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## The role of information in decision-making with regard to travel

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While the Office of Science and Technology commissioned this review, the views are those of the authors, are independent of Government and do not constitute Government policy.

### Executive Summary

The decision-making of individuals lies at the heart of individual and collective travel behaviour and gives rise to the patterns of mobility that place their demands upon our transport systems. This article aims to examine what is known about the role of information in decision-making with regard to travel alongside considering current developments in the provision of travel information (in the information age). Its structure is arranged around the following series of key questions:

- What is the role of information?
- What types of information services are available?
- Is information in demand?
- What information do travellers want?
- What are the behavioural effects of information use?
- What are the challenges in providing information?

The article draws out a number of observations. The simple presumption that individuals wish to have or need information to assist them in their decision making is misplaced. Psychological factors such as habit and satisficing behaviour can obviate the need for information. Inertia and mental effort can inhibit actions to review the relative merits of alternative travel choices. The need and hence demand for information is much more limited. In addition, even when information is sought, it may be for confirmatory reasons rather than for reasons of comparison – in other words it can provide assistance to the individual in planning the detail of and executing their journey whilst not bringing about any change in behaviour as such. The offering of information services itself has advanced substantially in the last 10 years, boosted notably by advances in ICT and specifically the mainstreaming of Internet and mobile telephony. Indications of high usage levels of some services would suggest that while information services are not in high demand for a large proportion of journeys, this should not be misconstrued as an absolute indication of low demand. There is a significant minority of journeys for which information can prove highly useful to the individual. The extent to which, however, usefulness to the individual equates to behaviour change by the individual is not clear though it seems that substantial behaviour change (certainly in terms of mode choice) is unlikely. Insights from this article it is hoped will serve as a safeguard against technologically deterministic and thus utopian outlooks for the future of travel information provision. There are still strong temptations evident in the literature to sweep aside the barriers with a speculative view that everything can be solved by ‘clever’, personalised information services, made possible through technological advance and ingenuity. Some of the barriers, it is true, are technological in nature, but other more challenging ones concern human nature and indeed the availability of and relative merits of actual travel options. As we move into the future, technological advance will doubtless occur, but fundamental traits of human behaviour and information seeking are likely to remain much more fixed. As to the travel options themselves and hence the overall performance and use of the transport system, that is something that lies outside the bounds of information service provision.

### 1 Introduction

The decision-making of individuals lies at the heart of individual and collective travel behaviour and gives rise to the patterns of mobility that place their demands upon our transport systems. Decision-

making is something which occurs at a number of levels. *Strategic* decisions are made that, intentionally or otherwise, shape longer term behaviours – for example decisions about where to live, where to work, whether to buy a car or whether to buy a public transport season ticket. Such decisions can significantly dictate the set of travel options available to an individual or determine the relative attraction of different options within the set. With such strategic decisions made, an individual continues to make more numerous *tactical* decisions concerning individual journeys such as where, when, by what route and by what means to travel.

Seldom are any of these decisions uninformed or made randomly. Individuals employ their existing knowledge of the alternative options before them and may choose to enrich, update or extend their knowledge through acquiring information from third parties. The availability of and access to such information is not something that is the preserve of the information age. The oldest form of information provision is man himself. Individuals learn from experience and share their lessons with others. Shared lessons enable others to learn more quickly and make potentially better decisions. Reliance upon other people for information still plays a very important part in decision-making today with regard to travel.

However, what has changed over time is the size and complexity of our transport systems and how they are used. In the last 40 years the UK's road network length has increased by about one quarter (DfT, 2002). We have a public transport system in the UK that is in the hands of private operators and thus an industry that is made up of a multitude of organisations. We have more fares than there are people for travel between the nation's 2500 railways stations. Ever increasing levels of travel demand and personal mobility result in a transport system that at certain times and places runs very close to capacity, creating instability and unpredictable travel conditions. With increasing journey speeds has come an increase in the distances people travel (see below). As people travel further afield their travel options tend to increase and in turn the likelihood of them being familiar with such options may decrease as may the likelihood of having other people around them able to inform and advise based on their own experiences.

All this seemingly conspires to make the provision of information to meet the needs of the individual decision maker much more challenging. However, in line with the rising challenge has arisen the information age. This has presented and will continue to present many opportunities for data and information exchange that can, in effect, draw upon vast knowledge bases to provide individuals with the information they need in ways that were not possible when dependent solely upon word-of-mouth and paper-based services.

This article aims to examine what is known about the role of information in decision-making with regard to travel alongside considering current developments in the provision of travel information (in the information age). Its structure is arranged around the following series of key questions:

- What is the role of information?
- What types of information services are available?
- Is information in demand?
- What information do travellers want?
- What are the behavioural effects of information use?
- What are the challenges in providing information?

Further to addressing these questions the article moves, prior to its conclusion, to consider possible future trajectories for the role of information and the forms of information service provision.

The article principally considers the role of information in relation to tactical decisions and is centred upon a UK context.

Decision making and the role of information can be at risk of being considered in a somewhat abstract context. Therefore, brief clarification is now provided, at least at the aggregate level, concerning the nature of travel in the UK (DfT, 2005). Table 1 firstly presents figures for 1972/73 and 2002/03 thereby offering a comparison of how the nature of travel has changed in the last 30 years. The number of trips being made and the time spent travelling has changed very little *at the aggregate level* over time while the distances being travelled have increased substantially and by implication so too have journey speeds. In spite of this increase in average trip length, the majority of

travel can (still) be assumed to be local. In 2002/03 68 per cent of all trips were under 5 miles and 84 per cent of all trips were under 10 miles. Nearly 80 per cent of all car journeys and 90 per cent of bus journeys are under 10 miles. All walk trips are under 10 miles (and nearly one quarter of all trips are made on foot). In contrast nearly 80 per cent of rail journeys are 10 miles or over.

Table 1. An overview of changes in UK travel (Source – DfT, 2005)

	1972/73	2002/03	% change
Distance travelled per person per year (miles)	4476	6855	+53
Number of trips per person per year	956	998	+4
Average trip length (miles)	4.7	6.9	+47
Average trip time (minutes)	22.2	21.8	-2

Table 2. Trips per person per year by journey purpose (Source – DfT, 2005)

Trip purpose	Proportion of all trips (%)	Proportion of all miles travelled (%)	Mean trip length (miles)
Commuting	15	19	8.5
Business	3	10	20.7
Education	7	3	3.1
Escort education	5	2	2.2
Shopping	20	12	4.3
Other escort	10	7	5.0
Other personal business	11	7	4.4
Visit friends at private home	12	16	9.2
Other	19	25	9.2

Table 2 shows how travel is distributed across different journey purposes in terms of the number and length of trips. It highlights that commuting and journeys for education, escort education and shopping account together for nearly half of all trips. All or most of these are arguably routine, familiar trips with which individuals will be well acquainted. The same will be true for a proportion of all other trips. While the trip lengths shown in the Table are averages this nevertheless highlights business as the only trip purpose immediately associated with long distance travel<sup>1</sup>.

