The Transport Disadvantaged - Community Transport or Main Stream?

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Abstract

This paper is based on a study undertaken for the New South Wales Department of Transport in 1991 to examine the cost of providing transport services for the aged and those with disabilities through the Community Transport program. A sample of Community Transport Projects in N.S.W. country and metropolitan areas was studied in detail and data collected on the costs of the modes, which they used to provide transport for the aged and disabled. A cost model was then developed to determine the factors that influence the cost per vehicle kilometer for each service delivery based on the data collected. Discussions were also held with users of the services to determine the quality of service provided by each of the modes.

The results are discussed in the context of the changes which have occurred in the New South Wales bus industry as a result of the 1990 Passenger Transport Act. The restructuring of the industry put in place by the Act requires all route bus operators to meet new minimum service levels and also gives them greater opportunity to plan services to meet the needs of the market in their local area.

Historically the relationship between the Community Transport Projects and the private bus operators has, in general, been one of antagonism. Private operators have viewed Community Transport providers as competing unfairly with their business by undercharging their services, because they do not have to meet their costs. On the other hand, the Community Transport projects view the private bus operators as being solely commercially orientated and not sensitive to the needs of those who might have difficulty using public transport.

The overall goal for the authorities should be to provide mobility to as many people as need it in the most cost effective manner. The study compares the unit costs of providing services using the various Community Transport modes with the costs of providing services by the private bus industry. Greater cost effectiveness can be achieved by keeping as many people in the main stream transport services for as long as possible so that scarce public sector resources can be concentrated on providing a service for those least able to use the general public transit system.

The goal then is to get the private sector to extend services into the "transport disadvantaged" market sector as much as is commercially feasible. This can only be achieved by a thorough understanding of the needs of the market. The 1990 Passenger Transport Act not only gives bus operators the opportunity, but places greater onus on them to meet the needs of the market in their area. The only missing link is co-operation between the bus operators and the Community Transport Projects, a situation that in some areas is slowly improving.

Introduction

This paper is based on the results of a study undertaken for the New South Wales Department of Transport in 1991 to examine the cost of providing transport services for the aged and those with disabilities through the Community Transport Program (Battellino et al. 1991). Community transport became a significant issue in N.S.W. in the late 1970s and early 1980s as concern mounted about the inadequacy of the existing transport services. It was considered that many people, particularly those with disabilities due to age or other physical handicap, residents of rapidly developing outlying metropolitan

suburbs and those living in small country towns were not being catered for by the existing transport network provided by either the public or private sector operators.

Up until this time, there had been considerable locally based community initiatives in providing transport services primarily through churches, local service clubs, other charitable organizations, and the local councils. These services were funded locally. In 1978, the first Community Transport Group was established in a major NSW country town which succeed in attracting State Government funding. Since that time, the number of community transport projects receiving a combination of both state and federal government funding has increased to about 120. Each community transport project has grown out of local initiatives and offers services within a very limited budget framework in a way that it considers meets the transport needs of the local "transport disadvantaged" population. Despite recent attempts to provide some operating guidelines for community transport projects, service planning is still at the project level with the primary focus quite rightly being on the needs of passengers but with little consideration of the operating requirements of transport systems.

The 1980s was also a time of review and restructuring of the provision of bus transport in NSW as well as in other parts of the world. This culminated in the introduction of the 1990 Passenger Transport Act, which places greater standards of service provision and accountability on both the private and public sector operators. (For a discussion of the NSW 1990 Passenger Transport Act its requirements and implications, see Graham 1992). The Act also removed many of the restrictive bureaucratic requirements for service changes which were in place under the previous legislation. This not only makes it possible, but also places greater onus on the operators to ensure that their services meet the needs of the market in their local area.

Outside the inner areas of the major metropolitan centers, bus transport in NSW is provided by a large and efficient private bus industry. Historically the relationship between the community transport projects and the private bus operators has, in general, been one of antagonism. Private operators have viewed community transport providers as competing unfairly with their business by undercharging their services as they do not have to fully meet their costs. On the other hand, the community transport projects view the private bus operators as being solely commercially orientated and not sensitive to the needs of those who might have difficulty using public transport. The 1990 Passenger Transport Act provides the legislative framework and the operating environment for the private sector operators to introduce more efficient and effective services for those previously considered transport disadvantaged. Overall, this should result in optimizing the efficiency in the allocation of resources freeing public sector funding for those who are least able to be accommodated in the main stream systems. All that remains is for the community transport and the private sector operators to put history behind them and to work in a co-operative way to establish the best transport service for their local area.

The question facing the planning authorities with regard to transport services must be what is the maximum level of service that can be provided for the minimum public sector subsidy? The private bus operators in NSW have always, justifiably, been proud of the efficiency of their operations and the ability to operate without government subsidy (Hensher, 1993). Therefore, if it is more efficient to provide a unit of service by the private sector, then the aim would be to maximize the level of service that can be provided by the private sector. The limited resources of the community transport sector can then be directed to meet the needs of those who are most disadvantaged. We need, therefore, to consider the costs of service provision under both scenarios.

The authors were commissioned by the NSW Department of Transport to undertake a study to analyze the costs of providing services by the community transport projects using a variety of transport modes. The motivation for the study was not, in fact, to compare it with service provision costs by main stream

public transport providers; however, the cost analysis that was undertaken allows a comparison with findings of other research into the comparative performance of private and public sector bus operators (Hensher and Daniels 1993).

