Can flexible transport services be commercially viable?

CTR seminar
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What are flexible transport services?

‘transportation options that fall between private car and conventional public bus services’

- customer demand determines how each journey is operated
  - this predominantly affects the route taken and its timing
  - may also affect other factors such as the vehicle and the operator used

- key characteristics
  - requires pre-booking and operate on demand
  - types of vehicle can range from taxis to full size buses
  - can be provided for the general public but often only provided for specific passenger groups
• **public** FTS has small but increasing share of market
  – often used to fill gaps in commercial PT network
  – struggle to attract high passenger numbers

Adapted from: “Review of DRT in Scotland” Derek Halden Consultancy for Scottish Government, 2006
Growth in flexible services

• There are a number of reasons why flexible transport services for the general public have become an increasingly popular transport tool over recent years.
  – more dispersed land use patterns
  – ageing population with more mobility problems
  – increasing government interest in improving accessibility and reducing social exclusion
  – the lack of adaptability of conventional bus services
  – advances in ICT and booking/scheduling/dispatching software

• Rural and Urban Bus Challenge funding (Government funding programs aimed at increasing innovation in public transport)
  – have been extremely useful in encouraging the set up of public FTS schemes
  – these have tended to focus on applying new technology more than delivering cost-effective, long-term schemes

• Many public FTS schemes established under Bus Challenge funding have now been withdrawn on grounds of cost
Typical costs for public FTS

• Recent review of 48 FTS schemes in England and Wales

• Rural areas
  – 16 out of 25 >£5 subsidy per passenger trip
  – 8 out of 25 £2 - £5 subsidy
  – 1 service is breaking even

• Mixed rural / suburban / urban
  – 8 out of Out of 22 >£5 subsidy per passenger trip
  – 13 out of 22 £2 - £5 subsidy
  – 1 service requires £0 - £2 subsidy
# Typical costs for public FTS

## Funding and Subsidy Levels for Scottish DRT Services

<table>
<thead>
<tr>
<th>DRT Market</th>
<th>DRT Scheme</th>
<th>Operator</th>
<th>TDC</th>
<th>Fares/Subsidy (per trip)</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fife Go Flexi 1</td>
<td>Stagecoach (PSV)</td>
<td>Manual, at operator depot</td>
<td>£4.00</td>
<td>Scottish Executive Pilot</td>
<td></td>
</tr>
<tr>
<td>Town and Country Taxis (SR-PSV)</td>
<td>Manual, through operator</td>
<td>Approx £7.20 (costs increased when service hours expanded)</td>
<td>Scottish Executive Pilot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kininmonth Cabs (SR-PSV)</td>
<td>Central Council TDC (with Trapeze)</td>
<td>Approx £8.50 (not including TDC costs)</td>
<td>Scottish Executive Pilot / Council Funds</td>
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<td></td>
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<tr>
<td>Aberdeenshire Central Buchan</td>
<td>Aberdeenshire Council Social Work / Education / Buchan CT</td>
<td>Central Council TDC (with Trapeze)</td>
<td>Approx £8.50 (not including any BSOG claims and TDC costs)</td>
<td>Scottish Executive Pilot / Council Funds</td>
<td></td>
</tr>
<tr>
<td>Aberdeenshire Fraserburgh</td>
<td>Lomond Ring'n'Ride</td>
<td>SPT central TDC</td>
<td>Approx £4.80 (not including TDC costs)</td>
<td>Scottish Executive Pilot / Council Funds</td>
<td></td>
</tr>
<tr>
<td>John Kennedy (Local PSV operator)</td>
<td>Tiree Ring and ride</td>
<td>Manual, through operator</td>
<td>Approx £13.50</td>
<td>Scottish Executive Pilot / Council Funds</td>
<td></td>
</tr>
<tr>
<td>Stagecoach (PSV)</td>
<td>Gablerlunzie, East Lothian</td>
<td>Eve Cars and Coaches</td>
<td>Pre 2001: Council TDC, Specialist software</td>
<td>Approx £15.70 (fully flexible)</td>
<td>RPPG Funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2001 on: Manual, through operator</td>
<td>Approx £9.56 (fixed routes with diversions)</td>
<td>Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80p per mile operating costs</td>
<td></td>
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</tr>
</tbody>
</table>

*Source: “Review of DRT in Scotland” Derek Halden Consultancy, 2006*
What if .......?

