

World Transport Policy & Practice

ISSN 1352-7614

Volume 9, Number 1, 2003

Mission Statement

World Transport Policy & Practice is a quarterly journal which provides a high quality medium for original and creative work in world transport.

WTPP has a philosophy based on the equal importance of academic rigour and a strong commitment to ideas, policies and practical initiatives that will bring about a reduction in global dependency on cars, lorries and aircraft.

WTPP has a commitment to sustainable transport which embraces the urgent need to cut global emissions of carbon dioxide, to reduce the amount of new infrastructure of all kinds and to highlight the importance of future generations, the poor, those who live in degraded environments and those deprived of human rights by planning systems that put a higher importance on economic objectives than on the environment and social justice.

WTPP embraces a different approach to science and through science to publishing. This view is based on an honest evaluation of the track record of transport planning, engineering and economics. All too often, these interrelated disciplines have embraced quantitative, elitist or mechanistic views of society, space and infrastructure and have eliminated people from the analysis.

To help it to reach a wide readership, encompassing advocates and activists as well as academics and advisers, WTPP is available free of charge as PDF files on the internet at <http://www.eco-logica.co.uk/WTPPhome.html>

© 2003 Eco-Logica Ltd

Editor

Professor John Whitelegg
Stockholm Environmental Institute at York, Department of Biology, University of York, P.O. Box 373, YORK,
YO10 5YW, U.K.

Editorial board

Eric Britton

Managing Director, EcoPlan International, The Centre for Technology & Systems Studies, 8/10 rue Joseph Bara, F-75006 Paris, FRANCE.

Professor John Howe

Independent Transport Consultant, Oxford, U.K.

Mikel Murga

Leber Planificacion e Ingenieria, S.A., Apartado 79, 48930-Las Arenas, Bizkaia, SPAIN.

Paul Tranter

School of Geography and Oceanography, University College, University of New South Wales, Australian Defence Force Academy, Canberra ACT 2600, AUSTRALIA

Publisher

Eco-Logica Ltd., 53, Derwent Road, LANCASTER, LA1 3ES, U.K.

Telephone +44 1524 63175 Fax +44 1524 848340

E-mail: Editorial: <ecologic@gn.apc.org> Business Manager: <pascaldesmond@eircom.net>

World Transport Policy & Practice

ISSN 1352-7614

Volume 9, Number 1, 2003

Contents

- 3 Abstracts & Keywords
- 4 Editorial
- 6 The UK National Cycle Network: an assessment of the benefits of a sustainable transport infrastructure
Andy Cope, Sally Cairns, Ken Fox, Debbie A Lawlor, Mary Lockie, Les Lumsdon, Chris Riddoch & Paul Rosen
- 18 An evaluation of the bicultural services of the McAllen Central Bus Station linking the USA & Mexico
Martin Feinberg
- 26 Public transport provision in two European cities – Oxford & Odense
Torben Holvad
- 31 Stelios – the accidental environmentalist? The potential impacts of the EasyCar Club in the UK
Julia Meaton, Richard Starkey & Sue Williams
- 37 United States aviation transportation policies ignore the hazards of airport-related noise
Arline L. Bronzaft
- 41 The future development of air traffic in the UK
P.E. Hart
- 46 Letter to the Editor
- 47 Notes for contributors

The UK National Cycle Network: an assessment of the benefits of a sustainable transport infrastructure

Andy Cope, Sally Cairns, Ken Fox, Debbie A Lawlor, Mary Lockie, Les Lumsdon, Chris Riddoch, Paul Rosen

The UK National Cycle Network has increased opportunities for people to make trips by bicycle and on foot. In this paper, data from the NCN route usage monitoring project is analysed to examine the implications of the NCN for health, social inclusion, economic opportunities through tourism and recreation, and the nature of cyclists and cycling. Analysis of the survey data suggests that various benefits are being realised. The capacity of the NCN to further impact in these and other areas is discussed.

Keywords

Cycling, Health & transport, National Cycle Network, Social inclusion, Sustainable tourism, Sustainable transport

An evaluation of the bicultural services of the McAllen Central Bus Station linking the USA & Mexico

Martin Feinberg

Abstract

The Central Station in McAllen, Texas, is the first bus station ever to serve bus lines from both the USA and Mexico. This bus station aims to provide the public with a transportation facility that can supply transportation services to lower income individuals, Mexican tourists and immigrants. Based on the results of this survey, it can be seen that the passengers from both countries are impressed with the cleanliness, appearance, signs and restrooms, and the friendliness of the drivers.

Keywords

Bicultural, Bus station, McAllen, NAFTA, US–Mexico border, Texas, Tourists, Transit bus lines

Public transport provision in two European cities – Oxford & Odense

Torben Holvad

This paper provides a comparison of bus transport provision in two cities, Odense (Denmark) and Oxford (UK), in terms of regulatory frameworks used. A comparison of these cities is interesting because public transport is organised in significantly different ways – in Oxford bus services are largely based on an open entry model, whereas bus services in Odense are provided by a public entity. In contrast to the rest of Great Britain usage of buses in Oxford has increased significantly since bus deregulation was implemented through the Transport Act 1985.

Keywords

Bus provision, regulatory frameworks, Odense, Oxford

Stelios – the accidental environmentalist? The potential impacts of the EasyCar Club in the UK

Julia Meaton, Richard Starkey & Sue Williams

In March 2003 Stelios Haji-Ioannou publicised his plans for establishing as many as 30 EasyCar Clubs in the UK within the next year. This paper shows how Stelios arrived at the concept of operating Car Clubs through purely cost cutting motives. The paper includes an overview of the operational details of the proposed car clubs and compares them with more conventional community car clubs. The potential environmental impacts of the EasyCar Club are then considered.

Key Words

business, entrepreneur, car club, car sharing, rental cars

United States aviation transportation policies ignore the hazards of airport-related noise

Arline L. Bronzaft

By relying on methods that underestimate the numbers of people affected by airport-related noises and dismissing the growing evidence that aviation noise is harmful to health, quality of life and children's development, United States aviation transportation policies largely ignore the impacts of airport-related noises on residents. Anti-aviation-noise community groups continue to demand the refunding of the Office of Noise Abatement and Control which once had the responsibility of protecting citizens from the dangers of noise.

Keywords

aviation noise, noise pollution, transportation policy

The future development of air traffic in the UK

P.E. Hart

There is not a convincing case for investing in any of the new runways or airports proposed by the Department for Transport (2002). If air transport covered all its social costs by paying the same fuel taxes as other transport, air fares would increase and hence air traffic would decrease. The case for taxing air transport is so powerful that current international negotiations should lead to new charges on aviation. Extensions of runway capacity, while traffic decreases, would lead to losses on investment. Private investors should not rely on a future government to cover such losses when present government policy excludes public funding of new airport capacity.

Keywords

Airports, aviation, economics, finance, fuel price, investment, public policy, travel

In March 2003 the London based publishers, Earthscan, published a selection of the best material that has appeared in the last 8 years of this journal. The Earthscan Reader on World Transport Policy and Practice is intended to make this considerable body of original transport material widely available to students, teachers, politicians, campaigners and practitioners throughout the world. After 8 years of publication the global situation in transport is worse than ever and to mark the publication of this book we publish a brief assessment of the state of world transport.

Transport has a major impact on the lives of everyone. Lack of transport in Africa, Bangladesh and parts of India acts as a serious drag on economic development and a burden on women who carry water, fuel and crops over hundreds of kilometres. In other parts of the world too much transport is the cause of serious gridlock, congestion, pollution and health damage to children. Traffic in California, Southeast England and around Frankfurt in Germany is seriously congested, and this results in the loss of billions of dollars to economies and serious disruption to everyday life. Road traffic accidents currently running at over 3000 deaths per day are a significant public health problem and a serious blight on the lives of pedestrians, cyclists and bus users in developing countries. All these problems are getting worse over time as the world's population moves higher up the 'mobility ladder' and demands more investment in roads, railways and airports. These investments take a significant slice of tax dollars at a time when healthcare, pension and social infrastructure costs are rising fast in all parts of the world and the pressure on every tax dollar has never been greater.

The growth in the demand for transport is a major factor in the growth of greenhouse gas emissions and the problems associated with climate change. Transport growth has shown itself to be immune from most of the discussions surrounding sustainable development or the promotion of environmentally friendly modes of transport, especially walking and cycling. Most of us expect to travel further every year to carry out the most mundane of every day activities such as travelling to school and work. Even if we use the latest low emission vehicles our increased kilometres of travel cancel out those gains and push us further up the greenhouse gas emission curve. The more we want to travel and the more we abandon the environmentally friendly modes the more we damage the global environment.

Environmental problems are also created by the enormous growth of new road and motorway building. New motorways in the ex-communist countries of Eastern Europe are already encroaching on sensitive environmental sites and polluting the atmosphere and

watercourses. New roads in the UK such as the Birmingham Northern Relief Road are cutting a huge swathe of tarmac and concrete through open countryside, which has traditionally been protected. These new roads in their turn encourage yet more traffic and switch more trips from public transport to private cars. New roads also change geography and contribute to the 'spreading out' of everything we do. The spread of business parks, out of town shopping centres and low density suburban housing in the USA, the UK and even in Kolkata in India is a consequence of new highway investment.

The UK government has shown that most transport investment benefits those who are already wealthy. Transport spending is inequitable and socially divisive. Rich people fly more and drive more often than poor people and most public investment supports those who go further and faster than anyone else. In the UK the tax payer supports those who fly to the tune of about *£10 billion per year* and the environmental impact of flying (e.g. air pollution and noise) affects poorer people more than richer people.

The policy response to serious traffic and transport problems has traditionally been to invest money in more infrastructure. More roads, more airports and more high-speed trains are still the norm. Even in developing countries where the pressure on tax dollars is particularly acute the bias in investment is towards these 'wealthy' modes and away from the needs of the rural poor and away from the needs of the poorest in Mumbai or any other Asian/Indian city.

Recent events in Bogotá (Colombia) show that a completely different path is now possible. The ex-Mayor of Bogotá has carried through a series of radical transport policies and funding reallocations so that the needs of the poor and those who travel short distances to work and school in their own neighbourhoods are well served

Bogotá has developed the tradition of closing main arteries to motor vehicles for seven hours every Sunday so that people can use the road for cycling, jogging and meeting up. The total amount of road space closed to traffic has doubled to – and now represents – 120 km of main city roads. Investment in cycling has resulted in more than 300 km of protected bicycle paths being built with a steady increase in cycling. Public investment of US\$ 5 million per kilometre in the TransMilenio passenger buses now means that more than 540,000 daily trips are undertaken by bus.

The Bogotá approach has set a new standard for environmentally friendly, sustainable and socially just policies. London's congestion charge introduced in February 2003 sets a similar standard. The charge is £5 per day and currently raises about £500,000 per day, the majority of which will be spent on buses, walking

toand cycling in London. This is socially just. Only 20% of the trips into London every day are by car and this minority of trips imposes a serious burden on poorer Londoners who cannot pay the high house prices to escape the city's pollution. The congestion charge has reduced traffic for the benefit of everyone by about 20%, conditions for cyclists and bus users are now better than at any time in the last 70 years.

It is possible to improve living and working conditions in all the world's cities and in the poorest rural areas. There is nothing to lose and everything to gain. The only serious barrier is political conservatism, the distorted perceptions of politicians who think that moving in an environmentally and socially just direction will lose votes. It will not. The time has arrived for a new transport paradigm and one that rewards the cyclist, the pedestrian and the bus user whilst making the motorists and the lorries pay the full cost of the environmental damage that they

impose on society as a whole. There are signs that this is happening but it will require individuals as determined and clear-sighted as Enrique Peñalosa (ex-Mayor of Bogotá) and Ken Livingstone (current Mayor of London) to make it happen. One thing is clear; we have all the relevant transport expertise we need and we understand the problems and the solutions that will deliver a sustainable, vibrant, socially just and child friendly future. We lack only the political vision and the political leaders to make it happen.

John Whitelegg

Editor

World Transport Policy & Practice

Whitelegg, J. and Haq, G. (eds) (2003) *The Earthscan Reader in World Transport Policy and Practice* Earthscan, London ISBN 1 85383 851 9 Price: £19.95 (paperback)

<http://www.earthscan.co.uk/asp/bookdetails.asp?key=3890>

The UK National Cycle Network: an assessment of the benefits of a sustainable transport infrastructure

Andy Cope, Sally Cairns, Ken Fox, Debbie A Lawlor, Mary Lockie, Les Lumsdon, Chris Riddoch & Paul Rosen

Address for correspondence

Andy Cope

Research & Monitoring Unit, Sustrans, 37 Side, Quayside, Newcastle, NE1 3JE, UK

<andy.cope@sustrans-ne.org.uk>

Abstract

The UK National Cycle Network has increased opportunities for people to make trips by bicycle and on foot. In this paper, data from the NCN route usage monitoring project is analysed to examine the implications of the NCN for health, social inclusion, economic opportunities through tourism and recreation, and the nature of cyclists and cycling. Analysis of the survey data suggests that various benefits are being realised. The capacity of the NCN to further impact in these and other areas is discussed.

Keywords

Cycling, Health & transport, National Cycle Network, Social inclusion, Sustainable tourism, Sustainable transport

Introduction

In 1995 Sustrans, the sustainable transport charity, was awarded a major grant of £43.5 million of National Lottery funds by the Millennium Commission for the UK National Cycle Network (NCN). This flagship project was officially opened in June 2000 with 8,000 kilometres of cycling and walking routes passing through the centres of major towns and cities and linking urban areas with the countryside. A further 8,000 kilometres are due to be completed by 2005 (Sustrans, 2000). The initiative is a demonstration project; the NCN routes provide the basis for the development of local area networks. The principal aim is to encourage people to take up cycling for the first time, or to start to cycle again.

The NCN is a composite of over a thousand local sections ranging in length from a few metres to several

Andy Cope & Mary Lockie: Research & Monitoring Unit, Sustrans, Newcastle

Sally Cairns: ESRC Transport Studies Unit, University College London

Debbie Lawlor: Department of Social Medicine, University of Bristol

Kenneth Fox & Chris Riddoch: Department of Exercise & Health Sciences, University of Bristol,

Les Lumsdon: Department of Hospitality & Tourism, Manchester Metropolitan University

Paul Rosen: Science & Technology Studies Unit, Department of Sociology, University of York

kilometres. Each one is designed to be of benefit to local people, with on average two-thirds on minor or traffic-calmed roads and one-third on traffic-free paths. The sections are designed, built and signed by Sustrans and its partner bodies. There are over 400 active partners involved in the NCN project, including local authorities, countryside and utility bodies, landowners, central government, amenity groups and community groups. As well as contributing resources directly to the first phase of the project (increasing the original Millennium Commission grant to over four times its original value), these partners are regarded as the principal agents for the expansion of the NCN and other local networks. Further impetus has come from the UK National Cycle Strategy (Department of Transport, 1996). The Strategy is a key source of guidance that contains targets for increasing cycle usage, and cites the NCN project.

