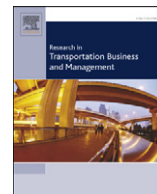


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Identifying potential market niches for Demand Responsive Transport

Lisa Davison^{*}, Marcus Enoch, Tim Ryley, Mohammed Quddus, Chao Wang

Transport Studies Group, School of Civil and Building Engineering, Loughborough University, Leicestershire LE11 3TU, UK

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ABSTRACT

In principle, Demand Responsive Transport services, or paratransit in US nomenclature, offer public transport providers a more flexible and potentially more cost effective delivery option than conventional bus services, particularly in situations of low demand. However in practice, there are many examples of promising DRT schemes that have failed, for a number of reasons. One recurring feature appears to be that the DRT operation introduced is not appropriate for the market served. This is due to a lack of knowledge as to what markets may be susceptible to DRT. This paper aims to help address this research gap by drawing on the findings of two qualitative research data collection efforts, exploratory in-depth interviews and focus groups, each including industry experts. Using a marketing framework, developments at the micro, meso and macro levels are explored to determine the circumstances necessary for developing 'successful' DRT market niches. Implications for managerial practice include integration of services to improve market penetration and in responding to market development opportunities aimed at the general public. Technology plays the greatest role in responding to market niche demand, primarily in enabling flexible booking and providing real time information, supporting market development, product development and diversification opportunities.

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1. Introduction

With the increasing predominance of the private car as a mode of transport in many countries since the 1950s, the principal form of competition, the bus, has steadily become marginalised as its markets are squeezed and marginal operational costs are increased. To compound this, the recent Global Economic Recession has seen public budgets cut in many countries with subsidised public transport being particularly vulnerable to government 'efficiency savings'. Yet, arguably, the need for viable alternatives to the car is more necessary than ever with the demographic pressures of rising unemployment and an increasingly elderly population, coupled with the environmental and economic concerns related to global warming and peak oil.

A frequently suggested solution to this growing transport challenge is an enhancement through Demand Responsive Transport (DRT) services. [Brake, Nelson, and Wright \(2004\)](#) suggest that DRT is "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" (p. 324). [Talley and Anderson \(1986\)](#) are slightly more specific when defining DRT, highlighting that demand-responsive paratransit services are flexible in time or are non-scheduled. The authors also recognise that routing may also be variable for services such as dial a ride or fixed for jitney-type services. They include commuter paratransit

services such as vanpools within their definition as service which operate at a fixed time but along variable routes.

In principle, DRT services offer public transport providers a more flexible and potentially more cost effective delivery option than conventional bus services, particularly at times and/or in locations of low demand ([Enoch, Potter, Parkhurst, & Smith, 2004](#)). However in practice, there are many examples around the world of promising DRT schemes that have failed. Such failures have occurred for a number of reasons, but one recurring feature appears to be that the type and/or scale of DRT operation introduced is often not appropriate for the market to be served. In simple terms, this is due to a lack of knowledge as to what markets may be susceptible to DRT of one sort or another.

This paper aims to help address this research gap by drawing on the findings of a series of exploratory in-depth interviews and focus groups with industry experts to examine the characteristics which comprise DRT and outline potential future market niches for a number of DRT-based public transport modes. Specifically, it draws on a specially-adapted marketing framework to ensure that key marketing-related issues are discussed at the micro, meso and macro environment levels in such a way that allows conclusions and implications for management practice to be generated.

2. Previous work

Thus far, research on DRT has focussed on the means of delivery. For example, the type of vehicle that is most appropriate, how the technology might work, and how flexible the routing and/or timetabling should be ([Enoch et al., 2004](#)). Less explored are issues relating to DRT schemes

^{*} Corresponding author. Tel.: +44 28 90368204.

E-mail address: Ldavison1@ulster.ac.uk (L. Davison).

and their interface with the user. That is to say the operation of such schemes and associated marketing to best meet passenger needs. One approach is to incorporate ideas derived from marketing theory. At its most basic level, marketing theory characterises influences on a particular product as to whether they occur at the micro, meso, or macro level (Adcock, 2000; Kotler, Wong, Saunders, & Armstrong, 2005; Verhage, 2010), and with respect to DRT, how they apply to the operational level, the task management level, and the broader context.

At the operational or micro level there is a range of influences impacting upon the success of DRT schemes. DRT has a 'novelty barrier', as it is different from conventional public transport, which can put people off. The more complex the system is, the greater the barrier can become. Moreover, complicated systems can potentially lead to more errors. For instance, Translink in Shellharbour, New South Wales, Australia trialled a high-technology, semi variable DRT route. The planned service could be booked up to 10 minutes in advance of the deviation from the route using a fully automated booking service. However, failure of the technology resulted in a low-tech demand responsive control system being introduced, thus reducing the capability of the service. Whilst an adequate service was provided, the scheme reverted to a fixed route bus with minor adjustments following the trial (Schwartz, 2000). In other cases, DRT success depends heavily on investments in technology. Not incorporating sufficiently high levels of technology when providing a complex service was a key factor influencing the failure of the Adelaide Dial a Bus in South Australia (Enoch et al., 2004).

Furthermore, in providing a flexible service care has to be taken as to the area coverage and geography of a service area. Services such as the PlusBus scheme in Truro, Cornwall failed because journey times along country roads meant that they could not effectively fulfil the role of a shared taxi feeder to and from the train station (Crossfield, 2003). Linked to this the service provided must be suited to the market served if DRT services are to be viable, then they need to be sensibly (and not under) priced when providing premium services, nor over specified when serving poorer markets.

Whilst there are recognised core markets using DRT, there is a lack of market research detailing which passengers are likely to use DRT at certain times, thus the lack of knowledge as to potential future markets. When relating the micro level environment to the meso level, the training of not only drivers, but also call centre staff, politicians and most importantly the general public about how to offer and use DRT is vital, and schemes have suffered when this has not been adequately achieved (Enoch et al., 2004). Brake et al. (2004) add that the adoption of DRT has been limited, and successful schemes have depended on the existence of strong branding, marketing, and a community orientated partnership.

At the meso level, Romanazzo, Ambrosino, and Nelson (2004), consider DRT to be a public transport option for use when market demand is too weak to support conventional buses. Research on DRT schemes in New Zealand suggests that DRT services are well suited to places and times of lower demand (e.g. rural areas; during evenings and at weekends); to meeting the needs of elderly and mobility impaired people (and particularly for community-based services); to occasions where more affordable forms of transport than single-hire taxis are required; and to situations where greater levels of flexibility are needed (RA Scott and Booz & Company, 2010).

A report for the (then) Scottish Executive concludes that, in Scotland,

'there is potential for growth in 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' (Derek Halden Consultancy, The TAS Partnership and The University of Aberdeen, 2006, p. 37).