So, in leading into the remainder of the article, one can summarise that the travel context for decision-making and the role of information is characterised by a very high proportion of journeys that are relatively short and likely to be familiar to the individuals making them. This said, the smaller proportion of longer and perhaps typically less familiar journeys should not be seen as insignificant. As will be considered later, the extent of familiarity is not the only important contextual consideration. The extent of reliability of the transport system also has a bearing on the ease and certainty with which journeys are undertaken and completed.

## 2 What is the role of information?

Travel information serves a number of important roles, it can:

1. make the individual aware of the travel options available to them for a particular journey;
2. empower the individual to make more fully informed travel choices; and
3. assist the individual in being able to successfully undertake and complete the journey.

### 2.1 Route and mode choice

Two key choices that are associated with the provision of information and its study in the literature are the route taken for a journey by road and the mode or modes of travel for a journey. The former appeared to predominate for many years in an era when car use was growing as was the transport infrastructure to support it<sup>2</sup>. The policy preoccupation was with managing traffic on the road network. It was also with modelling traffic flow on the network which presented a need to understand route choice. Route choice remains an important consideration today. Indeed intriguingly when the vast amounts of research literature on traveller information from the US are examined it quickly becomes apparent that for much of this the term 'travel(l)er' is synonymous with the term 'driver'. More recently in the UK, in spite of nearly two-thirds of all person trips being made by car and hence an implicit continued importance of information to support the motorist, greater attention has turned to the choice of *mode* of travel as the transport policy climate has shifted from 'predict and provide' for (car) traffic to one of wishing to reduce dependence on the car and encourage greater use of alternatives and notably public transport (DETR, 1998). Other travel choices include when to depart on a journey and which destination to go to.

<sup>1</sup> In passing one might note that transport researchers, practitioners and policymakers as a sub-set of the population are likely to experience a much higher than average incidence of long distance business travel which may implicitly colour their minds when assessing in general rather than specific terms issues associated with travel information!

<sup>2</sup> See Lappin and Bottom (2001) for a recent review of traveller information that includes coverage of route choice.

<sup>3</sup> The Association of Train Operating Companies in the UK makes a substantial annual investment in the provision of the National Rail Enquiries Service and through commissioned research have demonstrated the generative effect of information on ticket sales (Mapp et al, 2000).

<sup>4</sup> This is not always the case – research evidence suggests that in some instances people have a 'turn up and go' mentality to their travel and might therefore, in effect, do their travel planning on the fly. See for example research commissioned by the Department for Transport on end-legs and interchanges (MORI, 2002).

<sup>5</sup> Results of a questionnaire to English and Welsh authorities during autumn 2004 reveal that, further to investment by the Department for Transport in this area, 41 per cent of the local bus fleet in England and Wales is now equipped for real-time information and that about half of all bus passenger journeys occur on such equipped vehicles (Knoop and Nelson, 2005)

<sup>6</sup> The UK-centric orientation of this article is not to suggest that examples of state-of-the-art do not exist or are not emerging elsewhere. The Netherlands, Germany, France and Denmark for instance all have notable information services – see, respectively, for example: <http://www.9292ov.nl/> ; <http://reiseauskunft.bahn.de/bin/query.exe/en> ; <http://www.autoroutes.fr/index.php?lng=2> ; and <http://www.rejseplanen.dk/>

<sup>7</sup> <http://www.atoc.org/>

<sup>8</sup> <http://www.nationalrail.co.uk/>

<sup>9</sup> <http://www.traveline.org.uk/about.cfm>

<sup>10</sup> <http://www.traveline.org.uk/>

<sup>11</sup> <http://www.transportdirect.info>

<sup>12</sup> <http://journeyplanner.tfl.gov.uk/>

<sup>13</sup> <http://www.highways.gov.uk/trafficinfo/>

<sup>14</sup> The Department for Transport spent £1.025 million on an advertising campaign for the traveline phone service in 2001–02

<sup>15</sup> A national promotional campaign was run in early 2005 for Transport Direct.

<sup>16</sup> RDS/TP stands for Radio Data Service / Travel Programme which is a radio feature that automatically interrupts the radio station being listened to with traffic and travel news broadcasts.

<sup>17</sup> Demand also relates to whether people know an information service even exists (awareness) and whether they have the means to access it.

<sup>18</sup> For a review of work in this area and a clarification of the different matters concerning data exchange please see Bolelli et al (2000).

<sup>19</sup> For an extensive coverage of usability issues (in relation specifically to public transport information provision) please see Kenyon et al (2001).

<sup>20</sup> Social Research Associates characterise these three forms as follows: constrained – "My personal

circumstances dictate my choice” or “I believe I already know what to do”; passive – “I expect to be told what to do by a trusted source”; and active – “I carefully weigh up all the options and make a systematic choice”

<sup>21</sup> See for example <http://www.theaa.com> and <http://rp.rac.co.uk/routeplanner>

<sup>22</sup> See for example <http://www.m-spatial.com/mapway.htm>

## 2.2 Benefits to the traveller

It is tempting to take as given that travellers have a natural affinity with the three roles outlined above – in other words they *want* to know what their travel options are and *want* to make the best choice. This issue will be returned to in Section 4. However, for the time being let us succumb to this temptation as it seems others have done in considering and pursuing the role of traveller information. A key presumption is that travellers are rational and objectively weigh up the costs and benefits of the different travel options before them. It is acknowledged that they may often do so with incomplete or imperfect knowledge about these options. Thus if information about the *true* costs and benefits is revealed it is anticipated that travellers would choose the most cost effective option where ‘cost’ is seen to encompass factors including comfort, convenience, financial cost, journey duration and reliability (Ortuzar and Willumsen, 1994). On this basis if travellers embrace and use travel information services they stand to benefit themselves by minimising the ‘cost’ of their journeys.

In theory travellers faced with incomplete or imperfect knowledge are on occasions making sub-optimal choices concerning mode and route of travel. In turn, full knowledge of the options open to them on such occasions should lead to mode or route change. The role of information in closing the gap between perceived and actual ‘cost’ of a travel option is particularly pertinent to a policy and investment climate that seeks to reduce congestion and notably improve alternative travel options to the car. In this climate it is to be hoped that the number of instances when the actual ‘cost’ of travel by public transport is lower than that by car should be increasing. The benefits of such improvements will only be realised if, with the aid of information services, perceptions are adjusted to keep pace with the changing actuality of costs of travel alternatives.

