desire. But once the sponsor has determined the latter, the choice of operator may be preordained. For example, a city which decides it wants an SRT system based on experiences in other communities is already predisposed to select a taxi firm as operator. If a city is satisfied that the sole local taxi company is a competent, low cost provider, competition for the contract may be viewed as an unnecessary burden and waste of time. Similarly, should a sponsor determine it wants an operationally sophisticated DRT system using 12-20 passenger vehicles, the small local taxi firm may simply not be a relevant competitor. Competitive bidding, moreover, tends to reduce decisions to dollar and cents judgments, but sponsors typically are just as concerned about the capability of the provider they select. When a capable local provider exists, sponsors often believe they can achieve their cost and service objectives as well through negotiation as a formal competitive process.

The preference of sponsors for negotiated agreements rather than competitive processes extends most emphatically to SRT contract renewals. Some contracts are written to permit extensions without competitive bidding; in other cases informal agreements accomplish the same purpose. Over the past six years not a single taxi firm has lost an SRT contract after initially receiving it, except when funds ran out. In fact, only one DRT system in the state has changed providers due to a competitive process. In sum, the first contract is the crucial one, since the initial provider is likely to

remain the system's operator indefinitely so long as performance is adequate. Taxi firms thus not only enjoy favorable competitive positions initially, but often are also shielded from further competition for their SRT contracts.

Contractual Arrangements

The contract between funding agency and taxi firm provides the basis for implementing subsidized SRT. The contract delineates the responsibilities of each party, establishes service parameters, specifies compensation arrangements (including the use of incentives), and spells out who shall own vehicles and how they may be used. In a broader sense, contractual arrangements determine how closely the sponsor will attempt to control the performance of the operator.

Contracts can be viewed simply as a means of getting service on the streets, or as a device to maximize the accountability, efficiency, and productivity of the service. In California, when contract administration is a municipal responsibility the former perspective tends to apply, whereas transit agency sponsors are more appreciative of the broader function of contracts. This difference in perspective stems not only from the greater transportation sophistication of transit agencies, who believe (not necessarily correctly) themselves to be sufficiently knowledgeable about DRT to establish contractual arrangements which can improve performance, but also from different managerial and financial situations. Detailed contractual arrangements impose significant monitoring requirements on the sponsor, and such control, after all, is not costless. Municipalities have chosen to contract for service precisely to avoid the bureaucratic costs inherent in

providing service themselves, and are quite reluctant to incur significant managerial expenses for contract administration, even though external funds are available for this purpose.

In a transit agency, in contrast, bureaucratic oversight is the raison d'etre of the staff. Thus the Orange County Transit District (OCTD), which has a major DRT program, has erected a bureaucratic structure to ride herd on its SRT contractors. This structure is necessary because OCTD's contractors are subject to quite detailed service regulations--they must meet stringent service criteria, payment is partially based on performance, and considerable operating information must be collected and delivered to the transit agency for analysis. Although detailed contractual arrangements result in substantial administrative costs for both sponsor and SRT operator, such control is deemed essential by the agency bureaucrats. Moreover, all costs, managerial as well as service provision, are internalized in a transit agency, hence there is less reluctance to incur the former.

Even though they view contracts quite differently, the basic contractual arrangements utilized by most municipalities and transit agencies are similar. This stems from a common insistence that the vehicles used for SRT be dedicated exclusively to the SRT system. Dedicated vehicle requirements result primarily from a desire to have SRT vehicles indistinguishably linked, through painting and signing, to the funding agency's sponsorship of the service. But having imposed this requirement, sponsors are then restricted to compensation arrangements based on service availability, not service usage. Sponsors are forced to pay for service availability because no provider will operate a dedicated vehicle fleet without assurance of receiving

revenues to cover its costs, and the only two compensation methods which meet this criteria are a fee per vehicle hour of service or cost-plus payment. While a sponsor can closely monitor vehicle use and insist that the operator fine-tune the number of vehicles in service to bring capacity into line with demand, this is not ordinarily done. The operator, after all, must maintain and pay a staff sized for a relatively predictable level of service, not one which is subject to substantial fluctuation from day to day. As Table 3 indicates, over 80 percent of all SRT systems are based on contractual arrangements specifying dedicated vehicles and compensating the operator for available service.

