THE INTEGRATION OF HIGHWAY AND PUBLIC TRANSPORT INFORMATION

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INTRODUCTION

In its 1998 Transport White Paper (1), the UK Government set out its 'integrated transport policy', spelling out what it considered the key dimensions of integration to be. These included 'integration within and between different types of transport - so that each contributes its full potential and people can move easily between them'. The White Paper also set out a newly defined role for the Highways Agency (HA) which is responsible for maintaining, operating and improving the network of trunk roads and motorways in England. The new role is one of a network operator rather than a road builder with one of its key objectives being 'to promote choice and information to travellers'. Further to this it is tasked with 'encouraging travellers to consider options other than the car' (2).

A key element in the promotion of use of different modes of transport is information. The provision of traveller information can help to ensure that individuals are aware of the travel options available to them and that travel decisions are based on informed judgement. Public transport in particular can appear a daunting prospect for the inexperienced user or for those making an unfamiliar journey. This is especially the case when a public transport journey involves multiple stages and different services or modes. Information can help to alert people to the fact that a particular journey by public transport is possible and also that it might be a viable alternative to travelling by car.

The Transport White Paper set a target for the availability of a national public transport (telephone) information service by the year 2000. With Government performing the role of facilitator (and providing some funding) and local authorities and private sector public transport operators working in partnership, the service (traveline) now exists. In 2000 the Government published its ten year spending plan for transport (3) setting out how it would deliver its integrated transport policy. It announced an ambitious vision to further the provision of traveller information in the UK - Transport Direct. The Transport Direct Programme aims to provide the UK with a travel information service that can present the public with the opportunity to compare travel options across public and private transport modes. Using the Internet as its principal delivery medium it seeks to offer a one-stop-shop journey planning, booking and payment service, complemented with real-time update information.

Intriguingly, prior to the announcement of Transport Direct, the HA had established an outward facing research programme in 1999 to explore and identify (new) ways in which it could respond to its newly defined role and objectives. One element of this programme was a piece of research to investigate the potential integration of highway (car) and public transport information to provide the public with a multi-modal travel information service. In hindsight this research was very closely aligned to the vision for Transport Direct. This paper provides an account of the research and its findings.

OVERVIEW OF THE RESEARCH

From an initial desk study (4) a three-stage piece of HA research was undertaken:

1. A review of the UK public transport industry and information systems developments;
2. Consultation with prospective end users of an integrated information system (using focus groups); and
3. Consultation with prospective stakeholders in the delivery of an integrated system (using interviews and a workshop).

Prior to setting out the findings of the research it is helpful to clarify what is envisaged when reference is made to an 'integrated information system' (and ergo the potential form of Transport Direct). In essence such a system would enable an enquirer to stipulate the origin and destination for their journey alongside any constraints they wish to impose (such as required arrival time). In response the system would present the enquirer with a set of alternative options for making that journey involving different modes and/or combinations of modes. In effect the system would provide a multi-modal journey planning service. Mode-specific journey planners already exist (see for example http://www.thetrainline.com for rail, http://www.gobycoach.com for coach and http://www.theaa.com for car). Multimodal public transport journey planners also continue to evolve (see for example http://www.pindar.co.uk/bucks/). The envisaged integrated information system would, automatically present the enquirer with details for making a specified journey by car and the alternative of making it by public transport (the latter potentially

involving more than one mode of public transport).

It is important to also distinguish between integration and co-ordination. It would be possible, merely by providing a website that linked to the mode specific journey planners identified above, to offer a multimodal travel information service (i.e. a means by which an individual could compare travel options). However this co-ordinated approach places a not insignificant burden on the individual to make the comparisons. In contrast an integrated service would automatically gather and assemble comparative information as a 'back office' task and present the individual with the results.

Figure 1: A possible depiction of the response from an integrated information system

Figure 1 depicts a possible integrated information system response to an enquiry. The distinction between a journey from point to point and a journey from door to door should be noted. Figure 1 principally addresses the former; the latter can potentially become much more complex.

