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DRT schemes in England and Wales and considerations for their future

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INTRODUCTION

DRT *'provides transport "on demand" from passengers using fleets of vehicles scheduled to pick up and drop off people in accordance with their needs'* (Mageean and Nelson, 2003, p.255). DRT has also been seen as *'an intermediate form of public transport, somewhere between a regular service route that uses small low floor buses and variably routed highly personalised transport services offered by taxis'* (Brake *et al*, 2004, p. 324). As such DRT can essentially be defined as an intermediate and highly flexible mode of transportation giving rise to a wide variety of uses.

Numerous DRT services operate in the UK, however their future is uncertain as funding streams are in the main coming to an end. Some schemes have already ceased operating whilst others are thriving. As such, it is opportune to take stock of how DRT schemes are performing and what they are doing in order to discern a future strategy for DRT.

The aim of this paper is to investigate the current situation with respect to publicly funded DRT schemes in England and Wales. Specifically it investigates how and why DRT schemes have been established, including data on their design and operation, the reasons for scheme implementation and their objectives. Finally it considers the current performance of DRT schemes and the likely future of such schemes.

The section below provides a brief summary of the DRT literature followed by an outline of the method used to collect the data. This consisted of a survey which was sent to a carefully selected number of local authorities who administer DRT schemes. The findings from this survey are then presented and finally conclusions are developed in terms of the way forward.

LITERATURE

There are a number of reasons why DRT has become an increasingly popular transport tool in recent years. They include an increasing dissatisfaction with conventional public transport provisions (Enoch *et al*, 2004, Mageean and Nelson, 2003), more dispersed land use patterns (Enoch *et al*, 2004), the lack of adaptability of conventional bus and taxi services (Ambrosino *et al*, 2004) and an increasing governmental interest in improved social service transport and reducing social exclusion (Ambrosino *et al*, 2004, Mageean and Nelson, 2003).

Design and Operation

There has been much discussion of the most appropriate vehicles and technology for DRT services (for example, see Palmer *et al*, 2004 and Ambrosino *et al*, 2004) and the effect of education and access to information on the success of these services (see Fitzgerald *et al*, 2000, SEU, 2003 and Lyons, 2001). By using appropriate vehicles, technology and marketing for a scheme's intended market, it is generally agreed that DRT could encourage people to use public transport.

The selection of vehicle for the DRT scheme can be an important factor in the schemes success. The vehicle needs to meet the needs of the market the DRT scheme will provide for whilst adhering to a plethora of rules and regulations (Enoch *et al*, 2004). The choice of vehicle can have a marked effect on the acceptance of the scheme by drivers and passengers (Brake *et al*, 2004). Westerlund and Stahl, (2004), state the importance of the vehicles being suitable for several uses and suggest that is why Multi Purpose Vehicles (MPV's) are often used, despite them not being ideal.

The requisite technology varies with the market being served. Vehicles with on board computers linked to call centres can cope with rescheduling much more readily than those without (Lacometti *et al*, 2004). Although beneficial in terms of increased productivity of DRT schemes, this technology is expensive.

With regard to booking, DRT schemes can be placed along a continuum from no pre-booking to total pre booking, with most lying somewhere in the middle. No pre-booking is the cheapest method as it dispenses with the need for expensive in-vehicle technologies and call centres but can lead to inefficiencies in delivery of the DRT service. Total pre-booking contains a continuum of its own, ranging from fully automated to manual. Total pre-booking by the internet, SMS (Short Messaging Service) or IVRS (Interactive Voice Recognition Systems) are preferred by operators of DRT schemes (Mageean and Nelson, 2003) as they allow for 24hr booking and are inexpensive to run. However there is some concern regarding the loss of control over bookings since in an ideal situation most people would prefer to talk to an operator (Finn *et al*, 2004). There is some evidence to suggest older members of society in particular are less likely to use internet based systems and IVRS and would prefer to talk to an operator. It is noted that a fully automated booking service is limited by the consumer preference for some form of booking confirmation, although this could be provided with an automated phone call or email (Finn *et al*, 2004). If the service planners decide 24hr booking is preferential, but they do not desire a 24hr call centre, booking requests can be left as answer phone messages or be made online. The request can then be confirmed by the dispatcher the following day (Brake *et al*, 2004).

This evidence suggests that the method of booking should be an important consideration when planning a DRT scheme. Furthermore it has been suggested by Brake *et al*, 2004, that using Travel Dispatch Centres (TDCs) to manage booking requests and route planning software can lead to further integration between public transport services.

Scheme development

DRT is seen by some as a tool that could fill the gap between a fixed route bus and a taxi in order to meet the needs of certain members of the population (Mageean and Nelson, 2003). For example Romanzzo *et al*, 2004, suggest that viable markets

exist for DRT as an alternative transport method to be harnessed at times of weak demand thus serving those who want to travel at these times. DRT can also be used as a tool to promote modal shift and increase public transport integration. There is evidence that DRT has the potential to meet the needs of niche markets, such as hospital transport (SEU, 2003). Other suggested markets include shopping, commuting and leisure (Enoch *et al*, 2004). The Scottish Executive (2006) identified four potential categories for DRT services that encompass all of the aforementioned markets: premium value services, for example airport transfers; high value to agency services, for example Joblink transport; high care needs, for example patient transport and best value public transport for example rural services. The report concluded that, in Scotland, *'there is potential for growth in all four main DRT markets: high care needs, high value to agency, best value and premium services, but to achieve this growth will require better targeting of public funding, resolution of some regulatory issues and improved joint working across sectors'* (p. 37).