A Study of Community Transport Costs

Determining service provision costs

Traditionally community transport projects are thought of as providing group transport using the minibus and have thus generally been funded for these vehicles. Minibuses are used primarily for group activities such as attendance at day care centers or health clinics and regular outings or shopping trips. However, in many areas there is a growing demand for transport, particularly to medical services, which has to be provided in accordance with the individual's own appointment schedule. In most cases, community transport projects are attempting to provide these services with whatever vehicles are available to them. A range of vehicles is being used which includes minibuses, small passenger vans, project owned cars, volunteers' cars and taxis. As the requests for these types of services directed towards community transport projects appear to have been increasing over recent years, pressure is placed on the resources available to projects. A number of projects are consequently asking for additional funding to cope with this demand. This raises the question as to what is the most appropriate service model to provide these services?

The study aimed to provide data, both quantitative and qualitative, on models of service provision so that decisions can be made as to the appropriateness of each model in providing transport, particularly on an individual request basis. It is important that, if community transport projects are to provide an efficient service, the true cost of service delivery models is known. It is only by aiming to provide the most cost effective unit of service, within quality of service constraints, that the overall efficiency of the allocation of funds can be improved, thereby increasing the level of service available to the community as a whole. The question also arises as to what extent can the individual requests of those requiring transport continue to be met with government funds? The efficient solution must look for providing services at the lowest unit cost per passenger kilometer. This can only be achieved by increasing passenger loadings by providing a more regular scheduled type service. This, however, works against the need to provide service to meet the individual's trip requirements.

The study was conducted by taking a sample of eight community transport projects (four metropolitan and four non-metropolitan) and collecting from them details of the types of services provided and the operating costs of those services. Discussions were also held with clients regarding the quality of service provided. Using the data collected from these projects, a cost model was developed to determine the factors that influence the cost per vehicle kilometer for each mode of service delivery.

Data was collected on the annual vehicle kilometers for each mode, annual passenger trips, and an estimate of revenue collected from services. Full cost details for each mode were collected, which included fuel, maintenance, and driver labor. To ensure that all costs were included, we included an allowance for depreciation for project owned minibuses. Initially, we investigated the amount of depreciation applicable to project owned cars also using the standard rates set by the National Roads and Motorists Association (NRMA 1991). However, as project owned cars are sales tax exempt when purchased and, if resold at market value after say one to two years having completed 40,000 to 50,000 kilometers (this was the experience of the projects that were operating project owned cars), then there is no depreciation or loss of value of the vehicle. Thus, the analysis is based on the assumption that there is no depreciation cost to the project resulting from the purchase of a car or small passenger van.

Overall administration costs including staff wages and other overheads such as rent, telephone and office

supplies for the project were calculated and allocated to modes according to the proportion of vehicle kilometers. The majority of the projects studied also arranged bus brokerage services. Collection of data on the costs and revenue associated with these services was difficult because of the multitude of arrangements, which often involved non-quantifiable agreements between the parties concerned. An estimate was made for each project of the annual vehicle kilometers provided by bus brokerage, and this figure was used in the allocation of administration costs.

It was possible to calculate from this information the cost of providing a kilometer of service by each mode. The cost per kilometer of using a project car was calculated firstly using the costs as incurred by the project, i.e. using paid labor where applicable, and secondly by excluding labor costs and assuming volunteer drivers. This information is shown in Table 1.

The total cost per vehicle kilometer for each mode can be broken down into the cost components as outlined above, i.e. vehicle running costs, administration costs and driver labor costs. The averages across the eight projects for total costs per vehicle kilometer and for each of these component costs per vehicle kilometer are given in Table 2. These average figures across the sample of eight projects are useful in providing an indication of the cost that can be expected to be incurred in providing a kilometer of service by each mode. They are not necessarily meant to stand as a benchmark or a standard of performance but are merely an indicator of the range of cost experience encountered by this sample of projects under current operating conditions.

There is considerable variation between projects in the unit cost for the same mode. For example, the cost per vehicle kilometer in minibuses ranges from $1.08 to $4.97 and for volunteer cars from $0.32 to $1.92. Using other information from the project such as the number of vehicle kilometers provided and the average trip length, it is possible to develop hypotheses about the reasons for the variation in unit costs. However,to explore more formally possible reasons for the variations in unit costs, we took the data as collected from the projects and ran a series of statistical models.

The unit cost model

To appreciate the role each service mode has in providing services, we need to identify how unit costs per vehicle kilometer vary as total use changes. Ideally, we would like to allow for the distribution of travelling group sizes (i.e. the number of vehicle kilometers with one passenger, two passengers etc. by mode); however, this information was not readily available from projects. To identify potential sources of variation in unit total cost (per vehicle kilometer) we established a number of hypotheses and ran some statistical models to investigate these hypotheses. The variables investigated as having potential influence on total costs included vehicle use, composition of labor, proportion of administration, and vehicle type.

Given that we are evaluating sources of unit cost variation across service models, all costs have been aggregated. We did, however, investigate the possible relationship between differences in unit costs and the incidence of each source of cost in total cost. For example, we investigated the role of the proportion of costs that are associated with administration, drivers and fuel etc. After allowing for the presence of a high level of correlation between potential sources of variation in unit costs, we arrived at the final model.