Partners have supported the NCN on the premise that it will bring benefits from traffic reduction, a safer travelling environment, inclusive transport facilities, improvements to health, and improved economic prospects. Sustrans has adopted a raft of measures designed to investigate the NCN from a number of perspectives, not only as a means of facilitating debate about the effectiveness of the project, but also to provide a sound basis for further support of future safe-route development. This paper brings together academics from diverse backgrounds to test the validity of the perceived benefits with reference to a key data source.

The route usage survey programme

In 1998 a survey questionnaire and methodology were devised by Sustrans under the guidance of a panel of traffic monitoring experts. The survey format has since evolved, but follows the same basic pattern. A four-day sampling structure is used on each section of route being monitored; a weekday during school term-time, a weekend day during school term-time, a weekday during school vacation period, and a weekend day during school vacation period. The survey days are, in most cases, in the late summer and the early autumn. Each survey day is conducted over 12

Figure 1. Map of Sustrans Routes showing the routes surveyed



- | | | |
|------------------------------------|---------------------------------|-------------------------------|
| 1 Strathyre | 9 Spen Valley Greenway | 16 Swiss Valley Railway |
| 2 Bowling Harbour | 10 Rhyl Promenade | 17 Millennium Coastal Park |
| 3 Wansbeck Estuary | 11 Stoke Greenway | 18 Chelmsford Riverside |
| 4 Elswick Riverside | 12 Leicester Riverside | 19 Wandle Route |
| 5 Darlington to Stockton Railway | 13 Whittlesey | 20 Ramsgate to Sandwich Route |
| 6 Eston and Normanby | 14 Bury St Edmunds, Kevelar Way | 21 Fremington |
| 7 Blackburn, Oakenhurst Road | 15 Phoenix Cycle Route | 22 Penzance Coastal Route |
| 8 Rishton Railway Path, Lancashire | | |

hours from 0700 to 1900. All route users are surveyed (i.e. pedestrians and other users, as well as cyclists). Local authorities instruct surveyors in accordance with detailed guidance provided by Sustrans. In addition to questionnaire completion, surveyors manually count cyclist and pedestrian movements.

The areas covered by the questionnaire include: user type classification, purpose of trip, trip generation information such as start and finish points, length and duration of trip, other transport modes used on the trip in question, whether respondents could instead have chosen to use a car for their trip, and general respondent profiling information. In addition, cyclists are invited to describe their level of experience as a cyclist. Route users are approached on a ‘next-to-pass’ basis, and interviewers conduct the survey on the first adult member of the party to reach them.

Because of the resource limitations of the programme, it is not possible to engineer a sample of survey sites that is wholly representative of the NCN. However, steps are taken to ensure that a wide variety of types of traffic-free routes are included. Local authorities are invited to nominate routes for inclusion in the programme. The programme was originally supported by a charitable trust, and Sustrans was able to recover all survey costs. Subsequently local authorities have been invited to cover the survey costs, and to make some contribution to Sustrans’ data capture, collation, processing, analysis and reporting costs. Local authorities are responsible for commissioning surveyors, and usually appoint market research specialists, transport consultants, or their own survey personnel. These parties work to strict guidelines for survey implementation.

Sustrans’ route usage monitoring programme for 2001 focused on 22 NCN routes (see Figure 1) (Sustrans, 2002). Of these, 19 were surveyed for the first-time, and three were repeat surveys, each having been previously surveyed in 1998. This set of surveys provides the principal data source for this paper.

Four academic research groups were approached by Sustrans with a view to conducting detailed investigation of the data from specific perspectives. The following sections contain the interpretation of Sustrans’ survey data by these specialists with reference to the following key areas:

- Physical activity and health
- Social inclusion
- Sustainable recreation and tourism
- Characteristics of cyclists using the NCN

Physical activity & health

Regular physical activity is associated with increased life expectancy and reduced risk of coronary

Table 1. Key characteristics of the sample of National Cycle Network users

	All users	Cyclists
Total counted*	30,504	15,118
Total surveyed	3,430	1,464
<i>Age</i>		
0-15*	23.8%	26.0%
16-24	6.1%	5.6%
23-34	12.7%	12.6%
35-44	20.0%	23.9%
45-59	21.9%	21.2%
60+	15.5%	10.8%
<i>Gender (adults)</i>		
Male*	61.4%	68.8%
Female*	38.6%	31.2%
<i>Trip purpose (adults)</i>		
Recreational	60.5%	67.4%
Functional	39.5%	32.6%
<i>Cycling experience (adults)</i>		
New or starting again -		13.2%
Occasional -		33.8%
Experienced regular -		53.0%
<i>Employment status (adults)</i>		
Employed full-time	53.9%	65.8%
Employed part-time	11.0%	8.8%
Home-maker	4.0%	1.9%
Unemployed	5.3%	4.2%
Retired	22.0%	15.6%
Other	3.7%	3.8%

*These figures have been taken from the count data. All other information is based on the interview data.

heart disease, stroke, diabetes, hypertension, obesity, some cancers and osteoporosis (Haapanen *et al.*, 1997; Andersen *et al.*, 2000). In addition there is increasing evidence that physical activity can enhance mental health (Biddle *et al.*, 2000). To be effective at preventing cardiovascular disease, physical activity needs to be aerobic and regular but does not need to be vigorous. It has been estimated that only 31% of adult men and 20% of adult women in Britain are sufficiently active to provide protection against cardiovascular disease (Petersen, 1999). Since the early 1990s, UK government policy has emphasised the need to increase population levels of physical activity in order to improve both general and cardiovascular health (Physical Activity Task Force, 1995).

The results of the NCN user survey provide valuable insights into who uses the Network, and for

Table 2. Distinctions between NCN users based on gender & age

	Males	Females	16-24 years	25-34 years	35-44 years	45-59 years	60+ years	All users
<i>Main reason for choosing to use route</i>								
Journey efficiency	6.0%	8.0%	12.6%	10.0%	6.1%	5.1%	5.4%	7.2%
Money saved on journey	1.5%	1.2%	6.7%	0.6%	1.0%	0.7%	1.2%	1.4%
Convenience of route	19.2%	25.4%	34.3%	24.2%	18.1%	20.5%	20.4%	21.5%
Pleasant surroundings	22.9%	24.6%	11.7%	21.0%	22.9%	26.0%	27.8%	23.4%
Safety on the route	15.0%	15.3%	7.1%	15.0%	21.0%	14.1%	12.6%	15.1%
Personal fitness	20.1%	13.4%	15.1%	17.9%	18.2%	19.7%	14.9%	17.7%
Personal health	7.1%	5.5%	4.2%	5.0%	4.5%	6.3%	11.5%	6.4%
Quality of route	3.4%	3.4%	2.5%	2.5%	3.6%	3.9%	2.7%	3.3%
Other	4.2%	2.8%	5.4%	3.3%	3.9%	3.3%	3.1%	3.6%
<i>Has route helped change levels of physical activity</i>								
Yes, by a large amount	42.4%	41.5%	35.1%	38.2%	40.6%	44.5%	45.4%	41.9%
Yes by a small amount	27.7%	29.0%	29.0%	27.6%	31.5%	26.7%	26.1%	28.3%
No	29.9%	29.5%	35.9%	34.2%	27.9%	28.8%	28.5%	29.8%
<i>Levels of cycling experience (cyclists only)</i>								
New	1.7%	6.5%	3.0%	2.9%	3.8%	1.5%	3.5%	2.8%
Starting again	9.4%	13.4%	4.0%	10.7%	8.9%	12.2%	13.4%	10.4%
Occasional	10.8%	18.0%	12.9%	14.4%	16.4%	10.2%	5.0%	12.1%
Occasional, experienced	22.3%	21.1%	26.7%	20.6%	20.7%	21.1%	19.9%	21.7%
Regular, experienced	55.9%	41.0%	53.5%	51.4%	50.2%	55.0%	58.2%	53.0%

what reasons, and therefore gives some indications of potential health benefits. The most striking result from a health perspective is that high proportions of NCN users are from groups at high risk of cardiovascular disease, but who have been particularly difficult to engage through other physical activity interventions such as primary care 'exercise-on-prescription' schemes or exercise classes. These groups are specifically older individuals, men, and individuals living in deprived areas (Petersen, 1999). Table 1 shows that NCN users are more likely to be male (61%) than female (39%). Of these, men (27%) are more likely than women (19%) to say that they were primarily using the NCN for personal fitness or personal health (Table 2). Table 1 shows the age distribution of the users: 37% of users are aged 45 years or older. Over one-fifth of respondents are retired (Table 1); again this is important because retirement is often associated with decreases in levels of activity. Older individuals are more likely than younger individuals to report that they were using the NCN for health reasons (Table 2).

The survey also shows evidence of NCN use by children. Twenty-four percent of users counted are under the age of 16 years. Although survey constraints meant that these users were not interviewed, this

information reflects the potential importance of the NCN as a means of helping young people to avoid the kind of sedentary lifestyle that has been identified as posing a threat to health into adulthood (Biddle *et al.*, 1998).

Although the majority of respondents use the NCN for recreational purposes (61%), 39% use it for functional trips such as travel to work or the shops (Table 1). Those using the NCN for a functional journey may be doing so as a one off. However, the nature of these trips (visits to shops, work, school) imply that a substantial proportion of users are undertaking journeys that are likely to be regularly repeated and therefore have the greatest potential to improve health. The average functional bike trip is for a distance of 10 km, and the average functional walking trip is 3 km in length (the recreational equivalents are 25 km for cycling and 6 km for walking). Current recommendations for physical activity for health are the equivalent of 30 minutes of brisk walking on most days of the week (Physical Activity Task Force, 1995). The duration in each case is very likely to exceed 30 minutes. If journeys of this length are repeated twice a week the NCN is clearly supporting individuals towards achieving levels of activity that are required for health.

Table 3. Proportion of NCN user responses according to the relative deprivation of surrounding area:

Profile of NCN users		Relatively advantaged	Relatively deprived
<i>Gender</i>	Male*	60.0%	60.3%
	Female*	40.0%	39.7%
<i>Age</i>	0-15*	25.3%	25.0%
	16-24	6.0%	6.5%
	25-34	12.9%	13.7%
	35-44	21.5%	17.9%
	45-59	20.1%	21.0%
	60+	14.1%	15.9%
<i>Ethnicity</i>	White	96.6%	97.6%
	Other	3.4%	2.4%
<i>Disability status</i>	Disabled users	1.5%	4.9%
<i>Cycling status (cyclists only)</i>	New or starting again	10.2%	14.4%
	Occasional	33.9%	32.3%
	Experienced regular	55.9%	53.3%
Indicators directly or indirectly related to deprivation			
<i>Employment</i>	Full time	58.3%	50.4%
	Unemployed/sick	2.9%	7.6%
	Retired	18.7%	23.0%
	Other	20.1%	19.1%
<i>Car in household</i>	Yes	84.5%	74.0%
	No	15.5%	26.0%
Factors relating to the nature of journey, mode selection and route choice			
<i>Purpose of journey</i>	Recreational	52.5%	58.1%
	Functional	47.5%	41.9%
<i>Car alternative</i>	Chose not to use	34.5%	30.1%
	Not available	27.1%	35.9%
	Not appropriate	37.8%	34.0%
<i>Main reason for choosing route</i>	Personal fitness/health	24.8%	23.7%
	Pleasant surrounds/ route quality	25.7%	24.8%
	Safety, convenience or efficiency	43.2%	48.1%
	Money saving	1.8%	1.2%
	Other	4.3%	1.8%
Nature of route use, and likelihood of increasing frequency of use			
<i>Mode of use on NCN</i>	Cycling	55.4%	29.9%
	Walking	41.4%	66.7%
	Other	3.2%	3.3%
<i>Distance travelled to reach NCN</i>	1-5 miles	40.5%	69.2%
	6-30 miles	37.9%	24.8%
	31+ miles	21.5%	6.0%
<i>Increased use if route improved?</i>	Cycle and walk more	26.0%	23.7%
	Cycle more	15.3%	9.2%
	Walk more	11.3%	19.3%
	No / don't know	47.3%	47.9%

*These figures have been taken from the count data. All other information is based on the interview data.

Forty-two percent of adult users state that the NCN had helped them to increase their levels of regular physical activity by a large amount and 28% by a small amount; only 30% feel that the NCN has made no difference to their activity levels. There is no major gender difference with respect to the proportions who claim that the NCN has helped them to considerably increase their levels of physical activity (41% of women versus 42% of men), but older users are more likely than younger users to indicate that the NCN has helped them to increase their activity by a large amount (Table 2).

This survey indicates that the NCN has the potential to enhance both physical and mental health in significant sectors of the population. However, an important limitation of the data is the lack of evidence concerning previous activity levels of current NCN users. From a public health perspective, increasing levels of activity among the sedentary is the highest priority.

Social inclusion

A second hypothesised benefit of the NCN is that it can help to address 'social exclusion'. A number of recent Government-led initiatives have focused on the need to reduce the imbalances caused by social exclusion, and to ensure that the deprived and disenfranchised in society enjoy the same opportunities as others (Social Exclusion Unit, 2003). These initiatives extend to the fields of transport, healthcare and recreation. Social inclusion has become the motivation for an assortment of funding packages from which stakeholders in cycling and walking have benefited (New Opportunities Fund, 2002), as has the ongoing development of the NCN. It is assumed that improving facilities in relatively deprived areas will help to increase social inclusion by encouraging and enabling a broader range of people to participate in cycling and walking. The data collected as part of the NCN route usage monitoring programme provides an insight into these issues in three ways.

Firstly, as a means of examining the social implications of the NCN, the 22 survey locations were divided into two groups, based on an averaged 'index of multiple deprivation' value (DTLR, 2000). Where the count site was in an area with an index of deprivation value of less than 30, it was classified as 'relatively advantaged', whilst those with an index value of more than 30 were classified as 'relatively deprived'. Results are given in Table 3, and some key observations are as follows:

- There are no important differences in the age, gender or cycling experience of the two groups of users;
- Although numbers are small, the proportion of

disabled users in relatively deprived areas (5%) is three times greater than the proportion in relatively advantaged areas (2%);

- Differences between levels of car ownership (85% of households in more advantaged areas have access to a car, compared with 74% in relatively deprived areas) are reflected in the proportions of NCN users who do not have a car available for the trip they are making – 27% in relatively advantaged areas, and 36% in relatively deprived areas;
- Large proportions of users both in relatively advantaged areas and relatively deprived areas are choosing not to use a car even when one is available – 35% and 30% respectively;
- There is no evidence that relative deprivation is forcing people to use the NCN as a cheap mode of transport – the proportion of functional use is higher in relatively advantaged areas, and less than 2% of users in both areas report that they are using the NCN to save money;
- Users of routes in relatively deprived areas travel significantly shorter distances to reach the route (69% travelling less than five miles compared with 41% of users from relatively advantaged areas);
- Users in relatively deprived areas are more likely to walk than cycle, with 67% of users being pedestrians, compared with 41% in less deprived areas;
- Users of routes in relatively deprived areas are less likely than those in relatively advantaged areas to state that it has helped them to increase their activity levels by a large amount (36% and 41% respectively).