There is a suggestion that DRT schemes can prove a useful tool for attaining public policy (i.e. social, economic and environmental) goals (SEU, 2003, Enoch, 2004, Scottish Executive, 2006) and that some funding programmes, for example the RBC/UBC, lead to a number of DRT schemes being set up. However there is little documentary evidence referring to this type of scheme development using Bus Challenge funding and the associated costs, benefits and effectiveness at achieving goals.

Performance

One of the major problems facing transport planners considering DRT is the high cost of designing and running such services. Rural and Urban Bus Challenge funding has been extremely useful in encouraging the establishment of DRT schemes, though it is thought by some to have encouraged innovation more than cost effective long term schemes. The future is still uncertain for many DRT schemes established under Bus Challenge funding (Enoch *et al*, 2004).

The literature provides little detail on the factors that lead to the success or otherwise of DRT schemes, one exception is a report commissioned by GMPTE (2005) regarding their Local Link schemes. They suggested that the issues key to success were 'an objectives led approach, more targeted marketing and publicity, improvements to the booking service, more integrated ticketing and multi journey fares and better customer care' (p.88).

In order to address some of these gaps a survey was undertaken in order to gather data and to investigate some of the issues raised in the research into DRT to date. This paper focuses on DRT schemes operating in the public sector in England and Wales primarily because the research to date indicates that this sector is currently undergoing major changes in contrast to much of the previous literature in the field which documents highly technical aspects of DRT services.

THE DRT SURVEY

The contact details for the DRT schemes were obtained from a list of registered flexibly routed bus services operating in the UK provided by the

Department for Transport (DfT). The respondents to the survey were Local Authority officers with responsibility for at least one DRT scheme. The survey was sent to thirty six local authorities responsible for a total of ninety nine registered schemes and the initial responses indicated that some of these schemes had ceased to exist since the DfT had produced the initial list and also that some of the registered schemes were multiple services within a single scheme rather than entities themselves. A total of forty eight questionnaires were returned from twenty eight local authorities.

The schemes were spread across seven of the English regions with one scheme in Wales. Four of the schemes operated in the East of England, seven in the East Midlands, two in the West Midlands, eleven in the North West, fourteen in the South West, Eight in the South East and one in Yorkshire and Humberside.

The survey was administered in December 2005 via email. Initial contact was made by telephone to obtain an email address and buy-in to the 'aim' of the survey. A period of two weeks was allowed before non-respondents were contacted again by phone or email.

The survey contained questions relating to the history of the scheme, the reasons behind the scheme, the stakeholders involved and the initial objectives. It also contained questions with respect to the operation of the scheme and the lessons learnt. The survey allowed respondents the opportunity to state the problems they had encountered with DRT and how they had been addressed.

Table 1: Scheme context

ID	Location	Scheme Age (Months)	Funding Source(s)*	Funding cessation date	Vehicles (No. of seats)	Subsidy level
1	Rural	20	RBC	2007	1 (17)	£2 - £5
2	Rural	41	RBC/LA	2003/Ongoing	5 (54)	£5+
3	Rural	41	RBC/LA	2003/Ongoing	2 (14)	£5+
4	Rural	10	RBSG/LA	March 2007/Ongoing	3 (78)	£2 - £5
5	Rural	12	RBC/Other	March 2005	4 (76)	£2 - £5
6	Rural	2	LA	Unknown	1 (16)	£5+
7	Rural	34	RBC	March 2006	1 (15)	£2 - £5
8	Rural	52	RBC/LA	April 2006/Ongoing	5	£5+
9	Rural	24	RBC/LA	Unknown	Unknown	£2 - £5
10	Rural	24	RBC/LA	Unknown	Unknown	£2 - £5
11	Rural	41	RBC	2005	1 (20)	£2 - £5
12	Rural	66	RBC	2005	2 (26)	£2 - £5
13	Rural	37	RBC	2006/7	2 (16)	£5+
14	Rural	21	RBC	2007/8	1 (16)	£5+
15	Rural	140	None	N/A	2 (42)	Breaking Even
16	Rural	17	RBC/Other	March 2006	2 (28)	£5+
17	Rural	20	RBC	July 2006	5 (160)	£5+
18	Rural	9	RBC	March 2008	2 (36)	£5+
19	Rural	3	RBC	March 2008	2 (36)	£5+
20	Rural	18	RBC	March 2007	1 (8)	£5+
21	Rural	18	RBC	March 2007	1 (33)	Unknown
22	Rural	15	RBC/LA	March 2007/Ongoing	1 (15)	£5+