The model indicated that variations in unit costs are primarily explained by (i) annual vehicle kilometers of service provided, (ii) the proportion of driver's hours which are paid compared to being supplied at no cost to the project, and (iii) cost efficiency (i.e. revenue capacity kilometers per total annual recurrent costs). Together with dichotomous variables defining the type of vehicle (designed to allow for the average influence of unobserved vehicle specific effects), these factors were found to explain 86 percent of the

Table 1 Total Cost per Vehicle Kilometer by Mode.[a][b]

	Minibus	Project car		Volunteer car	Charter bus
		paid driver	volunteer driver[c]		
Metropolitan 1	$4.97	na	na	na	na
Metropolitan 2	$1.26	$1.46	$0.68	$0.96	na
Metropolitan 3	$3.39	$3.10	$1.57	$1.92	na
Metropolitan 4	$1.09	na	na	$0.63	na
Non-metropolitan 1	$1.08	na	na	$0.88	$1.30*
Non-metropolitan 2	$3.06	na	na	$1.89	$1.14**
Non-metropolitan 3	na	na	$0.35	$0.32	na
Non-metropolitan 4	$1.82	$0.97	$0.69	$0.80	na

* Example given of one charter bus service for that project
** Example given of one charter bus service for that project
(a) the total cost for each mode includes the vehicle running costs fuel, maintenance, registration, insurance and depreciation, administration staff labor costs, driver labor costs where applicable, and overhead costs such as rent, telephone and office expenses.
(b) administration costs were allocated to each mode as a proportion of the total vehicle kilometers.
(c) assumes that all driver services are voluntary

Table 2: Average Cost Items per Vehicle Kilometer by Mode

	Minibus	Project car		Volunteer car
		paid driver	volunteer driver[c]	
Average total cost	$2.38	$1.84	$0.82(a)	$1.06
Average vehicle running cost (b)	$0.65	$0.18(c)	$0.18(c)	0
Average administrative cost (d)	$0.94	$0.64(e)	(e)	$0.67
Average driver labor costs	$0.77	$0.86	0(f)	$0.35

(a) based on costs of all projects with a project car assuming no paid driver
(b) includes fuel, maintenance, registration, insurance and depreciation, where applicable.
(c) average cost for all projects with a project car as this does not vary with paid or volunteer driver.
(d) includes administration staff labor costs and overhead costs such as rent, telephone and office expenses. Administration costs were allocated to each mode as a proportion of the total vehicle kilometers.
(e) average administration costs for all projects in the sample with a project car. It was not possible to obtain a reliable separate average for administrative costs distinguishing between paid and volunteer driver.
(f) assumes no payments are made to volunteer drivers of project cars, in some cases minimal payments are made to cover expenses.

variation in the unit costs across the sample. The parameter estimates of the model are given in Table 3.

To understand the relationship between unit cost per vehicle kilometer and total kilometers supplied for each service model, we have simulated the relationship between unit cost and vehicle kilometers over a range of kilometers currently observed within the sample of vehicles studied. The range is very large, from

Table 3 The Sources of Influence on the Cost per Vehicle Kilometer of Service Provision

Explanatory variable	Estimated parameter	t statistic
Constant	4.22436	5.81
Minibus specific effect	-1.14034	-1.53
Project car specific effect	-1.50568	-1.95
Volunteer car specific effect	-1.19880	-1.62
Log (annual vehicle kilometers)	-0.35259	-2.18
Proportion of driver hours paid	1.23978	3.04
Cost efficiency index	-0.041825	-1.92
Overall explanatory power (r-squared)		0.86

less than 1,000 kilometers to over 100,000 kilometers per annum. The results, which are summarized in Table 4 and graphed in Figure 1, illustrate how the cost per vehicle kilometer varies with the number of kilometers of service provided by each mode.

Columns 2 to 6 are derived by applying the average unit cost derived by the model of the sample of vehicles studied to the range of annual vehicle kilometers shown in the first column. For the project cars, we have evaluated the costs depending on whether the car is driven entirely by paid labor (column 3) or by volunteer labor (column 4). The taxi column is derived from a separate analysis of the sample of projects using volunteer cars, which responded to a survey on the use of volunteer drivers by projects, which was also conducted as part of this study. Assuming that the same number of kilometers had been provided using a taxi service, rather than volunteer cars, we estimated the total cost of that service by applying the taxi fare per kilometer and making some assumptions about the administration costs of arranging taxi services. It is assumed that the project meets 50 percent of the taxi fare for the client with the client meeting the other 50 percent.

Figure 1 shows the declining unit cost per kilometer as the number of kilometers increases for each mode. It indicates that the mini-bus is the most expensive form of transport on a per kilometer costing over the full range of kilometers shown. With all project car drivers paid at the current wage rates, the project car is the next most expensive mode on a per kilometer basis. However, when the project car is driven by volunteer labor, the project car competes favorably with the volunteer car service. On these statistics, the taxi is the cheapest form of transport up to about 20,000 kilometers. The initial establishment costs for the other modes and the higher overhead costs make them all more expensive per kilometer than taxis if only a limited number of kilometers is provided. However, as the number of kilometers increases, volunteer car services, project owned cars driven by volunteer drivers, and charter bus services compete more favorably.

However, reliance on unit costs per kilometer can be quite misleading as a basis for making decisions on the optimal mix of service modes as these figures do not take into account the size of the group requiring transport. On a cost per passenger basis, the larger vehicles, the minibus, and the charter bus, are much more attractive than the project car and the volunteer car. This suggests that there may be an argument in favor of the minibus, which is able to cater for a range of group sizes up to the full seat capacity of the bus and also can take a substantial number of "individual transports" at other times.