TABLE 3
BASIC CONTRACTUAL ARRANGEMENTS FOR SRT SERVICE

<u>Type of Arrangement</u>	<u>Number of Systems</u>	<u>Percent of Systems</u>
Dedicated vehicles, VSH* compensation, no incentives	12	41%
Dedicated vehicles, cost-plus compensation, no incentives	5	17
Dedicated vehicles, VSH compensation, fare-box incentives	2	7
Dedicated vehicles, VSH compensation, performance incentives and disincentives, farebox incentives	5	17
Integrated fleet, RVM** compensation, no incentives	3	10
Integrated fleet, meter compensation, no incentives	2	7

*Vehicle service hours

**Revenue vehicle miles

The alternative to dedicated vehicle arrangements is an SRT system built around a common fleet of vehicles for both SRT and ERT. In an integrated fleet system, the SRT operator is compensated only for service usage, i.e. only when hauling SRT passengers. (It is important to note that an SRT passenger is one which has requested SRT service, not necessarily one which actually shares a ride with another passenger.) Compensation is linked to SRT revenue miles, either by means of a mileage charge or through meter rates. While experience has shown that such SRT systems can achieve important cost-efficiencies relative to dedicated vehicle operations (a point elaborated on below), they represent a small minority of all systems. Sponsor preferences for dedicated vehicles represent the major reason for this outcome, but the integrated fleet alternative suffers also from an unpredictable budget, dependent as it is on both actual demand and the operator's productivity achievements, and the perceived problem of obtaining an honest rendering of in-service miles (or fares) from the operator. If vehicle hours of service are set in advance by the sponsor, the budget level is known and little potential exists for overcharging by the operator.

One of the most striking characteristics of these contractual arrangements is the limited use of productivity or performance incentives. Incentives are utilized in only seven systems, five of which are OCTD systems. In the other two, the use of farebox incentives was at the provider's urging. Although transportation analysts have extolled the virtues of incentives [2, 4], sponsors have little interest in them. Incentive systems are resisted either due to their potential complexity or because the simplest incentive, that of allowing the operator to keep

all fares, does not reduce the sponsor's net cost of service in the short run. In fact, if system capacity is fixed (as it often is in any 6 to 12 month period), productivity (hence ridership) increases by an SRT provider operating under farebox incentives increase the net cost of service to the sponsor relative to what this cost would be if fare revenues were returned to it. Only if the productivity improvements deter the need for capacity expansion does the sponsor benefit financially from such incentives. In general, sponsors wish to have the gains from productivity increases accrue to them, thereby reducing subsidy requirements. Alone among the sponsors, OCTD has recognized that productivity gains may not be achieved costlessly by operators, hence incentives are appropriate.

The Cost-Efficiency of SRT

As Table 1 revealed, taxi firms can deliver an hour of DRT service much less expensively than other DRT providers. What accounts for their apparent cost-efficiency? Does it stand up under close scrutiny, and how is it affected by contractual arrangements?

Compared to transit districts or municipal transit agencies, taxi firms enjoy two major cost advantages. First, they are low overhead organizations with a minimum of managerial-administrative staff. Transit agencies, in contrast, tend to have much greater proportional staff costs since they are more complex organizations. Second, taxi firms are low wage employers. Driver wages, by far the single largest cost component for SRT, rarely exceed \$4.50 per hour, and are usually in the range of \$3.50-4.00 per hour. Transit agencies typically pay their bus drivers at

least twice as much as SRT drivers earn, and these wage differences hold for all types of taxi and transit labor.

Low wages and a minimum of overhead cannot explain all the cost advantages of taxi firms, however, since DRT management firms pay their employees comparably and also strive to minimize overhead expenses, yet generally have higher costs than taxi operators. The reason is to be found in a third cost-saving factor, the ability of taxi firms to share their overhead among SRT and the other services they produce, most notably ERT. By virtue of their ERT operations, taxi firms already possess an administrative-managerial structure, maintenance function, radio dispatching set-up, and buildings and yards, all of which can be utilized for SRT at little additional expense. Since the total cost of SRT consists of the sum of the direct costs of service production--wages for drivers and dispatchers, fuel, tires, and insurance for the vehicles--and overhead expenses, a taxi firm which need allocate only some fraction of its total overhead costs to SRT is almost inevitably a lower cost provider than a DRT management firm which must establish an overhead structure dedicated exclusively to the service and charge all expenses accordingly. In some cases, municipalities which contract with DRT management firms for service provide much of the overhead structure themselves, seeking to avail themselves of the economies of scale involved in overhead sharing. But, since municipal costs commonly are higher than taxi firm costs, this service model too is typically more expensive than contracted SRT.