23	Rural	3	RBC/LA	March 2007/Ongoing	1 (7)	£5+
24	Rural	38	LA	Ongoing	1 (14)	£5+
25	Rural	25	RBC/LA	March 2007/Ongoing	1	£5+
26	Rural	63	RBC	Ceased	4 (56)	£5+
27	Rural, Suburban	16	RBSG	March 2007	1 (16)	£5+
28	Rural, Suburban	3	LA	Unknown	1 (24)	£2 - £5
29	Rural, Suburban	24	RBC/Other	March 2007/Ongoing	1 (13)	£2 - £5
30	Rural, Suburban	85	RBC/Other	March 2007/Ongoing	6 (86)	£2 - £5
31	Rural, Urban	33	RBC/LA	Unknown	Unknown	£2 - £5
32	Rural, Urban	54	RBC	March 2006	4 (73)	£2 - £5
33	Rural, Urban, Suburban	2	UBC/LA	September 2007/Ongoing	1 (14)	£0 - £2
34	Rural, Urban, Suburban	13	UBC	January 2007	1 (16)	£5+
35	Rural, Urban, Suburban	72	RBSG/LA	Ongoing	10	£5+
36	Rural, Urban, Suburban	26	DfT/LA/Other	March 2005/Ongoing	10 (152)	£2 - £5
37	Urban	26	UBC	August 2006	1	£5+
38	Urban	8	UBC/LA	April 2007/Ongoing	1 (12)	£5+
39	Urban	31	UBC	May 2006	3 (22)	£2 - £5
40	Urban	328	UBC/LA	Unknown	2 (20)	£5+
41	Urban	30	UBC	November 2005	2 (30)	£2 - £5
42	Urban	32	Other	Ongoing	6 (84)	£2 - £5
43	Urban	37	UBC/LA	Ceased	5 (56)	£2 - £5
44	Urban, Suburban	38	UBC	October 2004	4 (32)	£2 - £5
45	Urban, Suburban	12	UBC/LA	July 2006/Ongoing	1 (7)	£2 - £5
46	Urban, Suburban	10	UBC/LA	March 2007/Ongoing	2 (24)	£5+
47	Urban, Suburban	12	UBC	December 2004	4 (52)	£2 - £5
48	Urban, Suburban	9	UBC	March 2008	2 (36)	£5+

*RBC: Rural Bus Challenge, UBC: Urban Bus Challenge, LA: Local Authority, RBSG: Rural Bus Subsidy Grant

Design and Operation

Table 1 lists contextual information with respect to the schemes. The schemes are numbered in order to protect the identity of the respondents and to enable the attribution of quotations during the analysis.

Funding

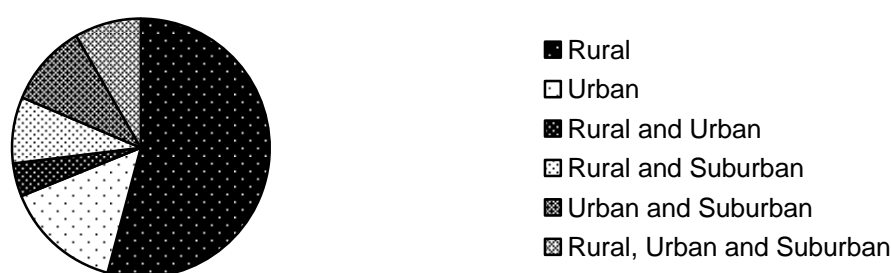
For the majority of scheme's funding came from the local authority or RBC/UBC grants and in a number of cases a combination of Local Authority and RBC. The 'Other' category included money from beneficiaries of the service, for example employers and, in one case, a Rural Enterprise Partnership. Many of the schemes' funding was due to cease in 2007 or earlier and only a small proportion had secured funding (usually from the local authority following cessation of the original funding).

The results in Table 1 reinforce Enoch *et al*, 2004 which stated that Rural and Urban Bus Challenge grants had funded many DRT schemes.

Geography

Most of the schemes that responded operated in rural or semi rural areas. Twenty six of the forty eight respondents questioned classified their schemes as operating in rural areas with seven classifying themselves as operating in urban areas and fifteen operating in a combination of area types. Figure 1 shows the split in more detail.

Figure 1: Geographical definition of area



Route and schedule

The survey identified three different types of DRT route: fully flexible; semi flexible; and fixed and flexible. Those that were fixed and flexible were generally time (demand) dependent, operating on a flexible basis off peak and a fixed basis when demand was higher at peak times. The semi flexible services often had fixed routes in busier areas and flexible sections off route in areas of lesser demand.

Six of the seven urban schemes had fully flexible routes. Fourteen of the twenty six rural schemes had fully flexible routes with a further eight having semi flexible routes. Of the remaining four, three had fixed routes at peak times and one had a flexible route a peak times.

The respondents were asked to state whether the scheme operated on an ‘on demand’ (runs only if there are bookings) or ‘scheduled’ (runs route regardless of bookings) basis. Thirteen of the rural schemes operated on an on demand basis, five on a scheduled basis and eight had route sections that operated with a combination of both. Of the urban schemes six operated on demand and one on a scheduled basis. Of the remaining schemes three operated on a scheduled basis, six on an on demand basis and six used a combination of both.