The analysis suggests that NCN routes in relatively deprived areas are providing a positive facility for their local community since they are used by people living relatively locally, use appears to be from choice (not necessity), and they are involving some groups often excluded from transport and leisure facilities, such as the disabled. However, some of the potential benefits from using the NCN (such as health gains or access to a cheap mode of transport) are not necessarily being fully realised in such areas.

Secondly, Table 4 shows how the profile of cyclists has changed over time on the three NCN routes where users were surveyed in 1998 and 2001. On all three, substantially higher levels of use are occurring. Moreover, there has been some diversification of the social profile. The proportion of female users has increased, and more users are children or are aged over 60 years. The average group sizes have also grown, suggesting that there is potentially more participation by families or at least an increased social component to usage. There has been a very substantial increase in

Table 4. Changes in the use of three NCN routes over time

	Elswick Riverside, Newcastle			Tarka Trail, Fremington			Rishton, Lancashire		
	1998	2001	% change	1998	2001	% change	1998	2001	% change
Number of users*	749	1071	43.0%	2499	3752	50.1%	1285	1667	29.7%
Number of adult female users	152	310	103.9%	799	1284	60.7%	378	627	65.9%
Percent adult female users	20.3%	28.9%	-	32.0%	34.2%	-	32.4%	34.0%	-
<i>Age*</i>									
Number of children (0-15)	65	120	84.6%	654	956	46.2%	246	595	141.9%
% children	9.0%	11.2%	-	26.2%	25.5%	-	20.2%	32.3%	-
Number of adults (16-59)	616	798	29.5%	1733	1512	87.2%	891	1056	18.5%
% adults	85.0%	74.5%	-	69.3%	64.0%	-	73.2%	57.3%	-
Number of elderly (60+)	44	153	247.7%	112	394	251.8%	81	192	137.0%
% elderly	6.1%	14.3%	-	4.5%	10.5%	-	6.7%	10.4%	-
Percent adults on functional trips	31.1%	24.0%	-	6.8%	2.5%	-	17.4%	44.4%	-
Average party size	1.4	1.8	28.6%	2.9	3.3	13.8%	1.4	1.5	7.1%
<i>Type of cyclist</i>									
Number new/occasional	108	36	-66.5%	1273	1042	-18.2%	162	72	-55.5%
Number experienced	234	415	77.3%	883	1613	82.6%	176	355	101.9%
Percent new/occasional	31.5%	8.0%	-	59.1%	39.2%	-	48.0%	16.9%	-
Percent experienced	68.5%	92.1%	-	41.0%	60.7%	-	52.0%	83.1%	-
Number of interviews	122	189	-	248	209	-	384	252	-

*These figures have been taken from the count data. All other information is based on the interview data.

the proportion of regular experienced cyclists on the routes, in comparison to other types of cyclist. This suggests that those who were initially attracted to using the route (including novice cyclists) have progressed to cycling more regularly. The diversification of the user profile is a positive step towards social inclusion. However, the results also suggest that additional initiatives may be required to ensure that non-cyclists are encouraged to try out the facilities on an ongoing basis.

As a *third* means of assessing social inclusion, the profile of cyclists on the NCN is compared with data from the National Travel Survey (which records on-road cycling only), and with UK demographic data (Table 5). This suggests that compared with on-road cycling, the NCN has helped to encourage some traditionally under-represented groups to cycle more, specifically women, children and the retired. The NCN has also been successful in encouraging cycling among the 35-44 years age group. However, the data provides few indications that minority ethnic groups and those not in full-time employment are encouraged to cycle by the NCN.

The evidence presented suggests that the NCN is making a positive impact in terms of social inclusion,

and that time is one of the keys to unlocking potential. As usage changes over time, the proportions of females and children increase, as does group size, suggesting increased use by family-based groups. The lack of usage by minority ethnic groups suggests a need for additional initiatives to target such groups. Strategies are also needed to highlight the advantages of cycling for health, and as a cheap mode of transport. The localised patterns of use in relatively deprived areas show that the NCN has been successful in providing a practical resource for such communities.

Sustainable recreation & tourism

A prime aim of the NCN is to encourage non-motorised transport for functional purposes. However, parts of the Network have become tourism attractions in their own right, and the entire NCN has the potential to encourage local recreational trips (Sustrans, 2000). Sixty-one percent of all NCN trips are for recreational or tourism purposes. The proportion varies according to location. For example, data from the 2001 route usage surveys on the Tarka Trail in North Devon, and in Strathyre in Scotland, show that the proportion of recreational trips is 98% and 95% respectively, whilst on several other routes leisure trips represent less than 5% of recorded usage. There

Table 5. Comparing a sample of NCN cyclists, with National Travel Survey data about cycling in Britain, & data about the population as a whole

	NTS cyclists (%) [1]	NCN cyclists (%)	GB/UK population (%)
% female (adult)	21.7%	31.2%	51.2%
% non-white (adult)	Approx 3.9%	1.5%	6.9% [2]
<i>Age</i>			
0-15	13.6%	26.0% [3]	20.1%
16-24	14.3%	5.6%	10.8%
25-34	18.1%	12.6%	14.9%
35-44	19.8%	23.9%	15.1%
45-59	22.5%	21.2%	18.6%
60+	11.5%	10.8%	20.5%
<i>Job status (adults only)</i>			
Full time	61.9%	65.8%	44.7% [2]
Unemployed/sick	5.1%	4.2%	5.2% [2]
Retired	10.5%	15.6%	20.2% [2]
Other [4]	22.5%	14.4%	29.9% [2]
<i>Household income quintile</i>			
Lowest quintile	16.0%	-	20.0%
2nd	17.0%	-	20.0%
3rd	24.0%	-	20.0%
4th	20.0%	-	20.0%
Highest quintile	23.0%	-	20.0%

[1] This refers to the proportion of all cycle kilometres that each group travels.

[2] Data is for the UK. All other data in this column is for Great Britain.

[3] Data is from user counts. All other data in this column is from interviews.

[4] Other includes part-time workers, those looking after home/family; students & voluntary workers.

are, of course, a number of definitional issues to consider, however three types of recreational cycling trips emerge from a simple analysis of the survey data. The first type comprises journeys made by local residents for recreational purposes such as trips to a nearby attraction. The second category is the day visit made by a resident or a visitor staying in the locality; it is usually a longer trip in terms of time or distance. The third category relates to cycle touring trips that involve overnight stays from home.

Analysis of usage on the routes where recreational use prevails shows some interesting distinctions from the aggregated data, and highlights the different patterns of use on touristic routes. On the Tarka Trail and at Strathyre, 75% of trips recorded through the survey are in excess of three hours duration, compared with a 25% overall average for the 22 routes surveyed. The average distance of cycling and walking trips are 29 km and 9 km respectively on the Tarka Trail, and 37 km and 15 km at Strathyre. Group sizes are larger than the overall average of 1.8 people per group, being 3.3 people on the Tarka Trail (Table 4) and 3.6 people

at Strathyre. These two routes also have the highest incidences of users travelling to the route from a holiday base with 50% of users on the Tarka Trail and 37% of those at Strathyre doing so, compared with 11% overall.

The route usage survey programme does not address the issue of the economic benefit that NCN-based recreation and tourism can bring to an area. However, evidence is available from other components of Sustrans' research programme. A study on the Celtic and Taff Trails in South Wales (Sustrans, 2001) during 2001 shows that the majority of users are local recreational cyclists, with a mean cycling duration of 2.8 hours, although 20% cycled for more than four hours. Recreational cyclists tend to use the NCN in small groups rather than as individuals. A similar study on NCN Route 1 in Northumberland (CAST, 2002) recorded a far higher percentage of cycle tourers, at 32% of all users, whilst day riders amount to only 10% and local recreation riders 47%. In both cases, the combination of group size and duration of stay on the trail was shown to increase the level of visitor

spending.

There is a perception among some traders that cycle tourists spend less than other visitors, hence limiting the impetus to stimulate local business development near to the NCN (Downward & Lumsdon, 2001). However, several cycle tourism surveys indicate that this is not the case, and that cyclists tend to spend similar amounts to other visitors. Surveys of businesses on the flagship C2C cycle tourism route in Northern England suggest that businesses gain in terms of improved occupancy and in turnover. This is particularly the case in fragile rural economies where there are few alternative opportunities to attract visitors. The mean average spend per day in the local recreational cyclist-dominated South Wales study was £3.33 per person. In contrast, data from the Northumberland study and work on the C2C route indicate a far higher spend per day for cycle tourists, over £30 per day with an overnight stay (Cope *et al.*, 2000).

In terms of the advancement of sustainability in tourism provision, one reservation regarding the NCN has been raised. Opponents of cycle route development argue that cycle tourism *per se* is not sustainable if it generates new car trips or encourages longer distance trips by car to facilitate a cycle excursion (Withers, 2001). One example that is often cited is one of the pioneer traffic-free routes, the Camel Trail in Cornwall, where studies have suggested that over 80% of all visitors cycling on the trail had arrived by car (Cornwall County Council, 1998). Analysis of route usage monitoring survey data from the Tarka Trail in 2001, indicates that 58% of recreational cyclists access the area by car. However, at Strathyre in Scotland the figure is 19%. Overall, the proportion of all route users accessing the routes by car is also 19%. In both the South Wales and Northumberland studies, less than 20% of journeys use a car or other vehicle for access. These figures are substantially lower than figures cited for other visitor attractions in the countryside, or for visitors to national parks for example.

It is important not to overwork the results from the monitoring programme and complementary studies, but what is emerging is that the NCN offers a duality as a sustainable transport tourism and recreation offering. Firstly, it is satisfying demand for near-to-home recreation, and may be generating increased demand for such activity. This highlights its potential to supply informal recreation opportunities at city destinations and in near-urban areas. Secondly, several sections of the NCN have considerable potential for the development of a transport tourism experience, especially for short breaks based on the attraction of walking and cycling. Furthermore, there is a strong indication of the capacity of the NCN for the

abstraction of trips from cars to cycling.

Characteristics of cyclists using the NCN

Although the NCN is a resource available to both cyclists and pedestrians, there are a number of reasons why it is necessary to analyse cycling NCN users in isolation from non-cyclists when evaluating the initiative. Firstly, such information may be useful in stimulating increased cycling, and enhancing the role of the NCN as a catalyst for modal shift. It is also recognised that the majority of cases for funding are presented in terms of cycling, so subsequent evaluation must also be expressed in these terms. This is in part a consequence of the assignment of the name 'National Cycle Network' to the initiative, a fact that also drives the need for appropriate reporting to media outlets; providing information about cyclists on cycle networks retains clarity.

Over 15,000 adult cyclists were counted during the 2001 survey programme, of whom 69% were male (Table 1). This is a greater proportion than the 61% overall male usage of the NCN. However, females are proportionately better represented than men in the self-classification cycling experience categories of 'new to cycling', 'starting to cycle again' and 'occasional cyclist'.

Classifying cyclists according to age group shows that the peak ages of adult cyclists on the NCN are 35 to 44 years, with a 24% share of all cyclists, and 45 to 59 years, with 21% of cyclists (Table 1). This contrasts somewhat with the overall usage pattern by age, which shows slightly more users aged 45 to 59 years. The 35 to 44 years group forms the majority of each of the experience level categories of cyclist, except for those starting to cycle again who are dominated by those aged 45 to 59 years (33%). The different age categories are broadly similar in terms of their share of experienced cyclists, over 70% in each case. However, the highest proportions of interviewees in the 'new to cycling' and 'occasional' categories are in the 35 to 44 years age category (43% in both cases) (see Table 6).

An issue that is the subject of much debate within cycling policy and promotion is the relative importance of recreational and functional trips. One-third of cyclists are making functional trips, with the other two-thirds making recreational journeys (Table 1). This compares with 39% of all users making functional trips (44% of pedestrian users). On urban routes the proportion of functional trips rises to 59% for both cyclists and pedestrians. Cyclists classifying themselves as experienced are far more likely to make functional journeys than less experienced cyclists.

Two important perceived benefits of the NCN are its capacity to help people gain the confidence and

Table 6: Comparison of groups of cyclists with differing levels of cycling experience

	New to cycling	Starting to cycle again	Occasional cyclists	Experienced, occasional cyclists	Experienced, regular cyclists
<i>Age</i>					
16-24	7.5%	2.7%	7.5%	9.2%	7.3%
23-34	17.5%	17.8%	20.2%	16.9%	16.8%
35-44	42.5%	27.4%	42.8%	31.5%	30.4%
45-59	15.0%	33.6%	23.7%	28.8%	29.7%
60+	17.5%	18.5%	5.8%	13.6%	15.7%
<i>Gender</i>					
Male	46.2%	70.1%	66.7%	77.9%	82.0%
Female	53.8%	29.9%	33.3%	22.1%	18.0%
<i>Main reason for choosing to use route</i>					
Journey efficiency	-	2.3%	2.6%	4.5%	8.5%
Money saved on journey	2.8%	2.3%	0.6%	1.7%	2.3%
Convenience of route	2.8%	7.5%	7.7%	11.8%	15.8%
Pleasant surroundings	22.2%	24.1%	27.6%	19.8%	12.5%
Safety on the route	33.3%	33.1%	26.9%	26.0%	21.9%
Personal fitness	11.1%	16.5%	21.8%	21.5%	25.2%
Personal health	11.1%	3.8%	1.9%	5.6%	5.1%
Quality of route	8.3%	5.3%	3.2%	5.9%	3.6%
Other	8.3%	5.3%	7.7%	3.1%	5.1%
<i>Car alternative</i>					
Chose not to use	28.9%	16.0%	19.5%	31.5%	36.8%
Not available	15.8%	23.6%	20.7%	16.1%	25.3%
Not appropriate	55.3%	60.4%	59.8%	52.4%	37.9%

experience necessary to enable them to cycle more, and the provision of a network designed to attract more people to cycle more frequently. The route usage monitoring survey is not detailed enough to allow close interrogation of these points, though it provides some useful insights. Within all age groups, experienced cyclists (whether regular or occasional) make up the largest proportion of users at around 70-80%. The surveys recorded a relatively low proportion of users who were 'new to cycling' and 'starting to cycle again'; 13% of all cyclists (Table 1). A further 34% are 'occasional' cyclists. However, these figures conceal the role of the NCN as a demonstration project that provides a safe try-out space for potential cyclists, who may eventually develop from recreational cyclists to utility cyclists. They also mask the possibility that having gained such experience, Network users may quickly come to regard themselves as experienced cyclists, and respond to survey questions accordingly. As highlighted previously, the results from the three repeat survey exercises suggest this effect, with increased usage figures, but lower proportions of novice cyclists (Table 4).

Experienced cyclists at the higher end of the age

spectrum are more likely to be regular than occasional cyclists. Likewise, experienced and regular cyclists are more likely to have chosen not to use a car to make their trip. This suggests an association between a strong commitment to cycling as a lifestyle choice, and greater experience over a longer time period involving more regular cycling. This kind of commitment is widely recognised as being central to a growth in cycling (Joshi & Senior, 1998); a modal shift to include greater numbers of cycle trips is dependent upon cycling becoming a familiar, comfortable and convenient option for individuals to choose. The higher degree of commitment displayed by more experienced users of the NCN highlights the need for policymakers to recognise that encouraging cycling is a long-term process.