All else being equal, the greater the degree of internal integration of a contractor's services (assuming multiple services), the less it must

charge a sponsoring agency for delivering SRT. This is nicely illustrated by the El Cajon and Barstow SRT systems. In the latter, labor is used flexibly among SRT, ERT and an ambulance-medical supplies delivery service, while the El Cajon system is a fully integrated SRT-ERT operation. In 1977-78, El Cajon and Barstow ranked second and third lowest among 24 SRT systems in compensation rate per vehicle hour equivalent paid by the sponsor to the provider.

The cost-efficiency of a DRT system has two aspects, however, namely production cost-efficiency, e.g., cost per vehicle hour, and consumption cost-efficiency, e.g., cost per passenger. The latter is significantly effected by productivity as well as low production costs. In order to determine whether the cost-efficiency of SRT stands up when productivity is introduced into the equation, the cost per passenger and productivity achievements of SRT providers were compared with those of the only DRT management firm operating in California. To make this comparison as fair as possible, SRT systems in which sponsors were known to oversupply service (usually for political reasons) were excluded from the sample, since the low productivities of such systems were not indicative of operator performance. Table 4 reveals the results of this comparison.

TABLE 4
PERFORMANCE OF SRT PROVIDERS AND DRT MANAGEMENT FIRM

		<u>21 SRT Systems</u>	<u>8 DRT Systems</u>
Total Operating Cost/ Passenger:	Average Range	\$2.60 \$1.41 - 4.75	\$2.29 \$1.90 - 2.62
Passengers/Vehicle Hour:	Average Range	5.1 3.6 - 7.8	7.5 6.5 - 8.6

Seen in this light, the cost-efficiency achievements of SRT providers are much less impressive. Despite average production costs more than 25 percent less, the markedly lower average productivity of SRT providers results in average consumption costs about 13 percent greater than the DRT management firm. The productivity achievements of the latter stem largely from more effective dispatching procedures--sophisticated manual dispatching techniques are used, whereas most SRT operators rely strictly on the mental capabilities of their dispatchers. While these procedures entail higher control room costs, which partially offset the productivity gains, they result in much more consistent performance and a much narrower cost range, as Table 4 indicates. While the observed difference in consumption costs is not conclusive, it does imply that some local governments are purchasing less cost-efficiency than they believe when they contract with taxi firms for SRT. Nonetheless, the best consumption cost-efficiency performances among this group of 29 DRT systems are registered by SRT systems, and 8 SRT systems are represented among the 10 systems which have achieved costs per passenger of \$2 or less.

The influence of contractual arrangements on cost and performance is a third key aspect of operational efficiency. Two findings bear on this question. First, it is quite clear that integrated SRT-ERT systems are a real money saver compared to dedicated vehicle systems. El Cajon's integrated SRT system costs the city 18 percent less per vehicle service hour equivalent than the average compensation rate for all SRT systems, and the City of La Mesa, which utilizes the same SRT provider, will reduce its cost per passenger 15-20 percent due to its recent conversion from a dedicated vehicle system to an integrated fleet operation. The three integrated fleet

systems in operation during 1978 achieved a cost per passenger of \$1.66, compared to a per passenger cost of \$2.72 for the dedicated vehicle systems, or 39 percent less. Even eliminating the high cost OCTD systems and the low efficiency City of Los Angeles systems from this comparison, the integrated SRT systems achieve per passenger costs 26 percent lower than their dedicated vehicle counterparts. While service area conditions probably have some effect on these results, most of the superiority of the integrated systems is attributable to the high SRT productivities they attain. The El Cajon system, for example, achieves an average vehicle productivity in excess of 8 passengers per hour when vehicles are in SRT service. But then, more efficient utilization of vehicles should have a salutary effect on productivity.

Second, incentive systems or detailed contractual regulations seem to have no significant positive effect on productivity or costs. SRT systems in which the provider keeps the fares achieve no better productivities than non-incentive SRT systems. The most plausible explanation of this outcome is that farebox incentives are not very powerful. For example, a provider receiving a base compensation rate of \$10 per VSH and a 50¢ per passenger fare incentive, and initially attaining a productivity of 5 passengers per VSH, would receive only 4 percent more revenue by increasing productivity 20 percent (to 6 passengers per VSH). Achieving such a large productivity increase through improved operating procedures would probably require increased control room expenditures, thus offsetting part or all of the revenue gains. Increasing productivity by depressing level of service could lead to user complaints and funding agency dissatisfaction.

On the other hand, contractual regulations aimed at stimulating an optimally organized and delivered service seem only to add to costs and depress productivity, although they do produce an improved level of service, i.e., more consistent and lower response times. For example, OCTD's SRT contractors, subject to an elaborate set of service regulations, receive significantly more compensation per VSH than do operators of municipally sponsored SRT systems. Moreover, these contractual arrangements require considerable bureaucratic oversight, hence large administrative costs. Despite all this expenditure of time and energy on the part of both sponsor and providers, system productivities are merely average. The net result is total costs per passenger ranging from \$2.50 to \$4.75, high by any standards.