One of the schemes that did not run in a fully flexible way operated on an on demand basis. Seven of the remaining twenty operated on a scheduled basis with the final thirteen using a combination.

Operating Hours

Most of the schemes operated over six days during the daytime and evening. A few exceptions operated on a Sunday or 24 hours a day. Fourteen of the forty three schemes that gave their operating hours operated for between 41 and 60 hours per week with 61 – 80 hours per week also being common operating hours. Four schemes operated for in excess of 120 hours.

Vehicles

The fleet sizes of the schemes are displayed in Table 1. Schemes usually had 8 – 16 seat vehicles that were manufactured by Volkswagen, Mercedes or Roehill.

The most common number of seats per scheme was 11 - 20, followed by schemes with 50+ seats and 21 – 30 seats. The schemes with 50+ seats were most common in rural areas. In all seat number bands excluding 31 – 40 there was an even split between those schemes operating on a fully flexible basis and those operating on a semi flexible basis. Furthermore the majority of vehicles in each category except 31 – 40 seats were operating on an on demand basis

Most of the schemes used vehicles accessible to users with disabilities, in common with much of conventional public transport. Some of the larger schemes, those with 4+ vehicles, had a fleet of accessible and inaccessible vehicles. Thirty four of the schemes were more than 80% accessible to those with disabilities, with only three schemes being 60% or less accessible.

Technology

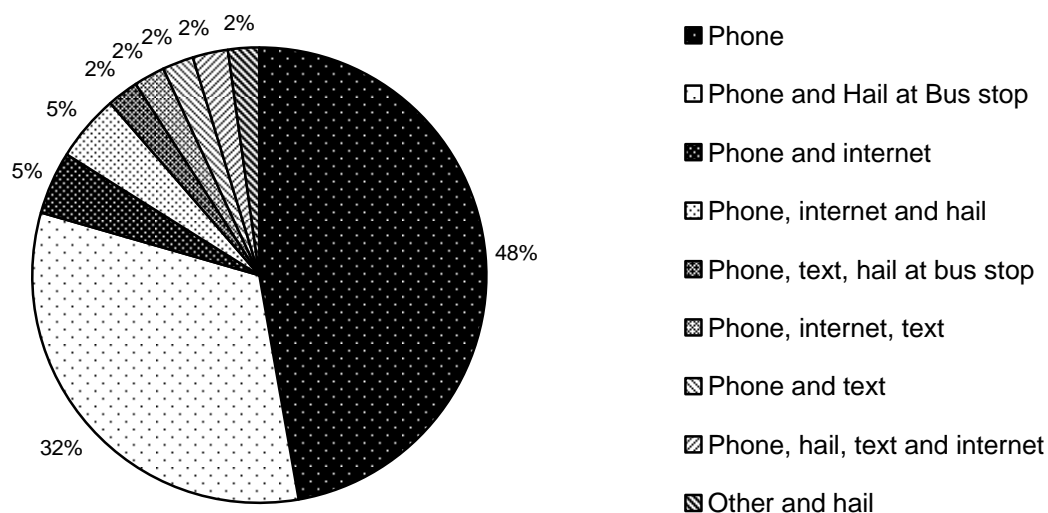
Twenty nine of the forty five schemes that responded used booking and routeing software, mainly Mobisoft with some using Trapeze or other alternatives. Approximately half of the schemes in rural areas did not use any specialist software relying on pencil and paper booking or taxi software. Of those with software, five used Mobisoft, two Trapeze and two other software. All but one of the schemes in urban areas used some kind of booking software, usually Mobisoft.

None of the schemes with 1 – 10 seats used any software. Of those schemes with 11 – 20 seats, nine of the fourteen schemes used software or some kind. Only one of the six schemes with 21 – 30 seats and eleven of the twenty four schemes with 50+ seats used software of any kind.

Schemes with fully flexible routes were more likely than those with semi flexible routes to make use of software as were those that operated on demand as opposed to any other way.

Booking

Figure 2 shows the booking options the DRT schemes offer.

Figure 2: Scheme booking options

Most of the schemes offer phone booking often with hailing at a bus stop. Text message and internet booking were not common, however fourteen of the services did have websites featuring timetables and information. Internet booking was not commonplace but a small number of schemes planned to use it in the future.

Fares

Most of the schemes had variable fares (Table 2) based both on journey length and passenger type (for example OAP, Child). The fares ranged from £0.30 for a single journey to £4.00 for a return, with one service offering a longer cross county journey priced at £12.00 for an adult return. Those services with flat fares ranged from £0.70 for a single to £5.00 for a return journey with the average being £1.00 - £1.50 for a single ticket. Less than half of the services offered a season ticket.

Table 2: Fare types

Fares	Response rate	Variable fare based on:	Season ticket offered
Flat	11	N/A	Yes: 4 No: 7
Variable	34	Journey length: 9 Passenger type: 3 Both: 22	Yes: 17 No: 17

Design and operational lessons

This section discusses the problems the respondents face and reviews what changes to the design or operation of the scheme they would make with hindsight.