Brake et al. (2004) report that "fully integrating services and pooling vehicles from all public transport sectors through brokerage

at a single agency will be an important step towards achieving sustainable DRT services whilst concurrently providing a more efficient public transport network" (p. 336). They comment that improved technology is key to service provision, although as highlighted by the Shellharbour example there needs to be sufficient trust that the technology will be effective.

Multiservice transit firms, which provide fixed route and DRT (Dial a Ride, DRT for the general public, vanpool) services, are less vulnerable to overall service reduction as they can respond by altering the service provided. Restructuring can provide cost savings whilst expanding services. One way to do this is by cutting services introduced in response to the Americans with Disabilities Act, which have positive marginal costs (Colburn & Tally, 1992).

Wilson (1975) identifies DRT stakeholder groups as being users of DRT services; non-users of DRT; operators of DRT; operators of other transportation services; and managers of other business and activity centres in the area. It is also stated that, whilst experience indicates that more productive operations can be provided at higher demand densities, subsidy is required to deliver this. Brake and Nelson (2007) emphasise the importance of a partnership approach with strong relationships between stakeholders, and that merging all budgets available for DRT would create optimum flexible transport services. There is, therefore, a need for the integration of provision. However, at present the stakeholder environment is often one of competition rather than collaboration, with private operators objecting to publicly funded schemes such as the Corlink, in Plymouth, Devon and south east Cornwall (Gliddon, 2003). Further challenges are presented from the macro level, where regulation can provide a barrier to entry to the DRT supply market (Enoch et al., 2004).

Macro level influences are explored in Nutley (1988a), which shows that geographical coverage of different forms of DRT are largely influenced by local politics rather than other factors, whilst Nutley (1988b) states that with the exception of dial-a-ride most flexible transport services are best suited to rural areas.

In a review of the literature relating to the need for DRT, Laws (2009) suggests a number of (often interrelated) reasons why DRT could potentially become more widespread. These are:

- An increasing dissatisfaction with conventional public transport provisions in terms of it being inflexible, cumbersome and unreliable – and the ability of DRT to become a 'third way' between the bus and the private car.
- The lack of adaptability of conventional bus and taxi services coupled with the inherent variability of the public transport market. Different users (indeed the same users at different times) can have very different requirements from a transport service that are perhaps easier to resolve using DRT than with a bus service.
- More dispersed land use patterns leading to increased car ownership and use, and a less viable market for conventional public transport services.
- An increasing governmental interest in using DRT to address social inclusion/accessibility and modal shift public policy goals, coupled with the idea of using DRT as a means of integrating the delivery of community transport, social services, education, and public transport services into a single system.

Similarly, Ferreira, Charles, and Tether (2007) note that a number of trends suggest DRT could become more widespread in the future. These include changing lifestyle and demographic patterns; increasingly diverse travel patterns; a growing proportion of the population without access to a car and/or with limited access to conventional passenger transport; declining use (and increasing costs) of conventional public transport; increasing demands on limited public funds; and the political need for reducing the reliance on the car to reduce environmental impacts and limit energy use.

Finally, Adeniji (1987) highlights the importance of contextual factors, by noting that, unlike in developed countries, DRT in Nigeria is the dominant mode in urban areas due to it being quicker and more available at times which meet demand than the municipal bus, despite higher fares. This study also shows that DRT would be best suited to providing public transport in smaller urban areas, although it can act as a feeder service in larger urban areas if there is improved regulation and safety.

Table 1 presents the marketing framework, which has emerged from the marketing and DRT literature.

3. Method

This paper comprises two data collection elements: nine in-depth exploratory interviews with 'experts' in the DRT sector; and three focus groups, primarily consisting of DRT providers.

In-depth interviews and focus groups are qualitative research methods suited to "exploring rationalities, implications and meanings" (Hoggart, Lees, & Davies, 2002, p. 204) rather than making statistical inference. Whilst interviews provide the opportunity for individuals to express their views without the influence of others, focus groups provided an opportunity for participants to confer in response to questions, thus highlighting areas of consensus and areas of disagreement. In using focus groups, it is accepted that participants will have set and malleable opinions, some of which will develop and shift during the focus group process (Litosseliti, 2003).

The in-depth, semi structured exploratory interviews with experts in the field of DRT, or paratransit, were completed between March and October 2011. A purposive driven sampling technique was adopted to incorporate the views of two categories of stakeholder, those currently involved in the provision of DRT and those with an influential advisory role (Miles & Huberman, 1994).

The three focus groups were conducted on Thursday 16 June 2011 at a workshop held at Loughborough University, each involving five or six participants and a moderator, which is in line with the preferred size of focus groups (Gibbs, 1997).

Interviewee and focus group participant roles and experiences are summarised in Table 2.

Both research methods were based around a semi-structured interview schedule which allowed for consistency, assisting thematic analysis, whilst maintaining the flexibility to explore specific interviewee expertise. Interviews explored: what comprised DRT and other operational factors; current and future DRT markets; DRT performance and customer perceptions; and stakeholders' current and future roles and positive and negative influences on DRT. Focus groups explored influences on current and future markets.

Interviews and focus groups were transcribed in full and the data coded to avoid losing valuable detail, richness and rigour in their

Table 2
Interviewee and focus group participant characteristics.

Reference	Current role	Experience
Interviewee 1	Academic	Interest in sustainable transportation policy and planning
Interviewee 2	Academic	Interest in public transport operations and management
Interviewee 3	Community transport	Operates community transport organisations
Interviewee 4	Consultant	Advises upon community transport
Interviewee 5	Marketing manager	Involved in software development for the DRT sector
Interviewee 6	Consultant	Represents the role of taxis in DRT provision
Interviewee 7	Consultant	Interest in passenger transport and sustainable travel
Interviewee 8	Local authority officer	Operational manager of a County Council DRT
Interviewee 9	Local authority officer	Strategic manager of a County Council DRT
FG A participant 1	Local authority officer	Network development manager for a unitary authority
FG A participant 2	Consultant	Interest in rural transport
FG A participant 3	Community transport	Operates community transport organisations
FG A participant 4	Local authority officer	Network accessibility manager for a passenger transport executive
FG A participant 5	Consultant	Interest in sustainable transport
FG A participant 6	Academic	Transport modelling
FG B participant 1	Local authority officer	Integrated transport manager for a unitary authority
FG B participant 2	Local authority officer	Sustainable travel manager for county council
FG B participant 3	Academic	Interest in transport modelling
FG B participant 4	Research manager	Interest in passenger travel
FG B participant 5	Consultant	Interest on transport accessibility
FG C participant 1	Consultant	Advises upon community transport
FG C participant 2	Academic	Interest in information technology
FG C participant 3	Local authority officer	Public transport manager for a unitary authority
FG C participant 4	Local authority officer	Public transport manager for a county council
FG C participant 5	Local authority officer	DRT manager for a passenger transport executive
FG C participant 6	Local authority officer	Integrated transport unitary authority

analysis (Bloor, 2001). For ease of reporting, results from both primary data sources are combined into a single storyline in the following sections and both interviewees and focus group participants are referred to as 'interviewees' within the text. Themes were then identified and the data analysed on that basis (see Silverman, 2006; Crabtree & Miller, 1992, on the thematic approach to analysis). The themes identified are discussed with reference to the marketing framework outlined in Table 1.