III. SRT Contracting: Taxi Firm Consequences

Internal Changes Resulting From SRT

Every taxi firm which has made the transition from ERT operator to public transit provider has found it necessary to shift gears internally. Consistent with the human and organizational inclination to minimize change, most firms have adapted incrementally to their new situation. This is particularly evident in their operational procedures and labor practices, both of which have undergone far less change than might have been anticipated given the different circumstances surrounding ERT and SRT provision.

The heart of any demand responsive operation is the dispatching function, which includes trip assignment, scheduling, and routing. The dispatching requirements for SRT are considerably more demanding than those for ERT, since the principal objective of ERT dispatching is simply to minimize waiting time, whereas SRT dispatching attempts simultaneously to minimize

waiting time and maximize vehicle productivity subject to constraints on both vehicle capacity and in-vehicle time for users. Despite the fact that SRT dispatching is qualitatively more difficult than ERT dispatching, most SRT providers have not instituted completely new dispatching procedures for SRT, but have chosen to simply modify ERT dispatching practices to conform to the requirement for shared riding. Where major changes have occurred, they have been in response to pressure by sponsoring agencies (notably OCTD) or to levels of demand which clearly would overwhelm incremental ERT procedures. In no cases have computer capabilities been employed to assist in dispatching; all systems are strictly manual, and most rely totally on the mental capabilities of the dispatcher(s).

Given their total reliance on humans to perform this most critical SRT function, one might expect that operators would attempt to insure high quality performance by dispatchers (and drivers, where they are responsible for scheduling and routing decisions) through labor compensation practices. This has not proven to be the case, however. SRT dispatchers are paid approximately the same as ERT dispatchers, and only two firms have experimented with incentive systems for their dispatchers (basing compensation partially on productivity). As for drivers, who handle a very substantial amount of decision making responsibility for scheduling and routing in some systems, they tend to fare no better under SRT than ERT, and in many cases worse. The most important monetary advantage to SRT driving is the guaranteed salary, since compensation is normally paid on the basis of an hourly rate rather than the commission system utilized for employee ERT drivers. However, wages are quite low, typically in the range of \$3.50-4.00 per

hour. Only about one third of all systems offer drivers an incentive to boost their compensation, and in several the incentive is quite limited.

As their labor practices indicate, most SRT providers continue to strive to minimize operating costs, even though they are providing a subsidized service immune from the usual discipline of the market. Of course, the operator is motivated to keep costs to a minimum in order to maximize profitability, but the apparent willingness of funding agencies to periodically increase compensation removes any real threat of serious loss. There is a political as well as economic market, however, and operators recognize that low costs are politically very salient to local decision makers. Many expressed concern that if costs rose too high, elected officials would reassess their decision to contract for SRT, since constituents might perceive the service as being a wasteful use of public funds. Moreover, although contract rate increases have been granted when requested, they invite scrutiny of the firm's operating practices and undermine its reputation for cost-efficiency, especially if the requested increases are large. It is noteworthy that the compensation rates of the longest standing SRT providers have increased no faster than the rate of inflation, and often less. In the extreme case, the provider for the La Mesa SRT system maintained essentially the same compensation rate for three years, and over a four year span the rate increased by a mere 7.5 percent. Thus, while they are often the only DRT game in town, this advantageous position has not caused most SRT providers to abandon close attention to cost-efficiency.

Labor-Management Relations

The labor practices of SRT providers are in stark contrast to the expectations of analysts who have foreseen significant changes in labor-management relations under SRT [1, 3, 11]. These changes were expected to result from the combined influence of three factors distinguishing SRT from ERT. First, the SRT driving job is perceived as more onerous, since throughout the shift the driver is under direct operating control and engaged in service delivery, whereas ERT drivers enjoy more autonomy and free time. Second, job performance is more critical to the well-being of the firm, since competent, dependable, and courteous drivers are needed to deliver service to the standards expected by public agencies, and capable dispatchers are an obvious necessity. Third, the SRT contract provides the taxi firm with a guaranteed source of funds from which to compensate personnel, unlike ERT in which revenue is totally dependent on market demand. Together, these factors seemingly imply a greater ability on the part of labor to influence the terms of its relationship with management, and in particular to secure improved wages and benefits relative to ERT labor [11].