Design and operation: Problem issues

The respondents highlighted a range of issues with the design and operation of the DRT schemes. These included issues with respect to users expectations such as *'some local community groups felt that it should be for their specific use and not for the general population'* (1) and *'high public expectations can make the scheme difficult to deliver, since people expect it to do everything all the time'* (30). There were also some problems with getting tender bids *'few available taxi operators in the area lead to a small choice from the tender round'* (24) and problems with technology *'initially when introducing the scheme we did not have the computer software in place in time to give us enough time to design a system'* (2). Respondents had also experienced problems with building an acceptable level of patronage, vehicle breakdowns and reliability issues, integration into an established commercial network and limitations of booking systems.

Design and operation: Changes

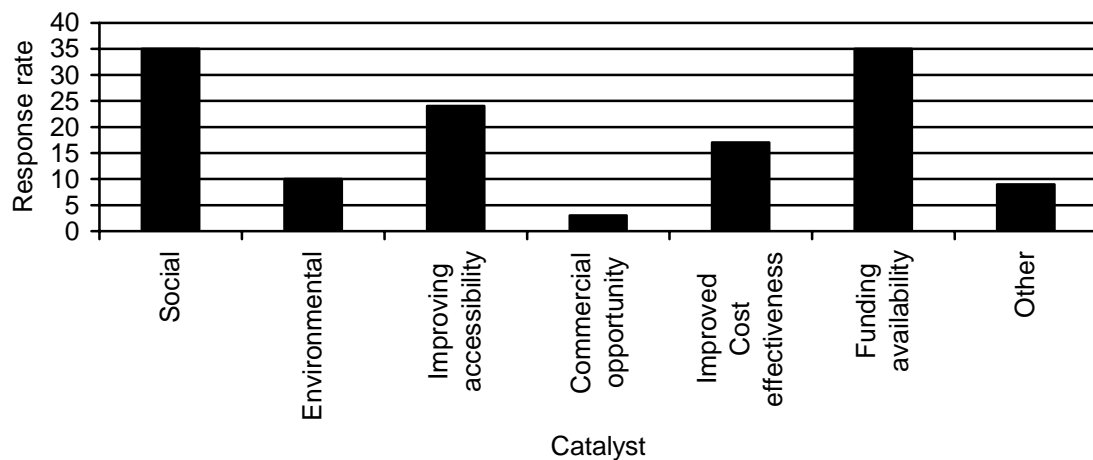
Ideas about changes to design or operation ranged from *'not much as the scheme has gone from strength to strength'* (12) to *'try something else!'* (16). However other responses were more specific and concerned elements of the design of the schemes such as *'simplify the timetable and route, promote the interchange possibilities more, make more of the scheme demand responsive, provide more localised information for each village'* (13) and *'make it far more flexible with even less timing points from the start'* (28). Others concerned issues about planning and promotion for example *'start promotion and awareness raising six months before launch'* (29), *'more meetings with rural residents in the early stages of the scheme'* (27) and *'make sure there is enough lead in time before the scheme goes operational'* (3). Finally some of the changes were in relation to the operator side of the scheme for instance *'set up in an area where more taxi operators are willing to try a service'* (25) and *'build partnership with the Taxi/PHV operators and develop a scheme with them'* (43).

The main lessons that those designing and operating DRT schemes had learnt from the process was that sufficient time and research must be undertaken at the planning stage and that the final service should not be overcomplicated and should be designed to with the intended users in mind.

Motivation for scheme implementation and scheme objectives

The respondents were asked to state what had motivated them to design and implement a DRT scheme. Figure 3 illustrates the spread of responses.

Figure 3: Motivations for establishing a DRT scheme



he respondents were able to choose multiple answers to this question and were asked to justify their responses. These justifications are explored in more detail below.

Social

Many of the respondents cited a social motivation for commencing the scheme. The qualifying reasons given for this choice were wide ranging from the all encompassing *‘to give otherwise excluded people a choice’* (1), to more specific statements, which centred on providing a travel option to reach activities and services. For example *‘provision of a transport service in order to access the supermarket, cinema etc’* (41) and *‘to provide access to services and facilities for a wide range of people’* (28). Some of the justifications centred around the type of users, for example, *‘to provide a specialised service for older shoppers’* (33). The responses illustrated that characteristics can be widely variable.

Environmental

Many of the schemes also had environmental motivations centred around reducing the use of the private car *‘to reduce the need for a second car’* (43) and *‘to aid a reduction in car usage’* (48), *‘encourage public transport usage by reducing car dependency’* (18) and *‘to encourage modal shift away from the car in an environmentally sensitive area’* (5). In a similar vein *‘to reduce car use in rural areas’* (25), *‘to encourage modal shift by serving destinations not previously covered by public transport’* (43) and *‘to encourage a shift away from the private car’* (18).

Increased accessibility

The respondents who chose this category justified their choice in a number of ways. For example *‘DRT allows for a door to door service to be offered’* (41) and allows transport to access *‘otherwise isolated residents’* (27). Furthermore it can be operated using *‘fully accessible buses’* (18) and can easily be used to provide a feeder service to *‘onward transport connections’* (25).