THE UK PUBLIC TRANSPORT INDUSTRY

The integration of highway (car) and public transport information by implication necessitates an interaction and dialogue between transport professionals working in the two spheres. It appears that in general, professionals in one sphere have a limited awareness and understanding of the other sphere. This needs to be overcome and will be achieved in part if (greater) dialogue between the spheres takes place in future. However, as a first step it is helpful to be able to demystify the public transport industry and its information systems' developments for those outside the industry. A comprehensive attempt to do this is reported elsewhere (5) and a summary is provided below.

Structure of the industry

The reorganisation of public transport administration in the Transport Act 1985 and Railway Act 1993 with deregulation and privatisation, together with a restructuring of local authorities, created a complex public transport industry structure within the UK with many competing operators accompanied by a range of varying aims, responsibilities and relationships. Service provision is now mostly in the hands of a few major groups which work together through industry associations.

Outside London, bus service provision no longer has regulatory controls over routes, timetables and fares (deregulation) and formerly publicly owned operating corporations are in private ownership (privatisation). Most bus services are now operated by the subsidiaries of a few major groups. The Confederation of Passenger Transport UK (CPT) is the national trade association representing UK bus, coach, light rail and metro operators.

Further to the Railways Act 1993 the assets and activities of British Rail were split up between about one hundred infrastructure, operating, engineering and management companies, and the majority of these were sold into private ownership. The passenger rail industry now has the following main component parts: Railtrack (which owns and runs the UK's national railway infrastructure - although at the time of writing Railtrack is in administration with plans in place for it to be replaced by a not-for-profit company); 25 Train Operating Companies (TOCs) (which provide passenger services under franchise); and Rolling Stock Companies (ROSCOs) (which provide passenger rolling stock to the TOCs under lease agreements). The Association of Train Operating Companies (ATOC) is the trade association of the passenger rail industry. The Office of the Rail Regulator (ORR) oversees operation of the privatised industry and the Strategic Rail Authority (SRA) was formed in July 1999 to provide a focus for strategic planning. In the seven metropolitan areas, Passenger Transport Executives (PTEs) specify the minimum

level of passenger rail service, administer subsidy and are co-signatories to the relevant franchise agreements.

A major part of PTEs' and other local authorities' public transport activities concerns bus services. Quality Partnership (usually informal) arrangements allow bus companies and local authorities to work together within a common purpose. Most often, this involves the bus company providing new buses on key routes and undertaking to maintain service quality, while the local authority (LA) provides (improved) infrastructure. Joint support of enhanced information is sometimes covered by quality partnerships. All LAs had powers to provide information on public transport if they deemed it necessary. The Transport Act 2000 places a duty on LAs to ensure provision of appropriate bus information for users and potential users.

Information systems' developments

There has been and continues to be a considerable amount of development activity associated with public transport information services. Some developments are to assist the efficient and effective operation of services. Others are centred on the deliver of improved information to the customer. The large number of operators in the bus and passenger rail industry results in a complexity of data and information flows with a multitude of different (sometimes competing) systems serving different tasks and dealing with different data formats from different sources. There is a need to manage this complexity and there are projects addressing this.

The National Rail Enquiry Service (NRES) (launched in 1997 and provided on behalf of the TOCs by ATOC) enables the public to make telephone enquiries concerning timetables and fares information irrespective of individual TOCs.

The Rail Journey Information Service (RJIS) (a 10 year public/private partnership project) is aiming to improve 'the booking office experience' for staff and customers. To be able to provide a customer with a ticket for the cheapest fare between an origin and a destination station requires access to information (from different databases) on: timetables; fares; routing guide; and reservations and quotas. RJIS acquires and checks data from a number of sources and can then run queries on the data (e.g. integrated journey query) and provide a graphical user interface. It has parallels with the HA's Travel Information Highway (described later). Both seek to provide a common interface between data providers/sources and data users or value-added service providers (VASPs). To date, no consideration appears to have been given, regarding RJIS, to future prospects of integration between highway and rail information and, thereby potentially, some relationship between RJIS and the TIH. Indeed, at present RJIS will not even extend beyond the rail industry to include other public transport modes.