To facilitate effective cycle promotion, understanding cyclists' motivations is of paramount importance. The survey questioned individuals on the single most important reason why they chose to use the route that day. The results cover a range of motivations common to many cycling studies (e.g. Davies *et al.*, 1997; Rosen & Skinner, 2001) such as concerns about safety, convenience, health and fitness

(whilst the data distinguishes ‘personal health’ from ‘personal fitness’, these have been aggregated for the discussion in this section). Looking at the ways these break down across different groups within the sample provides further insights (Table 2).

Among all users of the network (i.e. cyclists and others), a number of patterns are discernible in the way motivations are distributed. Younger age groups are more often concerned about journey efficiency, money saved and the convenience of the route (Table 2). The oldest age group (60+) is most concerned about the quality of their surroundings, whilst safety, personal fitness and the quality of routes are of the highest concern to the key age group of 35-44 years. Convenience of the route, health and fitness, pleasant surroundings and safety are the highest scoring factors for both men and women. People using the routes for functional trips tend to be more concerned about journey efficiency and convenience, whilst recreational users focus on safety and how pleasant their surroundings are. Not dissimilarly, the highest priority for those using urban routes is convenience, whilst for rural users it is pleasant surroundings.

The breakdown of motivations and priorities specifically among cyclists lends support to arguments that concerns about cycling vary according to which stage somebody has reached in the process of becoming a cyclist (Davies *et al.*, 1997; Joshi & Senior, 1998). For those who are new to cycling or starting again, safety is the most important issue, with pleasant surroundings and health and fitness about equal but some way behind. Safety never becomes insignificant, but as people become more established or more experienced as cyclists it comes to be less central to their concerns. So, for occasional cyclists, pleasant surroundings are the most important motivational factor, whilst for experienced cyclists health and fitness take priority (see Table 6). This reflects findings elsewhere (Rosen & Skinner, 2001), and underlines the value of the NCN’s role as a safe try-out space.

Implications of the findings for development of the NCN

This paper clearly demonstrates that the NCN is making important contributions to societal welfare in a number of areas. However, the NCN is not a panacea. Rather it represents an opportunity for the furtherance of some key objectives: it offers a resource that can be used for health improvement, but appropriate promotional measures are required to support its use as such; it can provide a socially inclusive facility for the entire community, but additional initiatives are required if it is to fulfil its potential as a means of reducing exclusion for all groups; it offers a means of regenerating economies in some areas through

recreation and tourism, but only with supportive packages of measures relating to provision of appropriate facilities; it offers an alternative to environmentally damaging modes of transport, but only as part of a series of wider transport solutions.

There may be other ways in which the NCN can benefit areas through which it passes, for example as an educational resource, as a mechanism for delivering art to a wider audience, as a way of encouraging greater social interaction within the community, as a means of engendering a sense of pride and ownership within a community, as a resource well-suited to the needs of some groups of disabled users, and as a safe area where potential cyclists can gain experience. This paper has not fully addressed these issues, yet all have the potential to add considerably to the overall value of the NCN.

At the same time, the NCN has shortcomings that tend to undermine the achievements of the project, some of which are highlighted in this paper, and some of which are not. Issues raised by the paper include the challenges of attracting representative use by minority ethnic groups and women, maintaining a large and ongoing influx of novice cyclists, and reducing the significant minority of users accessing the NCN by car. Additional concerns include the variable standards of provision, the need for coherent mapping and signing across the NCN, issues of conflict between different user groups, and the lack of NCN market penetration in terms of brand recognition among target audiences. What is common to all of these issues is that none are insurmountable. Three key themes emerge from the evidence presented in this paper that will aid the NCN to fulfil its potential:

- The need for a strategic assessment of the ways in which the NCN can assist in key policy areas, coupled with appropriate implementation plans;
- The need for improved mechanisms for information dissemination in terms of reaching target audiences, promoting the availability of the resource, communicating route alignment, and brand recognition;
- The need for wider research programmes for the NCN, in particular research programmes that quantify the full costs and benefits of the NCN for a range of policy areas.

The analysis of existing data also raises important priorities for future research. A key priority should be a review of the efficacy of the current survey process. Issues include the expansion of certain research exercises to include non-user populations, the inclusion of all route users in the sample (current constraints dictate that minors are not interviewed), the establishment of control exercises to enable

discernment of the magnitude of impacts of related initiatives, the possibility of constructing a sample that is representative of the NCN as a whole, synthesis of cost-benefit models, measures of the balance of use displacement and new use as a consequence of new route development, the variation in social perceptions and usage implications of route implementation, and the value of the aesthetic quality of a route.

Acknowledgement

The authors would like to thank to Spencer Broadly (NTS, DfT) and Helen Crimmins (ONS) for help with data preparation.

References

- Andersen, L.B., Schnohr, P., Schroll, M. & Hein, H.O. (2000) 'All-cause mortality associated with physical activity during leisure time, work, sports and cycling to work' *Archives of Internal Medicine* 160, 1621–1628.
- Biddle, S.J.H., Fox, K.R., & Boutcher, S.H. (Eds) (2000) *Physical activity and psychological well-being* Routledge, London.
- Biddle, S.J.H., Sallis, J.F., & Cavill, N.A. (Eds) (1998) *Young and active? Young people and health-enhancing physical activity: Evidence and implications* Health Education Authority, London.
- Centre for Alternative and Sustainable Transport (2002) *The North Sea Cycle Route* CAST, Stoke-on-Trent.
- Cope, A. (2000) *Monitoring cycle tourism on the C2C cycle route during 1999* University of Sunderland, Sunderland.
- Cornwall County Council (1998) *Camel Trail Visitor Survey 1997* Cornwall County Council, Truro.
- Davies, D., Halliday, M., Mayes, M. & Pocock, R. (1997) *Attitudes to Cycling: A Qualitative Study and Conceptual Framework* TRL Report 266, TRL, Crowthorne.
- DTLR (2000) *Indices of multiple deprivation* Department of Transport, Local Government and the Regions, London.
- Department of Transport (1996) *National cycling strategy* Department of Transport, London.
- Downward, P. & Lumsdon, L. (2001) 'The economic impact of a long distance cycle route on small communities' Presented to the Velo-City 2001 International Cycle Planning Conference, *Proceedings of Velocity Conference CD*, Spokes, Edinburgh. Available from <http://www.spokes.org.uk>
- Haapanen, N., Miilunpalo, S., Vuori, I., Oja, P. & Pasanen, M. (1997) 'Association of leisure time physical activity with the risk of coronary heart disease, hypertension and diabetes in middle-aged men and women' *International Journal of Epidemiology* 26, 739–747
- Joshi, M. & Senior, V. (1998), 'Journey to work: the potential for modal shift?', *Health Education Journal* 57, 212–223.
- New Opportunities Fund (2002) *New Opportunities Fund: your lottery, your community* <http://www.nof.org.uk>
- Petersen, S., Mockford, C. & Rayner, M. (1999) *Coronary heart disease statistics* British Heart Foundation, London.
- Physical Activity Task Force (1995) *More people, more active, more often: Physical activity in England* Department of Health, London.
- Rosen, P. & Skinner, D. (2001) 'The role of Green Transport Plans in developing cycle commuting: individual and corporate change' Presented to the Velo-City 2001 International Cycle Planning Conference, *Proceedings of Velocity Conference CD*, Spokes, Edinburgh. Available from <http://www.spokes.org.uk>
- Social Exclusion Unit (2003) *Making the Connections: Final Report on Transport and Social Exclusion* Social Exclusion Unit, Office of the Deputy Prime Minister, London http://www.socialexclusionunit.gov.uk/publications/reports/pdfs/SEU-Transport_Main.pdf
- Sustrans (2000) *The official guide to the National Cycle Network* Sustrans Ltd, Bristol.
- ____ (2001) *Celtic Trail User Monitoring Report 2001* Sustrans Ltd, Bristol.
- ____ (2002) *National Cycle Network route usage monitoring programme* Sustrans Ltd, Bristol.
- Withers, R. (2001) 'Hordes of hurtling cyclists; developing national cycle routes in protected environments' Presented to the Velo-City 2001 International Cycle Planning Conference, *Proceedings of Velocity Conference CD*, Spokes, Edinburgh. Available from <http://www.spokes.org.uk>

An evaluation of the bicultural services of the McAllen Central Bus Station linking the USA & Mexico

Martin Feinberg

Address for correspondence

Dr. Martin Feinberg

Department of Computer Information Systems & Quantitative Methods, College of Business Administration, University of Texas-Pan American, 1201 W. University Dr., Edinburg, TX 78539, USA

<feinbergm@panam.edu>

Abstract

The Central Station in McAllen, Texas, is the first bus station ever to serve bus lines from both the USA and Mexico. This bus station aims to provide the public with a transportation facility that can supply transportation services to lower income individuals, Mexican tourists and immigrants. Based on the results of this survey, it can be seen that the passengers from both countries are impressed with the cleanliness, appearance, signs and restrooms, and the friendliness of the drivers.

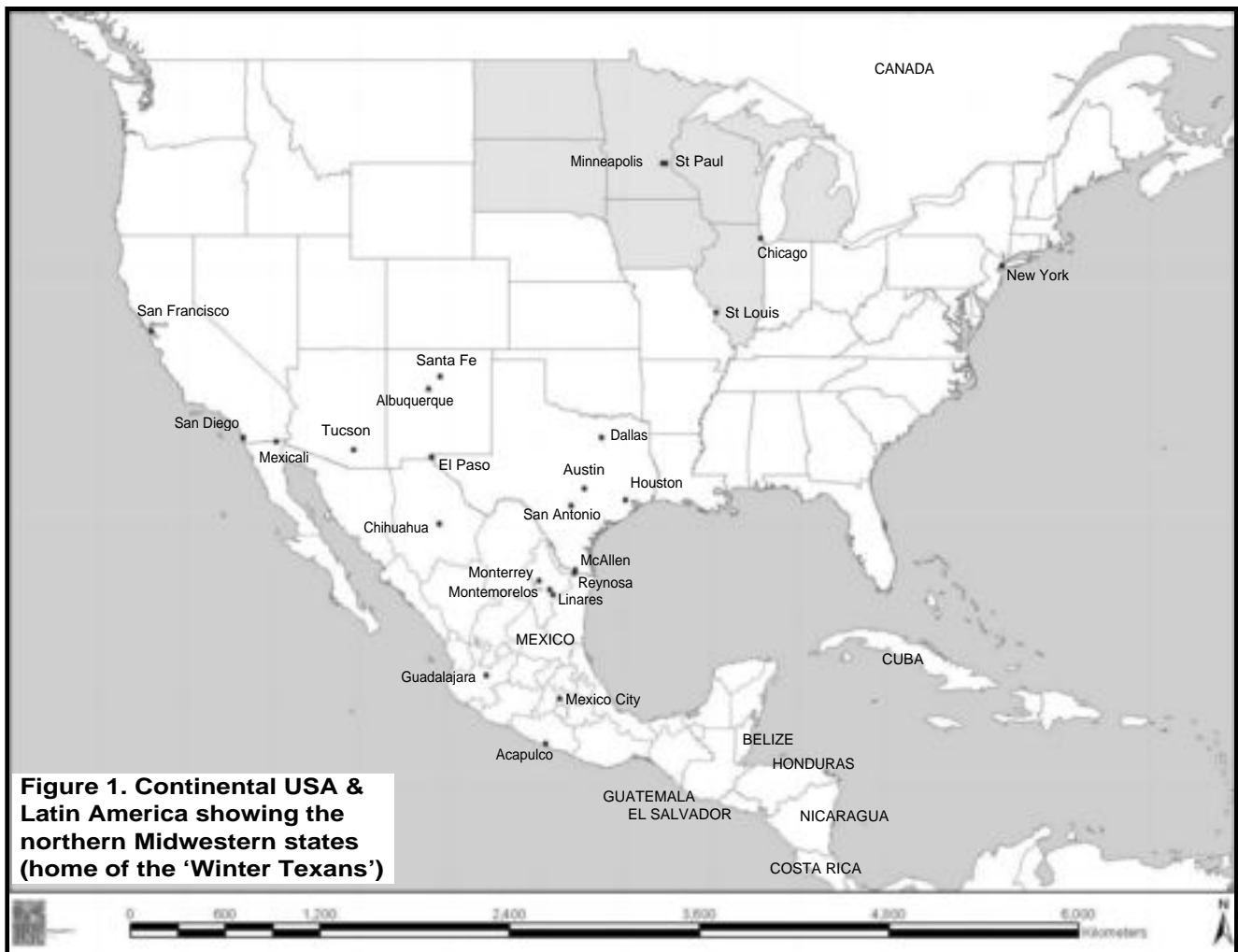
Keywords

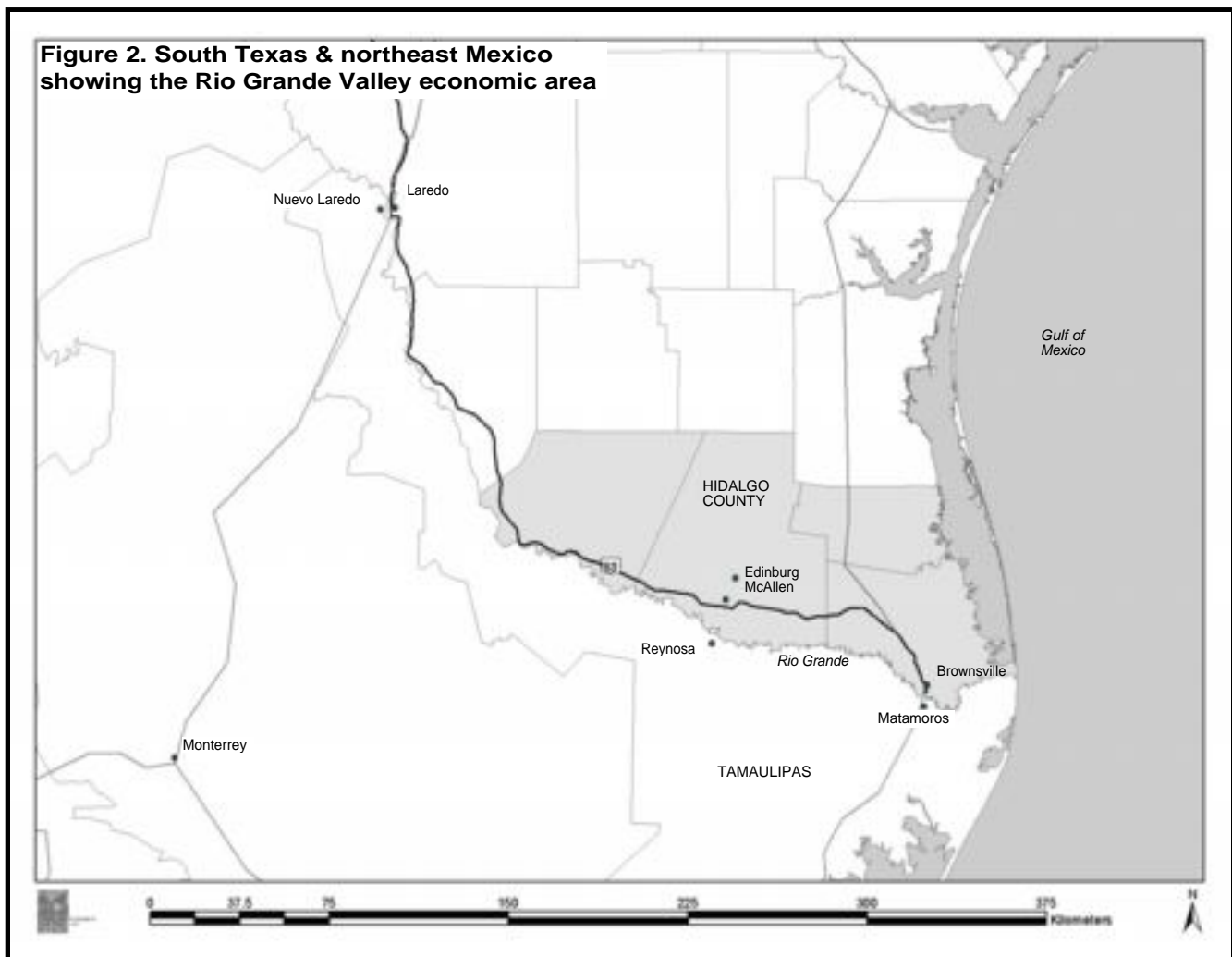
Bicultural, Bus station, McAllen, NAFTA, US-Mexico border, Texas, Tourists, Transit bus lines

Introduction

The McAllen Central Bus Station is the first station ever to link US and Mexican bus lines. The bus station became the first to house both US and Mexican bus lines when it opened in January 2001. Buses are a crucial means of transportation in the area on the US-Mexico border. Although the income level in this area is at or near the lowest in the USA, people do travel frequently. This border area is endemic to constant migration.