......flexible services were introduced in higher demand areas?

- Data from peak hours in high demand service areas indicate that the maximum hourly capacity of a flexible service is about 16 passenger trips per hour.

- Typically the total cost of operating a minibus on a FTS service for 12 hours per day, 6 days per week is £80,000 - £100,000 p.a.

- Even if the service is working to its capacity for its entire operation period
  - Potential revenue @ £1.20 per trip = £19.20 per hour * 12 * 6 * 52 = £71,884 p.a.

- So even assuming a maximum load throughout the operating period a bus based service is still not economically viable.
Public FTS in urban areas

27 public FTS services operating in Greater Manchester

Cost per passenger trip between £4 and £10
Typical costs for public FTS

• In broad terms, an ‘economically successful’ or economically viable service is often regarded as one where costs and revenues are at least in balance.

• Current experience in the provision of public FTS suggests that services are not sustainable without on-going direct subsidy.

• When a gap between revenues and costs persists need to consider
  – whether costs can be shrunk
  – whether revenues can be grown
Shrinking Costs

• Buses typically cost £20 to £25 per hour of operation.

• One option is to reduce contract costs by using not-for-profit community transport groups (with voluntary drivers) rather than commercial bus operators.
  – Problems with service reliability when using volunteers

• For flexible services ‘pay as you go’ contracts make more sense.
  – Only pay when needed.

Not common in bus industry but is what taxis have always done!
In rural areas, standard bus services and Flexible Transport Services have higher subsidy costs than taxis.

Analysis by LEK consulting has shown that it would be cheaper to book taxis for all Plusbus or Wigglybus FTS passengers rather than fund a bus service!

Note: Costed for Plusbus/Wigglybus area for comparison only. The service provided under standard bus is Mon- Sat, 11 hours per day, hourly or every three hours.

<table>
<thead>
<tr>
<th>Type</th>
<th>Scheme tested</th>
<th>Subsidy cost/pax (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxi</td>
<td>PHV</td>
<td>3.36 - 3.40</td>
</tr>
<tr>
<td>Experimental</td>
<td>Wigglybus</td>
<td>5.12</td>
</tr>
<tr>
<td></td>
<td>Plusbus</td>
<td>4.65</td>
</tr>
<tr>
<td>Standard</td>
<td>Hourly</td>
<td>6.92 - 17.84</td>
</tr>
<tr>
<td></td>
<td>3 Hourly</td>
<td>5.77</td>
</tr>
</tbody>
</table>
Growing Revenues

• 2 options =>

Attracting more passengers or charging higher fares

• Previous example illustrated that attracting more passengers (paying ‘bus fares’) on its own cannot generate sufficient revenue for commercial viability.

• But are FTS passengers prepared to pay fares which are higher than equivalent bus fares?
• Developed detailed cases of 72 DRT projects across the world

• Intermode identified two segments of the market for FTS services

  1. **captive users** - those who do not have a car available for their journey

  2. **choice users** - those who use FTS even though they have a car available

  – Attraction of the first group supports the objectives of improved accessibility and social inclusion.
  – Attraction of the second may in addition contribute to congestion relief and environmental improvement.
Intermode findings

- The factor most highly rated by both captive and choice markets is certainty of arrival time.

- The key distinction between the markets was that choice users prefer taxi-like attributes (such as personalised and door-to-door service), while captive users required a basic means of reaching their destinations and carrying on with their activities.

- Price was an important variable for captive users but was much less so for choice users.