## 2.3 Benefits to the information service provider

For traveller information services to be made available there must be others besides the travellers themselves that stand to benefit, namely those that invest in and undertake to provide such services. Service provision can involve either private sector organisations, public sector organisations or both. They are likely to be seeking one or more of the following benefits (Lyons, 2001):

- *Financial* – beyond certain statutory obligations to provide information, public transport providers will invest in information provision if sufficiently increased revenues from ticket sales can be achieved (or if to not invest would see revenues decline)<sup>3</sup>. Private sector information providers may also achieve financial benefit through the sale of devices used to access their information and/or through payment to access the information either on a subscription basis or pay-per-use basis.
- *Economic* – based upon the assumption that travel time is a cost to the economy and that saved travel time therefore has an economic value, information can achieve benefits through encouraging a better distribution of travel demand across time of day, routes and modes such that congestion and total travel time are reduced.
- *Environmental* – environmental benefits similarly can be derived in turn from reduced congestion and a redistribution of travel demand with the prospect of reduced noise and emissions.
- *Social* – recent investigation of the links between transport and social exclusion (SEU, 2003) pointed to the issue of people having limited travel horizons that in turn may limit their access to people, goods, services and opportunities. Notably for households without a car (which amount to nearly one third of all households in the UK) inadequate information provision may diminish the accessibility of public transport particularly in areas where services are infrequent and people are not familiar with when and from where public transport services run. Good information provision has the potential to make it easier for people to find suitable options for reaching destinations that in turn can help mitigate social exclusion.

## 3 What types of information services are available?

We now turn to consider what types of information services have come into existence in pursuit of

the benefits identified and seeking to fulfil the roles set out.

### 3.1 Degrees of integration

Kenyon and Lyons (2003) have made the distinction between three types of travel information service provision in the specific context of considering the influence of information on mode choice:

– *Unimodal traveller information (UTI)* – This has been and continues to be the most common form of provision whether it be in the form of low tech paper timetables and road atlases or via the Internet or telephone providing more complex planning facilities and real-time alerts concerning traffic or transport services' operating conditions. UTI services may cover a wide geographic area or more than one transport service but they are characterised by only informing the traveller about a single mode of travel. There are many UTI services operating at local and national (and in some cases international) levels associated with plane, car, rail, coach and bus travel. That such services are unimodal might suggest that they cannot inform and influence mode choice. More accurately, they can be employed to inform and influence mode choice if the individual uses more than one of them (or uses one of them alongside their own knowledge of, or perceptions about, other alternatives).

– *Multimodal traveller information (MTI)* – This concerns the provision of information about more than one mode within a single source. In effect, an MTI service consists of a series of UTI services housed together within a single website or available via a single telephone number. MTI services provide, in effect, a portal that offers a single point of access to multiple sources of information, making information about the available modes more accessible and consequently, reducing the effort associated with any wish to compare between modes. They can also provide a convenient and logical common location for all travel information concerning a particular geographic area.

– *Integrated multimodal information (IMMI)* – This type of information provision extends further the principle of trying to reduce the effort for the individual in comparing their travel options. Like MTI services, IMMI services provide a single point of access to information concerning more than one mode. However, rather than merely coordinating the provision of information on more than one mode, IMMI services *integrate* that provision. In other words, the service user can make a single request stipulating their journey requirements (the origin and destination as a minimum) and the service will interrogate its systems to provide travel options for the required journey that cover more than one mode. Such services are only now beginning to make their presence felt in the (UK) information marketplace.

### 3.2 Journey planning and journey execution

Information provision can also be separated into that which assists in journey *planning* and that which assists journey *execution* (which in itself can include journey re-planning). Journey planning is generally undertaken before the journey commences or 'pre-trip'<sup>4</sup>. As such, journey planning information can potentially assist and influence the full set of tactical travel choices – destination, mode, route and departure time. Information to support journey execution in one respect is about providing the guidance to complete the journey as set out at the planning stage with as much ease as possible. Notably this concerns providing wayfinding assistance.

In another respect it is about providing 'real-time' information about the journey to advise travellers about conditions of the transport system that may affect their journey and prevent it from being completed according to the planning. Such information may advise of unpredicted traffic congestion as a result of an incident or of delay to or cancellation of a train service. This information can also be *advisory* or *directive*, i.e. it may simply alert the traveller to a problem or it may also indicate a suggested means of overcoming the problem respectively.

### 3.3 Real-time information

If indeed an individual is to make fully-informed decisions between their travel options then it is necessary for the information made available to them to be accurate. Complete accuracy would equate to the information being exactly the same as the related part of the journey as actually experienced. For example, if a truly accurate information service advises that the train departs at 11:05 then this is indeed when the train does depart.

Some information may be considered *static* and unchanging in its accuracy on a daily basis – for example knowing which junction to leave the motorway from for a particular journey. Other static

information is defined as such because it is schedule information such as that provided within bus and train timetables. Such information can be correct in the sense that the schedule is accurately conveyed to the travellers and yet can be incorrect in terms of accurately reflecting what the traveller may in practice experience. Similarly, journey planning services for car drivers have tended to assume fixed average speed levels in calculating the quickest route. They can be accurate in faithfully adhering to these assumptions in advising individuals in their journey planning but will likely be proved inaccurate to some degree in terms of the eventual travel speeds experienced by the driver.

Other information, by its very nature, will be *dynamic* – for example the actual journey time to work in a congested urban area. Reference is frequently made in this context to real-time information. Taken literally this describes an accurate account of actual travel conditions as they develop. In practice it may be helpful to broaden this interpretation to encompass that information which is not static or schedule information. This can then include a range of sorts of information:

- planned deviations from schedule;
- historic information on actual journey conditions;
- observed journey conditions as they happen; and
- predicted conditions.

An example of a planned deviation from the schedule would be adjustments to the national rail timetable because of known engineering works being undertaken. An example of the use of historic information would be to record journey times experienced over time along a particular route at different times of day and days of the week as a means of advising others of potential journey times based on that ‘experience’ when planning their own journeys. Radio traffic and travel broadcasts are a typical example of sharing information on observed journey conditions as they happen. Finally, the ‘real-time’ information displays at bus-stops that inform the traveller when the next bus will arrive are an example of predictive information – the information service cannot guarantee that the bus will arrive when stated but it offers a best estimate based on known information about the bus’s progress along its route<sup>5</sup>.

#### 3.4 *Delivery media*

Mention above of re-planning a journey points to the issue of different delivery platforms for information provision being more appropriate in different contexts of information need. For example, a carefully planned car journey pre-trip might have been done on the Internet with a detailed travel itinerary printed out for use on the journey. If part of the route once the journey is underway is blocked by an incident (about which the individual may have been made aware through advisory information from the radio), the individual will wish to have a revised itinerary but will not have desktop-PC access to the previously used Internet information service. In the absence of an in-car navigation system, the solution may be to combine the use of a road atlas with directive information received from an information service accessed via (hands-free) mobile phone.

Mainstream media for acquisition of travel information are face-to-face, paper (print media), telephone and desktop Internet. Mobile Internet is also now becoming an alternative. Additionally, on-street kiosks and in-vehicle/at-stop devices further extend the array of information delivery channels.

#### 3.5 *Examples of existing information services*

There is not place in this article for an extensive review of the many and varied specific information services that exist across the different types of service and delivery channels. It is appropriate, nevertheless, to highlight a selection of UK examples illustrating some of the points above<sup>6</sup>.