The metropolitan McAllen area is known as the Rio Grande Valley. The Rio Grande Valley is an area that in the past 10 years has evolved into one of the most important metropolitan areas in the state of Texas.





Immediately after the North American Free Trade Agreement (NAFTA) went into effect, the demographic growth of the Hidalgo County metropolitan area outgrew its infrastructure.

Very little research has been conducted on bus stations on the US–Mexico border. Boarnet and Compín (1999) have addressed overall transit issues on the border area in San Diego, CA area near the Mexican border.

McAllen is located in Hidalgo County. This metropolitan area had to make some immediate changes in infrastructure in order to meet the public's needs as a result of NAFTA and the rapidly growing population. Roads, water treatment plants, wastewater treatment plants, communication lines, and electric plants had to be modified in order to meet with public needs. But of all these changes in infrastructure, perhaps the most positive crucial impact on public needs in Hidalgo County has resulted from the construction of the McAllen Central Bus Station.

McAllen Central Bus Station Background

The effective planning of the McAllen Central Bus Station increased in importance due to its being the

first station ever to serve bus lines from both the USA and Mexico. This state of the art facility is centrally located in the heart of McAllen's downtown commercial district, between 15th and 16th streets along Business Highway US 83. This location gives all terminal users easy access to McAllen's famous downtown shopping area. Also, its location along Business US 83 facilitates the convenience of accessibility to local travellers.

The convenience of the station has already benefited many different people. It can be seen that in particular, tourists and migrant workers are now able to travel more easily as a result of the bus station. Before the new station was built, the trip to the interior of Mexico would require about an extra hour or more layover in McAllen in order to go to a second bus station in the town. Tourists and migrant workers had to ride three buses in order to reach the Mexican interior. Travellers had to ride one bus to the frontier, they had to take a shuttle across the international bridge, and then they had to board another bus in Mexico in order to continue to their destination. It now takes 25 minutes to go from McAllen to Reynosa.

The Central Station took three years to build and

Figure 3. McAllen bus station outside



Figure 4. Reynosa bus station outside





Figure 5. McAllen bus station inside



Figure 6. Reynosa bus station inside

cost \$4.9 million. The design of the station shows influences from both the USA and Mexico. More than a million passengers pass through the station annually. Approximately 100 buses arrive and depart the McAllen Central Station each day.

Eighty percent of the bus station was paid for through funding from US federal transportation funds. The remaining 20% was funded by the Texas Department of Transportation and the City of McAllen.

McAllen Central Bus Station has 14 bus bays, 14 ticket counters for bus lines and a large lobby with 250 seats for guests. The facility is 22,000-square feet. In addition, a restaurant, a news shop, a package delivery area, restrooms, vending machines, water fountains, storage space and administrative offices are available inside.

Greyhound routes all of its local arrivals and departures through this terminal. The local bus lines McAllen Express and Valley Transit Co. use the station as its primary base of operations (Stack, 2001).

In the first eight months of operation, McAllen Central Station had an estimated monthly average of 95,134 passengers per month. Within the United States, 52,710 people have travelled with Houston, Dallas and San Antonio the three most common destinations. In addition, 23,038 people have travelled into Mexico, with Monterrey, Montemorelos, Linares and Mexico City the most common destinations (Transit Department, 2001).

It is clear that McAllen Central Station supplies a need for transportation to lower income families, migrant workers and Mexican tourists. This unique international factor of McAllen Central Bus Station raises a research issue that has been lacking in the literature. Is the bus station meeting the bicultural population needs and services? To be sure, issues involving the planning of bus stations for the 21st century have been somewhat addressed (Paswell & Stanley, 2000). But the bicultural bus transit issue has been lacking in the literature. A key question this paper seeks to answer is whether the future of bus travelling in South Texas is ready to meet the public expectations and deliver what this diversified community expects?

This study attempts to help determine whether the McAllen Central Bus Station is effectively meeting the needs of the customers with respect to bicultural services. It can be seen that many immigrants consider this area as the starting point on a long journey into the land of opportunity. In addition, the bus station,

Table 1. Distance & time by bus from McAllen, Texas

City	Distance (miles)	Time by bus
Minneapolis, MN	1618	32:45 hours
San Antonio, TX	233	4:45 hours
Houston, TX	374	8:45 hours
Dallas, TX	513	10:10 hours
Monterrey, Mexico	144	4 hours
Montemorelos, Mexico	193	4 hours
Linares, Mexico	225	5 hours
Mexico City, Mexico	599	17 hours

Sources: <http://www.expedia.com> & <http://www.greyhound.com>

Note: Mexican cities do not provide exact arrival times.

by connecting many cities in both countries, can clearly serve the needs of Mexican immigrants that utilise this type of transportation because of its affordability. If people visiting McAllen Central Bus Station experience a refreshing change from the typical look that most US and Mexican border bus stations have, it is likely more Mexican and local visitors will travel by bus from or to McAllen.

In addition, Winter Texans will more likely use the bus station to cross the border to purchase pharmaceuticals in Mexican pharmacies. The Winter Texans are people from the US northern Midwestern states who live in south Texas during the winter months between October and April. The new station will facilitate transportation for this large influx of people from the north who choose to live in the US–Mexico border region during the winter. The average Winter Texan is about 70 years old. Clearly the winter Texans choose go to Mexican pharmacies because of the generally lower prices at these pharmacies.

Table 2. Survey items

- The bus station's appearance and staff make me feel welcome
- The station's signs make it easy for me to find my way around the station
- I feel safe in the terminal
- Parking was easy to find and available
- The bus drivers are friendly
- There are a sufficient number of bus routes into the USA
- There are a sufficient number of bus routes into Mexico
- The cleanliness of the bus station meets my expectations
- The signs throughout the station are easy to understand
- The restrooms are well maintained
- The station offers adequate security
- The service I receive is reliable and on time

Table 3. Descriptive Statistics

	n	Minimum	Maximum	Mean	Standard Deviation
Appearance	125	1	7	6.43	1.194
Finding way around	124	1	7	6.44	1.106
Safety	122	1	7	6.29	1.364
Parking	85	1	7	4.00	2.464
Bus drivers	119	1	7	6.20	1.381
Number of US routes	102	1	7	6.16	1.295
Number of Mexican routes	112	1	7	5.97	1.585
Cleanliness	124	1	7	6.53	1.078
The signs	124	1	7	6.39	1.241
Restrooms	120	1	7	6.35	1.171
Security	121	1	7	6.25	1.433
Service	119	1	7	6.18	1.359

Survey Instrument

A survey was developed with the assistance of the McAllen Central Bus Station Transit Manager. With the permission of the Transit Manager, a table was set up inside the station where travellers were asked to complete the survey. Surveys were distributed throughout 2001. The McAllen Central Station Survey was written in both English and Spanish. One important area that is of great interest is the differences between the Mexican passengers point of view and the American passengers point of view. The twelve survey items are displayed in Table 2. There was also a section in the survey for comments.

Results

The results of all of the survey respondents together are shown in Table 3. It can be seen from Table 3 that the passengers are most impressed with the cleanliness and appearance of the bus station. The passengers also highly rate the ease of finding their way around the bus station facilities. The items dealing with the station's restrooms, security and safety are also highly rated. However, the parking facilities of the station receive a low rating.

In the comments section, most of the passengers responded that the signs in the Central Station are easy to understand and that the bilingual signs are especially helpful in finding the way around the station. The bus station gets high marks for being well lit and having a clean environment. A security guard is always on watch and there is friendly service from the food stands.

The appearance of the building is very impressive particularly because of its clean environment. Both the US and Mexican residents rate the McAllen station very high in regards to the clean restrooms. The comments also stress that the drivers are friendly and give ample information. The passengers also

emphasise that the safety of the passengers is of utmost importance to the drivers and station personnel.

A key disadvantage that can be seen from Table 3 is the lack of parking available at the station. In addition, the parking lot across the street from the bus station does not have a sign that catches people's attention. A more appropriate signing system needs to be developed so that people can find their way to the parking lot across Business US 83.

Hence, the parking facilities at the bus station are the biggest problem according to the passengers. The passengers comment that because the station is located next to one of McAllen's biggest shopping areas, it is especially difficult to find a parking space. More US residents than Mexican residents are dropped off at the station. Problems with parking facilities at bus station are common and have been addressed in the literature (Merriman, 1998).

Table 4 provides the results of the survey classified by the results of US passengers and Mexican passengers. It can be seen from Table 4 that overall the Mexican residents rated the McAllen bus station higher than the U.S residents. Table 4 further shows that the Mexican residents rated the areas of safety, parking and service significantly higher than the US residents.

The Mexican people could be comparing the McAllen station to the bus station in the nearby border city of Reynosa, Mexico. The Reynosa station is not considered safe and is not well lit.

The comments reveal that the US residents are more used to, in general, easily finding parking. In Reynosa, people often park on double lines. In addition, many Mexican residents do not get to the McAllen station by car from the Mexican side of the border.

The Mexican people also rated the service of the

Table 4. A comparison of Mexican & US ratings

	Residence	n	Mean	Standard Deviation
Appearance	USA	82	6.35	1.241
	Mexico	43	6.58	1.096
Finding way around	USA	82	6.39	1.119
	Mexico	42	6.52	1.087
Safety	USA	79	6.19	1.442
	Mexico	43	6.47	1.202
Parking	USA	60	3.45	2.368
	Mexico	25	5.32	2.212
Bus drivers	USA	79	6.06	1.324
	Mexico	40	6.48	1.467
Number of US routes	USA	71	6.06	1.308
	Mexico	31	6.39	1.256
Number of Mexican routes	USA	72	5.92	1.581
	Mexico	40	6.08	1.607
Cleanliness	USA	81	6.44	1.118
	Mexico	43	6.7	0.989
The signs	USA	81	6.37	1.219
	Mexico	43	6.42	1.295
Restrooms	USA	78	6.28	1.172
	Mexico	42	6.48	1.174
Security	USA	79	6.06	1.555
	Mexico	42	6.6	1.106
Service	USA	78	5.96	1.445
	Mexico	41	6.61	1.07

McAllen station higher than the US residents. The Reynosa station bus station workers are paid considerably less than the US bus station workers perhaps leading to the perceived inferior service in Reynosa. This salary differential could be a reason why the Mexican residents rate the McAllen bus service higher. The reasons for differences in perceived quality of bus stations have been addressed in the literature (Cunningham *et al.*, 2000).

However, it is important to stress that the comments reveal that the Mexican buses are usually considered superior to the US buses. Mexican buses for the most part have televisions and movies and refreshment carts. These amenities are much less likely in the US buses. In addition, the Mexican residents rate the Mexican station as superior in regards to available destinations and the variety of bus companies.

Conclusion

In its first year of operation (2001) McAllen Central Station has served close to one million people. Because the McAllen station is the first bus station ever to link US and Mexican bus lines, it is important to study

whether the US and Mexican population societies are satisfied with the services that are provided by the station. Based on the results of this survey, it can be seen that the passengers from both countries are impressed with the cleanliness, appearance, signs and restrooms, and the friendliness of the drivers. However, the parking is rated by the US residents as inferior. Overall, the McAllen Central Station is clearly meeting the needs of this bicultural society.

Parking is a major problem for the station, in particular for the US residents. Parking space is limited and people often have to park about two blocks from the station. It is also important that the city of McAllen provides better signing directions to the parking lot than what exists. McAllen’s local bus services may need improving so that U.S. residents need not bring their cars to Central Station for their onward journeys to Mexico.

This bicultural bus station has come at the right time and similar stations should be built in other US–Mexico border cities. It is time that more bus terminals along the US–Mexico border house both US and Mexican bus lines. Future research should

emphasise how the Winter Texans in particular perceive the McAllen bus station. In addition, future research should specifically focus on migrant workers.

References

- Boarnet, M.G. & Compin, N.S. (1999) 'Transit-oriented development in San Diego County: The Incremental Implementation for a Planning Idea' *Journal of the American Planning Association* Volume 65, number 1, 80–95.
- Cunningham, L., Young, C. & Lee, M. (2000) 'Methodological Triangulation in Measuring Public Transportation Service Quality' *Transportation Journal* Volume 40, number 5., 35–47.
- Merriman, D. (1998) 'How many parking spaces does it take to create one additional transit passenger' *Regional Science & Urban Economics* Volume 28, number 5, 565–584.
- Paswell, R. & Stanley R.G. (2000) 'Shifting the Public-Transportation Paradigm for the 21st Century' *ITE Journal of the Institute of Transportation Engineers* Volume 70, number 7, 32–34.
- Stack, M.K. (2001) 'McAllen opens hub for Mexican, US bus lines' <http://www.medc.org/transportation.shtml>
- Transit Department (2001) 'Central Station (La Central)' McAllen Transit Department, McAllen.