- Choice users found comfort to be an important quality attribute.
Growing Revenues

Attracting more passengers or charging higher fares

- Illustrated that attracting more passengers (paying ‘bus fares’) on its own cannot generate sufficient revenue for commercial viability.

- *Intermode* project identified two segments of the market for FTS services
  - *captive users* - those who do not have a car available for their journey
  - *choice users* - those who use FTS even though they have a car available

- Attracting more ‘choice’ passengers and charging a higher fare may provide the answer.

- But to charge a higher fare (and still attract more passengers) you must provide a more attractive service!
Key lessons of the commercial and near-commercial FTS schemes

- Many of the commercial or low-subsidy FTS services are premium products. They seek to deliver a near-taxi level of service for fares that are closer to taxi fares than bus fares.

- The use of simple, manual, developments of taxi or hire car systems tend to have an associated low cost base.

- Commercial FTS addresses upmarket niches – such as air travellers or middle-class rail commuters.
Commercial FTS examples

Airport shuttle services – using minibus
Case Study: Dot2Dot

London’s Airport Shuttle
Connecting Heathrow, Gatwick
Central London and Canary Wharf

http://www.dot2.com/

- drop off at - and pick up from - any hotel, office or private address in service area

### Between Heathrow and Central London

<table>
<thead>
<tr>
<th>Number of passengers:</th>
<th>One Way (£’s £):</th>
<th>Round Trip (£’s £):</th>
<th>20% off return (£’s £):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21.50</td>
<td>43.00</td>
<td>34.40</td>
</tr>
<tr>
<td>2</td>
<td>43.00</td>
<td>86.00</td>
<td>68.80</td>
</tr>
<tr>
<td>3</td>
<td>88.00</td>
<td>116.00</td>
<td>92.80</td>
</tr>
<tr>
<td>4</td>
<td>73.00</td>
<td>148.00</td>
<td>118.80</td>
</tr>
<tr>
<td>5</td>
<td>98.00</td>
<td>176.00</td>
<td>140.80</td>
</tr>
</tbody>
</table>

- Dot2Dot transfer prices between London and Heathrow Airport are typically half the price of a taxi and are fixed at all times of the day.
Logical Transport software chosen for dot2dot as National Express takes Demand Responsive Transport mainstream
Case Study: Auckland, NZ

- **Airport Express bus to city centre, every 15 mins**
  - adult single $16 NZ
- Not ideal if destination outside city centre
  - Taxi fare to city centre $55 - $80 (11 miles)
  - Taxi fare to Eastern Suburbs up to $80 (11 miles)
  - Taxi fare City to Eastern Suburbs - $55 - $60 (10 miles)

- **Super Shuttle - Airport to Eastern Suburbs**
  - Shared use
    - $41 for one
    - $50 for two
    - $59 for three
  - Exclusive use price $93
Near commercial FTS examples

Railway station feeder services – using shared taxis
TreinTaxi

- National taxi based scheme in Netherlands
  - Serving 2.2 million passenger journeys per year in areas around 38 rail stations
  - TreinTaxis serve an area of approximately 8 km around each station.
  - Equates to an average of 160 passenger trips per day per station

- 16 – 20 trips per hour at busiest times ……but a single bus couldn’t serve all this demand due to the spatial distribution

- Therefore a number of smaller taxi vehicles are used
  - Av fare per journey £3.30
  - Subsidy per pass trip is about £1
  - 75% of costs from fare revenue
  - 25% subsidy

- In UK typically 60 – 80 % subsidy required for public FTS
TaxiPlus in UK

CfIT – A new approach to public transport (2008)

- CfIT believe the UK would benefit from taxi based FTS schemes similar to the regional and national operations that have developed in the Netherlands and Switzerland – which have been shown to have lower subsidy costs per trip than the more locally-organised schemes currently operating in the UK.

- CfIT have coined the phrase ‘TaxiPlus’ to refer to a form of taxi-based public transport using a fleet of small vehicles that provide shared transport to passengers who pre-book. Ticketing should be integrated with conventional public transport, and services should be designed to connect with buses and trains.