The flexibility offered by DRT services in relation to both scheduling and routing made some respondents believe it would improve accessibility in an area as indicated by statements such as '*DRT can operate at periods of low demand*' and '*it can offer a combination of fixed bus route at scheduled times and provide flexible demand responsive transport in between*' (3). One respondent simply stated that DRT was '*more flexible*' (43), others were more expressive. It was thought by one respondent that DRT would offer '*more flexible routes*' (14) or from another angle '*fixed route services would not give the flexibility required*' (26).

Commercial Opportunity

Three of the respondents recognised the commercial opportunity of operating the DRT service for the local area. Reasons such as '*to keep people using local shopping facilities rather than travelling further a field*' (32) and '*to promote sustainable tourism in rural areas and encourage use of local shops*' (5).

Improved Cost Effectiveness

Certain respondents were operating the services to see if it could provide the same or a better level of service than conventional transport tools for the same or reduced costs. For example '*to see if higher levels of service and flexibility can be offered for the same cost as a conventional bus*' (30) and cutting costs by using '*suitably sized vehicles to meet demand*' (43). It was also stated that DRT offered reduced costs because '*it would only travel when needed*' (12) and it could be '*integrated with special needs and schools transport*' (35). One respondent stated that it offered improved cost effectiveness because '*even a limited service each day is better than no service*' (11). It was predicted that DRT could provide a cost effective transport solution in '*deep rural areas that are not conducive to operating a conventional bus service*'. This is further illustrated by the response '*the need for a bus service to cover a large rural area that provides a cost effective service for the whole community*' (14). For some, DRT is seen as a way of making '*the most cost effective use of the available resource*' (15).

Funding Availability

The second most popular response was the availability of funding. Of the twenty six respondents who gave a qualifying statement for selecting funding availability as a motivation, twenty five mentioned either RBC or UBC in their qualifying statement. The only respondent who didn't mention RBC or UBC cited '*limited funding availability in small rural area*' (27) and was 100% funded by the Rural Bus Subsidy Grant.

Other motivations

Nine respondents cited other reasons for choosing to operate DRT. These included; '*based on our experience with other DRT services*' (1) '*to allow us to provide transport to pockets of isolation and feed into public transport through a network scheme*' (32) and because '*DRT is seen as a regeneration tool*' (46).

Three of the schemes were set up to ‘*test out DRT in the area*’ (29), for example ‘*by using a taxi based solution and to find evidence of support for an evening taxi based flexible service*’ (23). Although few of the respondents explicitly state that DRT is an experimental concept for them this is apparent in some of the responses.

The survey revealed that most DRT schemes included in this study were established for two reasons. Firstly because of the availability of funding for innovative transport solutions and secondly to impact upon social policy goals that could be influenced by improved accessibility.

Scheme objectives

Each respondent was asked to identify the objectives of their scheme, that is what the schemes was specifically set up to do, and rate to what extent the objectives were being achieved. Most of the respondents had between four and six objectives. The objectives were split into four categories: Social; Environmental; Economic; and Geographical, as seen in Table 3. The objectives have been categorised by their primary purpose, for example improving access to fresh food could be a social or economic objective. Where the objective states that the scheme aims to ‘*provide access to food shopping for older and disabled people*’ (33), the objective would be classified as social because, although the service would increase patronage of local shops this is a secondary benefit of the objective. Where the objective states that it intends to ‘*provide a service for tourists to visit the historic market town*’ (11) it would be classified as economic, although it also has social benefits for those without a car and environmental benefits by providing a more sustainable transport option for those with access to a car. This method has been used during the categorisation of all the objectives but the classifications are somewhat subjective.

Table 3: Scheme objectives

Objectives	Response rate
Social	129
Environmental	12
Economic	16
Geographical	12

Social

The majority of the objectives fitted into the social category, they range from the unspecific ‘*Promote social inclusion*’ (17), ‘*reduce rural area social exclusion*’ (23) and ‘*provide public transport for socially excluded rural residents*’ (27) to specific. Such as ‘*to use the project to forge closer links with local community groups and involve these in defining and developing the services*’ (43), ‘*to engage a community who currently have no realistic public transport*’ (32) and ‘*enhance the quality of rural life by giving greater independence to youngsters, the elderly and mobility impaired*’ (4). The majority of the social objectives related to increasing accessibility to locations that were currently inaccessible. This is illustrated by the following objectives: ‘*access to food shopping for older and disabled people*’ (33); ‘*to provide people without private transport access to jobs*’ (6) and ‘*to provide access to essential facilities for the local community*’ (18).

Environmental

Twelve schemes had some environmental objectives although none had solely environmental objectives. Examples included *'modal shift'* (21), *'sustainable transport'* (22) and *'to help address environmental problems caused by individual car ownership by providing sustainable modes'* (6). Where schemes had one or more environmental objective it was never the primary objective. In most cases the environmental objective was secondary or something that would occur as a result of increased bus use. For example Scheme 4 had six objectives, both social and economic, except for one which was to *'reduce traffic into the rural villages and tourist spots'* (4). However this objective is not purely environmental because reducing traffic also has social benefits.