4. Micro level – operational characteristics

Interviews and focus groups emphasised the need to understand what characteristics defined DRT services and how DRT can operate in an effective manner in order to meet objectives. Fig. 1 provides categories under each of the micro level influences and illustrates areas of agreement and disagreement between interviewees as to what can be considered to be DRT. The 'grey areas' are areas of contention – the darker the grey, the lower the number of interviewees who agree that this constitutes DRT.

4.1. Flexibility

With respect to the route, origin–destination pattern and timetable, interviewees generally agreed that a DRT service could be flexible on one or more of these operational characteristics. Most recognised the

Table 1
Demand Responsive Transport marketing framework.
Framework adapted from Adcock, 2000; Kotler et al., 2005; Enoch et al., 2004.

Level of influence	Themes
Micro level – operational characteristics	Flexibility Approach to booking Vehicle and operator (Eligible) users Geographical coverage Pricing Effectiveness
Meso level – task environment	Market niche(s) Customer perceptions Stakeholders
Macro level – broader context	Political influences Economic influences Socio-cultural influences Technological influences

crucial element determining the level of flexibility was the market or markets being served and the levels of demand, often influenced by the local geography. However, a small number of interviewees viewed an area-based system, flexible across each of these scales, as being best suited to serving all market demands (*Interviewees 3 and 4*) or indeed the demand warranting the use of DRT rather than a conventional public transport option (*Interviewee 8*).

4.2. Approach to booking

Similarly, all forms of booking timescales and booking methods are recognised as possible for a DRT service, though this was influenced by other operational factors, in particular the level of flexibility. Whilst services which ‘divert’ from a fixed route, due to slack in the timetable require minimal advance booking (*Focus Group C participant 3*), a more flexible service, is often designed around the bookings made. Therefore, it is advantageous to book early to ensure that demands are met to a greater extent (*Focus Group C participant 5*) – though this should be managed in order to allow fair access and reduce refusals (*Focus Group C participant 4*). Furthermore, the booking method is also influenced by the flexibility of the service. For instance, it is only possible to book on-bus if the vehicle is going to be at a specific place at a given time and providing that there is capacity.

There was considerable discussion about the role of online booking both at present and in the future. At the moment, whilst interviewees recognise this as a possibility, trust in the technology to do this effectively is a barrier (*Interviewee 8*). Whilst existing markets may favour booking via a call centre, in the future, these demographic segments will be more technology savvy. Other potential markets were recognised as valuing an online option (*Focus Group B participant 1*).

4.3. Vehicle and operator

Whilst DRT is identified as a service provided by a whole range of different vehicles, though often minibuses, there were higher levels of disagreement between interviewees as to the types of operation that comprise DRT, hence there are a greater number of ‘grey areas’. Whilst one interviewee focussed primarily on services designed solely for the public provided by minibuses operated as public service vehicles, as popularised by schemes introduced through the rural and urban ‘bus challenges’ – funding streams designed to encourage innovation in public transport – (*Interviewee 5*), most other interviewees went beyond this, emphasising that DRT encompasses shared taxis, community transport, dial-a-ride and other ‘public services’. However, there was some disagreement at the extremes; a small number of interviewees suggest that the DRT supply include pooled use of private vehicles, for example, lift sharing or car clubs (*Interviewees 1, 2 and 7*) within this continuum, others hold the view that this is ‘taking things too far’ (*Focus Group A participant 1*). In defining DRT one interview highlighted that the corridor-focussed, frequent public transport is indeed demand responsive, as it provides a frequent service in response to localised, high levels of demand (*Interviewee 7*) and a further interviewee recognised a different division from the standard DRT, specifically coaches hired by organisations to meeting collective needs and wants (*Interviewee 6*).

4.4. Users

This leads back to essential characteristics identified by all interviewees, that DRT should be ‘transport used in a collective or shared way’ (*Interviewee 2*), meeting the needs and wants of the market or markets. So whilst it was recognised that at times a DRT vehicle may only transport one person, this should be a function of demand rather than design. Also the market group(s) eligible to use a service is an

Route	Fully flexible	Semi flexible, route deviation	Fixed			
Origin-destination pattern	Many to many	One to many	One to one			
Timetable	On demand	Check point	Fixed			
Booking timescales	More than a week in advance	A week in advance to the day before	On the day			
Booking method	Online	Call centre	On-bus			
Vehicle type	Car	Minibus	Bus			
Operation type	Pooled private	Minicab or taxi	Coach	Public service ¹	Community transport	Public bus
Eligible users	General Public	Restricted Public	Private			
Number of users	Single user	Collective users				
Geographical coverage	Rural	Suburban	Urban			
Pricing	Free / Discounted	Standard Fares	Premium fares			
Financial productivity	Unsustainable subsidy	Justifiable subsidy	Fully commercial			
Performance against objectives	Environmental	Economic	Social			

Fig. 1. Operational characteristics of demand responsive transport, identifying ‘grey’ areas from interviews and focus groups. ¹ Public service in this case does not refer to vehicles operated public service vehicle licenses by private companies (recognised as public bus), it incorporates public-funded provision, such as dial-a-ride and social service transport.

important element of operational design. All respondents agreed that DRT schemes should be open to the general public, whereas only a few interviewees refer to services which are only available for private hire, for example collective hire of a coach (*Interviewee 6*). The situation for the restricted public was less straightforward, as restrictions can be based on the area in which a person lives, the licencing arrangements for community transport operation, whether an individual works for a given company or whether they are eligible for certain forms of government support. On balance there was more agreement (e.g. *Interviewee 2*, *Focus Group C participant 1*) that such services comprise DRT than vehicles for private use.

4.5. Geographical coverage

In examining the geographical coverage, interviewees recognised that rural operation is dominant for the general public and urban operation for the specialist markets, in particular dial-a-ride. With the exception of one interviewee who stated that services for the general public were not feasible in urban areas (*Interviewee 8*), interviewees expressed the view that such services do operate across all areas (e.g. *Focus Group A participant 1*). Interviewees also recognised that services for the general public often exhibit greater levels of flexibility in rural areas where demand and geography encourage this.

