Centre for Transport & Society

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BIKE-RAIL INTEGRATION AS ONE SUSTAINABLE TRANSPORT SOLUTION TO REDUCE CAR DEPENDENCE

This three-year PhD research project set out to understand the existing behaviour of those who combine cycling with rail (bike-rail integration - BRI) and together with research involving non-adopters, to inform the design, development and implementation of initiatives to increase its incidence.

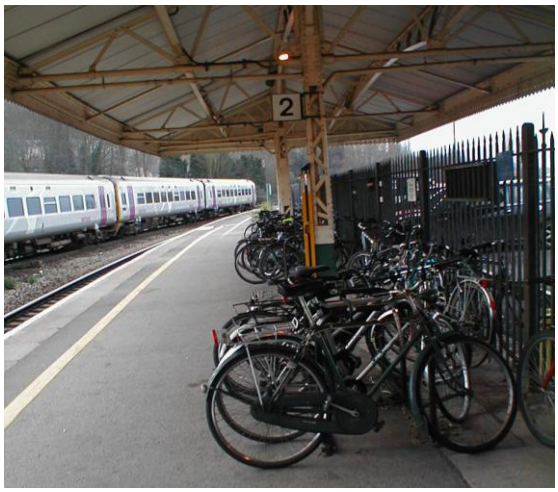
The research was carried out in collaboration with First Great Western Trains (FGW) through a Great Western Research Studentship designed to contribute to knowledge that will assist regional development as well as knowledge exchange between the private sector and academic institutions in the South West. The supervisory team was Prof. Graham Parkhurst (UWE), Mr Derek Robbins (Bournemouth University) and Dr Ian Walker (Bath University).

Background

The current level of cycling to the railway in the UK is very low (2% of passengers, which contrasts with a level of 40 per cent in The Netherlands). This research project stemmed from the normative perspective that there is a need for travel behaviour change towards less travel and more sustainable modes to mitigate the negative impacts of car use on the environment, health and quality of life. In particular, the dominance of the car in the rural and urban landscape has made the most sustainable transport modes a less attractive option. Bike-rail integration was seen as a way of extending the reach of the rail system through cycle access to enable individuals to substitute entire car journeys, thereby increasing the overall number of rail journeys. It was also seen as a way of reducing car use for current rail access journeys.

Objectives

The research approach and strategy aimed to combine an exploratory phase to understand the existing behaviour of bike-rail integrators with an 'action research' phase to design and implement two trial interventions and measure their outcomes. The first intervention was a pilot of a bike-sharing scheme in Bristol (Hourbike) and the second was a test of a methodology designed to influence car-commuters to switch to rail travel with walking or cycling access.



Methodology

Primary qualitative and quantitative data were collected at two Bristol stations using different methods: observation, 135 face-to-face surveys, semi-structured interviews, cycle parking and barrier counts, to ascertain the demographics of bike-rail integrators, their attitudes, motivations, cycling histories, social contexts and levels of experimentation. To enhance the geographical spread of some of the data types an internet survey was placed on the FGW website.

Drawing on these data and a literature review around travel decision making a dynamic conceptual ecological model was developed. This model was then applied to develop, design and implement the two interventions.

UWE BRISTOL University of the West of England

Findings from user surveys

The bike-rail integrators in the Bristol sample were shown to be predominantly male (71%) and in their thirties. Their level of income is comparable to those of rail travellers generally and the majority (89%) were employed. Their cycle journeys to and from the railway stations were on average 3.7 km and many stated that their alternative access mode to the railway station would be walking. The main motivations for BRI were saving time or money and taking exercise.

Five methods of integration had been deployed by the respondents, with some individuals using more than one type, depending on the journey purpose and frequency:

- cycling and parking at the station nearest home,
- maintaining a bike at one or more 'destination' stations,
- combining the above two options - a bike at both ends,
- investing in a folding bicycle to facilitate carriage due to space restraints or restrictions set by operators,
- taking a fixed frame bicycle onto a train and using it for access and/or egress trips,
- making an entire journey by cycle in one direction, but making either the outbound or return journey carrying the bicycle on the train.

The bicycle parking and barrier counts showed that 10% of bicycles at the available bike parking stands were not in use and therefore that capacity could be released by better management of cycle parking resources. Likewise, with improved security of bicycle parking, approximately one in ten bicycles might be left at the station rather than being taken on trains. The cycle parking was found to be used by two distinct groups, those living outside Bristol who parked overnight and those living in Bristol who parked during the day. The decision about which method to use was found to be influenced by:

- the security of bicycle parking or the perceived security of parking,
- the ease or difficulty of taking a bicycle on the train,
- the distance at either end of the rail journey,
- the journey frequency.