Table 4 Relationship between Vehicle Type, Unit Cost, and Vehicle Kilometers (a)

VKM per annum	Total costs per vehicle kilometer (b)					
	Mini bus	Project car		Volunteer car	Charter Bus	Taxi Service
		Paid labor	Vol. labor			
2000	$3.09	$4.02	$1.16	$1.01	$2.17	$0.67
5000	$3.35	$3.04	$0.88	$1.09	$2.35	$0.63
10000	$3.19	$2.46	$0.71	$1.04	$2.24	$0.60
20000	$2.77	$1.99	$0.58	$0.90	$1.94	$0.57
30000	$2.43	$1.76	$0.51	$0.80	$1.71	$0.55
40000	$2.18	$1.61	$0.47	$0.71	$1.53	$0.54
50000	$1.98	$1.51	$0.44	$0.65	$1.39	$0.54
60000	$1.82	$1.42	$0.41	$0.59	$1.27	$0.53
70000	$1.68	$1.36	$0.39	$0.55	$1.18	$0.53
80000	$1.56	$1.30	$0.37	$0.51	$1.10	$0.52
Average	$2.32	$2.04	$0.59	$1.01	$1.79	$0.58

(a) The figures in this table are derived by taking the average total cost per vehicle kilometer as derived by the unit cost model for each mode and calculating the total cost per vehicle kilometer over a range of kilometers.

(b) The total cost for each mode includes the vehicle running costs fuel, maintenance, registration, insurance and depreciation, administration staff labor costs, driver labor costs where applicable, and overhead costs such as rent, telephone and office expenses.

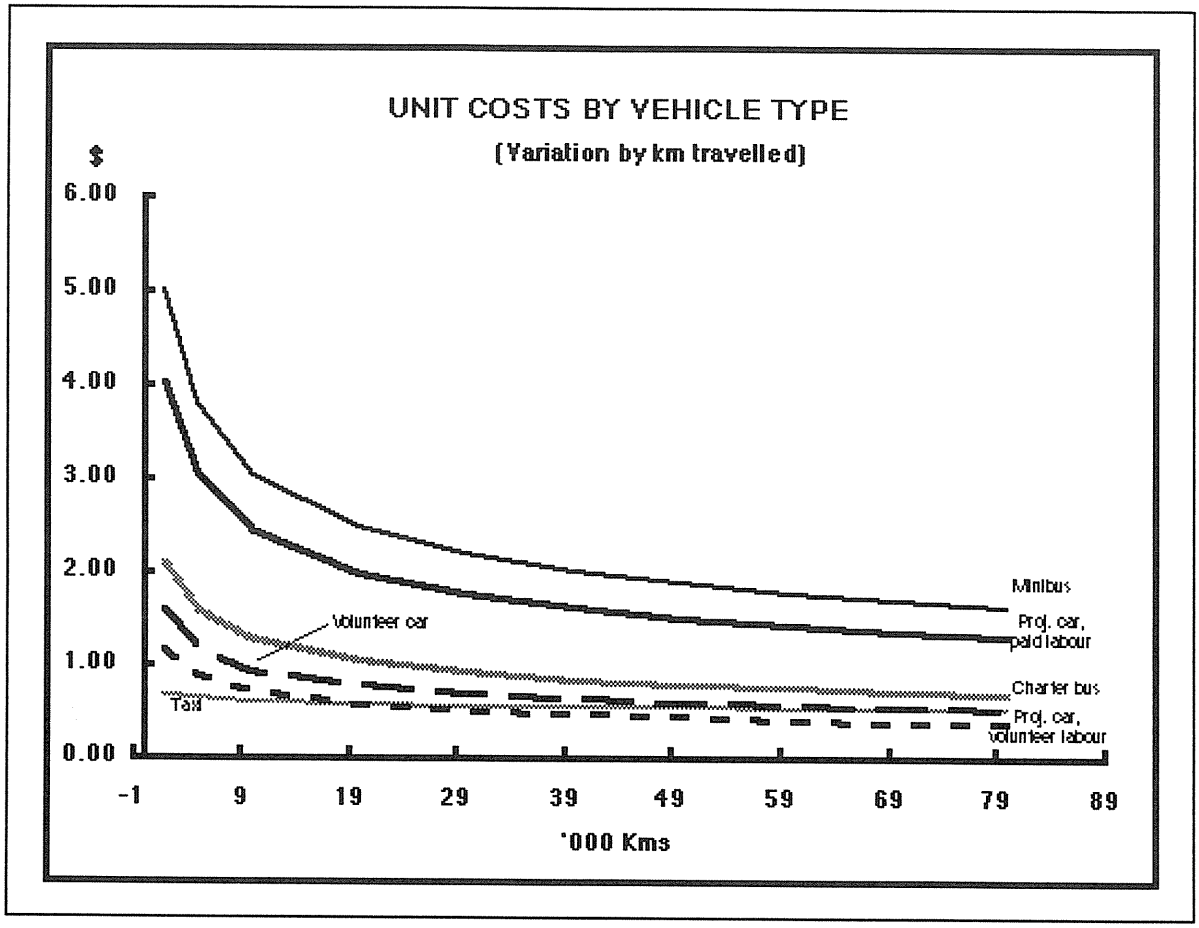
(c) The average cost per vehicle kilometer for a taxi service was calculated by using the responses to the volunteer drivers survey. Assuming that the kilometers provided by volunteers had been provided by taxis, the cost of the taxi trips was calculated using the taxi fare per kilometer, the booking and call charge per trip and an allocation of administration costs at a rate of 25% of that for volunteer car services. These are the costs per kilometer to the project of providing a taxi service assuming that the client pays 50% of the taxi fare.

To illustrate the relationship between group size and the cost of providing a unit of service in each mode, we have developed some examples of service provision for a range of group sizes. These are summarized in Table 5 and represented graphically in Figure 2.