Manifestly, this has not been the case to date. Management unilaterally dictates the wages and working conditions of SRT labor, just as it has with ERT labor except in the relatively few ERT operations which are unionized. SRT workers have not improved their bargaining position relative to ERT workers for two reasons.

First, drivers, who constitute the bulk of SRT labor, tend to view their jobs as temporary--they do not ordinarily expect to make a career of it. For many, it is an entry, or re-entry into the job market. Students, former housewives, and job mainstream drop-outs are heavily represented among SRT

drivers. Perceiving the job as temporary, such persons do not have the investment in the position that would cause them to agitate and organize for better compensation arrangements.

This leads directly to the second point. SRT workers are unorganized, and unions presently are making no attempts to change this situation. Taxi labor traditionally has been non-union except in large central cities. Recently, the uncertain financial prospects of ERT have caused the traditional taxi unions, most notably the Teamsters, to exhibit little interest in additional organizing efforts. Nor have transit unions indicated any interest in organizing SRT workers, even though the existence of low-wage DRT providers makes direct transit agency provision of DRT economically unviable. Of course, with relatively few transit agencies involved in any way with DRT, this is not presently a relevant issue for most transit bargaining units. Over the longer run, as SRT contracts become the financial foundation for involved taxi firms, unions may recognize that the secure revenues of subsidized operations give SRT workers a major source of leverage over their employer (as transit unions have long since recognized) and view such workers as attractive organizing targets. At present, however, organizing activity among SRT workers is virtually non-existent.

It might be supposed, nonetheless, that taxi operators themselves would see a need for improving compensation in order to attract the quality of SRT employee required to deliver service to public agency standards. Taxi operators perceive the situation differently, however. Operators maintain that attracting qualified SRT personnel does not represent a major difficulty, in spite of the low wages and admitted quality problems with ERT drivers. They report that SRT attracts safer and more dependable drivers

than ERT, which they attribute to the improved working conditions of the former--regular daytime hours, better vehicles (often air conditioned), safe service areas, more job status--and to the predictable, consistent earnings. There seems little reason, therefore, to institute special compensation practices for SRT simply to recruit adequate workers.

Nor are SRT operators persuaded that additional labor compensation costs can be recouped through better performance. In their view, performance is affected most significantly by service area conditions--demand density, area size, trip lengths, and the pattern of origins and destinations (many too many or many too few, for example)--and funding agency policy on response time. Moreover, considering that their workers are now at the lower end of the wage scale, the wage increases needed to markedly increase operating efficiency--if such could even be accomplished--would be of such a magnitude as to destroy the provider's cost-competitiveness. In sum, better to pay low wages and accept less than optimum performance in order to maintain a cost advantage relative to potential competitors for DRT contracts.

Legal Implications of SRT Contracting

By contracting with public agencies, taxi firms enter into an institutional arena different from the prevailing when they were solely an ERT operator. In particular, the status of government subsidized public transit provider involves new legal rights and responsibilities, which some analysts have suggested could have a major impact on affected taxi firms [1, 3, 6]. To date, however, this potentially significant development has not come to pass in California.

The source of funds for subsidized SRT constitutes one major reason for this outcome. Many of California's SRT systems utilize no federal transit subsidies, and the receipt of state transit subsidies imposes no special rights or responsibilities on private providers, except as specified by sponsoring public agencies.

In contrast, the Urban Mass Transportation Act grants "mass transportation companies" important protections from federally subsidized competition in Section 3(e), while also making recipients of federal subsidies subject to labor protection requirements in Section 13(c). While UMTA has administratively concluded that SRT does indeed fall within the purview of "mass transportation," there exists as yet no definitive criteria specifying how much of a taxi firm's total operation must be in shared ride services in order to qualify for "mass transportation company" status under federal law [6]. The Department of Labor has, however, in recent rulings on 13(c) protections considered this status to be attained if at least 15 percent of the taxi company's revenues came from SRT services [1]. Although this particular figure may be superseded, and in any case is not binding on DOT's administration of Section 3(e), it does provide a means of determining how many California SRT operators might be subject to the impact of federal transit legislation.

Currently, 9 of California's 15 SRT providers derive at least 15 percent of their overall revenues from their SRT contracts, and the contract revenues of 6 of these 9 companies are at least partially comprised of federal transit subsidies. These 6 companies, moreover, provide service for 18 different SRT systems (although federal funds are not utilized in all these systems) and include most of the large SRT providers. In not a single case,

however, have either Section 3(e) or Section 13(c) protections become an issue.