Set against the often competitive environment of bus service provision many local authorities have assumed responsibility for making comprehensive public transport timetable information available in their areas with the provision of telephone enquiry services and web sites with journey planning facilities.

Recent research and development has been seeking to achieve integration of information systems across public transport modes. Two of the major developments are the JourneyWeb and PTI2000 projects.

JourneyWeb (6) establishes a way that will allow local computer-based public transport journey planning systems to collaborate with each other so that they can construct itineraries for journeys that involve travel beyond the area covered by any one local journey planning system. JourneyWeb seeks to provide the traveller (or intermediary enquirer acting on behalf of the traveller – e.g. a call centre operative) with a means to make a single enquiry concerning a potentially multi-stage, multi-modal public transport journey. At the heart of the JourneyWeb project has been the development of a communications protocol – a collection of standard methods for exchanging electronic data (via the Internet) between heterogeneous systems.

The PTI2000 project was established and taken forward by the CPT as a means of delivering what is now traveline. Like JourneyWeb, traveline adopts a federal approach. A series of call centres corresponding to eight regions across the UK have and share their respective information databases. traveline is not (yet) a fully integrated information system that can automatically produce the response to an enquiry. Each call centre carries information on local and in some cases adjacent areas as well as national information for coaches and trains. Communication between operatives at different call centres or between the enquirer and operatives at different call centres is necessary to obtain the response to an enquiry for a journey spanning more than one region. In due course it is likely that developments such as those within JourneyWeb will be used to achieve back-office integration such that an operative at one call centre can automatically obtain response details for a multi-stage / multi-region journey enquiry.

Highways information provision

Developments are also taking place concerning highway information. The HA's Traffic Control Centre (TCC) project was established in 2001 as a 10 year public/private partnership. The TCC will provide traffic monitoring and strategic traffic management over the whole of the UK's core road network. TCC will make information available via a computerised 'Travel Information Highway' (TIH) (7). In operation, the TIH is a network which resides on the Internet and provides a common interface between VASPs and owners of travel data. The TIH aims to embody the one-stop shop' concept and seeks to provide the marketplace for exchange of travel data, interconnecting heterogeneous systems.

DELIVERING AN INTEGRATED SERVICE

From studying information system developments and consulting with those who might play a part in the deliver of integrated (highway and public transport) information, a number of observations can be made.

The number of different information systems and data sources makes the prospect of common standards for data formats remote. Attention instead has focused on means by which data exchange interfaces can be standardised to enable transfer of information between heterogeneous systems.

In technical terms there are already examples of integration of information provision across operators, modes or regions. Nevertheless, much activity remains insular in its approach as operators or modes each concentrate on their core business. The public transport industry has not yet afforded itself the opportunity of considering the issues, barriers and opportunities to integration beyond its own systems, i.e. integration with highway (car) information.

The level of activity in terms of information systems developments is substantial but it may not be keeping pace with external expectations. The scale of datasets and networks involved, limitations in compatibility, availability and quality of data sources and the scale of resources required makes progress appear slow.

Common referencing for all modes is needed to ensure multi modal travel links between different services. A national public transport gazetteer has recently been completed and is already proving useful in call centres. By adding grid references, this could be linked into road based systems. The gazetteer offers the opportunity to form the basis for a fully personalised travel service across all modes.

Commercial companies operating public transport services are typically driven by the need for an identifiable short term profit, probably reflected by increased travel on their services. Providing information, and investing in systems to enhance its provision, often fails this test.

The combined accessibility to information and data that RJIS and TIH will provide holds the promise of attracting a number of VASPs. Such VASPs might then take a lead in delivering multi-modal information services to end users founded on different business cases than would be possible for either the HA or public transport operators themselves.