Public transport provision in two European cities – Oxford & Odense

Torben Holvad

Address for correspondence

Dr. Torben Holvad

Transport Studies Unit, University of Oxford, Bevington Road, Oxford, OX2 6NB, UK

<torben.holvad@transport-studies.oxford.ac.uk>

Abstract

This paper provides a comparison of bus transport provision in two cities, Odense (Denmark) and Oxford (UK), in terms of regulatory frameworks used. A comparison of these cities is interesting because public transport is organised in significantly different ways – in Oxford bus services are largely based on an open entry model, whereas bus services in Odense are provided by a public entity. In contrast to the rest of Great Britain usage of buses in Oxford has increased significantly since bus deregulation was implemented through the Transport Act 1985.

Keywords

Bus provision, regulatory frameworks, Odense, Oxford

Background & purpose

In the last decade(s) significant changes in the regulatory structure of urban public transport have been implemented in a number of European countries including the UK, Sweden, Germany and Denmark. Although there are differences between the countries in terms of the details of the reforms, general trends include some form of deregulation in order to enable entry to the public transport industry. In most cases deregulation has been linked to the introduction of competitive tendering procedures for the selection of the public transport service operators such that increased competition is mainly off the road rather than on the road. These trends are supported by EU initiatives; in particular the proposals for the revision of Regulation 91/1893 include provisions for competitive tendering for public transport services where contracts should be valid for a fixed term. This paper will provide a comparison of public transport provision in two cities, Odense and Oxford, in terms of organisational and regulatory frameworks used for bus service provision. A comparison of these cities is interesting because public transport is organised in significantly different ways – in Oxford bus services are largely based on an open entry model, whereas bus services in Odense are provided by a public entity (Odense Bytrafik). In contrast to the rest of Great Britain usage of buses in Oxford has increased significantly since bus deregulation was implemented through the Transport Act 1985.

Bus provision in Oxford

Oxfordshire is located in the South East of the UK with a population of over 600,000 of which some 147,000 are in the City of Oxford. This area is rather affluent compared to other parts of the UK with average income being above £22,000 (1998 data) and low unemployment. The City of Oxford has a high student population and there is a relative high influx of tourists. Substantial changes have taken place concerning the framework for public transport in Oxford over the last two decades reflecting changes at a national level. These are the deregulation and privatisation of the local bus industry with the 1985 Transport Act and the splitting up and privatisation of British Rail with the 1993 Railways Act. Oxford is seen as the prime example of successful implementation of the bus deregulation reform where bus travel has increased significantly, in contrast to the general situation in the UK outside London. Competition on the road between two equal-sized bus operators has contributed to this situation, although other factors may also have influenced it, e.g. a comprehensive Park and Ride system combined with a transport policy at the local authority level aimed at promoting public transport, cycling and walking. At present the two companies (Oxford Bus Company and Stagecoach Oxford) carry on average some 600,000 passengers per week within Oxfordshire and over 50% of journeys into the city centre is by bus.

Past situation

In Oxfordshire (in parallel with the situation in the rest of the country), local bus services were, until 1986, in the main regulated through the Road Traffic Act 1930. This introduced a system of road service licensing which provided the basis for quantity regulation. The right of initiative rested in principle

Table 1. Oxford & Odense – a comparison

	Oxford	Odense
Population	147,477 (1999)	183,628 (2001)
Area in square kilometres	45.6	207.5
Unemployment (%)	3.3 (2000)	6.5 (2000)

Source: Oxford (2001b) & Odense i Tal <http://www.odense.dk>

Table 2. Persons entering the centre of Oxford in an average 24 hour period

	Cycle	Bus & Coach	HGV	LGV	Motorcycles	Cars & Taxis	Total
1991	9,000	21,000	2,000	3,000	2,000	42,000	79,000
	11.39%	26.58%	2.53%	3.80%	2.53%	53.16%	100.00%
1999/2000	8,000	31,000	1,000	3,000	1,000	27,000	71,000
	11.27%	43.66%	1.41%	4.23%	1.41%	38.03%	100.00%

Source: Oxfordshire County Council (2000).

with the operators combined with strict regulation as specified by the 1930 Act; operators could apply for a license to provide a service but the regulatory authority (Regional Traffic Commissioners) could reject the application taking into account the public interest. Although, the regime was legally based upon market initiative, only few private operators existed in Oxford with the publicly owned National Bus Company subsidiary, Oxford and South Midland, being responsible for the vast majority of services. Oxford and South Midland operated commercial and subsidised services, with subsidised services being supported by Oxfordshire County Council and the district councils. The licensing system was operated in practice to discourage entry, where the burden of proof concerning public need for the service was placed on the applicant. The local authorities in Oxford promoted through innovative transport policies a favourable environment for bus provision. This included bus priority measures, off-street parking controls, on-street parking controls, restrictions on movement, planning controls, and Park and Ride. This contributed to the situation where revenue support to bus services was the lowest per capita and the lowest overall absolute levels. Local bus services in Oxfordshire were subject to less direct authority involvement compared with other parts of Great Britain.

Triggers for discussion on reforms

The main elements that contributed to the changes in the local bus industry outside London relate to reduced performance during the preceding decades leading to the need for increased revenue support. Bus patronage declined during the 1950s and 1960s, and increased government support during the 1970s did not seem to be able to reverse the declining passenger levels. There were also concerns regarding public ownership from a general perspective in terms of insufficient incentives to control costs and encourage innovation. However, bus provision in Oxfordshire was among the cheapest in Great Britain in terms of subsidies. The consistent policy of the Conservative government from 1979 to 1997 involved the privatisation and deregulation of publicly controlled activities. The process of deregulation of the local bus industry was initiated by the 1980 Transport Act that removed price regulation. In the 1983 Transport Act the

possibility for local authorities to put out for tender the provision of bus services was introduced. Subsequently, the government started the preparation of deregulation and privatisation of the whole bus industry through the White Paper 'Buses' (DoT *et al.*, 1984) which was taken forward in the 1985 Transport Act.

Intended transitional path & preferred situation

The aims of the deregulation of the local bus industry with the 1985 Transport Act were to:

- improve efficiency and reduce costs,
- decrease the involvement of authorities,
- increase the freedom of operators in designing services, and
- increase competition to provide the opportunity for lower fares, new services and more passengers.

For commercial services (private) operators would have the initiative subject to regulation from the Traffic Commissioner mainly concerning safety, road traffic provisions and quality standards. Local authorities would have the right of initiative for subsidised services determined as socially necessary, but an authority would not be allowed to be both procurer and producer of services (the operator should be selected on the basis of competitive tendering). The intended transitional path included the following elements (listing those of relevance to the Oxford bus market):

- (1) anyone with an Operator's License granted by a regional Traffic Commissioner would be allowed to operate bus services wherever they wished, subject only to safety and road traffic provisions,
- (2) local authorities were allowed to secure socially necessary services through subsidy (the subsidy should be linked to public service contracts) on the basis of competitive tendering,
- (3) operators had a right to participate in concessionary fares schemes and authorities have the powers to require operators to participate in the schemes,
- (4) the break-up of the National Bus Company, where units of the subsidiaries were to be sold off, and
- (5) protection against unfair competition with powers (but no resources) being given to the Traffic

Commissioners to police these aspects of the Act.

Actual transitional path

The privatisation of the National Bus Company involved the splitting of the subsidiaries into smaller units (from 40 subsidiaries 70 companies were created). In the case of the Oxford and South Midland Bus Company it was split in two: Oxford responsible for the urban services and South Midland responsible for the rural services. The urban company was sold in 1987 to a management buy out team. Soon after the removal of the quantity restrictions for the local bus industry under the 1985 Transport Act a competitor (Thames Transit) to the urban company (City of Oxford Motor Services Ltd., COMS) appeared. Over the next few years Thames Transit substantially increased its market share through innovative marketing, high frequency routes and late night services. It was aided in this by a limited reaction from COMS (or the Oxford Bus Company).

A more substantial response from the incumbent followed the Go-Ahead Group's acquisition of the Oxford Bus Company. Costs were cut and wage specifications and other conditions from the mid-1970s were modified. Thames Transit has grown from just 6 coaches and 12 minibuses to become one of the largest operators in Oxford. In July 1997 Thames Transit was sold to Stagecoach Holdings PLC and was renamed Stagecoach Oxford. In contrast to the situation generally outside London, bus patronage in Oxford has increased by between 35% and 70% along with reduced costs (Colson, 1996). In fact, Oxford is recognised as the prime example of the successful implementation of the Transport Act 1985.

The most important recent change of importance for the reform of the bus industry was the election of a Labour government in May 1997. A White Paper *A New Deal for Transport: Better for Everyone* was published in 1998 setting out plans for an integrated transport policy in order to engineer a switch from cars and lorries to buses and trains as well as walking and cycling (DETR, 1998). Subsequently, the Government's Ten Year Plan for Transport was launched in July 2000 with significant investment in public transport (DETR, 2000). The Transport Act 2000 introduced improved regulatory tools for local authorities to control the bus operators through Quality Partnerships, Quality Contracts (which reintroduces exclusive rights for local bus services), and provisions concerning joint ticketing and information provision. These tools were outlined in the above mentioned White Paper.

Current situation

The fundamental structure regarding the right of initiative for bus services remains similar to the provisions in the 1985 Transport Act. Bus operators are still free to run whatever commercial services they

choose (subject to satisfying certain quality, safety, traffic conditions, environmental and competition criteria). Local authorities can still only subsidise services that do not duplicate commercial services. However, the Transport Act 2000 has provided local authorities with enhanced powers concerning:

- (1) Quality Partnerships (where authorities agree to provide certain facilities/initiatives in exchange for operators providing services of a certain standard),
- (2) Quality Contracts (limited possibility to introduce exclusive rights to specific routes),
- (3) integrated ticketing schemes, and
- (4) information provision.

In Oxfordshire, two operators (Stagecoach Oxford and the Oxford Bus Company) are providing the vast majority of services in Oxfordshire for both commercial and subsidised services. These operators have succeeded in significantly increasing the bus market through competition. The Traffic Commissioner can exercise control on all bus operators through its licensing responsibilities combined with its functions to monitor traffic conditions, quality and safety standards. (Tacit) agreements between bus operators are controlled by the Office of Fair Trading in order to avoid anti-competitive measures.

Future plans

In the case of Oxford the following elements are of relevance:

- (1) preparation of a bus strategy as part of the new statutory Local Transport Plans, where the authority outlines how it will ensure that the bus services considered necessary are provided in accordance with standards set out by the local authority,
- (2) increased use of Quality Bus Partnerships,
- (3) use of extended powers for the Traffic Commissioner to impose Traffic Regulation Conditions at the request of local authorities on congestion, safety or environmental grounds,
- (4) enhanced integrated ticketing systems,
- (5) enhanced information provision whereby the local authority is obliged to ensure appropriate information provision from the operators;
- (6) possibility for not choosing bidder with lowest tender but taking into account congestion and environmental considerations;
- (7) subsidies to be directed towards high-quality routes with high frequency as well as ensuring evening and Sunday services;
- (8) implementation of a range of public transport capital schemes such as bus stops, bus priority measures, and capital grants for wheelchair accessible buses

Table 3. Vehicle kilometres & number of passengers, 1995–2000.

	1995	1996	1997	1998	1999	2000
Vehicle km (million)	6.1	6.4	6.4	6.1	6	6
Estimated number of passengers (million)	19.8	19.8	20.3	20.8	19.8	19.2

Source: Odense Bytrafik (2000) & <http://www.odense.dk>

Bus provision in Odense

In contrast, the organisational framework for bus service provision in Odense has until recently remained stable with all bus services within the Odense Municipality being planned and provided by Odense Bytrafik (a municipal department). This situation is in contrast to the general trend for bus provision in Denmark. Although there is no legal obligation, the general trend in Denmark has been towards increased use of tendering and it can now be considered the norm. Therefore, the public transport companies are increasingly becoming public transport planning entities without direct responsibility for operations.

Odense Bytrafik is owned by Odense Municipality and is organised as a self-managing unit within the Environment and Highways Department. However, in 2001 a first round of tendering of bus services in Odense was organised covering approximately one-quarter of the services. Two bidders took part in the tendering with Odense Bybusser winning the contract for a six year period with the possibility of an additional two year extension. As part of the changes planning and operation functions were separated: Odense Bytrafik retained responsibility for planning and ordering of bus services, while Odense Bybusser was established as a unit (within the Environment and Highways Department) with responsibility for the operation of the services planned and ordered by Odense Bytrafik.

Overall, the Municipal Council has specified a number of goals that Odense Bytrafik has to fulfil. These include:

- Citizens in the municipality must have access to public transport that provides a qualitative alternative and supplement to individual car-based passenger travel, and
- Public transport must be operated with the highest possible attention to the environment, i.e. in terms of vehicle and engine type, fuel types and operational procedures.

These goals imply that:

- (1) citizens should have confidence in the bus services to provide a stable and reliable mode of transport,
- (2) public transport contributes to an efficient organisation of the overall transport system, and
- (3) the planning of bus services take into consideration as far as possible citizens with special needs.

Table 3 shows information about the total number of vehicle kilometres and number of passengers between 1995 and 2000 with respect to Odense Bytrafik.

These services concern only local bus services within Odense Municipality. Regional services are under the responsibility of FynBus (the public transport authority at Fyn County Council). All regional services are tendered, in contrast to the situation in Odense.

Past situation

Prior to the changes in 2001 the in-house municipal operator, Odense Bytrafik, was responsible for both planning and operation of bus services in Odense. Odense Bytrafik was established as a self-managing unit within Odense Municipality in 1994¹ and was given a high decision-making power concerning the operation and planning of bus services as well as investment in buses (other investment in public transport such as infrastructure and ticketing equipment is decided by the Municipality Council). Odense Bytrafik prepared an annual budget that has to be approved by the Municipality Council. All operational related decisions could be taken by the management of Odense Bytrafik whereas proposals concerning service levels, fare level, etc. should be forwarded to higher (political) levels in Odense Municipality: the political head of Environment and Highways Department, the Committee for Environment and Highways, the Budget Committee or the Municipal Council.

The changes

In the Business Plan for Odense Bytrafik for 2000 two alternative scenarios were outlined (Odense Bytrafik, 2000), either:

- Odense Bytrafik's organisational framework would remain unchanged, albeit with a significant budget cut, or
- Introduce competitive tendering for part of the services allowing Odense Bytrafik to participate but with the possibility of granting the contract to other public transport companies.

The Municipal Council decided to introduce competitive tendering for one-quarter of the services provided by Odense Bytrafik. As part of this change Odense Bybusser was established with responsibility for operations, while Odense Bytrafik retained

¹ Before 1994 bus services were provided by 'Bytrafikken' and organised as a department within the Municipality of Odense.

responsibility for the planning and procuring/ordering (internally) of bus services from Odense Bybusser. Four routes were put out in tender in 2001: 2 normal urban bus services and 2 service bus routes. Bidders were obliged to bid on all four routes as a single package. Two bidders participated in the tendering procedures Connex and Odense Bybusser. Odense Bybusser won the tender, and operations under the new framework began in July 2002. The outcome of the tendering process did not result in the entry of other bus service providers in Odense; all bus services are still provided by a municipal in-house operator, Odense Bybusser (separated out from Odense Bytrafik). For three-quarters of the services the framework is the same as before the introduction of tendering, whereas for one-quarter Odense Bybusser will have to provide the services according to agreed rates per vehicle hour. In effect, this is a gross-cost contract, where the operator bears the production risk and the authority bears the revenue risk. The contract will run for a period of 6 years followed by up to 2 years extension.

