POLICY LEARNING IN INFORMATION TECHNOLOGIES FOR PUBLIC TRANSPORT ENHANCEMENT

GOOD PRACTICES – PUBLIC TRANSPORT AND/OR MULTIMODAL INFORMATION SYSTEMS

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REAL TIME INFORMATION SYSTEM & BUS PRIORITY AT SIGNALS

General information

Description

State of the art real time passenger information system which distributes up to the minute bus information between tracked buses and on-street displays in the Greater Bristol area. Information is also delivered to travel information websites and mobile phones.

In addition to passenger information, the system provides intelligent bus priority at signal junctions to give late running buses priority, via a link between the real time information and urban traffic control systems, helping to reduce journey times and ensure buses keep to timetable.

GPS technology is used to track the location of buses, forming the basis of a journey time prediction calculation from which the information is transmitted between the buses, a central system, bus stop display screens and traffic signals.

The system has been implemented throughout the West of England sub region, which has over 52 million bus trips every year.

Backround and Context

The West of England sub region has a population of over 1 million residents within the authority areas of Bath & North East Somerset, North Somerset, Bristol and South Gloucestershire. The provision of a Real Time Information (RTI) system for bus services is a core part of the West of England's transport strategy, helping to achieve the objective of reducing traffic congestion and pollution by making bus travel easier and more attractive. There are currently over 52 million bus journeys made in the region every year.

The RTI system was first implemented for the Greater Bristol area in 1997 and has been significantly upgraded and expanded in subsequent years. The system

comprises on-bus Global Position System (GPS) equipment which communicates via a radio base station with a central system server. The equipment is linked to the bus ticket machine to enable the predicted arrival time at each stop on that vehicle's route to be generated, which is then sent to the bus stop displays to provide a countdown in minutes to the predicted arrival time. This information is also sent to local travel information websites to provide the same information for a selected stop (whether or not it has an on-street display) so long as the route is operated by equipped buses.
The system allows Bristol's Urban Traffic Control (UTC) centre and bus operator's depots to monitor the location of all equipped vehicles and to identify early and late running services. Other features of the system include the operator's voice radio system and the ability to send an emergency alert from the bus driver to the depot.
The RTI system also includes the provision of intelligent bus priority at traffic lights, via a link to Bristol's UTC systems. This function helps to reduce journey times and ensure buses keep to the timetable by providing late running vehicles with priority at signal controlled junctions. The system works by the bus sending an identifying message to the signals on its approach, which the UTC system will then process and adjust the signal phasing accordingly. The system can be set to give different levels of priority, for instance to all buses or just to those operating behind schedule. It is currently set up to provide priority to all equipped buses that are running late by 3 minutes or more. The signal phasing can be adjusted by the UTC system to either extend a green phase to allow a bus in a queue to progress through the junction, or to adjust the phasing of the lights to provide a green light to the arm with a late running bus sooner than would happen under the normal cycle. To operate correctly it is essential that the data relating to the timetable, route, bus stop allocation and the location of all stops served is correct within the RTI system.

Policy design details

Policy Design Steps and Timing

The main policy design steps for the system include:

- The provision of the RTI system and associated bus priority is a core part of the West of England's transport strategy, as outlined in Joint Local Transport Plans from 2001 to the latest plan covering the period 2012-26.
- The recommendation made in the Greater Bristol Strategic Transport Study in 2005 for greater provision of bus priority in the sub region.
- The introduction of the Punctuality Improvement Programme (PIP) in 2007 as an agreement between Bristol City Council and First Bristol. The PIP contained commitments and proposed actions on behalf of the Council and First with a range of targets to be progressively achieved over the programme's five year lifetime.
- Securing funding from central Government and First Bristol in 2008 to implement the Greater Bristol Bus Network major scheme, providing a comprehensive upgrade of ten corridors between 2008 and 2012. The project aims were to significantly improve service for passengers by upgrading 40 routes, 1,000 bus shelters and the creation of bus priority lanes. The programme of works included the provision of RTI at bus stops and bus priority at traffic signals.
- The introduction of Quality Partnership Schemes (QPS) in 2010 to govern bus operations on the ten within the Greater Bristol Bus Network. The QPS include agreements on maximum fare levels, minimum frequencies, vehicle standards and service performance (including punctuality levels). The QPS is

complimented by voluntary partnership agreements with trigger points, whereby, when agreed levels of patronage and/or revenue are obtained operators will deliver specified improvements to services. The QPS has therefore been established to lock in the benefits and provide a virtuous circle of investment by all local bus operators and the local authorities.

Actors Involved

The main parities involved in the RTI system are:

- Bristol City Council (lead local authority);
- Bath & North East Somerset Council (partner local authority);
- North Somerset Council (partner local authority);
- South Gloucestershire Council (partner local authority);
- First Bristol (main bus operator);
- Wessex Connect (bus operator);
- Abus (bus operator);
- Vix (supplier of system and current maintenance provider).

Decision Making Process

The implementation of the original RTI system and substantial development and expansion in subsequent years has been enabled through the decision making process formed by the West of England partnership, the four individual local authorities and their ability to secure funding from central government for the system.