PUBLIC REACTIONS TO INTEGRATED INFORMATION PROVISION

A series of six focus groups across England were conducted to assess the potential demand for, user needs from, the potential barriers to the use and the potential effects of multi-modal information provision. Each focus group was designed to represent a sector or a combination of sectors of the population, in terms of age, gender, family profile and use of different modes of transport. In each focus group participants were presented with mock-ups of possible outputs from an integrated information system as shown in Figure 1. For each group the mock-ups related to a specific journey intended to be familiar to the participants. The focus groups yielded a number of important observations (8).

Although in general people regularly use a variety of modes they are habitual in their use of modes for specific journey types. In turn, the motivation to seek information, particularly to assist in mode choice, is limited. Individuals appear to have a 'primary' and a 'default' mode of transport. They will consider using their 'default' mode only once the viability of the 'primary' mode has been dismissed. People exhibit a lack of awareness or intention to become aware of alternative modes for their journeys.

Focus group participants naturally expressed negative perceptions of public transport and positive perceptions of the car, the former being more fully formed than the latter. These perceptions directly inform mode choice. A lack of information adds to negative perceptions of public transport use being complicated and difficult to plan and undertake. In contrast, travel by car is seen to require little planning. Information needs for travel by car are seen to be low; conversely, for travel by public transport, information needs are high.

Convenience, especially in the door to door journey, was emphasised by participants as a defining factor in modal choice, as was confidence. Other traditionally

perceived ‘costs’ of travel were significantly less important. Participants felt that it is easier to access information for long journeys than for short, contributing to the increased willingness to use public transport for longer journeys than for short. The door to door factor was less of an issue for long journeys than for short.

Participants naturally discussed the need for an integrated, ‘one stop’ source of traveller information without prompting. Integrated multi-modal information is seen to reduce the hassle of information access.

There was an initial reaction against the integrated multi-modal information concept from (in particular) car drivers, who felt ‘under attack’, doubting the motivation of the information providers. However, during discussion, an attitudinal change was observed. Participants were more accepting both of the information and of the idea of modal alternatives and possible modal change. The integrated information mock-ups challenged perceptions, especially the assumption that the car is the optimal mode for all journeys and raised awareness of alternative modes. This awareness, alone, could produce a modal change.

The mock-ups included varying levels of detail. Participants' reactions suggested in some cases that limited information on each mode in an integrated multi-modal information context might be insufficient to surmount confidence issues.

CONCLUSIONS AND FURTHER WORK

Technological and systems developments provide a healthy environment for pursuing the provision of integrated information. However, the investment needed to address data requirements and system development itself leaves industry in need of convincing that a viable business case exists. This depends in part upon how the public will react to an integrated information service in terms of its influence on travel choices.

The qualitative work described suggests that whilst people are not currently inclined to review their mode choices, when confronted with information on travel options, mode choice might be influenced. Further research is needed to explore this issue in greater depth. The Integrated Information Broker has been conceived to achieve this. The project, outlined in Figure 2, will seek to manually create an integrated travel information service and, through 'intervention in real life', observe how people respond when this service is made available to them.

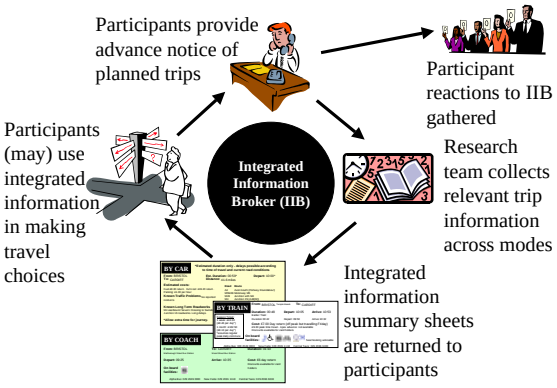

Figure 2: Schema for integrated information broker

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