*National Rail Enquiries* – The Association of Train Operating Companies (ATOC) is the trade association for passenger rail and represents 26 member operating companies<sup>7</sup>. To comply with one of the conditions of the franchise agreement of each of its members it provides the National Rail Enquiries service. This was launched as a telephone service in 1997. The telephone service provides timetable information for journeys between any of the 2500 stations on the national network. It also provides booking and fares information. The timetable information is regularly updated with known changes and service disruption information. More recently the service has also been made available via the web<sup>8</sup> (with booking and payment possible through hand-off to third party online

ticket retailers). As well as journey planning, the web service includes a 'live departure boards' function. By entering a station name, the service provides details of all the expected arrival and departure times of trains for that station in the near future. Listed on the service's website are further information channels that are addressed: "The National Rail WAP site; TrainTracker™ - an automated voice service which gives you up-to-the-minute information on your chosen trains for both arrivals and departures; TrainTrackerText™ (the SMS version of TrainTracker); TextMe JourneyPlanner: which lets you send a copy of your journey details to your mobile phone." Across its multiple deliver channels and functions, National Rail Enquiries is a prominent example of a unimodal information service that delivers both static and dynamic information. Statistics on the use of the telephone service revealed a substantial increase in enquiries during the September 2000 fuel crisis and following the Hatfield rail crash in October 2000. Respective quarterly demand figures were 51 per cent and 36 per cent higher than the corresponding figures of the previous year (SRA, 2001). This highlights the heightened demand for traveller information when (perceived) merits of different modal travel options change or service running of a particular mode becomes more unreliable.

*www.travelbristol.org* – Bristol City Council provide a good example of a multi-modal information service which is billed as follows. "For all of your travel information needs both in Bristol and further afield you can now visit a new online one stop shop at *www.travelbristol.org*." Figure 1 shows the homepage of the service. It has gathered together, for the convenience of the user, a range of source of information of potential relevance to journeys to, from or within Bristol. The 'Jamcams' function within the service is in itself an example of what is a longstanding though not seemingly a widely used means of conveying real-time information to motorists. The user is able to view a map of the Bristol area road network and click on camera icons. When this is done a recently taken (within the last few minutes) roadside camera image of traffic conditions at that location is displayed.

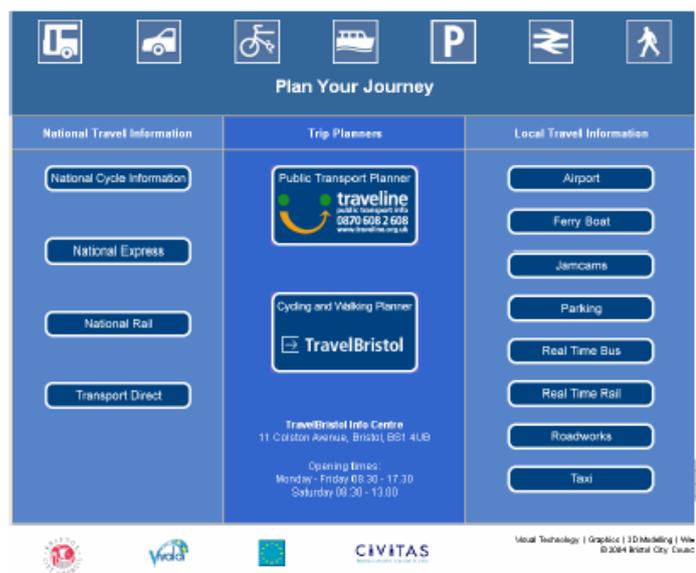


Figure 1. Homepage of the *www.travelbristol.org* website

*traveline* – In its 1998 Transport White Paper (DETR, 1998) the UK Government announced its intention to develop a national public transport information system by 2000. This was delivered under the banner of *traveline*. A major achievement of *traveline* was to 'sew together' and standardise the many and varied individual services providing bus information in particular and also to link these to national services for coach and rail. The service now provides "impartial journey planning information about all public transport services – buses, coaches, trains, ferries, trams, metro and underground - throughout England, Wales and Scotland"<sup>9</sup>. Initially provided (and still available) as a telephone service, *traveline* offers a single point of contact for the planning of any public transport journey, be it locally, regionally or nationally. The telephone service operates through a number of regional call centres, accessed by a single national number. A single call centre can fully answer an enquiry about a journey in its region. For longer distance journeys the system currently requires manual linking up between regions. *traveline*, then, is an example of an integrated multi modal information service at a regional level. The service is also now available on the Internet<sup>10</sup>.

*Transport Direct* – Building upon *traveline*, the UK Government announced in its Ten Year Plan for

transport (DETR, 2000) the goal of providing the UK with a travel information service that could present the public with the opportunity to compare travel options across public and private transport modes. The Transport Direct Programme, based in the DfT, was established and funded to achieve this. The Transport Direct website<sup>11</sup> was formally launched in December 2004. It seeks to offer a one-stop-shop journey planning, booking and payment service, complemented with real-time update information. Delivery of the service has been a feat of achievement in terms of establishing access to, managing and interrogating the different and vast databases of information across modes and regions. The user can now request door-to-door travel options for any journey in Great Britain and from a single request compare public and private transport side-by-side. For city to city journeys, travel options by train, plane and coach can be similarly compared. As such the service stands out as a rare example of integrated multimodal information provision at a national level. Journeys by car take account of historic journey time data for the strategic road network thus reflecting, to some extent, the likely impact of traffic conditions depending upon the departure time and route of the planned journey. Users can register with the service which allows them to save their favourite journeys and travel preferences and to email travel information to other people. The service also provides for mobile Internet access, WAP and SMS.

*TfL Journey Planner* – Another notable integrated multimodal information service for public transport journeys is Transport for London's Journey Planner<sup>12</sup>. This provides door to door travel options that can include walk, bus and tube journey stages. The TfL offering also extends to other channels besides desktop Internet. Journey planning, travel news, timetables and colour maps are available via mobile phone and PDA as are personalised real-time travel alerts. Satellite TV subscribers can access journey planning for London via their TV sets.

*Traffic England* – The Highways Agency (whose strapline is 'Safe roads, Reliable journeys, Informed travellers') provides an interactive mapping service on the web called Traffic England<sup>13</sup> which it states "gives you the ability to check the traffic conditions before you set off on your journey, giving you the information to make an informed choice to take an alternative route or change your time or even mode of travel". The service displays location-specific information on current traffic conditions, incidents and roadworks. There is an affiliated service called Traffic Forecaster which uses historic hourly traffic speed data to indicate projected potential traffic conditions for chosen travel dates and times in the future.

#### **4 Is information in demand?**

The examples above of information services reflect an information marketplace that has rapidly matured and grown in recent years, notably since the mainstreaming of the Internet as a communications medium and the impetus given to developments by national transport policy and associated legislation and funding. Having examined the role of information and highlighted such examples, it is now appropriate to consider the extent to which information services are used by the general public. In so doing it is important to ensure demand is put into context – as has been demonstrated in this article already, there is a considerable diversity in terms of the roles of information and the range of services providing information. Thus demand for information will be context specific (Lyons et al, 2001).

##### *4.1 Empirical evidence of demand for information services*

Before the major transport policy shift in the UK in the late 1990s a study of bus passenger needs and priorities in the UK (Balcombe and Vance, 1996) found that most passengers do not use information in making bus journeys and that passenger information was a major priority for only 7-11 per cent. Early market research relating to the development of traveline found that half of the UK population do not use public transport information services and "among current users of public transport, those who use public transport information services only slightly outnumber those who do not" (TNS Harris, 2000).