Future plans

Following the first round of tendering of bus services in Odense Municipality it remains to be decided whether additional parts of the services will be selected for competitive tendering. No political decisions have been made explicit on this, but it remains an option for the Municipal Council to decide to use competitive tendering in the future. A critical point will emerge when the tendered contract runs out in 6 to 8 years. A main factor in the decisions regarding additional rounds of tendering and re-tendering of the tendered bus services will be how this group of services perform within the new framework. There will be a need to consider the reasons for the low number of bidders participating in the tendering process so far.

Discussion

Currently, the organisation of public transport is changing across Europe, mainly away from a model with regulated, publicly-owned monopolies towards a less regulated model with controlled competition where operators compete for exclusive rights for limited periods. The paper has illustrated the range of options available regarding the precise nature of the regulatory structure for public transport systems with specific reference to the cases of Oxford and Odense. In the case of controlled competition models incorporating competitive tendering as used for socially desirable services in Oxford and for one-quarter of the services in Odense since 2001, there are a number of unresolved issues regarding the optimal specification of the contract between the operator and the authority, including:

- Route contracts versus network contracts
- Gross contracts versus net cost contracts

- Length of contracts
- Contracting out of planning as well as operation
- Service quality incentives

These issues are important in terms of operator performance and, hence, decisive for whether public transport is able to regain its position in the transport market. In this context the market concentration trends are of concern and require attention in order to ensure that the potentially positive impacts from competition (for the market) are not eroded by lack of competitors/contestability. The way forward may require a strengthening of the regulatory tools available to the authority in order to ensure that a controlled competition model will deliver more sustained development.

Regarding the appropriate regulatory structure it is important to consider the contribution from public funding towards uncommercial services. This would apply to individual services as well as the overall contribution to public transport. The public funding decision will have a significant impact on public transport service provision.

References

- Colson, B. (1996) 'UK Bus Deregulation: A qualified success with much still to offer customers and society at large' *Transport Reviews* 16, 4, 301–312.
- Danish Transport Council (2000) *Benchmarking af den kollektive bustrafik i Aalborg, Odense, Århus, og HT-området* Danish Transport Council, Copenhagen.
- DETR (1998) *A New Deal for Transport: Better for Everyone* Department of the Environment, Transport and the Regions, London.
- ____ (2000) *Transport 2010 – The 10 Year Plan* Department of Environment, Transport & the Regions, London. <http://www.dtlr.gov.uk/trans2010/plan/>
- Enoch, M. (1997) 'Oxford and Darlington: The mess and success of bus deregulation' *Proceedings of the Chartered Institute of Transport* Vol. 6, No. 1, 29–47.
- DoT, The Scottish Office, Welsh Office (1984) *Buses Cmnd 9300*, Department of Transport, HMSO, London
- Odense Bytrafik (2000) *Virksomhedsplan 2000* Odense Bytrafik, Odense.
- ____ (2002) 'Overview of Introduction of Tendering in Odense' Personal Communication
- Oxfordshire County Council (2000) 'Oxford Transport Strategy: Assessment of Impact'
- ____ (2001a) 'Oxfordshire Local Transport Plan 2001–2006: Annual Progress Report 2001'
- ____ (2001b) 'Overview of Bus Provision in Oxford' Personal Communication, May.
- White, P. & Tough, S. (1995) 'Alternative Tendering Systems and Deregulation in Britain' *Journal of Transport Economics and Policy* 29, 3, 275–289.

Stelios – the accidental environmentalist? The potential impacts of the EasyCar Club in the UK

Julia Meaton, Richard Starkey & Sue Williams

Address for correspondence

Dr. Julia Meaton

Centre for Enterprise, Ethics & the Environment (CEEE), Huddersfield University Business School, Huddersfield University, Huddersfield, HD1 3DH, UK

[<j.meaton@hud.ac.uk>](mailto:j.meaton@hud.ac.uk)

Abstract

In March 2003 Stelios Haji-Ioannou publicised his plans for establishing as many as 30 EasyCar Clubs in the UK within the next year. This paper shows how Stelios arrived at the concept of operating Car Clubs through purely cost cutting motives. The paper includes an overview of the operational details of the proposed car clubs and compares them with more conventional community car clubs. The potential environmental impacts of the EasyCar Club are then considered.

Key Words

business, entrepreneur, car club, car sharing, rental cars

Introduction

Stelios Haji-Ioannou is most famous for introducing low cost, no frills flying to the UK. He founded EasyJet on the basis of a 'make-it-brash, pile-it-high and sell-it-cheap strategy', famously turning £5 m into £1.6 bn in less than 3 years (Walters, 2002). However, behind the high profile persona and publicity, Stelios has a strong business philosophy that focuses on innovation and offering added value for the customers (Rogers & Kumar, 2000). His formula for implementing this philosophy is simple yet effective – slash costs, maximise publicity and 'sweat the assets' (Kirsner, 2002). This strategy enables his companies to use their assets more efficiently than the competition and then to deliver steep discounts to the customers (ibid). This approach clearly can deliver financial rewards (although not always as successfully as EasyJet), but it is also possible that Stelios' unique approach to business could also deliver some inadvertent, or accidental positive environmental externalities.

It would be impossible to argue that any company promoting cheap flights is acting in an environmentally sustainable way, but it is possible to suggest that many of the mechanisms he uses to deliver these cheap deals do represent progress towards more sustainable business practices. For example, EasyJet uses the internet for taking reservations, eliminating the need for large numbers of staff with their inherent impacts. This wholesale adoption of information technology has resulted in the whole suite of

Easygroup companies being run from a modest office servicing approximately 100 employees. Less labour, less need for space and less need for paper has resulted in a streamlined, less wasteful and arguably more eco-efficient office environment. However, these environmental benefits are fairly marginal when compared with the potential environmental benefits that his latest business venture might reap.

EasyCar Rental

Stelios became involved in the car rental business three years ago, saying in 2000,

'The car rental industry is where the airline industry was five years ago – a cartel feeding off the corporate client. EasyRentacar will provide a choice for customers who pay out of their own pocket and who do not want to be ripped off for travelling midweek' (Rogers and Kumar, 2000).

The rental car industry was therefore an obvious target for Stelios who famously overhauls conventional business models. One of his senior staff describes Stelios as

'a superbly destructive thinker, who looks at old industries and smashes them to pieces' (Morais, 2001).

The EasyCar business follows the same model as EasyJet. Its vehicles become more expensive to hire as demand for them increases, and the pricing structure, based on a sophisticated yield management software model, encourages renters to return cars early, so that the cars can then be re-rented to other people. The goal is to maximise the use of the car – to make the 'asset sweat'. In order to do this the operational aspects of EasyCar are continuously being tinkered with in order to minimise overheads and drive prices down. The basic 'pit stop model' works on the basis of 150 cars per site, but with only 15 car parking spaces per site (the high utilisation rates make this feasible). Only one car type per site is used to maximise fleet utilisation and a mobile unit is used to facilitate faster roll out times. These mobile units require no regulatory approval and only require an energy supply to operate. Because of the mobile units and the fact that the cleaning is outsourced to the customer (they are required to bring

the cars back clean and if they don't they are charged) only 4 employees are required for every 150 cars. Opening times run from 0700 to 2300, 365 days per year. The sites themselves are supplied (for a fee) from a range of companies including NCP, Railtrack and London Underground.

The demand based pricing system means that if a customer books well in advance, they could only have to pay as little as £5.50 a day. The aim is to achieve a 90% utilisation rate for each car between the hours of 7 a.m. and 11 p.m.

Insurance is covered by a charge of £2.50 per day, and customers are not liable for damage. By managing their inventory as efficiently as possible, the costs of car hire can be kept low. The break even point per rented car each day, if 90% utilisation rates are achieved, is just under £11.00.

Although this 'new' model of car rental is in itself pretty revolutionary, Stelios and his team are anxious to reduce the price even more. One of the areas where costs can be cut is labour. This led the team to consider the possibility of operating car rental without the (already highly efficient) mobile unit, so that regular EasyCar renters could access the cars without having to rely on attendants to check them out and give them the keys. This original, efficiency driven thinking led the EasyCar team to consider the possibility of transforming many of the EasyCar sites into Car Clubs.

Conventional car clubs

Car Clubs are essentially pools of cars that groups of local people share on a formal or informal basis. They can be very small with as few as one or two cars shared between half a dozen members, but they can be fairly large, particularly in Europe where some car clubs have over 100 cars with more than a thousand members.

The operational aspects of each car club differ as most rules and regulations are set by the members themselves, particularly among the smaller clubs. However, a general pattern would involve an annual membership fee of around £100, a joining fee of around £20.00 and an hourly rental fee of around £2.00 an hour. Reduced daily and weekend rates are often available. These fees usually include insurance, servicing and repairs. A car club would normally have a range of new and reliable vehicle types, and the cars tend to be located in a central area with the aim of being within 10 to 15 minutes walking distance of most members' homes.

The early car clubs have grown in response to local, grassroots demand, and many of the smaller ones reflect the local, community focus, often being operated in an informal manner. As technology has developed more clubs are using the Internet for booking and operational management, but others continue to

operate in a low-tech way (Shaheen *et al.*, 1999).

Factors for success

Car clubs tend to work best where there is a reasonably large population with fairly high levels of population density. The crucial ingredient for successful, sustainable car clubs is a healthy membership, and a high population density would normally indicate that there are enough potential members to support a car club and allow it to grow.

Car clubs attract a range of members who are motivated to join for a number of reasons including cost, convenience, and ethical and environmental concerns. Research has indicated that people who drive less than 8,000 miles a year and who do not need their cars for a daily commuting journey, would be financially better off if they joined a car club. Some members join because it obviates the need for a second or third car, while for others a car club gives them the opportunity of accessing a car which would otherwise prove too expensive (Ball, 2002). Some people join because of the community 'feel' of their local car club, while others are motivated by ethical concerns regarding private car ownership and/or concerns about the environmental damage of unfettered private car use (Kramer-Badoni, 1994; Meaton, 2002).

Good public transport systems are considered to be important for the growth of car clubs (Koch, 2002). A good public transport system can reduce the need to travel by car and can therefore make Car Clubs more attractive for potential members.

While a healthy membership is vital for the success of car clubs, it is also important that the cars have high utilisation rates. The conventional car club business model requires each car to be used for at least 50% of the time based on an 18 hour day. This, plus the revenue from membership fees, ensures that sufficient income is generated to make the club self-supporting.

Environmental benefits of car clubs

Although car clubs are a relatively new concept, particularly in the UK, they are already being seen as a small, yet important tool for tackling urban transport problems (Ball, 2002).

Car clubs can deliver real environmental benefits. The oldest car-sharing organisation, 'Stattauto' in Berlin (300 cars, 100 'stations' and 7600 members) found that one car club vehicle substitutes for 4 privately owned cars, a reduction of the car fleet for members of 80%. Similar figures were found in Switzerland. The actual car mileage per member per day was reduced by 53% in Germany and by 72% in Switzerland (Carplus, 2002), with significant increases in the use of walking, cycling and public transport. Amongst Swiss car club members there are 280 cars per 1000 households compared with the national average of 1000. This is

the equivalent of 11 people per car instead of the average of 2.2 persons per car found in industrialised Western countries.

Car club members also tend to 'travel blend', that is they use a wide variety of transport modes in their daily lives. This is due, in part, to the fact that car club vehicles work out to be more expensive for longer trips (because the costs represent the total share of fixed plus variable costs) than in the case of car ownership (where fixed costs are paid already and only variable costs are visible). Thus there is a better comparison between the true costs of using a car club vehicle and those of using public transport and the latter becomes more economically attractive (Newig & Hockerts, 1995).

It is clear therefore that car clubs can bring about reductions in car traffic. However, this only works if the car club members would otherwise be private car owners. The reverse is true if car club members join to gain access to a car. Another problem is that car clubs are not financially competitive with owning a very old car with low depreciation costs, so it might be that people owning these older, more environmentally damaging vehicles would be the least likely to join a car club, based purely on the cost motivation. (Bonsall, 2002).

Some car clubs are introducing cars powered by more sustainable energy sources, which again, will have positive environmental spinoffs. Car Clubs could also result in fewer cars being parked on streets, which could ultimately result in safer streets for children to play in.

EasyCar Club

Although car clubs are growing in size and stature, particularly in Europe, it would still seem a peculiar area for Stelios to become interested in. Even though it is not strictly true, car clubs in the UK are often regarded as fringe affairs, community driven, often with the involvement of the more 'alternative' elements of the population, hardly an arena in which a billionaire might become involved. However, Stelios' involvement has come about from a completely new angle, and like many of his other ventures, he has turned the original concept of a car club on its head.

The EasyCar Club is based on the operational aspects of his original EasyCar rental model. The big difference is that there are fewer staff to operate the car 'stations'. This cost saving means that EasyCar Club vehicles can be rented out even more cheaply, for as little as 70p per hour or even £2.50 per day (depending on availability). Unlike conventional car clubs, EasyCar Club will have no joining fee. Instead members will be invited to join once they have completed three successful (uneventful) rentals from EasyCar. This is the criteria used in the pilot project operating in

Edgware Road, London. However, the membership criteria might well have to change to allow the expansion of the business Stelios desires. Stelios is planning to establish up to 30 new car club sites, each with 50 cars, in the UK during the next year. The operational procedures are still being developed but the Edgware Road pilot project requires customers to reserve a car using the internet and then to call on their mobile phone when they arrive to take away the vehicle. Operators at EasyCar will then unlock the car remotely using mobile technology connected to the central locking system and its immobiliser, and the customer will then be able to retrieve the car keys from the glove compartment and drive off (Mackintosh, 2003). This is the first time off the shelf consumer technology has been used for a car club, and the relative cheapness of the technology contributes to the low cost of the car hire. The benefits to the customers include; not having to pay a transaction fee; faster and easier car collection and drop off without having to show documentation; very cheap rates and short-term hire periods.

Unlike conventional car clubs, EasyCar Club will not have any local or community links, nor will it have any environmental or ethical aspirations. EasyCar Club will be run on the 'easy' principles, following the Easygroup mission statement

'to create long term capital growth by selecting and incubating substantial, profitable and sustainable businesses that reduce the cost of living and extend the *easy* brand ('paint the world orange') while maintaining the core brand values. In order to achieve the above, Easygroup will protect the *easy* brand from internal and external threats, develop its people and ensure their reward is aligned to shareholder returns and promote a fun and innovative culture.'

However, just because the venture is not driven by community, ethical or environmental concerns this does not mean that it won't achieve them. By obviating the need to charge membership fees, by planning greater availability and by making cars much cheaper to hire, Stelios is effectively mainstreaming car clubs. If more people then 'join' car clubs (Stelios' or others) then the environmental benefits outlined earlier could be significantly magnified.