4.6. Pricing

Considering the pricing of the product, this was mainly discussed with reference to concessionary fares. This segment currently makes up a high proportion of users across DRT options; however, some schemes are not eligible for reimbursement from central government. At a local level the administrative authority may opt to include such services in the concessionary fare offer, finding investment from other sources (*Focus Group C participant 1*). With respect to other fare options one interviewee also highlighted that DRT could be priced at a premium to reflect the personalised service offered (*Interviewee 2*).

4.7. Effectiveness

Effectiveness of DRT can be considered in two main ways, the productivity of DRT and the ability of DRT to meet objectives.

Taking the wide definition of DRT (including any 'grey areas') and applying it to the UK, interviewees highlighted the variability across DRT operators and markets. For instance, taxis were widely recognised as DRT operating commercially (e.g. *Interviewees 2 and 7*). In fact interviews also highlighted that in some cases journeys operating with a subsidy, whether unsustainable or justifiable, could be provided more cost effectively by commercial taxi (e.g. *Interviewee 6*).

With reference to markets, in the USA there are market niches that have been proven to be commercially viable. Of these, the airport market is stressed, but other markets are also valid (e.g. *Interviewees 1 and 5*). Furthermore the airport market has been a commercial success for some European airports (e.g. *Interviewees 2 and 7*). On the other hand, specialist types of DRT, such as non-emergency patient transport services (PTS), are identified as requiring heavy subsidies both within the UK and the USA (e.g. *Interviewees 1 and 3*, *Focus Group A participant 1*).

Though high levels of subsidy appear unsustainable, some interviewees stated that this has been justified by the service provider on the grounds of passenger need, something which was questioned during interviews and focus groups (e.g. *Focus Group A participant 5*, *Focus Group B participant 1*). Drawing on the latter example of non-emergency patient transport, given the distinct differences in what customers pay and the service costs, including the costs by other agencies, DRT is often perceived to be a high cost solution. However, interviewees emphasise that this need not be the case.

"It's seen to be very expensive and it can be very expensive. That's why I do the work that I do because I believe if you use DRT in the right way you can integrate the services and it is much more sustainable and much less expensive. If you just have buses running round, these are the big taxis, it is not sustainable, it is expensive" (*Interviewee 3*).

Understanding the real cost of operating a service, essentially a cost benefit analysis to provide a comparable benchmark is identified as a good practice. However, few organisations have adopted it in practice (*Interviewee 3*). Furthermore, the difference between cost and cost effectiveness is recognised. Often DRT schemes are introduced as the most cost effective manner in which to meet wider objectives. In terms of meeting social objectives, this includes providing individuals with a 'quality of life' and 'independence', therefore delivering 'cross sector benefits' (*Interviewee 4*). In fact, DRT can be very effective in meeting accessibility targets (e.g. *Interviewee 9*, *Focus Group A participant 5*, *Focus Group B participant 2*) as it can result in the vast proportion of households gaining access to public transport (e.g. *Focus Group B participant 4*). Plus, whilst DRT is only profitable in limited, niche markets, interviewees highlight that it essentially delivers economic benefits. This is influenced by the geography of the area and the service design. With respect to geography, the key consideration is the cost of providing an alternative service, such as a fixed route, fixed timetable service (e.g. *Interviewee 7*). With respect to service design, considerations include the size of vehicle used and the number of people carried collectively (*Interviewee 9*). In selecting the best size of vehicle there can be trade-offs, especially given that the driver is the biggest single cost, often accounting 'for anything between 50 and 75% of total cost for any type of bus operation' (*Interviewee 4*). Other considerations are whether the vehicles (or vehicles) available allow for peak loads without increasing overall costs of services and in increasing the load factor does the journey length, or the time spent in vehicle become unacceptably long (e.g. *Focus Group A participant 3*).

When considering the environment, DRT is not widely identified as enabling mode shift at present. However, the pressures of 'peak oil' were identified as driving a change in behaviour by some interviewees (e.g. *Interviewee 6*) and the individual or market response to the environment as driving change by other interviewees (e.g. *Interviewee 1*). Furthermore, a number of interviewees identified the characteristics of DRT as best reflecting those of a private vehicle, hence it is most capable of engendering change (e.g. *Interviewee 2*).

5. Meso level – task environment

The task environment considers the environment which surrounds the micro environment, specifically: the market and market potential for DRT; customer perceptions of the product; and the stakeholders involved under the classifications of competitor, collaborator, supplier and distributor. The interviews and focus groups highlighted how this influences DRT operation.

5.1. Markets

Interviewees identified the markets for DRT as detailed in [Table 3](#), these are differentiated by geographical scope, trip destination and user group. Based on interview response, markets are identified as:

- Having reached 'market penetration' (existing or strong market/ existing or strong product)
- Providing opportunities for:

'product development' (existing or strong market/new or less certain product);
'market development' (new or less certain market/existing or strong product), for example integrated provision for the general public and tourist focussed DRT; or

Table 3

Demand Responsive Transport market and product position and potential.

	Existing / strong products	Interviewee reference	New / less certain products	Interviewee reference
Existing / strong markets	<i>Market penetration</i>		<i>Product development</i>	
	Rural, general public	FGA P 1, 3, 5; FGB P 1-2, 4-5; FGC P 1, 4, 5, 6; and interviewees 2-9	Urban orbital, general public	FGA P 1; FG C P 5, 6; and interviewee 4
	Without access to car and conventional public transport	FGC P 4; FGB P 5; and interviewees 1, 7-9	Airport access for passengers and employees (Market penetration in USA and Europe)	FGA P 3; FGC P 1; and interviewees 1-2, 5, 7
	Mobility impaired	FGA, P 1, 5; FGB P 2, 4; FGC P 1, 3-4,6; and interviewees 1-4, 6-9	Workplaces, outside urban core, employees	FGA P 3; FGB P 1, 2, 5; FGC P 1, 4-6; and interviewees 1, 4-5, 7
	Non-emergency patient transport	FGA, P 1, 3; FGB P 1-2; FGC P 1, 4; and interviewees 1, 3, 5, 9	Hospitals and other destinations, specialist needs	FGA P 3; FGB P 1, 5; FGC P 4; and interviewees 5-6, 9
	Shopping, suburban and rural, general public	FGA P 2, 4-5; FGB P 4-5; FGC P 1, 3-6; and interviewees 1-3, 8		
New / less certain markets	Educational establishment for students with special educational needs	FGA P 1, 5; FGC P 1 and interviewees 1, 4-5, 7		
	<i>Market development</i>		<i>Diversification</i>	
	Educational establishments, rural, students	FGA P 1, 3; FGB, P 1, 5; FGC P 1, 4, 6; and interviewees 1-4, 6-7	Suburban, general public (Product development in USA)	FGA 1, 3; and interviewees 1, 3, 7
	Trip attractors, rural areas, tourists	FGA P 3; FGB P 1; FGC P 5; and interviewees 1-2	Entertainment venues in urban centres	FGA P 1, 3; PGB P 1; and interviewees 2, 4
	Integrated DRT supply for the general public	FGA P 1-3, 5; FGC P 4; and interviewee 7	Sport venues, ticket holders	Interviewee 1
			Meeting and conference venues, employees	FGB P2, 4; interviewee 5
			Services and good to rural areas	FGA P 1, 3; and interviewees 2-3

'diversification' (new or less certain market/new or less certain product).