These figures represent the cost of providing 10 kilometers of service for the range of group sizes shown in column 1. These figures are based on the cost of providing a vehicle kilometer of service in each mode, not on the cost of a passenger kilometer of service. Thus, they do not take into account the cost of organizing each individual passenger. Also, no account has been taken of matching special disability requirements of passengers with vehicles at this stage. These considerations are discussed in the following section of the report. The project car has been calculated using all paid labor (column 3) and all voluntary labor (column 4) as in the previous table. The taxi column has also been calculated as in Table 4.

Table 5 indicates that the cost of carrying nine passengers 10 kilometers in a minibus is $23.20 compared

Figure 1

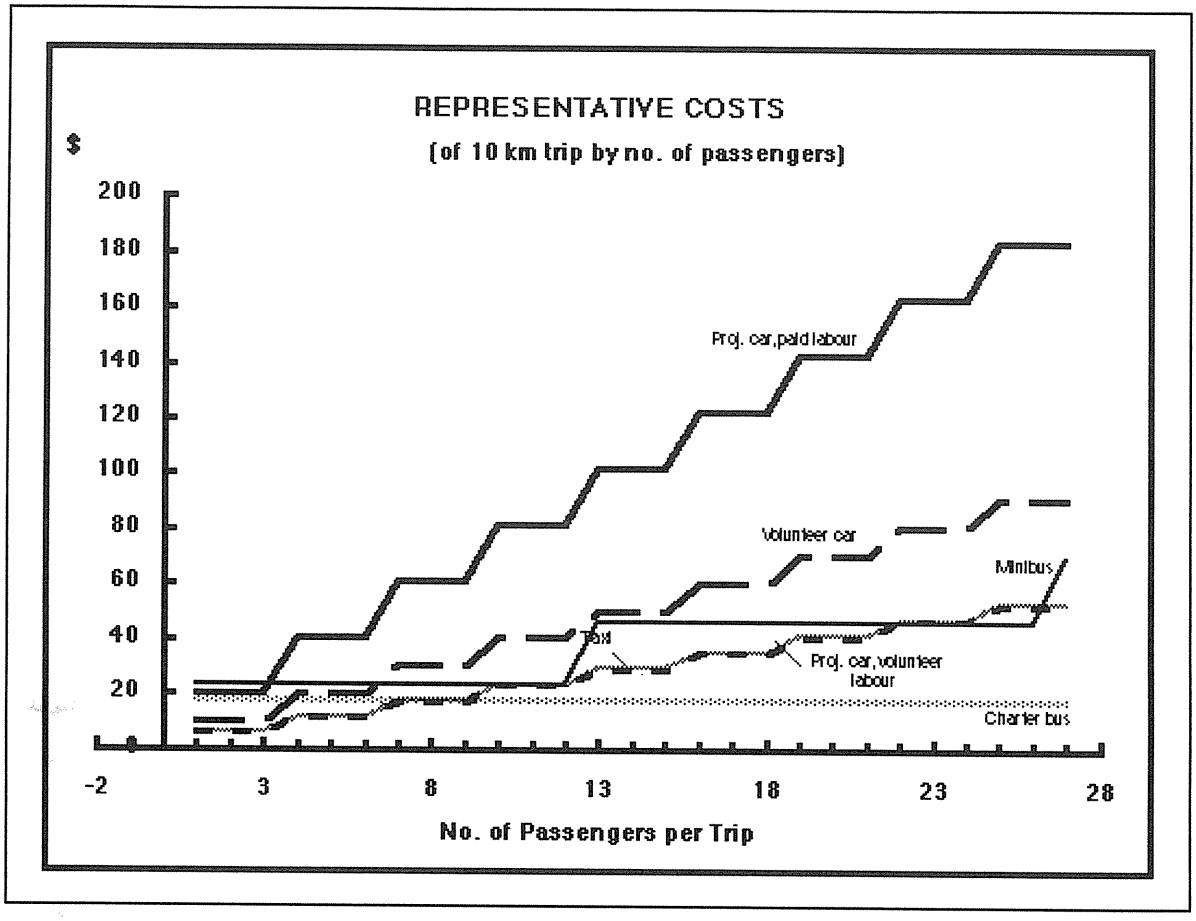


with $61.20 in a project car with paid labor, $17.72 in a project car with voluntary labor, $30.30 in a volunteer's car, $17.90 in a charter bus service, and $17.49 in a taxi. The project car driven by volunteer labor is marginally less expensive than the taxi. However, with 10 passengers, the charter bus becomes the least expensive form of transport with the minibus costing the same as the volunteer driver scheme and project owned car driven by volunteer drivers. When the minibus has a full passenger load (at 10 to 12 passengers and two buses at 22 to 24 passengers), it is also as cost effective as the volunteer driver scheme and the project owned car using volunteer drivers.

The charter bus service figures have been included in this analysis even though they are an optional mode only for those projects receiving community transport funding for the wider population defined as transport disadvantaged, rather than just for the aged and those with disabilities. Although it is not an appropriate form of transport for the frail aged and disabled, the above figures suggest that wherever the client group allows, the charter bus services as negotiated at these rates by the surveyed projects provided a cost effective means of servicing those clients.

When comparing volunteer cars and project cars driven by volunteer drivers with minibuses, Table 5 shows that the cars are more cost effective up to about nine persons (requiring three cars), but for larger groups the minibus is more cost effective. This is an important point in the long term view of the arrangement of services. It demonstrates that, wherever demand allows, arrangements should be made to group individual transports into the larger vehicle. However, unless the minibus is to be used to transport more than nine persons for at least the majority of trips, it is, perhaps, a better proposition to use three

Figure 2



cars. Although there may be higher administration costs associated with the organization of three separate vehicles, this may be offset by the flexibility which three vehicles provides in allowing a higher level of service if there are competing demands for trips in opposite directions.