This has occurred in large part because SRT providers have no compelling reasons to make such protections an issue. Section 3(e) problems can arise only if federally subsidized public transit services are established in direct competition with an SRT operator's services. Since no sensible transit funding entity will establish new services in direct competition with other of its services, there is virtually no likelihood that contract SRT operations could be affected adversely by subsidized competition. On the other hand, in areas where an SRT provider operates ERT but no subsidized SRT, its ERT operation could be impacted by new fixed route transit services. (While ERT is not considered "mass transportation" by UMTA, Section 3(e) protections arguably apply to all services of "mass transportation companies," not just their shared-ride services.) When such situations do occur, however, the taxi company invariably finds itself in the position of having to bite the hand which feeds it should it attempt to prevent deployment of the new service, since the sponsoring agency is the very same entity which funds its own subsidized SRT services. While several taxi operators firmly believed that their ERT business had been hurt by expansion of conventional transit services, they had no intention of challenging this expansion on Section 3(e) grounds for fear of jeopardizing their SRT contracts. They are much more concerned with maintaining a good relationship with their funding agency than protecting every bit of their ERT market, since ordinarily any loss of revenue from the latter pales into insignificance compared to the loss of an SRT contract.

Much the same motivation not to rock the boat explains the attitude of SRT providers toward Section 13(c) protections for their employees. Irrespective of whether SRT providers are considered to be mass transportation companies, recent Department of Labor rulings strongly indicate that those of their employees engaged exclusively in SRT provision hold the status of mass transportation employee, and are eligible for 13(c) protection [1]. In the larger SRT operations, the number of such potentially affected employees is considerable, exceeding 50 for one company. Despite the precedent set by an Ohio taxi firm which attempted to assert 13(c) rights for its employees, SRT providers in California have demonstrated no interest in gaining 13(c) protections for their SRT workers. While not ignorant of 13(c) in most cases, the SRT providers would like to avoid the issue entirely if possible, as they are frankly fearful of the potential organized labor complications. Moreover, 13(c) protects employees, not companies. It makes little sense, therefore, for an SRT provider to go to bat for its workers in such a risk laden area when the benefits accrue to the latter, not the taxi company itself, and may in fact damage further contract opportunities. Such damage could occur if extension of 13(c) protections to the provider's employees required a sponsor to guarantee employment for them even if the firm eventually loses the contract.

Financial Implications of SRT Contracting

The profitability and future revenue potential of their subsidized SRT operations have caused most of the involved taxi firms to make paratransit provision a cornerstone of their future financial strategy. For several companies, their SRT contracts represent the difference between making a

profit and losing money, or even being out of business. For example, Paul's Yellow Cab of Pomona, one of the largest SRT providers in California, lost nearly \$34,000 in 1975 on revenues of \$780,000 but acquired the first of a string of SRT contracts during that year. By 1978, this company was making a \$48,000 profit and grossing revenues of nearly \$1,250,000. During this same period its ERT ridership declined by nearly 50,000 passengers, or over 25 percent, yet the firm's financial health is better than it has been for a decade. In 1979 revenues from paratransit contracts are projected to constitute close to 50 percent of total revenues, which themselves will be up significantly from 1978. In 1973-74, the owner of the firm was seriously considering closing the company's doors.

Paul's Yellow Cab has benefited from subsidized SRT more than most taxi firms, but two other companies derive at least 50 percent of their total revenues from SRT, and five additional firms are at or above the 25 percent level. One company, in fact, generates over 90 percent of its revenue from subsidized SRT! Excluding the Yellow Cab Companies in San Diego and Los Angeles, it is probable that two-thirds or more of the SRT providers would instantly become marginal taxi operators if they lost their SRT contracts, and the long term financial prospects would be grim for virtually every single one. SRT contracts are not financial frosting on the cake for these companies--they are one or more layers of the cake itself.

This is not to say that the SRT providers are ready to abandon their traditional taxi operations. To an individual, they believe that ERT will continue to be an important part of their revenue base, but most recognize that ERT is at best a no-growth, marginally profitable enterprise. In fact, the majority have found it necessary to institute leasing or owner-driver

arrangements in order to avoid losing money on ERT. In light of these financial realities, the more insightful of the SRT providers realize that their future growth prospects are in paratransit, not conventional taxi operations, and are in the process of redefining their firms' role and image accordingly.

IV. Policy Implications

Cost-Efficiency, Contractual Arrangements, and Sponsor Perspectives

Local governments in California have turned to taxi firms to provide DRT because the latter can produce SRT services at low costs. But while the cost of produced SRT output is low, most taxi firms have not succeeded in achieving costs per passenger for SRT which are lower than other private DRT contractors. Productivity is the link between these two measures of cost efficiency; the merely adequate vehicle productivity of many SRT systems makes it impossible in most cases for these systems to achieve low per passenger costs.