This same market research, involving 1500 interviews with members of the public, found that 70 per cent would consider making a long distance public transport journey by train. Yet when asked how they would get information for such a journey, only 21 per cent mentioned telephoning the National Rail Enquiries service (ibid). In a UK focus group comprised of people aged over 60, none of those present were aware of the existence of this service (Kenyon and Lyons, 2003). These observations raise an important point concerning demand, namely that of awareness – low levels of use of a service may be attributable a lack of awareness of its availability. However, in relation to this particular service and these results suggesting a service that may be little used, the National Rail

Enquiries telephone service in fact received over 60 million calls in the year prior to the introduction of the web-based service in March 2003 (SRA, 2005).

Marketing campaigns have been undertaken for both traveline<sup>14</sup> and Transport Direct<sup>15</sup> though reports of the impacts of campaigns to raise awareness of information services are precious few in number. Some years ago a substantial marketing campaign was undertaken and its effect studied in association with the SmarTraveler telephone information services in the US (Englischer et al, 1996). The study found that the majority of non-users did not recall being exposed to any marketing mention or advertisement and concluded that most travellers are simply not information seekers. A more recent review in the US (Schweiger and Shammout, 2003) suggests little may have changed. The authors observed that “people generally do not appear to be highly motivated to seek sources of traffic and travel information that are currently available to them”. They add, however, that such “apathy among the public at large” may overlook greater interest amongst sub-sets of the population which are suggested to be comprised of younger, better educated, better paid males who are more engaging with ICTs.

Turning to driver information, recent work conducted for the Highways Agency sought to determine the extent of use of traffic information when travelling on the strategic road network in Britain (Atkins, 2005). This research involved intercepting members of the public at the end of their journeys to selected locations to enquire about use of information before and during the journey. A range of journey lengths were targeted. 1300 interviews were carried out in each of November 2003 and November 2004. 81 per cent of people did not consult any pre-trip information sources (sources that were most frequently used were: a map – 8 per cent of all respondents; the radio – 5 per cent; and the Internet – 4 per cent). 91 per cent of these non-users gave familiarity with the journey as their main reason. The majority (65 per cent) who did consult pre-trip information did so to select the best route. The majority of respondents (72 per cent) did not consult information during their trip (sources that were most frequently consulted were: fixed road signs – 12 per cent of all respondents; radio – 10 per cent; and RDS/TP<sup>16</sup> – 5 per cent). Just over half of those consulting in-trip information were confirming their location and route while a quarter were seeking warning of potential congestion/queues. In between the two November survey waves, a smaller summer survey was conducted involving 250 interviews. This was targeted “at a time of year and trunk road location when heavy traffic flows are traditionally experienced... Its main objective was to verify that there are certain circumstances when a relatively high proportion of respondents use (and potentially act upon) traffic information.” The summer survey found that non-use was reduced compared to the November surveys: 54 per cent of people did not consult information pre-trip and 46 per cent of people did not consult information in-trip.

Work commissioned for the Transport Direct Programme (Accent, 2002b) involving 1200 interviews to provide a representative sample of the GB population found that 67 per cent of people in England, and 64 per cent and 52 per cent of those in Wales and Scotland respectively, had consulted a telephone or internet-based travel information source. 72 per cent of these ‘information users’ sought information for leisure travel compared to 21 per cent and 29 per cent for commuting and business respectively.

Examples of empirical evidence of demand for information services are not abundant. A message from the small number of examples above is, however, apparent. In many, and probably most, instances travellers do not seek information because they are familiar with their journey and do not encounter undue disruption to it. This corresponds to the nature of travel in the UK (as described in section 1) being comprised predominantly of short, familiar journeys. Nevertheless the empirical evidence also points towards a (significant) minority of less familiar, longer distance journeys with perhaps more disruption, where information may be in greater demand.

#### *4.2 Travel choice theories affecting demand for information*

Earlier in this article the presumption that travellers are rational decision makers wanting to identify and choose the most cost-effective options was followed. This presumption is appealing because it readily identifies a need and hence demand for information. However, closer examination of choice-making behaviour reveals alternatives to this utility maximisation approach. In particular individuals can exhibit satisficing behaviour or habit. The satisfaction approach (Ben Akiva and Lerman, 1993) assumes that if a travel option is found that satisfies the minimum requirements of the individual then

it may be chosen even if this is not overall the most cost-effective option. In the context of demand for information then it can be surmised that if an individual is already aware of at least one travel option that meets their minimum requirements then there is no motivation to seek information to explore further alternatives. Allied to satisficing behaviour is a degree of acceptance when it comes to journey disruption that can obviate the need for an individual to seek information in order to potentially modify their behaviour. In both the UK and US it has been observed, for example, that people can be quite fatalistic in relation to traffic congestion, seeing it as a 'fact of life' (Schweiger and Shammout, 2003; and DTLR, 2001).

Qualitative research into the role of information in mode choice (Kenyon and Lyons, 2003) found that for a given journey purpose, individuals tend to have a *primary* mode of travel. They automatically use this and in addition, should this primary means become (temporarily) unavailable they will revert to a predetermined *default*. Such observation extends the notion of satisficing behaviour to that of habitual behaviour. Habits may be defined as "a learned sequence of acts that become automatic responses to specific situations, which may be functional in obtaining certain goals or end states" (Triandis, 1977, 1980). In reviewing the matter of habit in relation to information search, Gärling et al (2002) comment that:

"As habit strength increases, depth of predecisional information search decreases (Verplanken et al., 1997). Individuals with a strong habit apparently do not require as much information about the pros and cons of available options. They may, therefore, have false negative beliefs about alternatives (Fujii et al, 2001). All these points suggest that planned, thoughtful decision making is not wholly application in these cases."

That an investment of time and mental effort is typically required to acquire information to consider travel options can further enforce satisficing or habitual behaviour. The following quote from a focus group participant (Lyons, 2001) makes the point: "it doesn't even occur to me to take the bus – I live probably a mile from my station I should walk but I always get a cab, but there's a bus garage literally on the corner but I just think that to try and find out is going to be complicated and time consuming". Qualitative research into driver information (Atkins, 2005) examined the propensity to seek up-to-date traffic information before setting off on a journey. Propensity was very low and where people were inclined to obtain this information it tended to be via television or radio since this was obtainable (passively) as a background task while doing the many other things before setting off on the journey. In other words any inclination to seek travel information has to compete with the other demands on people's time.

Recognising these different choice theories suggests that the demand for and impact of travel information is unlikely to be as great as many proponents of travel information services would wish it to be. However, once again it points instead to selected circumstances where information is likely to be of more value – journeys that are less familiar or unfamiliar around which habits have not formed. One can also note that habit and familiarity are not synonymous and that habit can operate at different decisional levels. An individual may habitually select rail as their primary mode for a business trip yet a specific business trip may not be at all familiar and will thus still require information to be sought in order to plan how to undertake that trip by rail.