Using a vehicle to its maximum capacity is more cost effective, because of avoidable costs associated with the purchase (or non-purchase) of the vehicle. That is, the majority of costs are directly related to the number of vehicle kilometers with the exception of vehicle depreciation for minibuses, which is a function of vehicle age. These costs are incurred if a vehicle is purchased regardless of vehicle kilometers.

Table 5 also shows that if volunteer drivers are used for project cars, then the cost of using project cars is considerably lower than using volunteer cars. We need to recognize that volunteer drivers using their own car are reimbursed for a fixed sum per kilometer to cover the running cost of their own vehicle. There is no set rate at which community transport projects are directed to reimburse volunteers for the use of their vehicles. Each project negotiates a rate with their own drivers. However, if that rate of reimbursement is greater than the running cost per kilometer of using a project owned vehicle, a zero-labor costed project car is less expensive than the volunteer car. The average cost per kilometer from the sample of running a project car was 41 cents per kilometer, thus a project is no better or worse off on a cost basis if it uses a project owned car or volunteer car reimbursed at the rate of 40 cents per km.

Table 5: Relationship between Group Size and the Cost of a 10km Trip (a)(b)

Group size	Minibus (13 seats)	Project Car		Volunteer Car	Charter Bus	Taxi Service
		Paid Labor	Vol. Labor			
	$	$	$	$	$	$(c)
1	23.20	20.40	5.91	10.10	17.90	5.83
2	23.20	20.40	5.91	10.10	17.90	5.83
3	23.20	20.40	5.91	10.10	17.90	5.83
4	23.20	40.80	11.81	20.20	17.90	11.66
5	23.20	40.80	11.81	20.20	17.90	11.66
6	23.20	40.80	11.81	20.20	17.90	11.66
7	23.20	61.20	17.72	30.30	17.90	17.49
8	23.20	61.20	17.72	30.30	17.90	17.49
9	23.20	61.20	17.72	30.30	17.90	17.49
10	23.20	81.60	23.63	40.40	17.90	23.32
11	23.20	81.60	23.63	40.40	17.90	23.32
12	23.20	81.60	23.63	40.40	17.90	23.32
13	46.40	102.00	29.54	50.50	17.90	29.12
14	46.40	102.00	29.54	50.50	17.90	29.12
15	46.40	102.00	29.54	50.50	17.90	29.12
16	46.40	122.40	35.45	60.60	17.90	34.98
17	46.40	122.40	35.45	60.60	17.90	34.98
18	46.40	122.40	35.45	60.60	17.90	34.98
19	46.40	142.80	41.36	70.70	17.90	40.81
20	46.40	142.80	41.36	70.70	17.90	40.81
21	46.40	142.80	41.36	70.70	17.90	40.81
22	46.40	163.20	42.27	80.80	17.90	46.64
23	46.40	163.20	42.27	80.80	17.90	46.64
24	46.40	163.20	42.27	80.80	17.90	46.64
25	46.40	183.60	53.18	90.90	17.90	52.47
26	46.40	183.60	53.18	90.90	17.90	52.47
27	69.60	1g83.60	53.18	90.90	17.90	52.47

(a) The figures in this table are calculated by taking the average cost per vehicle kilometer for each mode over a range of kilometers (as generated by the unit cost model and given in Table 3) and multiplying it by 10 kms to give the total cost of a 10 km trip. Assumptions have been made about the carrying capacity of each vehicle so that the cost of carrying a range of group sizes, as given in column 1, can be calculated. The total cost per vehicle kilometer is calculated as outlined in Table 3 note (b).

(b) The cost of the 10 km trip is based on the vehicle kilometer cost per mode not on the passenger kilometer cost i.e. it does not take account of the cost of organizing each individual passenger.

(c) The taxi service costs are based on the same assumptions as outlined in Table 3 note (c).

Performance indicators

In the above analysis, we have taken the unit cost per vehicle kilometer for the sample of vehicles studied to simulate some cost scenarios over a range of kilometers and group sizes for the various service models

to provide information to determine the optimum mix of vehicles given a project's service requirements.

Total cost per vehicle kilometer is just one of a number of performance measures used by private and public transit operators as the basis of monitoring performance and in providing suggestions on the nature of changes that are likely to improve the cost efficiency of service supply. Without entering the debate on how one should select suitable measures of performance, there are now a number of generally accepted partial indicators of performance. Table 6 summarizes some of the most useful measures for the State Transit Authority (STA), the private bus industry (Bus and Coach Association, BCA), and for each of the four service models in the sample of community transport projects surveyed. Some indicators are not available for all operators.

Within the set of community transport service models there is no one unambiguously preferable service mode an all performance measures, although the charter bus services tended to perform best on the majority of indicators. Interestingly, on current charging practices, charter bus has the highest revenue per vehicle kilometer, whereas the project car generates the greatest revenue per passenger. The volunteer car is the least expensive on a cost per vehicle kilometer basis. Currently one observes the highest number of passengers per seat kilometer from volunteer cars, although the charter buses carried the greatest number of passengers per vehicle kilometer.

In interpreting these performance measures, we have to recognize that the statistics reflect the existing patterns of utilization and fare charging of each service type rather than representing some inherently permanent pattern of utilization and fares. These patterns condition the nature of unit costs. Nevertheless, the differences are sufficiently distinct to provide a basis for establishing trends in respect of relative costs and service performance.