Sponsors, of course, cannot know in advance that a provider's consumption efficiency achievements may turn out to be no great bargain. This is especially important because providers are ordinarily selected (so far, at least) on the basis of production costs. However, as transportation analysts have recommended, productivity related contractual arrangements can be established which provide a financial incentive to achieve higher levels of consumption efficiency, thus reducing the necessary public subsidy per passenger [2].

The conceptual merits of this strategy are undeniable, but it suffers from three practical defects. First, with the exception of sophisticated

transit agencies like OCTD, local governments strive at all costs to avoid complexity in contracting, since this imposes administrative burdens and costs. From the municipal perspective, incentive systems more complicated than fare retention are simply out of the question. Farebox incentives, moreover, are both relatively weak and perceived by many sponsors as a net drain on subsidy revenues. Second, OCTD's experiences with incentive systems suggests that they do not necessarily reduce the cost of consumed service. Not only have incentives failed to spur productivity to above average levels, but OCTD's SRT contractors seem to have simply increased their basic compensation requirements in order to account for the uncertainty associated with actual compensation and for the additional administrative costs of meeting contract standards. This upward pressure on compensation rates has occurred despite the presence of abundant competition for OCTD's contracts. Third, providers have less than complete control over productivity, since it is affected by service area conditions (e.g., level of demand, population density, trip lengths) and sponsor decisions about capacity and response time. In some systems, high levels of productivity, and hence low costs per passenger, are simply unattainable.

The only consistently effective contractual arrangement for achieving low per passenger costs is an integrated SRT-ERT system. There is no mystery as to why this is the case. In an integrated system, the sponsor pays only for consumed output, not produced output, and the provider is motivated to maintain productivity at high levels (to the extent demand permits) in order to utilize vehicles and labor efficiently, thereby maximizing profits. Significantly, the most cost-conscious cities--those whose funds for SRT were restricted, or so they perceived--have opted for

this type of SRT system. Most sponsors, however, perceive themselves to be affluent enough, principally by virtue of abundant TDA subsidies, to afford the less cost-efficient dedicated vehicle system. Relatively few sponsors make a detailed investigation of both service options, but even if all did, it is unlikely that choices would change dramatically. To the agency which financially supports the service, the political benefits of SRT vehicles identifiably linked with its sponsorship are clearly worth something.

Benefits of SRT Contracting

The financial benefits accruing to both taxi firms and local governments account largely for the fact that subsidized SRT has become the dominant form of DRT in California. For local governments, subsidized SRT is ordinarily the least expensive method of providing (although not necessarily delivering) community level transit. For taxi firms, SRT contracts result in an infusion of much needed revenue, in many cases representing the difference between financial health and sickness.

Less obvious benefits to both parties also flow from this public-private sector partnership. For SRT providers, the transition from conventional taxi firm with a clouded financial future to broadly based paratransit company positioned to serve a variety of profitable markets can be made at least partially at public expense and with a minimum of risk. Local governments, typically lacking detailed knowledge about transit, can take advantage of taxi operator expertise to design and implement their community transit system, thereby enabling them to place a desired service on the streets quickly and with a minimum of administrative effort and expense.

Moreover, a competent, accountability-conscious SRT provider minimizes the need for subsequent government supervision once the system is in place.

These last two benefits are associated with any capable provider, particularly a DRT management firm. But few such contractors exist. Taxi firms are unique among potential DRT contractors, however, in that they also provide unsubsidized transportation services to the general public. By keeping local taxi firms in existence, SRT contracts can insure that local public transportation service, both subsidized and unsubsidized, will continue to be available. Should taxi services cease entirely, as they have in some localities, the local government, as public transportation supplier of last resort, may find itself compelled to pick up the slack and introduce costly new services. An important benefit of SRT contracting is thus to maintain low cost, private sector alternatives to governmental provision of needed local public transportation.