## **5 What information do travellers want?**

The extent to which information services are used is not only governed by the decision-making strategies individuals have and the types of trips they make. It also relates to whether available services provide the information that individuals need to support their decision making<sup>17</sup>. The travelling public is not a homogeneous entity; different individuals have different information needs and those needs potentially change for different travel contexts.

### *5.1 Focusing on important information*

The question of the information travellers want should be considered in terms of how important certain information is to the individual (Lyons, 2001):

- *Very important* – information that is essential in determining the choice of mode, route or destination or whether or not to make a trip;
- *Useful* – information that does not affect the travel choices above but which enables the traveller to make a more convenient, comfortable trip with possibly greater confidence and assurance; and

– *Irrelevant* – information which offers no value to the traveller in either planning or executing a trip and which would be likely to be viewed as irrelevant or off-putting.

From the providers' point of view, they will wish to prioritise being able to offer very important information and will wish to avoid giving irrelevant information. Unfortunately all or most information is important to someone. This is especially true when one moves away from considering only the able-bodied, well-educated, middle-class, middle-aged, unencumbered male business traveller to encompass the many and varied needs and concerns that other segments of the travelling public have. It has been found that "specific characteristics, both physical and psychological, in addition to social class, sex, age and existing use of different travel modes result in a wide range of information needs across the travelling population" (Transportation Research Group, 2000). A solution in this context is to prioritise the provision of information that is of most importance to most people most of the time. Such a solution, however, is at risk of being exclusive and failing to address the needs of a significant and potentially sizeable minority of individuals for whom an absence of information they need may restrict their travel options or cause them anxiety and distress when they do travel.

### 5.2 What the public say they want

A UK survey of 500 individuals (ibid) assessed in general the relative importance of five travel factors. Overall the most important of the five factors was reliability, followed in order by time, convenience, cost and comfort. (This research did not seek to more clearly define what was meant by 'reliability' and 'convenience'.) Other research consulting the general public in England found that for trains and local buses, punctuality/reliability is the highest priority over and above service frequency, level of fares, overcrowding and journey times (MORI, 2001).

786 members of the GB public who consult telephone or internet-based travel information services were asked which types of information they considered were essential to have (Accent 2002b). The results are shown in Table 3.

Table 3. Information types considered essential to have (ibid)

Information type	Respondents (%)
Notification of any travel restrictions that may apply during your journey	87
The ability to plan journeys	80
The time taken to travel by modes(s)	73
The overall cost	66
The ability to buy a ticket	56
The cost comparison by means of travel	54
Suggestions on different means of travel	43

The results set out above, albeit that the number of studies of user needs is quite limited, highlight that journey time and cost are not necessarily the highest or only important concerns of the traveller. Yet time and cost are tangible and measurable and have tended to be the core elements of provision in most travel information services (though this is not to suggest that they are always trivial forms of information to address). The challenge ahead it would seem is also to address the other important concerns, notably journey reliability. Here it is necessary to make a distinction between reliable journeys and information advising travellers about the *extent* of reliability of the journey. The former is an ideal. Indeed, if all journeys were totally reliable then there would be no need for real-time information. The latter is concerned with trying to accurately inform the traveller about the degree of reliability that can be expected for a journey.

### 6 What are the behavioural effects of information use?

Ultimately, and from a transport policy perspective especially, it is whether or not information achieves any influence over travel behaviour that determines its effectiveness. Influence can be direct or indirect and short or long term. Direct influence concerns changes to the key travel choices of mode, route and timing (and possibly destination). Influence can be indirect if, for example,

information makes it (psychologically) easier or more reassuring to undertake a journey by a given mode or route such that it becomes more appealing to do so and discourages a change or reversion to alternative options. Short term influence takes the form of an immediate affect on key travel choices for a given journey. Information can also, however, perform a sustained longer-term role in gradually adjusting people's perceptions and bringing perceptions more in line with reality. In this way such a 'war of attrition' can take time to bring about actual changes in travel choices.

### *6.1 Evidence of behavioural effects*

It is perhaps surprising in light of behavioural effects being so central to the case for developing traveller information systems that so little compelling evidence exists about them. Indeed, from 30 in-depth interviews with travel information website providers in the UK it was found that the providers had difficulty in ascertaining the actual impact on their business through having a website (Accent, 2002a). There has been much research into (driver) route choice behaviour and stated-preference studies (Lyons et al, 2001) within which potential for behavioural change can be identified. However, in overview the observation that persists is that there is a paucity of robust, evidence-based understanding of the behavioural effects of traveller information (see for example Mokhtarian, 1996; and Chorus et al, 2005). What seems to be reported across the literature is a combination of simply not knowing clearly what the nature and scale of effects might be as well as observations that little *change* in behaviour results from the use of information services.

In relation specifically to mode choice, despite the fact that results from some pre-implementation studies into user attitudes towards multi-modal traveller information have suggested that users would respond to such information with rational consideration of modal choice and thus a modal change (Harris & Konheim, 1995; Neuherz et al., 2000), a significant modal shift in response to such information has not been observed to date (Abdel-Aty, Kitamura, and Jovanis, 1996; Lyons et al., 2001).

In the context of making unfamiliar journeys it has been found that for short journeys (where short is defined as 5 miles or less) approximately 13 per cent of people determine their mode of travel having consulted a travel information service; for long journeys the figure is 27 per cent (Accent, 2002b). This would suggest that for a significant minority of journeys individuals allow their modal preferences to be susceptible to influence by information provision (though of course consultation of information may not yield a change in mode but be more of a confirmatory step in the journey planning process).

In the study referred to earlier of UK motorists' use of information during their journeys (Atkins, 2005), it was found that of the 27 per cent of all respondents that had consulted in-trip information only 7 per cent of those reacted by changing route or interrupting their journey. The information had no direct effect on the remaining respondents with the main reasons being that there had been no disruption on their chosen route or no suitable alternative route available. Similarly, a consideration of the effectiveness of traveller information provision in the US (Orski, 1997) noted that, whilst individual commuters (drivers) may act on information where major incidents occur, otherwise they do not change route, meaning that information has little overall effect on the network.

### *6.2 The travel context for behavioural effects*

The study cited above points towards the importance of context in terms of behavioural effects. On the one hand, the viability of travel options when choosing between them is not only about their absolute comparison but about their perceived viability from the traveller's perspective (Bonsall, 2000). On the other, information can change perceptions of the values of journey attributes, but it cannot change the values themselves (with the exception of making it easier to undertake the journey for example by providing wayfinding assistance).

If satisficing behaviour and habitual behaviour are commonplace, coupled with a high incidence of short, familiar journeys, then the behavioural effects from information in terms of information *changing* behaviour are likely to be heavily dependent upon the volatility of the travel context and the extent to which the actual values of attributes are changing over time. If, for example, rising levels of traffic give rise increasingly to more unpredictable journey times and longer journey times while investment results in improvements to public transport services then car users may be less inclined to habitually consider driving acceptable. Thereby they will be more inclined to examine the alternatives and in so doing the gap between perception about, and the realities of, those alternatives will be closed such that change in travel choice may result.