This is based on an adaptation of an Ansoff Matrix (Ansoff, 1965) which differentiates between existing or strong and new or less certain markets and products, as opposed to simply recognising something as existing or new. This is important in that DRT development has the potential to learn from and in some cases adapt niche examples of DRT.

A note of caution in classifying such markets is that it can ignore the intricacies of demand for DRT (Focus Group C participant 5). The destination choice may be masking the main purpose of the journey, the social element of the journey itself, a point emphasised further in an individual interview, highlighting that travel "is not a totally rational derived demand" (Interviewee 6). Furthermore, during one focus group a number of interviewees argued strongly that demand is a function of supply (or operation), and segmentation could be detrimental to market understanding and the product provided (Focus Group A participants 1, 3, and 5). However, an interviewee stated that without an understanding of the market there may not be sufficient demand to justify supply, thus leading to product failure, a point accepted by the focus group in question. This led to the group accepting that there would always be certain population segments more likely to use the bus "whether or not socio-economic characteristics define those people" (Focus Group A participant 2).

In terms of DRT market penetration geographical coverage has been largely rural, though interviewees highlighted that there is potential for operation in suburban and peri-urban areas either in the form of diversification in the UK or product development in USA, where "diffused travel patterns" (Interviewee 1) support such services. In a limited number of places urban DRT for the general public exists, the current market comprising primarily of urban orbital journeys, where the frequent,

conventional bus services that focus on radial routes cannot satisfy demand (Focus Group C participant 5). Interest in the potential for such services was expressed in a number of interviews and in two focus groups and has been identified as an opportunity for product development.

When discussing user groups, it is worth noting that for both existing and potential markets overlaps exist between these classifications. For instance, individuals in rural areas could also be commuters. Owing in part to the heritage of DRT and current regulation influencing access to services, interviewees identified market penetration of the older population, the mobility impaired and individuals without access to a car or other alternative forms of transport. Furthermore, supply may be fragmented across the range of services available, as they often attract similar, or the same, individuals.

"For example, you may have somebody who uses PTS transport to go to a hospital... and yet the next day or even the same day they may use a conventional community transport service or they may use a taxi service" (Focus Group C participant 1).

This selection amongst the available alternatives in order to serve the same people, or similar population segments, is an opportunity for product development in response to the personalisation of budgets. This change in policy and practice provides adults with special needs (or carers of children with special needs) access to their own budget in order to make informed decisions as to the services that meet their needs, including transport provision.

In response to existing and potential markets, benefits of integrating financially and physically all forms of DRT were emphasised because "that way you not only satisfy existing demand, but you actually generate the potential for satisfying unmet demand" (Focus Group C participant 1). Whilst interviewees recognised a small proportion of users who would always require a specialist service, they advocated pooling investment

in DRT as a more financially sustainable way forward. Related to this, one interviewee proposed an integrated system whereby passengers accessed transport options via a hub, selecting the most desirable transport option to reach their destination based on a range of attributes, including service provider, vehicle and price (Interviewee 6). Therefore, not only are DRT schemes considered but potentially also conventional public transport and single-user taxis. However, it was widely recognised that existing practice at the micro, meso and macro levels presented a challenge in achieving either of these concepts.

A further possible suggested 'user group' was providers of goods and services, particularly in low density areas. This would have similarities to the post bus in that it would combine the movement of passengers with goods and services. Potential services could include library books, prescriptions (and other medical functions) and post/parcels.

Trip destination was influenced heavily by the demand of the user groups and market penetration was therefore recognised in terms of access to healthcare, including hospitals, schools for children with special education needs, and shopping facilities. Opportunities for product development of DRT include provision to airports and workplaces, whilst market development opportunities included DRT to rural schools. Market diversification opportunities included DRT serving a range of trip destinations, in particular, entertainment venues in urban centre ('the night time economy'), sports venues and meetings and conference venues.

5.2. Customer perceptions

Interviewees reported high levels of customer satisfaction amongst users across most elements of provision. One exception being the lack of frequency especially, when a nearby area benefits from a conventional, frequent bus service (Focus Group C participant 3). Naturally, the high levels of reported satisfaction are influenced by having actually used a DRT scheme and understanding how it works (e.g. Focus Group A participant 3). However, interviewees also outlined that you need to 'manage expectations' (e.g. Focus Group A participant 1), not just with respect to quality of the service but also with respect to the capabilities of the service in meeting journey and time demands.

One of the main challenges is to encourage people to use DRT, with the greatest barrier to use being the need to pre-book. Interviewees highlighted that the level of notice required is often determined by the operational characteristics, with greater flexibility and personalisation requiring more advanced notice. Related to this, interviewees stated that pre-booking presents opportunities which maximise productivity. However, it is such booking systems that make it difficult to attract new and less certain markets (e.g. Interviewee 4).

Awareness is a further barrier to use, as DRT is rarely recognised within traditional journey planners such as Traveline (<http://traveline.info/>). This was emphasised by a number of interviewees often with reference to the low current market share served by modes such as DRT or with reference to the complexity of communicating the demand responsive nature of such services (e.g. Interviewees 2 and 5). This leads onto the perception of the existing DRT product held by the wider market. The heritage of DRT as a mode of transport solely for the mobility impaired has implications for potential users of such services:

"I remember we used to take school children on the bus and the kids used to lie on the floor because they didn't want to be seen to be on the community bus" (Interviewee 3).

This in turn has implications for stakeholders involved in product development, putting pressure on vehicle manufacturers, service operators and local authorities. With respect to local authorities, a number of interviewees highlighted the need for strong political will and an innovative approach to public transport in overcoming both customer and wider market perceptions (e.g. Interviewees 5 and 9). Interviewees emphasised that the best advocates of DRT are existing users (e.g. Focus Group A participant 5).

A number of interviewees identified DRT as being most similar to the car in terms of the service offered:

"The analogy with the other prime form of door-to-door transport, i.e. your private car, or even a conventional taxi, is such a powerful one that it's got a lot of potential to transform the whole way in which we perceive and deliver public transport" (Interviewee 3).

However, other interviewees emphasised that the public and in some cases political perceptions of DRT present barriers that need to be overcome before these similarities are accepted (e.g. Interviewees 6 and 9).