- CfIT recommend that central Government should consider the funding of a large-scale TaxiPlus demonstration pilot. The scheme should be at the level of an entire county.
• CfIT work has established that a TaxiPlus service in rural areas is likely to provide a similar level of service for significantly reduced subsidy.

• But could a TaxiPlus service be commercially viable?

• Remainder of the talk
  – Present a worked example serving a commuter rail station (along the lines of the Dutch TreinTaxi model).
Possibly over 100 more with lower demand and less frequent train services but still have station access and parking capacity issues.

Harlow Town Station

At least 50 other commuter stations around London with similar levels of demand and frequency of train service to Harlow.

HARLOW

Fairly typical commuter town

Population 75,000

25 miles from Central London

2 Rail Stations

Rail corridor between

- Cambridge to Liverpool Street and
- Stansted Airport to Liverpool Street

Possibly over 100 more with lower demand and less frequent train services but still have station access and parking capacity issues.
Harlow Town Station

Research conducted for Passenger Focus by Steer Davies Gleave

Examined parking capacity and utilisation at 101 stations in Greater Anglia region and conducted more detailed study at 4 stations
Potential Shared Taxi Demand
Harlow Town Station

- Number of trips per weekday =
  - 5180 single journeys per day.
  - Or 2590 return journeys per day.

- proportion of these which are commuter trips = 48% = 1243 commuter trips per day

- proportion of commuter trips which are park and ride and kiss and ride
  - 33% P+R = 415
  - 24% K+R=298

- proportion of these which originate within 4km of the station
  - 80% of P+R =332
  - 75% of K+R = 224
  - approx 550 total

- number of trains during the commuter period (0645 – 0815) = 7

- => number of park and ride / kiss and ride passengers per train (close enough to station to use shared taxi) = 78

- If a quarter of these car drivers would consider switching to shared taxi then this represents approximately 20 passengers per train.
What level of uptake is likely?

- Commuter currently driving 3 miles to local rail station and taking train 25 miles to work.
  - Parking for the day at cost of £1000 to £1500 for season ticket.
  - Cost of car travel £1 each way per day.
  - Cost of parking £4 to £6 per day.
  - Total cost £6 to £8 per day.

- Cost of taxi home to station £7  
  Daily cost of taxi = £14

- What proportion of drivers would choose to use shared taxi if it guaranteed a £4 fare? ........or a £3 fare ???

- **IF** a quarter of commuters who currently access station by private car would consider switching to shared taxi then this represents approximately 20 passengers per train.
Other potential users

• Commuter currently driving 30 miles to work and paying £0 parking.
  – Cost of travel £5 each way
  – £0 per day parking
  – Total £10

• Commute takes 60 to 90 minutes. Train takes 30 minutes.

• Train season ticket costs £2500 (or £10 per working day) – do time savings justify this extra cost?

• Problem is no parking at station and no public transport to access station.

• Would any of these car drivers be prepared to pay £4 each way for shared taxi?

Other Beneficiaries
• Local business benefit through release of central parking spaces for town shoppers
• Train operators benefit through extra passenger revenue
• Environmental benefits – less traffic on motorways and local town roads
• Car available for use by partner (possible impact on ownership of second cars)
Would this be commercially viable?

- A taxi trip of 3 miles pays £7 and takes 20 minutes to drop off and return to station.
- At peak times for rail commuters taxis can expect 2 or 3 passenger pick-ups per hour and £14 to £21 in fares.
- At peak commuter periods there may be an additional 20 passengers every 15 minutes prepared to use shared taxi service.
- So if 4 shared taxis operate from the station every 15 minutes (e.g. North; East; South; West) carrying an average of 5 passengers each (paying £4) then the revenue per trip would be £20 rather than £7.
- It is likely that the same taxi could return to the station within half an hour and so provide 2 trips per hour resulting in a revenue of £40 per hour.
- Even if only 2 passengers can be combined the shared service is still viable.