## **7 What are the challenges in providing information?**

The predominant focus of this article is on the users of traveller information and their needs from, propensity to use and behaviour consequences from using traveller information services. However, it is also important to give attention to the providers of information services and the challenges they face which can be identified as:

- commercial challenges;
- partnership challenges;
- technical challenges; and
- usability challenges.

### *7.1 Commercial challenges*

For a private sector organisation to invest in the delivery of information services in a context where there is no or limited obligation to commit investment, there is a need for a clear business case. Such a case will involve setting out the design, build and operating costs and balancing them against the projected revenue from use of the service (or, in the case of public sector organisations the projected economic, environmental or social benefits). A significant proportion of such costs will be attributable to the acquisition of the data to populate the information service. It has been highlighted (Cartledge, 1996) that experiments to test the hypothesis concerning increased revenue are found to be few and far between and those which exist are now dated. However, the few that are cited point in the same direction – that a greater investment in information provision can show a positive return. A rare example of later research (for passenger rail) has considered the potential for information services to generate extra revenue through increased ticket sales (Mapp et al, 2000). This concluded that the telephoned-based National Rail Enquiries service had a 10 per cent generation value – i.e. 10 per cent of those who travelled by train after calling the service would have otherwise travelled by another mode (8 per cent) or not at all (2 per cent).

Revenue from service use implies that the user pays in some way to use the service. It has been found (Lyons et al, 2001) that willingness to pay for travel information is an issue that is seldom given thorough and detailed consideration in the literature. Those studies that do exist are almost all based upon stated intentions about willingness to pay rather than proven willingness to pay as observed through usage of a charged-for service. Such studies tend to suggest a rather limited willingness to pay. Early assessment of likely public reactions to the Transport Direct service referred to earlier considered willingness to pay for such a service. It was concluded that:

“There was some evidence of willingness to pay for a Transport Direct service. Although 35% of those likely to use the service would not pay at all, 17% would pay for car, bike or public transport routes, times and costs; 15% for general info about road works or public transport engineering works; 25% for a personal alert (by e-mail, text message or phone call) about problems with a journey before setting out; 35% for a personal alert (by e-mail, text message or phone call) during the journey indicating that there is a problem ahead and suggesting another way of reaching the destination. Around half of those willing to pay thought that £1 a month would be reasonable.” (DfT, 2001).

The commercial context considered in full is too complex to address in this article. However, it has been ably set out (for success in passenger transport information provision) by Austin (2001). It requires: political commitment; a healthy commercial environment for operators (including supportive trends in land-use planning, traffic management and economic growth); appropriate technological infrastructure, and regimes that stimulate take-up by consumers (and technological regulation is important); and market and regulatory stimuli so that it is in operators' commercial interests to introduce technological solutions for passenger transport information wholeheartedly.

### *7.2 Partnership challenges*

Delivery of information services in most cases will involve more than one organisation. Typically, in what ever forms, this will involve partnerships between public and private sector organisations (Orski, 1998). As the number of modes of travel or the geographic coverage of a service is increased this is

likely to lead to an increasing number of organisations involved in partnering. Partnership implies a degree of mutual dependence amongst the organisations involved. This does not, however, necessarily provide clear passage for swift and effective partnership working. There can be many problems that arise in both engaging organisations in the partnership and in turn in achieving consensus regarding the operation of the partnership and the commitments of each organisation within it. Each organisation will have its own objectives and at times these may be in conflict. The UK, with its privatised public transport industry, has, through necessity, had to make partnership working a success within an industry that involves so many organisations. It is suggested by the author that valuable insight into the challenges of partnerships and the overcoming of them can be obtained by examining the National Rail Enquiries service, traveline or Transport Direct. These initiatives between them have faced the particular challenge of sharing (and agreeing the terms of sharing) data across modes, services and geographic areas.

### *7.3 Technical challenges*

It is not proposed to dwell upon the technical challenges of providing information but this is not to suggest they are trivial or inexpensive to address. Key technical challenges reside in the exchange of data between heterogeneous systems<sup>18</sup> and the rule bases and algorithms required to successfully interrogate the databases in order to process user enquiries and deliver a response that is both accurate and intuitively sensible to the user. One can begin to appreciate the enormity of the technical demands placed upon the back-office systems of information services by taking the case of Transport Direct. To support public transport journey planning it has developed NaPTAN (National Public Transport Accessibility Network) – a dataset which gives the locations of all bus stops, railway stations and other access points for public transport in the UK. NaPTAN contains 350,000 entries, geo-referenced and cross-referenced to streets and landmarks (Slevin, 2005).

### *7.4 Usability challenges*

Sat closely alongside the technical challenges, and again not able to be given full consideration in this article, are usability challenges<sup>19</sup>. As the amount of information that services seek to provide increases and the functionality offered to the user grows, the problem of designing a simple, intuitive and quick and easy to use interface to the service becomes ever more challenging. Users are only interested, understandably, in getting a response to their particular request. That the service must be designed to meet a multitude of different requests is not something that concerns them. Interface design must also evolve as the service offerings change and as the range of delivery platforms extends.

## **8 What does the future hold for travel information provision?**

In light of the considerations in this article, an assessment of the future role and nature of information provision is offered. This is framed by distinguishing between familiar and unfamiliar trips.

### *8.1 Familiar trips*

Notwithstanding a minority of domestic (as opposed to international) routine journeys that will be made by air and a proportion of familiar journeys, as now, that are longer distance in nature and being made by road and rail, the majority of familiar, routine journeys will be characterised by short distances. This is likely to hold true in the future even in the face of a possible continuation in the increase in average journey length. Most people will continue to have a primary and default mode and route for their familiar journeys. In this context the nature of and demand for pre-trip and in-trip information can now be considered:

- *Pre-trip information for familiar trips* will for most people, most of the time continue to be something that is not in demand. Familiarity can be taken to embody sufficient acquaintance with the mode, route and traffic and travel conditions such that the individual is comfortable that the actual journey that will be experienced is within the bounds of their expectations. There may be limited demand for disruption alerts for such journeys – i.e. a means of advising the individual when the journey to be experienced is likely to fall outside their bounds of expectation. This is likely to be provided in the form of ‘push’ rather than ‘pull’ information. In other words the individual typically (especially for daily journeys) will not expect to or be inclined to actively request such information themselves; they will instead wish for the alert to be automatically brought to their attention. Such services are already entirely viable subject to data availability. The form of such a service by its nature would be personalised with a need for the user to have logged details of their familiar journeys (including details of primary and perhaps also default options). Alerts could then be delivered (prompted or unprompted) to an always-on hand-held

device (with the present-day manifestation of this being a text message to a mobile phone). It is likely that use of such an alerts service would in a modest proportion of instances lead to a change in departure time, route or mode. There have been instances where demand for pre-trip information for familiar trips has been substantially higher – for example the September 2000 fuel crisis and the Hatfield rail crash mentioned earlier. Similarly, the bombings on the London Underground in 2005 highlighted that crisis situations can rapidly create a different (and less familiar) context for travel with a commensurate heightening of demand for information.