It could be argued that comparison of community transport performance indicators with those of the mainstream public and private bus operators is not realistic because of the special nature of their target passenger group. If community transport projects want to monitor the efficiency of their transport services, they should be aware of the use of performance indicators in other sectors of the industry. They are, indeed, a valid basis of comparison between projects. In the US, performance indicators are used to monitor the efficiency of projects and to provide guidelines for funding approvals (See US Department of Transport 1989). The indicators in the above table are developed from a small sample of operators studied in this project. As such, they can be used only as a guide to typical costs currently experienced which will of course vary with local conditions. The ease of collection of the data from the projects on which these figures were based varied depending on the records kept by the project. There appear to be no standard guidelines as to the format of data records by projects. It is suggested that consideration be given to the development of a standard model of data collection, which would allow generation of performance measures to assist the project and the funding authority.

Quality of Service Provision

Although an appreciation of the unit costs of providing services is important when determining funding priorities, the quality of service provided by each type of service mode is also an important consideration. This is especially so given the frail and/or special medical requirements of many clients of community transport services.

The minibus, which has been shown to be most cost effective for group travel (although not a very comfortable vehicle particularly for frail, elderly passengers) provides adequate transport over short distances for the not so frail client. When equipped with a wheelchair hoist, it is the most accessible vehicle for wheelchair clients who are not able to transfer from their chair to a car. The hoist also assists

Table 6 Performance Measures: A Comparison across Service Suppliers

Indicator	BCA	STA	Community Transport			Charter Bus
			Minibus	Project Car	Volunteer Car	
Revenue/vkm	$2.09	$3.38	$0.38	$0.31	$0.16	$0.93
Revenue/pass	$0.86	$1.50	$1.51	$8.89	$4.37	$3.22
Revenue/total cost	1.08	0.98	0.17	0.39	0.21	0.62
Total cost/vkm	$2.01	$3.54	$2.32	$1.24	$1.01	$1.79
% Total cost						
labor	47.4%	50.0%	74.0%	74.0%	65.3%	—
fuel	11.4%	7.3%	6.3%	18.7%	—	—
maintenance	7.8%	10.0%	5.2%	4.5%	—	—
Total cost/seat km	$0.03	—	$0.16	$0.31	$0.25	$0.04
Total cost/pass	—	—	$9.00	$27.50	$25.00	$4.96
Cost efficiency	40.40	—	9.99	6.32	6.06	30.00
Pass/seat km	—	—	0.27	0.44	0.52	0.35
Pass/vkm	—	—	3.85	1.77	2.07	1.56
Total cost/passkm	—	—	$0.84	$0.88	$0.93	$0.36

clients who have difficulty negotiating the steps onto the vehicle. The best level of service using the minibus was provided with a paid professional driver accompanied by a volunteer carer. The services of the carer are important in assisting with the loading of clients, particularly those in wheelchairs. This reduces the wait time for clients in picking up and dropping off other passengers and also in generally relieving the stress on the driver of caring for clients.

The most comfortable form of transport for the aged client is the car. A high level of quality of service is provided both by paid drivers in project owned cars and by volunteer drivers in their own or project owned cars. Volunteers, in general, provide a very good level of service, which goes beyond just providing transport. Often volunteers undertake other tasks for clients and/or accompany them to medical appointments providing support and companionship.

Although the value of volunteer services to community transport projects cannot be underestimated, the extent of services that can be provided in this manner is limited in most areas. A survey, which was conducted of volunteer driver schemes, revealed that most projects have difficulty finding enough volunteers to fulfil the demands on the project. In some areas, volunteers are not available at all. The increase in health related transport has also increased the responsibility placed on volunteers in the transport of sick clients who may require varying degrees of medical attention.

Taxi services are not available in all areas, particularly in non-metropolitan projects. Where they are available, taxi drivers may not necessarily be willing to undertake the long trips required to medical services or provide the level of service that is appropriate for elderly or disabled clients. Taxi services are used successfully in some metropolitan projects where a good working relationship has been established with the local taxi company. If more taxi companies were able to improve the quality of service provided by drivers, perhaps they could play a greater role in providing transport for the target population.

The high cost of taxi services to the user, even when subsidized by the community transport projects, puts them beyond the budget of most of the target population if regular, particularly long distance, trips are required.

Servicing the Transport Disadvantaged Market

The community transport projects have evolved to provide service for the transport disadvantaged. However, the "transport disadvantaged" market is rarely precisely defined. Even where definitions are proposed, for example, as a means of funding targets, in practice they are not always strictly adhered to. Those generally considered to be transport disadvantaged include the elderly, women with young children, those people with physical disabilities, low income earners, and those who do not have access to a private vehicle. However, these groups of people are not necessarily always transport disadvantage due to some inherent personal characteristic. In some cases, their access to public transport is disadvantaged as a result of some feature of the public transport system on offering.

These groups can be rendered transport disadvantaged because of their inability to use the current mainstream public transport system which may be due to physical constraints such as their own impaired physical mobility exacerbated by the physical design of the public transport vehicles and/or facilities or physical distance from the transport service. It is the responsibility of the transport provider to reduce or eliminate as much as possible these transport disadvantaging factors within the constraints of profitable service provision. It is suggested that there is scope for existing operators, both public and private, to improve their service design in terms of frequencies and route structures as well as in the types of vehicles used to reduce the disadvantaging influence of physical barriers to transport use. Already in NSW, innovative services using smaller vehicles at higher frequencies and, in one instance, incorporating "demand response services" are being trialled. Designing services with these needs in mind, rather than putting service patterns in place and expecting the travelling public to design their transport needs around them, can be advantageous to the operator by generating increased patronage and revenue and to the travelling public by increasing the accessibility of services.