So if passengers with similar needs can be combined then potential revenues between 0630 - 0830 and 1730 – 1930 can be significantly increased.
Problems / Issues

- Commuter acceptance - willingness to pay
  - Commuters sensitivity to price will need to be researched to establish the optimal fare (e.g. willingness to pay surveys may reveal an equal likelihood of attracting 3 passengers per taxi at £3 per trip or 2 passengers at £4 per trip).
  - There needs to be a guaranteed fixed fare regardless of number of shared users.

- Reliability concerns
  - Risk that taxi doesn’t pick up in time for outward train connection (remember the factor most highly rated by both captive and choice markets is certainty of arrival time).
  - Importance of this will be linked to frequency of trains
  - Assurance can be provided through sending real time updates on taxi pick-up time to commuters mobile device

- Flexibility
  - Commuters may desire the flexibility to change return journey pick up from station if delayed at work.
  - Need to be able to easily alter taxi pick-up times/confirm arrival time using mobile devices.
Problems / Issues

• Operator risk
  – if fixed shared-fares are offered to passengers regardless of the number of passengers carried then the operator is exposed to some risk
  – if only one passenger is carried at £4 per trip then the operator is making a loss on what they could otherwise earn for non-shared operation (£7) at that time of day.

• Operator acceptance - perceived loss of income
  – It needs to be demonstrated to operators that where demand is time limited (e.g. commuter peak periods) any potential revenue from servicing this demand is lost for good if the supply is not sufficient. Offering shared rides at peak times results in more rather than less income.
  – Furthermore, if supply is better matched to demand during the peak then this deters new entrants to the market resulting in less competition during periods of lower demand.
Why has it not happened?

- To date in the UK there has been very little attempt made to combine unconnected individual passenger journeys in the same taxi.

  - This is primarily down to two reasons:
    - taxi operators have very limited means of identifying potential passengers with similar trip requirements (time and direction of trip)
    - potential passengers cannot find information on taxis offering shared trips or other passengers wanting to share a trip in the direction in which they are travelling at the time they are travelling

A web portal matching similar trip demands with available taxi operators could provide the solution.
Next steps

• CTR are involved in developing and trialling “A UK DRT booking portal”
  – funded through Technology Strategy Board
  – Partners: CTR; Napier University; Mobisoft; Quotient
  – October 2009 – Sept 2011

• This web based portal is intended as a mechanism to bring together public FTS services and enable smaller operators to provide their services more cost effectively

• Taxis can be considered as a small operator providing a flexible service for the public
Use of web-portal

- Digital mapping will make it very easy for the operator to publish details of their shared services
  - E.g. stations and times to which shared services will connect and the catchment areas and fares covered by the services they offer

- The mapping linked to address point databases enable passengers to view visual map based presentation of the services on offer thereby enabling easy identification of suitable services and subsequent capture of passenger demands
  - E.g. passengers enter their pick-up address and station arrival time

- The web-portal software would combine appropriate trips and schedule the pick-up times

- The portal and background software can manage the bookings:
  - Providing real time updates on pick-up time to commuters mobile device if taxi is delayed
  - Receive booking alterations from commuters mobile devices at short notice if train is delayed or commuter is held up at work ........and forward amendments to relevant taxi operators.

- The portal will allow even the smallest taxi operators to offer shared services – no costly outlay for own software
Issues to consider

• Contract between passenger and taxi - liability for no-shows

• Safety / security of passengers – who is responsible if booked through portal

• Payments – how are they made and is a fee made for using portal – how much?

• Easy to advertise the portal at station platforms, station car parks or on trains.
Further research?

• Study to establish the likely take-up from commuters of a shared taxi service
  – at different locations and fare levels

• Study to establish the capacity and likely take-up of the taxi industry to offer shared taxi service to commuter stations
  – at different locations and fare levels
Thank-you for listening

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