– *In-trip information for familiar trips* will again for most people, most of the time continue to be something that is not in demand. An alerts service as for pre-trip will be desirable for some travellers though only alerts of substantial (expected) disruption to the journey are likely to lead to serious consideration of behaviour change. In the vast majority of cases an alert would serve two purposes. Firstly to allow the traveller to know why their journey is being or will be disrupted and secondly to make the traveller aware of the expected change to their arrival time. The latter would typically be acted upon by subsequent advisory telephone calls made to those being met by the individual at their destination. Mention of such telephone calls also hints at the growing role that peer to peer in-trip information support might play, given the substantial recent penetration of mobile phone ownership and use. Intriguingly this might point to the emergence of informal, human-based travel information ‘networks’ facilitated by new technologies whereby peer to peer news and advice on travel disruption is spread rapidly. This may especially apply within certain social networks where less affinity with and ease of using ‘formal’ information services exists. If such travel information ‘networks’ exist or emerge in future then it is highly likely that their operation will be in conjunction with, and underpinned by, a (small) number of network members drawing upon formal information services.

## 8.2 Unfamiliar trips

Unfamiliar trips will continue to constitute the minority of all trips. They will remain characterised by long distances though not exclusively. Again the nature of and demand for pre-trip and in-trip information can be considered separately.

– *Pre-trip information for unfamiliar trips* is likely to be the main market for travel information services. Recent research for the Transport Direct Programme (Social Research Associates, 2005) has used theoretical and empirical knowledge to establish that (steps in) the choice process of journey planning (relevant particularly for unfamiliar trips) assumes one of three forms: constrained, passive and active<sup>20</sup>. If choice is constrained then information is unlikely to influence that choice. If choice is passive or active then the individual will wish information to guide them in their decision making. The form of information provision to best suit the user will then depend upon whether their approach is passive or active. The type of choice process can change even for the same individual in the course of planning a single journey – mode choice (typically made first) can be constrained while the subsequent route or service choice may be passive or active. The ability for information services to support passive and active choice has a degree of dependence on user co-operation. The more information the user is prepared to tell the service about their requirements, the more likely it is that the service can provide a succinct and usable response. Herein lies a persisting dilemma – people want ‘instant gratification’ from using the service with minimal effort; meanwhile the service needs parameters set by the user in order to provide a suitably directed and acceptable response to their demands. Services such as Transport Direct are evolving to attempt to address this with one of the keys being personalisation. It may be that future journey planning services will reflect an ongoing incremental development of Transport Direct type services. Alternatively, there is scope for a journey planning ‘revolution’. One could, for example, envisage a ‘Google’ journey planner which, through a sophisticated and vast relational database of possible journey options and user stipulations (all pre-stored and continuously checked and updated), could respond instantly to a natural language request for specific journey options from a user. Such a service could resolve the conflict between massively complex datasets and the need for a highly simplified user interface. Information content provided by services will continue to evolve. Content provision will continue to be dictated by a combination of demand from users and cost of supply from providers. A key area of development is likely to be that associated with reliability. Building upon existing services such as the earlier cited ‘Traffic Forecaster’ provided by the Highways Agency, one can envisage all journey planning for unfamiliar journeys taking account of historic performance and trend data.

– *In-trip information for unfamiliar trips* will serve two roles, namely to provide an alerts service (as discussed for familiar trips) and to make the execution of the journey as easy as possible. It is

the latter where the potential for further evolution of information provision may be greatest. Existing information services already support this role to a degree in providing information to support wayfinding. Notably car journey planners<sup>21</sup> already provide step-by-step directions for undertaking the journey in question as do in-car satellite navigation systems. Services accessible via hand-held devices are also available that provide directional guidance for journeys<sup>22</sup>. The ideal service provision would be something that might be referred to as 'Unfamiliar Travel for Dummies'. Such a service would be capable of providing travel itineraries with a content and format sufficient to allow any unfamiliar journey to be undertaken with the confidence of a *familiar* journey. This offering could in time also exert influence over pre-trip decision making, particularly where lack of familiarity with travel options weighs significantly in the travel choice made (typified perhaps by the regular car user who has no experience of travelling by bus and disregards the prospect of bus travel as too 'difficult').

### 8.3 Factors governing future demand for information

Notwithstanding the need for information services to be useful (providing relevant/needed content) and useable (relevant/needed information easily obtained), in terms of the overall demand for and importance of information into the future this will be dictated significantly by three factors:

- the share of overall travel between familiar and unfamiliar journeys;
- the extent of stability and predictability of transport system performance; and
- the extent of change in the relative 'costs' of alternative travel options.

The first of these should be self-evident from the preceding discussion. The second relates to whether the future transport system and its use will be characterised by poor reliability, frequent disruptions and substantial day-to-day variations in patterns of use or whether it will be characterised by high standards of performance with few disruptions and consistent travelling conditions. If the former of these then the need in principle for alerts services should increase. If the latter then demand for information will decline. The third factor concerns the important point made earlier that information can change perceptions of the 'cost' of travel options but it cannot change the actual 'cost'. In a future scenario where public transport services are improving and either road user charging has been introduced or congestion is continuing to worsen then, particularly in relation to mode choice, the relative 'costs' of the different options will change and accordingly the gap between perceptions and reality may be widened. Alternatively, or additionally, changes in 'costs' may be such that the differences in total 'cost' between different travel options become typically much less, making individuals potentially more inclined to consider alternatives.

## 9 Conclusion

This article has sought to highlight and examine some of the key issues associated with the role of information in making travel choices. A number of summarising observations can be made. The simple presumption that individuals wish to have or need information to assist them in their decision making is misplaced. Psychological factors such as habit and satisficing behaviour can obviate the need for information. Inertia and mental effort can inhibit actions to review the relative merits of alternative travel choices. The need and hence demand for information is much more limited. In addition, even when information is sought, it may be for confirmatory reasons rather than for reasons of comparison – in other words it can provide assistance to the individual in planning the detail of and executing their journey whilst not bringing about any change in behaviour as such. The offering of information services itself has advanced substantially in the last 10 years, boosted notably by advances ICT and specifically the mainstreaming of Internet and mobile telephony. Indications of high usage levels of some services would suggest that while information services are not in high demand for a large proportion of journeys, this should not be misconstrued as an absolute indication of low demand. There is a significant minority of journeys for which information can prove highly useful to the individual. The extent to which, however, usefulness to the individual equates to behaviour change by the individual is not clear though it seems that substantial behaviour change (certainly in terms of mode choice) is unlikely. Insights from this article it is hoped will serve as a safeguard against technologically deterministic and thus utopian outlooks for the future of travel information provision. There are still strong temptations evident in the literature (Adler and Blue, 1998) to sweep aside the barriers with a speculative view that everything can be solved by 'clever', personalised information services made possible through technological advance and ingenuity. Some of the barriers, it is true, are technological in nature, but other more challenging ones concern

human nature and indeed the availability of and relative merits of actual travel options. As we move into the future, technological advance will doubtless occur, but fundamental traits of human behaviour and information seeking are likely to remain much more fixed. As to the travel options themselves and hence the overall performance and use of the transport system, that is something that lies outside the bounds of information service provision.

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