5.3. Stakeholders

Stakeholders in the current task environment have a significant effect on DRT provision and the markets served. With a focus on UK stakeholders, their current and potential future roles, as mentioned by interviewees, are summarised in Table 4.

In essence, there are many stakeholders involved in this broad definition of DRT, yet whilst there could be collaboration between stakeholders there is often competition, and, as a result there is often a duplication of services available to the market. For example:

"The silo working that we find ourselves in institutionally is enormously frustrating and costly as well, there's got to be an acknowledgement that there's duplication." Focus Group C participant 4

And whilst the main competitor to all forms of public transport is the private car, open competition between public transport providers presents many barriers to DRT provision (e.g. Interviewee 4). For instance, when making changes to regulatory systems to facilitate the introduction of DRT, taxi operators object to competition (e.g. Interviewee 1). This is in part influenced by the view that there is not a level playing field, as some providers are eligible for forms of funding which either subsidises or cross subsidises operation (Interviewee 6), whereas others are not. However, one interviewee highlighted that competition for contracts is based on best value, or in some cases purely cost (Interviewee 3). Furthermore, national policies to encourage organisations, such as community transport operators to play a growing role in transport provision are identified by one interviewee as a 'double edged sword' in that certain stakeholders may prioritise schemes that are of advantage to a small segment of society who they represent rather than the wider public (Interviewee 7).

Related to current levels of productivity, one noticeably absent UK stakeholder is commercial bus operators, aside from those funded by public sources. However, a significant number of interviewees identify growing interest from commercial operators, particularly smaller operators in either satisfying niche market demand (Interviewee 5), or entering the general market in response to changes at the macro level (Interviewee 9). For a future integrated service such competition needs to be overcome and a collaborative environment created for operation. This requires all stakeholders to take a more strategic view, with local authorities viewing themselves as enablers and providers to consider the market in a wider sense. In enabling this strategic view at the national level, two interviewees highlighted a role of a membership organisation in representing DRT stakeholders (Interviewees 7 and 9).

Further important stakeholders in DRT are the users. As well as the overall market trends discussed above specialist users are expected to hold an increasingly niche market position with training provided to integrate the majority of such users onto mainstream DRT. Furthermore, this mainstreaming of DRT is expected to result in the broader general public buying into the DRT concept.

Two core groups of stakeholders that are expected to hold a growing role in DRT provision can be classified as suppliers and distributors. Considering suppliers to the DRT sector, two interviewees mentioned the vehicle providers as key industry stakeholders (Interviewees 6 and 7) but the majority of interviewees examined the role of software providers.

Table 4
Stakeholder roles in DRT, a UK-centric summary.

Sector	Stakeholder	Current role(s) in DRT	Suggested change in role
Governmental and institutional	Supra-national, national and regional governing bodies	<ul style="list-style-type: none"> – Provide funding – Provide regulatory framework – Sharing good practice 	– Also support member organisation
	<ul style="list-style-type: none"> – European Union – Department for Transport – Traffic commissioners 		
	Local authorities	– Make decision about local investment.	– Enable DRT provision at a local level
	<ul style="list-style-type: none"> – Planning department (transport and land use) – Transport planning department – Education department – Licensing department – Social services – Customer services / booking team 	<ul style="list-style-type: none"> – Transport and land use planning. – Commissioning, supporting and / or operating DRT services – Marketing, booking and/or scheduling services 	<ul style="list-style-type: none"> – across stakeholders rather than providing DRT – Develop hubs for collective transport coordination
	Health authority	– Operate DRT services to provide patient access to non-emergency transport, including bookings and scheduling	– Support patients in selecting the most cost effective mode to get to appointments
	– Non-emergency patient transport		
	Employment agencies	– Provide DRT access to jobs	– Enable clients to access DRT
	Community Transport Association	– Advise and represent community transport operators	<ul style="list-style-type: none"> – Represented at executive level of membership organisation – Provide or facilitate training of community transport operators as required
	Membership organisations	– Does not exist at present	<ul style="list-style-type: none"> – Represent DRT at national level across the different stakeholders – Provide a forum to share good practice – Provide operational and strategic advice
Transport providers / facilitators	Commercial bus operator	– Operate commercial DRT outside the UK and contract DRT for Local Authorities in the UK	– Identify niche, commercial markets to exploit
	<ul style="list-style-type: none"> – National / larger – Local / smaller 		– Recognise DRT as a cost effective approach to transport provision
	Taxis	– Operate commercial DRT and a contract DRT for Local Authorities	– Play a growing role in DRT provision, particularly in areas of low and /or diverse demand
	<ul style="list-style-type: none"> – Hackney carriages – Private hire vehicles 		
	Community transport operators	– Operate services for the general public or specific groups of the public defined by need	<ul style="list-style-type: none"> – Play a growing role in DRT provision – Provide a product for the whole market
	Charities and local organisations	– Provide or organise transport for members or clients	– Play a growing role in DRT provision
Suppliers and distributors	Software developers	<ul style="list-style-type: none"> – Provide systems to assist with booking and / or scheduling – Provide means of communication 	<ul style="list-style-type: none"> – Develop products to meet the needs of a wider market – Share details of DRT provision nationally – Improve the interface between different software provider to integrate services
	Journey planners / online booking providers	– Limited role at present	– Include DRT in online journey planning and enable online booking, supported by developments in technology
	Vehicle designers / manufacturers	– Designing and manufacturing vehicles for the DRT market	– Respond to market need
Users	General public	– Market niche demand	– Larger market demand
	Specialist users	– Larger market demand	– Market niche demand
Freight, goods and services	Providers of goods and services	– No role at present	– Coordinate distribution of e.g. library books, prescriptions and post with DRT providers

A range of different technology suppliers were identified, including Mobisoft, Trapeze and Cleric. These have a function in bookings, route and timetable development, communication with drivers and vehicle brokerage. One interviewee highlighted that such systems had often been imported from other countries, including Finland or the USA, and were therefore optimised for DRT operating under a different system (*Interviewee 4*). However, other interviewees mentioned there was the opportunity to adapt (*Interviewee 8, Focus Group C participant 4*), or in one case redesign (*Interviewee 3*), the existing system to provide more ‘sensible’ results. The majority of interviewees

recognised that software did not, as yet, have the ability to think as a human, or the capacity to negotiate with passengers. Often the software was a valuable tool used by individuals in routing and scheduling flexible, high-demand DRT but final decisions were made by a person in order to maximise productivity and ensure customer satisfaction (*Interviewee 8*).

One interviewee emphasised an important barrier to the integration of services, with respect to the range of software providers, specifically the challenge of how to make such systems interface to select the optimum passenger journeys (*Focus Group A participant 1*). Technology of

a different form, such as smart cards, was recognised as beneficial to the integration of services:

“Smart cards are going to be great because it doesn't matter if you're a social care client, you're a health client, you're an individual, you have one card, you swipe it, the bill goes to social care for that one,

it goes to that for that, you top it up when you use it yourself” (Focus Group A participant 3).