Economic

None of the schemes had primarily economic objectives. They were often secondary benefits attributable to social objectives. Improving access to facilities and services inherently has economic benefits (i.e. by improving access to jobs and access to facilities such as shops). Examples of economic objectives were to *'provide the most cost effective service for those remoter areas'* (12), *'to provide a cost effective service that balances patronage to service provision'* (14) *'to use existing taxi provision in the area more efficiently'* (25). and to *'meet employers demand for workers due to expansion'* (6). It appears that the social objectives would offer long term economic benefits, but this was not explicitly stated.

Geographical

The objectives classified as geographical were those that referred to providing a service to an area without bus services but made no mention of a social group or access to a specific service or activity. Six of the schemes primary objective did fit into the geographical category and this was usually due to the perception that DRT could provide a bespoke service ideal for the geography of the area. Examples of these objectives included *'provide the remoter areas with some level of service'* (1), *'low cost access from the rural area using taxi provision'* (23) and *'increase local bus services to small rural communities which generated low levels of passenger usage'* (13).

The services with geographical objectives were often those that had viewed DRT as a way to increase accessibility and cost effectiveness. The type of objectives revealed by many of the schemes suggests that those working within a local authority share the opinions of Enoch *et al* (2004), and the Scottish Executive (2006) who suggested that DRT could be a useful tool in achieving Government policy goals.

To summarise it would seem reasonable to suggest that DRT schemes were established in order to provide a travel option for those living in relatively isolated areas in terms of public transport provision. It would seem that those planning the services hoped they would improve accessibility in such areas at a lower cost than other options. A secondary benefit of the services would appear to be some modal shift. Furthermore funding was available for the services at the time for this type of service which reduced the financial risk of experimentation for the local authority.

In terms of objectives the schemes seem to be attempting to impact upon social issues such as exclusion caused by poor access to services and activities. The high frequency of social objectives compared to other types could be a result of funding conditions or could be an indication of the political situation of the time and an emphasis on social exclusion as a key problem in the 21st century.

Current performance

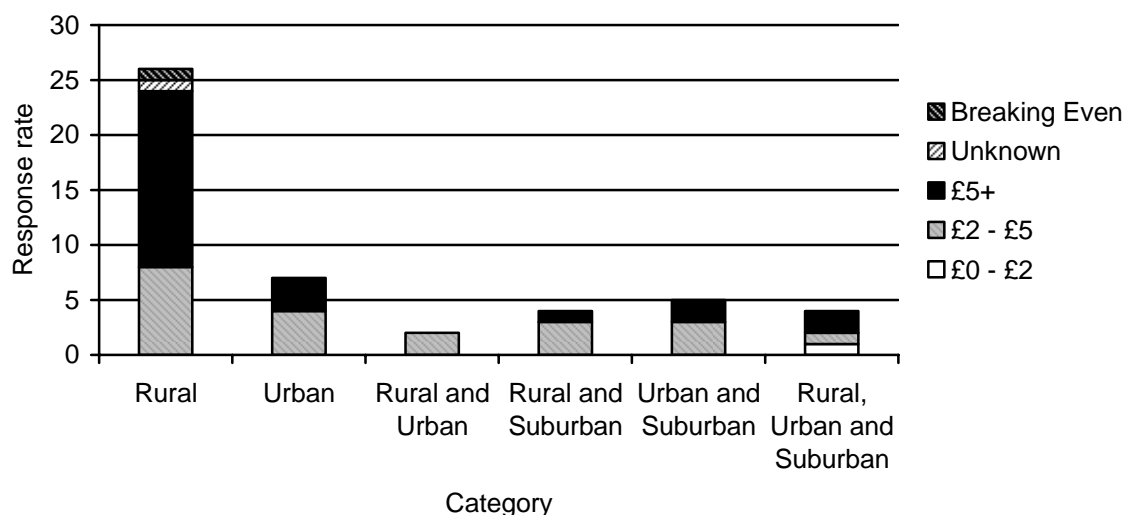
This section details the subsidy levels and financial sustainability of the schemes and their performance in relation to their objectives. Finally it will discuss the overall performance of the schemes in terms of subsidy levels and achievement of objectives.

Subsidy level

Table 1 showed that the majority of the schemes were operating at a subsidy level exceeding £2.00 per passenger trip, with slightly over half having a subsidy exceeding £5.00 per passenger trip. Only one of the respondents schemes was in fact breaking even.

Figure 4 shows that those schemes operating in a purely rural area had a higher incidence of subsidies exceeding £5 and a lower incidence of subsidies falling into the £2.00 - £5.00 range than those operating in an urban or mixed area. In addition, schemes with less than twenty one seats were more likely to have higher subsidies than those using larger vehicles.

Figure 4: Subsidy level and geographical factors



he option to purchase a season ticket for the service seemed to have the strongest effect on the subsidy levels. Fourteen of the twenty one schemes that offered season tickets were in the £2.00 - £5.00 subsidy range. Conversely eighteen of the twenty four schemes that did not offer any kind of season ticket had subsidies above £5.00. However this may just have been coincidental and is an area that would benefit from additional research.