The principle of allocative efficiency requires that transportation services are marginally cost-priced and that those who can afford to pay the true marginal costs are required to do so directly. Subsidies are most efficiently provided directly to those who are unable to pay on a marginal cost pricing basis. Although this rule may not be fully observed in the mainstream bus industry, services are run with the goal of cost recovery with direct user side subsidies to low income groups through fare reimbursements.

On the other hand, the community transport services are allocated on the basis of perceived need without necessarily taking into account the client's ability or inability to pay. It was observed in the course of this study, and this finding is consistent with similar research into community transport service provision in the U.K. (Cassidy and McGuinness 1993), that, although there are broad guidelines for eligibility of community transport clients set by the funding authorities, the eligibility of clients and the allocation of services is determined by the project co-ordinator. It was reported by Cassidy and McGuinness and was also apparent from our work that "central to the development of individual CTs has been the role of the founder and/or Co-ordinator of those organizations. Our evidence has shown that the organization often reflects the ideals of this key individual. These ideals are instrumental in determining policy direction, operational criteria and ultimately who the beneficiaries of those transport services will be."

The co-ordinator has the power not only to allocate services but also to set the charges for those services. It was apparent from the survey of projects undertaken that these charges were not set with the goal of cost recovery. Compare the figures for revenue per vkm and revenue per total cost for the community transport modes with those of the private bus industry and even those of the public sector as shown in

Table 6. In most cases, "fares" were set at an arbitrary level at what was considered "reasonable" and in one case on the basis of requesting donations, which elicited very small contributions. The subsidy which is inherent in providing the community transport service is thus not necessarily allocated on the basis of inability to pay but on a perceived need as service is requested.

In terms of organizing services, the community transport projects considered each request on its merits. With the growing demand for requests for "individual transport" being directed to the projects, particularly for medical appointments, this resulted in a difficult problem of allocating scarce resources by the project to meet these demands. The underlying cause of this problem is that assessing each request on its merits inevitably resulted in an unpredictable trip profile for the organization which was only capable of fulfilling a limited number of the demands placed on it. Only some projects were looking at the possibilities of streamlining these requests into a more predictable service pattern, possibly allowing the use of more cost effective larger size vehicles. However, community transport projects have their roots in, and are most likely to always have more affinity with, community service providers than with public transport operators. Hence given their current brief, it is unlikely that they would be comfortable or willing to move towards a more professional cost orientated level of service provision.

The advantage of the mainstream public transport system over the community transport sector is its ability to achieve greater overall allocative efficiency. Thus there is an onus on the planners of public transport services to encourage the maximization of service provision by the mainstream industry. This opportunity has been provided within the framework of the 1990 Passenger Transport Act in NSW. It is now the responsibility of each operator to maximize that opportunity. One approach to achieving this goal is for greater co-operative effort between the bus operators and the community transport projects. The community transport workers are often more aware of transport needs in the local community and could provide the possibility of acting as a catalyst for the commencement of services which could then be incorporated into the commercial network of the private bus operator. This, however, requires a co-operative, rather than a competitive or antagonistic, relationship as has existed in the main to date between the two parties.

There will always by a group in the population who are unable to be accommodated in the mainstream services either due to low income or physical disability. The U.S. has adopted a equitable accessibility policy with the introduction of the Disabilities Act (ADA) 1990, which requires that all new transport facilities and all newly manufactured buses and rail carriages must be made accessible to the physically and mentally impaired. While these are laudable requirements in terms of anti-discrimination, the impact of the cost of providing such accessible vehicles, particularly to the private bus industry as well as the increased operating costs and costs to other users as a result of delay time due to boarding and accommodating such passengers, must be considered.

Excessive capital and operating costs incurred by the operators in providing such an equitable level of accessibility may be such that a subsidy is required to allow the continued operation of services. The additional delay costs incurred by other users may be such that they are discouraged from using public transport either choosing the private car, if that is an alternative, reducing the number of trips made or turning to the community transport sector and thus increasing the already excessive burden on their limited resource base. Each of these scenarios moves against the goal of providing a more accessible cost effective public transport system which can become, wherever possible, a viable alternative to the private car. Perhaps a more effective solution is to streamline the community transport system to providing a viable paratransit service for those people who are truly unable to be accommodated in the mainstream system. This would mean that eligibility requirements would have to be tightened and more professional service planning practices implemented.

Conclusion

The data that we collected on the cost of service provision by community transport projects shows a very marked variation in those service costs depending on the practices of the individual project. However, when full cost allocation is undertaken, which includes a labor cost for the use of voluntary services, the cost of providing a vehicle kilometer of service is considerably higher than that in the private bus industry. It should also be noted that the pricing policies, due to the nature of the projects as community service providers, are not based on cost recovery principles. Services are allocated according to perceived need and thus the subsidy, which is inherent in the provision of the service, is not necessarily allocated according to inability to pay.

To achieve higher allocative efficiency in public transport service provision, the number of passengers that can be accommodated in the mainstream services has to be maximized. This will only be achieved if the operators of these services are able to design their services which most adequately meet the needs of their market, thus reducing wherever possible the population which can be categorized as "transport disadvantaged." It is then suggested that the role of the community transport projects is to provide a paratransit service for those passengers who, mainly due to physical disability, cannot be adequately accommodated in the mainstream services. As the proportion of the aged population in Australia is growing rapidly, with the increased propensity for physical disability and thus special transport requirements, it is imperative that planning is undertaken to provide transport services that are adequate for this sector of the population while also encouraging the growth of a viable mainstream public transport industry.

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