Implementation details

Implementation Steps and Timing

The main implementation steps for the system include:

- Implementation of the original RTI system in 1997.
- Implementation of selective vehicle detection to enable bus priority at signal junctions through the RTI and UTC systems.
- Installation of a new radio system to provide increased capacity and wider coverage in 2007.
- Expansion of the system to include additional bus 'showcase' routes, particularly as part of the implementation of the Greater Bristol Bus Network major scheme between 2008 and 2012.
- Implementation of renewed maintenance arrangement for the RTI system in 2011.

ICT/Infrastructures needed

ICT is fundamental to the RTI and bus priority system, from the GPS based vehicle tracking system, to the RTI server software to calculate arrival time predictions and the link to the UTC system to provide bus priority at signal junctions.

ICT is used within the UTC and associated SCOOT systems to enable the provision of bus priority. This includes an assessment of the current performance of each junction to ensure providing bus priority does not have any unintentional consequences on other services or parts of the highway network.

In addition, ICT is used to provide information from the RTI system more widely, including the ability for virtual RTI displays to be used on local travel information websites and to be communicated to mobile phones.

Human Resources

A substantial level of resource has been allocated by the four local authorities, bus operators and RTI system supplier during the lifetime of this project from the original procurement in 1997 to the current date.

Monitoring Procedures

Monitoring of the success of the RTI and bus priority system is undertaken through the reporting of targets and indicators included within the West of England's Joint Local Transport Plan, particularly with regard to bus punctuality performance and customer satisfaction.
The monitoring and incentivising of performance through the PIP and QPS agreements between local authorities and bus operators is vital to the success of the RTI system and the wider provision of good quality bus services throughout the Greater Bristol area.
In addition, monitoring of performance is carried out at regular working group meetings and real-time monitoring of bus services and the wider network status is undertaken within Bristol's UTC centre.

Supporting Mechanism

Awareness/Information Campaigns

Awareness and information campaigns to promote the RTI system have been undertaken through the Travel West, Travel Bristol and Next Bus Bristol brands, including the provision of RTI data on local travel information websites.

Partnerships/Key Supporting Stakeholders

Key partnerships and key supporting stakeholders include:

- The West of England Partnership, which encompasses the authority areas of Bath & North East Somerset, North Somerset, Bristol and South Gloucestershire.
- The partnership arrangements between local authorities and bus operators secured through the PIP and QPS initiatives.

Results

Expected vs Actual Benefits

Overall the expected benefits from the RTI and bus priority system have been realised including benefits relating to improvements to bus journey times, punctuality, reliability and passenger satisfaction.

Quantitative Results Achieved

Quantitative results achieved through the RTI system include improvements to bus service punctuality, reliability and reduced journey times.

Qualitative Results Achieved

Quantitative results achieved through the RTI system include a substantial improvement in the quality of bus provision, particularly the information provided to the travelling public which has been dramatically improved through the introduction of the RTI system. This has resulted in improved levels of customer satisfaction with the bus services.

Key Considerations

Lessons Learned

The main lessons learnt from the project to date include:

- The importance of meeting the tight timescales to implement timetable changes within the RTI system and the differing requirements of the system operator and bus operators during this process.
- The recognition that the provision of bus priority has different levels of effectiveness at different junctions, due to a range of factors relating to the junction itself and the current traffic conditions.

- The need for a holistic approach to network management to maximise the benefits of the bus priority system, for instance through the provision of messages on VMS roadside displays.

Primary Obstacles

The main obstacles experienced through the project to date include:

- The maintenance costs associated with the system are high and purchase of equipment can be prohibitive, particularly for small bus operators.
- Obstacles have delayed implementation of future enhancements to the system, including the provision of scrolling messages on at-stop RTI displays and provision of on-bus screens and audio announcements.

Critical Success Factors

The key factors which were critical to the success of the project include:

- The importance of all data relating to the timetable, route, bus stop allocation and the location of all stops served being fully up to date for every journey at all times to ensure the RTI system and associated bus priority operates correctly and provides accurate information to the travelling public.
- Reliable communication throughout the system is vital to ensure there is no loss of connection and therefore the system is able to operate. For this reason enhanced communication infrastructure is likely to be a fundamental aspect of any future bus rapid transit scheme in the area.
- The importance of effective partnership working, both between local authorities and bus operators, but also between different teams within the same organisation, both through the formal PIP and QPS arrangements but also through regular liaison at a working group level.

Transferability Considerations

Transferring the knowledge gained from the implementation of the system in Great Bristol to other public bodies within the country of the good practice is enabled through the use of standard protocols and the forums established by Real Time Information Group (RTIG) for RTI systems and UTMC Development Group (UDG) for UTC systems.

Up-scaling Considerations

The RTI system has been extended to include additional bus ‘showcase’ routes, particularly as part of the implementation of the Greater Bristol Bus Network major scheme between 2008 and 2012.

The main factor required to enable the wider scale role out of the system is the requirements to install the relevant equipment on buses, at stops and to enable bus priority at signal junctions on the new corridors.

Contact

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