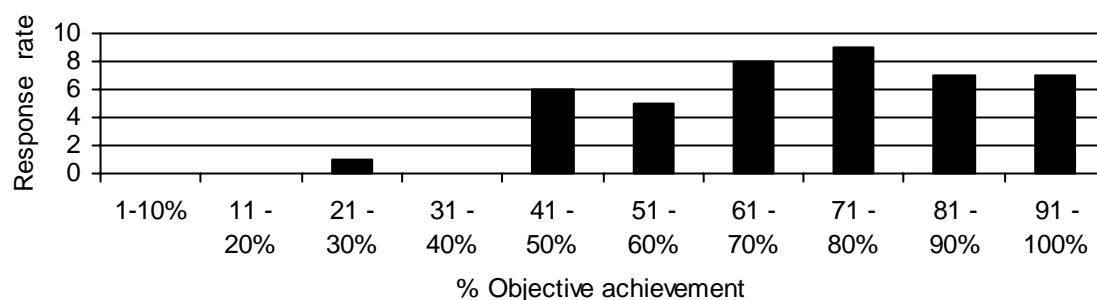
Financial sustainability

All the respondents were confident that the schemes would achieve financial sustainability in the medium (1-3 years) or long (3+ years) term. In total twenty eight out of the forty eight that responded to this question were hoping to achieve financial sustainability within the next three years. This included all the schemes that operated in solely urban areas and rural and suburban areas. It also included half of those operating in a rural area.

Objective Achievement

All of the schemes had some social objective so it is difficult to define the objective most likely to be achieved, suffice to say that the schemes had a higher achievement rate for the objective listed first. Figure 5 illustrates the average level of objective achievement across the schemes. This was calculated by taking the percentage the respondent that felt each of the scheme's objective's was being achieved and dividing it by the number of objectives. All but one of the schemes achieved in excess of 40% of their objectives. Only one scheme had a 100% objective achievement rate (Scheme 3).

Figure. 5: % of Objectives achieved



Reasons given for not achieving objectives ranged in generality. For example respondents regarded a lack of demand for the service as a main factor in its failure to achieve the objectives. *'Very limited demand for the service in practice'* (16), *'patronage remains low because many employees are being recruited from outside the area in which the service operates'* (19), *'few journeys being made to employment areas which was the main reason for the previous bus route extension'* (45), *'problems increasing demand and usage of the services provided'* (27), *'not all areas can provide sufficient users to fill the vehicle'* (15) and *'the service is falling well short of anticipated success possibly because although the area is deeply rural it is inhabited mostly by commuters who have more than one car per household and therefore do not suffer the perceived isolation'* (17). Although one scheme had the opposite problem *'the door to door aspect of the service had proved to be so popular that on some occasions people have had to be turned down. Therefore some people who need the service are not using it'* (40). Five of the respondents had problems overcoming issues related to the public's understanding of the scheme, that is potential users did not realise the service was for them or did not comprehend how the service

worked. For example *'in line with other experiences people are unwilling to take two buses for a journey as there is a perceived potential problem'* (1) and *'patronage levels are low and although we are unsure of why we believe it is due to people lacking confidence in using something new and different and taking time to grasp the concept'* (48).

Finally seven respondents had low achievement rates due to the recent start of the scheme. These respondents hoped to attain higher achievement levels in the future, for example *'the scheme has only just started running'* (23), and *'the route has only just become fully demand responsive'* (28).

CONCLUSIONS

The DRT schemes involved in the research were often looking to meet a social need, however the research did reveal that this need is not always realised. As such, some schemes were likely to fall at the first hurdle. Without the need passenger numbers on these services tended to remain low and thus subsidy levels high. Conversely some schemes were set up in areas of actual need and where this was the case they tended to be more successful both in terms of objective achievement and subsidy level. Nonetheless they still suffered the effects of operating a new type of service and thus having to surmount the barriers that occurred due to prospective passengers not understanding the service.

In terms of lessons for practitioners the results provided some evidence to substantiate the idea that transport planners are still making some rudimentary errors in both the design and operation of the schemes. Emphasis has often been placed on designing a technologically advanced scheme where perhaps a low tech design would have been sufficient. Once again the results indicate that the early planning stages of a scheme are fundamental to the schemes success, that many of the numerous variations in scheme design can work but only when the situation itself has lead to the careful selection of the design.

With regard to performance some of the schemes had managed to reduce subsidies to acceptable levels and most felt they would achieve sustainability in the long term. These schemes were, as expected, the longer running ones thus demonstrating the benefits of learning from experience. Another key feature of some of the more successful schemes was that they tended to be in more urbanised areas.

In terms of lessons for policy makers the DRT schemes included in this research are often trying to meet social policy goals. What is poignant is that those involved in the schemes feel they have a valuable role to play. Although the data does not fully support this assertion at present it has created a base on which to develop further research into the merits or otherwise of publicly funded DRT schemes in England and Wales. Moreover the impact DRT makes on social issues needs to be measured in a way acceptable to funders if those operating the schemes are going to secure funding and justify higher subsidy levels in the long term. Furthermore it does make the tentative suggestion that in the right place, at the right time and with the right planning DRT could be a valuable tool.

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