A picture emerged that bike-rail integrators had experimented with the different options and had invested a considerable amount of time to find the optimum BRI method for a particular journey given the capacity of existing facilities. 44% of the sample (N=135) had a car available for the particular journey for which they were surveyed but chose to bike-rail integrate. The motivations were diverse, illustrating a complex web of interactions amongst a number of influencing factors. Negative or 'push factors' were given by some: high parking charges and traffic congestion; others articulated positive and affective reasons for bike-rail integration. The results highlighted the importance of the individuals' transport, social and cultural context in influencing the decision to bike-rail integrate.

Findings from bike hire pilot

The availability of new technology has enabled the possibility of bikes being available for hire 24-hr with minimal staffing requirements. The application at stations was intended by the researcher to enhance the experience of existing bike-rail integrators and perhaps encourage new users by:

- offering an opportunity to try cycle access without investing in a bicycle,
- providing an alternative egress mode for tourists/visitors but also for commuters and business travellers making less frequent journeys,
- reducing the need for bicycle carriage on trains,
- making more efficient use of bicycle parking facilities at station by providing an alternative for those keeping a second bicycle at the destination,
- allowing rail users to reduce their overall journey times over walking or by avoiding a wait for a taxi or bus,
- offering additional flexibility in case of a puncture, theft or repair.

The researcher collaborated with FGW, Bristol City Council, UWE and Hourbike to set up a network of hire hubs using battery-powered GSM docking technology. Users needed to register (as a way of building in accountability

and theft prevention) and could then hire a bicycle using a swipe card with a passcode. The first 30 minutes of each hire were free; £1 per hour or part-hour thereafter. As with other bike-sharing schemes, the pricing structure was designed to incentivise the quick return of the bicycles to make them available to other users.

From October 2008 for a year, 10 bicycles were available at hubs at Bristol Parkway and two locations on the UWE Frenchay Campus (picture below). The bicycles were rented over a 160 times in the year, mainly for travel between Bristol Parkway and UWE, with most rentals being 5-15 minutes duration. The walk from Bristol Parkway station to campus is approximately 20-25 minutes.

A short survey of individuals who had registered an interest in the scheme or joined was conducted (345 responses): 7% categorised themselves as 'never having cycled before'; 61% as 'occasional cyclists'. A quarter of respondents anticipated using the bicycles for many different journey purposes; half thought they would only use them for leisure. Respondents were more interested in receiving help with route planning than safety training or bike maintenance.

The small scale pilot with minimal publicity indicated that such facilities are in demand and also the potential to attract new cyclists. It has also illustrated that useful data can be gathered through such a scheme in terms of cycling behaviour: the particular journeys that are made, when, for what duration and the frequency. The process of designing and implementing such a scheme has provided useful insights into the potential barriers for future schemes.

Findings from mode shift pilot

The second intervention aimed to attract those known to drive to the UWE campus and live within walking and cycling distance of their home railway station to trial rail. The intervention had several elements:

- a financial incentive (two free rail tickets),
- motivational messages – exercise and productive time use were highlighted,
- the social message that others in the same social group were already accessing campus by rail,
- informational barriers were removed through personal travel advice, and
- an additional access option through a free trial of Hourbike

Twelve out of the 440 staff contacted by email responded and six participated in the trial. Each participant was given relevant travel advice and was interviewed post the trial about the journey experience, previous travel behaviour and the likelihood of choosing rail in the future. The post trial interviews yielded rich qualitative data highlighting the many different factors influencing the choice of access to campus and specific aspects of the rail journey experience that were not conducive to repeat travel. The car travel context of heavy peak hour congestion and limited parking were major factors in the decision to take up the free trial.

This intervention represents one combination of measures and has created some useful insights for the future design of programmes to promote rail travel with walking or cycling access and this element of the research is on-going with an expanded pilot using discounted rail travel through carnets to lock-in new users for a sufficient time for them to optimise their experience.

Contact Details

Dr Henrietta Sherwin
Henrietta.Sherwin@uwe.ac.uk

Centre for Transport & Society
University of the West of England
Frenchay Campus
Coldharbour Lane
BRISTOL BS16 1QY
UNITED KINGDOM
www.transport.uwe.ac.uk

University of the West of England
BRISTOL