Table 5
Macro environmental influences on Demand Responsive Transport.

	Macro-level influence	Influence on meso-level
Political and legal	Land use planning enabling dispersed activity sites	Individuals without car access require flexible public transport
	Deregulation of the bus industry and subsequent regulation / licensing	Differentiation in DRT products contributing to competition and silo working
	Social inclusion including accessibility planning	Local accessibility planning and accessibility targets providing motivation to introduce DRT
	Concessionary fares – discounted travel for older and disabled people	DRT services registered as a local bus will be eligible for reimbursement from central government, local government may opt to provide the same support for other schemes
	Localism Bill and Big Society agenda	Growing role for stakeholders such as the community transport operators
	Government restructuring including personalisation agenda	Wider transport choices for a major market segment
Economic	Increased affluence facilitating increased car ownership	Individuals without car access require flexible public transport
	The economic downturn is reducing public investment in services	Reduced investment in local transport, whilst other budgets are protected
	Economies of scale	Encourages collaboration between stakeholders in response to cuts
Socio-cultural	Ageing population	Increased demand for DRT from the elderly market segment, particularly in suburban and rural areas
	More diverse household structures	Broader demands in terms of origin and destination and times of travel
	Move towards a twenty-four hour society	Broader demands in terms of origin and destination, times of travel and booking options
	Increased environmental concern	Potential mode shift from private car to collective modes of transport
	Strong social conscience	Perspectives on what governments should invest in
Technological	Advances in programming and software	Improved routing, scheduling and booking options for DRT and the capability to communicate to users
	Increased availability of the internet, including via smart phones	A medium to find out about DRT routes, to book journeys and to locate vehicles, (or alternatively create your own collective journey).
	Cloud computing	Making it easier for small organisations to enter the market

Distributors, for the purpose of this paper, are the organisations that distribute knowledge about the DRT scheme. Given the importance of user awareness in providing a productive and effective service this is a core role. One interviewee highlighted that for DRT to be implemented, marketing needs to be focussed at all levels with the message and means adapted for that audience. When this market relates to the general public interviewees highlighted the need to use the right media to communicate with a given audience (e.g. *Focus Group C participant 6*).

At a local level often it is the local authority that coordinates this though often other providers, such as community transport and operators, do contribute. However, given the range of different stakeholders, it is often too challenging to have a grasp on service availability even at this level. At the national level it is a greater challenge. As identified above, Traveline, which provides public transport information across the UK, and other conventional journey planners, provide limited information on DRT services. This lack of marketing and distribution channels is a barrier for both supply and demand. A number of interviewees identify OpenDRT (<http://www.opendrt.co.uk>), a project sponsored by the Technology Strategy Board as part of the solution to this problem. An output of OpenDRT will be a DRT portal providing information on DRT services across the UK. Interviewees highlighted outcomes such as greater awareness and improved access to DRT for users and increased ease of entry for suppliers. One interviewee also mentioned the interface opportunities across software provider plus the capability to share good practice between stakeholders (*Interviewee 5*).

6. Macro level – broader context

A review of the broader context is achieved by examining the political, economic, socio-cultural and technological influences. As illustrated in *Table 5* these have a distinct impact upon the task environment, which in turn relates back to the micro level operation.

6.1. Political influences

Land use planning, assisted by the growth in private car ownership, has allowed for the dispersal of activity sites which has further encouraged individuals to live car dependent lifestyles. This provides an environment which supports DRT as the mode of choice (e.g. *Interviewee 1*).

Following deregulation of the UK bus industry in the 1980s all bus services outside London are operated either on a commercial basis, or a tendered basis funded by the local authority in response to social need. A result of which is that commercial services are generally concentrated on arterial routes into town and city centres (e.g. *Interviewee 7*). Related to this is the range of existing options for registering or licencing DRT services which influence the level of flexibility, the eligible passengers, the option to make a profit and the ability to pay for a driver (*Interviewee 4*). A further factor influenced by regulation and licencing is whether a service is eligible for reimbursement of concessionary fares from central government, or whether, if DRT is to be included in the concessionary fare offer, these costs can be covered by local government (*Focus Group B participant 4*).

At certain points in time political will has assisted in the supply of public transport, specifically DRT, through, for example, the social inclusion agenda, which has led to activities at the administrative level such as accessibility planning. Whilst such target driven policy development has advantages in providing efficient public transport, in sectors where transport is peripheral it can also result in organisations focussing investment elsewhere (*Interviewee 4*).

More recently the ‘Big Society’ (see *The Cabinet Office, 2010* for more details) and the ‘Localism’ agenda, designed to put ‘Big Society’ concepts into practice, would seemingly encourage organisations,

Table 6

Future directions for DRT and implications for managerial practice.