Legal and Labor Impacts of SRT

Considerable trepidation has been expressed about the legal and labor implications of the movement by taxi firms into SRT and publicly supported contract operations [1, 3]. While conceptually well-founded, the fear that this movement could upset the legal appletart in public transit, particularly with respect to Section 13(c) labor protections, is not supported by California's SRT experiences. Although it is virtually certain that several SRT providers are covered by Section 3(e) protections from federally subsidized competition, and that their employees come under the jurisdiction of Section 13(c), none have seen fit to make an issue of these federal protections. The reason, of course, is that they have little to gain, and

potentially much to lose, by doing so. With respect to Section 3(e), their status as government contractor compels them to be accommodating, not confrontative. As for Section 13(c), any broaching of the labor protection issue on behalf of their employees could eventually culminate in catastrophe, in the form of a severely impaired competitive position resulting from either union organization of their workers or extensions of protections to them which increase their cost and incur liability on the part of sponsors. Sponsors have also seen fit to finesse the 13(c) issue, even though they are required to obtain 13(c) certification from the Department of Labor before they can receive federal transit subsidies. Transit agency sponsors have continued to operate under their standard 13(c) agreement with DOL, making no special provision for employees of SRT contractors, and two municipal sponsors have agreed to accept liability for protection even while stipulating that no employees are affected. Almost inevitably a 13(c) or 3(e) embroglio will eventually occur, but the evidence to date suggests that in many situations these provisions of Federal law will not significantly affect taxi-based paratransit services.

Taxi Firm Consequences

The declining profitability of their ERT operations has caused most taxi firms to recognize that they must change in order to survive. For SRT providers, the direction of change is quite clear. ERT will continue, albeit under driver leasing arrangements in most cases, but the firm will increasingly seek its major revenue and profitability opportunities in the public sector of transportation, not the private sector. This trend is already strongly at work in California, with over half of the SRT providers

now securing at least 25 percent of their revenues, and an even greater portion of profits, from their publicly subsidized contract operations.

Another important indication that these providers perceive their future financial viability to depend upon the public sector is their attitude towards new private sector services, most notably unsubsidized SRT. Only two providers expressed even a willingness to experiment with this service, and neither had any near-term plans for doing so. This posture has little to do with local taxi ordinances which in many communities restrict or prohibit SRT. Taxi operators invariably viewed such ordinances as paper tigers which could be altered with little difficulty if this was their desire. Rather, while most operators are willing to concede the possible merits of unsubsidized SRT, they all either are genuinely skeptical it can be profitable or consider it too risky to try. Several operators had experience with unsubsidized SRT in the 1940's and 1950's, and remembered it to be an ultimately unprofitable service. These taxi entrepreneurs are looking to the government, not the market place, for innovation opportunities. The former is able to produce the guaranteed revenues which the latter cannot.

The strong reluctance of SRT providers to experiment with unsubsidized SRT represents a major impediment to cost-efficient user-side subsidy schemes, such as the one instituted in Danville, Illinois, since such innovations typically require the prior presence of SRT service. When California cities have established user-side subsidy on taxi travel for elderly and/or handicapped, they have been forced to subsidize ERT service, typically at normal ERT rates. The involved taxi firms have no desire to institute a regular SRT system, and the relatively small sums of money

involved in these services do not give sponsors sufficient leverage to induce the firms to see shared riding and lower rates in a more favorable light. Of course, those taxi firms which have secured SRT contracts with provider-side subsidy have no incentive to replace their ERT operations with unsubsidized SRT in the affected communities.

The conditions discussed above suggest that in California we may be witnessing the beginnings of a new generation of privately operated, predominantly publicly financed taxi companies. If so, it portends significant managerial changes for taxi firms, and shake-ups in industry structure as well. As the importance of contract operations increases, taxi managers will devote an increasing portion of their time to interacting with government or responding to its requirements. Taxi managers must develop methods of complying with government imposed accountability and data reporting requirements as well as managing the service provision process. A talent for communicating with government officials, and the acquisition of at least a minimal amount of political skill to play the "government game," become extremely important assets. Knowledgeable taxi operators discover that sponsor perceptions of their interactional capabilities influence how performance is evaluated, and that cost-efficiency becomes only one factor, albeit a very important one, in the evaluation matrix. Operationally oriented or politically unsophisticated taxi managers may experience great difficulty functioning in this new environment, with adverse consequences for their firm.

Changes of similar magnitude are likely to take place at the industry level. Unless a marginal taxi firm enjoys managerial astuteness or a lack of competition for government contracts, it is likely to fall quickly by the

wayside, probably pushed by government financed competition from other providers. Only those firms successful in obtaining contracts are able to grow and expand, while other taxi companies stagnate, or worse. With financial health dependent on substantial contract operations, successful new entry into the industry is likely to become the province of management firms with a strategy for capturing contracts, not individual entrepreneurs hoping to make a go of ERT operations. Smaller firms may find it most advantageous to join forces with such management entities, to sell out to them, or to join forces to create one themselves. Larger, and fewer, taxi companies seem to be the long term implication. However, these companies should also be financially stronger and more managerially and operationally competent, as their greater assets enable them to acquire the capabilities needed to become full-fledged paratransit providers.

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