Level of influence	Themes	Future directions	Implications for managerial practice
Micro level – operational characteristics	Flexibility	There will be the same range of flexibility in relation to route, origin destination pattern and timetable which will respond to socio-demographic and geographical demands.	Operators need to increase their awareness of how socio-demographic and geographical influences demand to ensure efficient investment.
	Approach to booking	Increased booking options, including online and via mobile sources, availability of on the day and last minute bookings; real time information will also be available.	Suppliers of technology need to further develop systems for online booking and to provide real time information through mobile and online sources. Operators of services need to be able to trust and implement alternative approaches to booking. Distributors need to ensure users are aware of the options and approaches
	Vehicle and operator	Integration between vehicle and operation types will improve provision for the whole range of eligible users, merged to become one general market.	Suppliers of technology need to allow different softwares to interface for coordination. Greater collaboration between stakeholders is encouraged and, in some cases, physical and financial integration.
	(Eligible) users	The general public will be the target market for DRT, though flexible schemes will continue to play an important role for the mobility impaired and older market segments.	Distributors need to make information about DRT available using a range of media, and using designs and language appropriate to the market(s).
	Geographical coverage	DRT will play a role in all geographic settings, though flexibility will differ by context. Door-to-door services are likely to be limited to deep rural areas and individuals with specialist needs.	Health professionals and travel trainers need to support individuals with additional needs in their travel decisions, ensuring that door-to-door provision is only used when required.
	Pricing	Premium services will exist and some market niches will provide opportunities for commercial operation; other services will be more cost effective to provide as barriers preventing choice come down. When separate services are available, an opportunity to select the best value option is encouraged.	Distributors need to make general and niche markets aware of provision in a customer/market focussed manner.
	Effectiveness	DRT will continue to respond to social and economic objectives. The ability to provide for environmental objectives depends on socio-cultural and political changes.	Operators should adopt a monitoring and evaluation framework to allow for comparison across a range of objectives.
Meso level – task environment	Market niche(s)	Linked to (eligible) users the market for DRT and DRT products will develop through providing a product for the general public and targeted niche demand, for example tourist markets, access to work and the night time economy.	Stakeholders need to take a strategic approach to developing the DRT product and market coverage.
	Customer perceptions	Existing and potential customer perceptions must be challenged to grow the market of DRT.	Distributors need to make general and niche markets aware of DRT provision in a customer/market focussed manner.
	Stakeholders	Stakeholders are expected to take a changing role and new stakeholders may engage in DRT provision, e.g. providers of goods and services to rural areas (as discussed in Table 4). There is a role for the wider distribution of DRT knowledge using the internet and mobile sources of promotion/information sharing.	The industry requires representation at the national level, to provide operational and strategic advice. The concept of sharing information about DRT online should be developed to increase both operator presence and users' access to knowledge of DRT services.
Macro level – broader context	Political influences	The barriers to integration of services need to come down at all levels; there needs to be support for the most appropriate form of public transport and, for modal shift, policies which discourage car use, particularly the use of fiscal measures.	Greater collaboration between stakeholders is encouraged and, in some cases, physical and financial integration.
	Economic influences	Whilst affluence has contributed to a geography and socio-demography supporting DRT, the recent economic downturn presents opportunities and threats, although decisions as to how available funds are invested will have the greater influence.	Service design needs to be informed by awareness of how socio-demographic and geographical influences demand to ensure efficient investment.
	Socio-cultural influences	The main change will be how the relationship with the car changes over time, as influenced by age or household structure; additionally it can be influenced by attitudes in response to policy.	Stakeholders need to respond to changing consumer demands in response to behavioural changes in response to policy and changes in preferences.
	Technological influences	Technology has played a growing role in DRT service design and use; technological advancements, and trust in such advancements, provide further opportunities for DRT.	Suppliers need to continue investing in technology to optimise booking and service provision, and do this in a manner which allows for service integration. Operators of services need to be able to trust and implement these technological advancements.

such as Community Transport, to play a growing role in transport provision (e.g. *Interviewee 2*). Yet, there are political barriers to entry for new or expanding stakeholder groups. Whilst recent updates to the regulation of DRT services were identified by some interviewees as advantageous, such as the ability for community transport operators to use paid rather than voluntary drivers when delivering a service aimed at the general public, challenges still remain. For instance the local authority approach to payment in arrears provides a barrier to entry for smaller, non-profit making organisations (*Interviewee 4*). A further example is the recognition of taxis within a local authority. Taxis are often seen as distinct from public transport and are therefore not integrated in terms of regulation or licencing and planning (*Focus Group B participant 5*).

This 'silo' working, identified by the majority of interviewees, persists at all levels of government, influencing investment levels and budget allocations across local authority departments and therefore services. Despite advice on vehicle brokerage examples of success in practice are limited. In fact, most interviewees argued that services have to go beyond sharing of resources to investment in a shared service (e.g. *Interviewee 6*). More broadly, one interviewee highlighted the influence of transport governance on the ability to introduce such policies through determining ease of access to the market for stakeholders and in creating 'a cohesive cultural framework' (*Interviewee 7*) for public transport.

6.2. Economic influences

Increasing affluence of the population has assisted in providing access to the car, and those without access to a car are often disadvantaged, particularly in rural areas. The current economic downturn is influencing investment in local services, which results in stark investment reductions into local transport in many areas (e.g. *Interviewee 4*). Whilst it is clearly a threat to DRT on one level, at another level the economic downturn provides opportunities in two main ways: the simple opportunity that DRT is recognised as a cost-effective solution to a demand for public transport, and that "hopefully the economic pressures will break down some of those barriers" (*Interviewee 3*). Pressures on stakeholder purse strings could provide a compelling argument to merge both provision and markets. The downturn is also having an influence at the household level which one interviewee recognised as contributing to recent increases in patronage on services, as household and individual access to a car declines (*Interviewee 8*).

6.3. Socio-cultural influences

Two demographic trends influencing demand were identified, namely an ageing population and a more varied household structure. Whilst the ageing population was identified as a growing existing market, the 'plurality' in household structure was argued to have 'created a demand for a much more diverse set of transport options' (*Interviewee 1*). An element related to this is the breakdown of the family unit, in particular the increased mobility which allows for family members to live further apart, meaning that older people need to look beyond their immediate family for support (*Interviewee 3*). Further socio-cultural influences encompass attitudes such as environmental concern, affecting the relationship with a car, and social conscience influencing how people in society are treated by other members, as well as by government (*Interviewee 4*).

6.4. Technological influences

One more poignant socio-cultural influence is driven by a further macro level influence, technology. The idea of a 24 hour society is also recognised as putting increased demands on a public transport system (*Focus Group C participant 6*). Such advancements in technology, having instant and mobile access to the internet, provide a two-way communication between DRT suppliers and the markets. As identified earlier, there is a growing role for the internet, especially

when catering for expanding and new market expectations. Herein lies another role for technology in improving the efficiency of routing and scheduling to better mimic the human decision-making process (*Interviewees 5 and 8*). This would enable trust in online booking systems to develop (*Focus Group C participant 2*). Along a different vein one interviewee, recognised that the capability to use shared computing power could assist in market entry for smaller organisations providing DRT (*Interviewee 7*).

7. Conclusions and implications for managerial practice

In conclusion, previous research has highlighted that there are a range of factors at the operational and task management levels, as well as at a broader level, which influence the success and failure of DRT schemes. Stakeholder interviews have been used to better understand the influences at each of these different levels and thus identify opportunities for further market penetration, market development, product development, and diversification, as summarised in *Table 3*. Whilst some of these markets, in particular the penetrated markets, would persist without major changes to the operational environment, the task environment or the broader context such services could be more productive with changes in place. With an emphasis on responding to identified and potential demands in an effective manner, through product or market development and diversification, changes at the micro, meso and macro levels are required. These future directions have a range of implications for managerial practice, as summarised in *Table 6*.

Two key developments have emerged from this research, one relating to supply and the other to demand, each with implications across the micro, meso and macro levels. The supply focussed recommendation is to merge the market through stakeholder collaboration and a redefinition of stakeholder roles. The demand focussed recommendation is the role of technology as a means for passengers to access DRT in terms of information and booking. Providing DRT for a wider general market would require large changes at the macro level in relation to the politics, and the meso level as to how stakeholders work together. Operationally, appealing to a wider market would require the identified technological advances to attract market more familiar with digital forms of information sourcing, booking and communication. Such advances would also assist with the development of niche markets, such as airports and 'the night time economy' (entertainment venues in town and urban centres). A deep socio-cultural shift is arguably required that would improve the public perception of DRT as a viable transport option.

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