Once Stelios' clubs are in place it is highly likely that more people will 'join' his car club. He already has 1400 members for the pilot scheme of five cars in the Edgware road (a ratio that many car clubs would die for). If conventional car clubs are considered to be cost effective for people travelling 8,000 miles a year or less, then Stelios' prices could dramatically move that figure to as high as 16,000 miles a year. The availability of car club cars from as many as 30 sites

during the next year means that many more people will be able to access car club vehicles. The EasyCar Club is also well placed to engage in partnerships with a range of agencies which could further fuel the club's development. For example, partnerships with public transport providers can result in subsidised ticketing for club members encouraging greater participation. Many housing developers are keen to link car clubs with proposed high density urban housing. There is also significant political support for car clubs and it is possible that this will allow Stelios to operate in areas that might otherwise prove difficult (Enoch, 2002).

All these factors could help EasyCar Club grow, making it more widely available to people. This 'mainstreaming' of the car club concept will help to shake off the image problem of car clubs identified by Bonsall (2002)

'Car clubs currently suffer from an image problem – they are invisible to most people and misunderstood by others; some people are off-put by their green image.'

A strong awareness of car clubs is fundamental to their growth and it is unsurprising that in countries where car clubs are successful, public awareness and understanding of them is high (Koch, 2002). In the past car clubs have struggled to promote the concept (Traue, 2002) but Stelios' brash publicity should prove an effective means of raising awareness.

Possible barriers for EasyCar Club

There are a number of factors that might affect Stelios' progress. The traditional model of a car club in the UK is local, serving a small community's needs, often with a local motivator and facilitator guiding the car club's development and recruitment. Research has indicated that early community-focused members are often fundamental to the success of car clubs. In Switzerland in the early days

'every member ... took over specific tasks on a voluntary basis (car operations, billing, introducing new members, etc.), were highly identified with the system and was a potential multiplier of it (Harms & Truffer, 1999).

Koch (2002) argues that

'without this close relationship and the engagement of the participants car clubs would not be what they are today in Germany and Switzerland.'

While Stelios does not seem overly concerned about recruitment (he doesn't require the membership fees to make his operations profitable) and expects his model to appeal to 'anyone who knows the value of a pound', there are some areas where this lack of community identity might negatively impact on EasyCar Club

operations.

Traditional community car clubs rely on their members to look after their cars and to respect and stick to club rules. Club operations depend on trust, honesty and a willingness to share, and it is debatable whether this level of co-operation would exist within a corporate car club. Stelios already has some problems with theft – or unauthorised leasing extensions – with the rental cars and it is possible that the car club cars could be more open to abuse.

Another area that might affect membership is that some people might feel that membership of a large corporate car club is inappropriate to their personal values.

Stelios' pricing structure might also be an issue for some people. The fact that a customer has to book early to secure a good price means that trips will have to be predictable to maximise cost savings.

On the environmental front, there are some concerns that the EasyCar Club model will not produce the same level of environmental benefits as the conventional car club model.

One issue is whether the availability of very cheap cars will stimulate latent demand. This is certainly what happened when EasyJet introduced cheap flights and that experience could lead to concerns that a similar rise in car use might follow in areas where the EasyCar Club model is established. Although it is impossible at this stage to predict the impacts, there are a number of factors that will affect the environmental impact of Stelios' car club.

Modal change is a key area and if the club means that people gain access to a car that they otherwise would not have driven and that they are consequently using EasyCar Club cars instead of public transport or walking or cycling, then the net environmental impact will be negative. Alternatively, if EasyCar Club users have abandoned their own cars and have chosen to use car club cars then it is possible that the environmental impact will be positive. However, that depends on whether they have substituted their own car for club cars or whether they are simply using the car club as an extra means of transport. If they still retain their full complement of private vehicles, then EasyCar Club might simply give members more choice in how they inflict environmental damage. On the other hand, if private cars have been replaced by EasyCar Club vehicles then it is possible that real environmental benefits can be reaped.

No information is yet available about the decisions made by EasyCar Club members but if they make similar choices to those made by EasyCar renters, then the environmental impact is likely to be negative. 42% of EasyCar renters considered making their trip by public transport, 23% considered using an alternative

rental company, 17% considered using their own car, 1% might have flown and 15% would not have made the trip (EasyCar.com, 2003). However, these statistics do have to be treated cautiously as they only refer to the behaviour of rental car drivers and might not necessarily predict the behaviour of club members. There is also anecdotal evidence which suggests that at least some renters in London have either given up their cars or decided not to buy one, because of the existence and cheapness of the EasyCars (EasyCar Club, 2003). This is clearly an area that demands further research.

The extent of any environmental benefit as a result of cars being given up will also depend on the age, quality and size of the car as compared with the car club model (at the moment EasyCar Club cars will not be using alternative fuels such as liquified petroleum gas, although it is something that will be considered in the future).

A further critical area is if and how membership of the car club changes peoples' more general travel behaviour. Bonsal (2002) found that members of traditional car clubs already had a propensity to review the way they travelled prior to joining car clubs. There is a concern that the ease of joining and the cheapness of using EasyCar Club vehicles would mean that members wouldn't necessarily fit this same profile and that as a consequence, EasyCar Club members would be less likely to travel blend than traditional car club members. However, even if the intention to travel blend is not there, it is possible that car club members who have given up their cars would travel blend almost by default. Most of these members would have to walk a short distance to gain access to the car and this alone could reduce the amount of traffic in neighbourhoods served by car club sites. However, in addition it is likely that many car club users will realise the futility of walking to a car club site to access a car for small local journeys that would have been quicker to walk or cycle. Even if the EasyCar Club members do not individually behave as environmentally efficiently as their traditional car club counterparts, the fact that there might be many more of them could mean that their collective contribution to environmental benefits is much greater.

It has already been noted that Stelios' car club is likely to appeal to a different sector of the population than traditional car clubs, and these membership profiles might have a direct bearing on the net environmental impact of the car club. Original members of traditional car clubs have tended to be characterised by their ethical, community or environmental principles. As clubs grow, later 'adopters' are less likely to display these concerns and are more likely to be motivated by convenience and costs savings. In car clubs where these late adopters

dominate membership and where the clubs have grown into professionally operated organisations, there is evidence to suggest that the original members drift away and even leave the clubs altogether (Franke, 2001).

There are a number of environmentally related issues here. The first is whether it matters if these more ethically motivated individuals do not join Stelios' car club. From a financial standpoint, it is completely irrelevant to EasyCar whether these people join or not. However, the composition of a car club, together with its mode of operation could potentially influence the environmental impacts of the enterprise. Research is currently being undertaken to explore the extent to which these early members drive the ethical, community and environmental message through all aspects of car clubs, and if they do, whether this results in higher awareness of these issues and any subsequent behavioural changes (Meaton, 2003). It is therefore possible that the absence of such individuals could compromise the environmental performance of the club and its members.

Although the potential marginalisation of the more alternative supporters of car clubs could have negative environmental results, some commentators would argue that this is a natural process. When fringe activities are made more mainstream, early advocates often drop out, only to find new ways of driving their agenda. This could ultimately lead to new environmental or ethical initiatives, further advancing knowledge and driving further positive change.

A further point relating to this issue is whether traditional car club advocates should be concerned about Stelios's involvement in the sector. Initial anecdotal evidence (Meaton, 2003) tends to suggest that some existing car club members are concerned, primarily about competition and secondly about changes to the ethos of car clubs. There is a perceptible wariness of future developments and some individuals have expressed concern about big business entering an arena that was largely the preserve of small, local communities. While these concerns are very real and tangible it should be remembered that even the most local, environmentally driven and ethically operated car clubs still rely on vehicles manufactured by large multinational corporations that are powered by unsustainable fossil fuels supplied by yet more multinational corporations. However there are valid fears about the relationship between EasyCar Club and existing car clubs. It is likely that EasyCar will compete with existing car clubs, which could result in the demise of traditional car clubs in some areas. Since the EasyCar club is likely to operate on less environmentally friendly lines, this could also

undermine any net environmental performance.

Conclusion

At the moment it is difficult to predict the impact of Easycar Club, but it is a real possibility that it will offer a large number of people an alternative to their present transport options. Whether this new option will deliver both accessibility and environmental benefits is unclear but Stelios' involvement in this area will undoubtedly mean a higher public profile for one of the UK's emerging transport solutions.

Stelios, described as 'a serial entrepreneur who ... aggressively enters new businesses with the goal of changing the rules of the game' (Rogers and Kumar, 2000), has effectively turned the car club concept upside down. By focusing on delivering a low cost, streamlined service and by ensuring that his assets 'sweat', Stelios has arrived at the concept of a car club from a completely different angle. However, it might not simply be conventional thinking about car clubs that he has turned on its head, but also the whole concept of progress towards more environmental sustainable business practice.

Most attempts to encourage big business to address the environmental agenda appeal to the costs that might be saved or the competitive advantage that might be gained. Without even trying, Stelios has challenged this, and has arrived at a potentially more environmentally friendly business operation simply by cutting costs.

References

Ball, C. (2002) 'Realising the Potential for Car Clubs' Institute of Public Policy Research, London. 18th November.

Bonsall, P. (2002) 'Car Share and Car Clubs: potential impacts' *DTLR and Motorists Forum Final Report* Institute Transport Studies, University of Leeds, Leeds.

Carplus (2002) *The Carplus Toolkit. CC3.2. The European Experience* Carplus, Leeds.
<http://www.carplus.org.uk/information/pdf/tool-kit-contents.pdf>

Easycar.com (2003) 'Easycar Rental Presentation' Easygroup, London.

Easycar Club (2003) Personal Correspondence with Easycar Club management team

Enoch, M. (2001) 'How Public and Private Organisations support City Car Share Clubs' Open University, Milton Keynes.

Enoch, M. (2002) 'Supporting Car Share Clubs: a worldwide review' MOSES project, European Commission, DG TREN.

http://213.170.188.3/moses/m_papers/car-share-clubs-rep.pdf

Franke, S. (2001) *Car Sharing: Von Okoprojekt zur Dienstleistung. From an eco-project towards a service.* Sigma Edition, Berlin.

Harms, S. & Truffer, B. (1999) 'Car Sharing as a socio-technical learning system' *World Transport Policy & Practice*, 5, 3, 172–180.

Kirsner, S. (2000) 'Stelios Makes Growth Look Easy' *Fast Company* Issue 64, 98. November.

<http://www.fastcompany.com/online/64/ioannou.htm>

Koch, H. (2002) 'User Needs Report' MOSES Project, European Commission, DG TREN

http://213.170.188.3/moses/m_papers/USER_NEEDS_REPORT.pdf

Kramer-Badoni, T. (1994) 'Life Without the Car: an experiment and a plan' *International Journal of Urban and Regional Research* 18, 2, pp 347–356.

Mackintosh, J. (2003) 'Easycar plans unmanned rental pick-up' *Financial Times*, March 3rd.

Meaton, J. (2002) *Our Car Your Car Feasibility Report*, Centre for Enterprise, Ethics & the Environment, University of Huddersfield, Huddersfield.

____ (in progress) 'Car Club Typologies in the UK and Europe'.

Morais, R.C. (2001) 'From Tragedy, a fortune' *Forbes Magazine*.

<http://www.forbes.com/global/2001/0709/032.html>

Newig, J. & Hockerts, K (1995) *Car Sharing and Charterway* EPE Sourcebook, 3.18

<http://www.epe.be/workbooks/sourcebook/3.18.html>

Rogers, B. & Kumar, N. (2000) *EasyEverything: the Internet Shop* ECCH Case Studies, 300-079-1

Shaheen, S., Sperling, D. & Wagner, C. (1999) A Short History of Car Sharing in the 1990s. *World Transport Policy & Practice* 5 (3), pp16–37.

Traue, R. (2001) *State of the Art Report* MOSES project. European Commission, DG TREN.

http://213.170.188.3/moses/m_papers/StateOfTheArtReportFINAL.pdf

Walters, J. (2002) Making it all look easy *The Observer* April 21st.

United States aviation transportation policies ignore the hazards of airport-related noise

Arline L. Bronzaft

Address for correspondence

Arline Bronzaft, PhD

505 E 79th Street, New York, NY 10021, USA

<Albtor@aol.com>

Abstract

By relying on methods that underestimate the numbers of people affected by airport-related noises and dismissing the growing evidence that aviation noise is harmful to health, quality of life and children's development, United States aviation transportation policies largely ignore the impacts of airport-related noises on residents. Anti-aviation-noise community groups continue to demand the refunding of the Office of Noise Abatement and Control which once had the responsibility of protecting citizens from the dangers of noise.

Keywords

aviation noise, noise pollution, transportation policy

Aircraft Noise Annoys People

Noises are unwanted, uncontrollable and unpredictable sounds, whether loud or soft, that annoy and disturb people. Information on numbers of people annoyed by noise, particularly those of decibel levels below levels commonly associated with hearing loss, can be obtained through the use of community attitudinal surveys and by checking numbers of noise complaints registered with appropriate government agencies. Zaner (1991) identifies transportation vehicles as a major contributor of noise; over 40 million residents in the USA are disturbed by traffic noise with about 14 million complaining about aircraft noise. In addition, many people are bothered by noises generated by rail vehicles, water transports and snowmobiles.

However, airport owners claim that the past twenty years has seen the introduction of, and greater reliance on, quieter aircraft and for that reason believe that fewer people are now being disturbed by aircraft noise. On the other hand, the numbers may not have decreased, but rather increased, if we consider the rapid rise in air travel during this time and the greater use of smaller planes and private jets at smaller airports (Stenzel, 1996). Furthermore, estimating annoyance from complaints, as is often done in studies involving aircraft, underestimates the actual annoyance because too few people complain

(Borsky, 1980). A recent report sheds some light on how bothersome aircraft noise is to nearby residents (Bronzaft *et al.*, 1998). A questionnaire aimed at examining the health of two communities, one living within a flight pattern and the other in a non-flight area, found that nearly 70% of the residents living within the flight corridor reported themselves bothered by aircraft noise. Four questions had been inserted in this questionnaire that dealt with noise but the communities believed them to be part of the health survey.

Nearly all agencies and boards, standards setting bodies and international organisations, except the United States Department of Defense and the Federal Aviation Administration, use a Day-Night Level, DNL, criterion value of 55 dB(A) as the threshold for defining noise impacts in urban residential areas. The Federal Aviation Administration relies on the Schultz curve, which sets 65 dB(A) DNL as the contour level for significant annoyance. Dependence on a 65 dB(A) DNL underestimates the numbers of people annoyed by aircraft. Furthermore, researchers have criticised the way the Schultz curve was developed in the first place, stating that by its very design it underestimates annoyance.

Combining the information on aircraft noise annoyance provided by the Bronzaft *et al.* study with the likelihood that reliance on the Schultz curve has yielded underestimations of community annoyance, it is safe to conclude that far more people are bothered by aircraft noise in the United States than is generally reported. Furthermore, airports generate highway traffic and it is very likely that people are annoyed by traffic noises as well. In the borough of Queens in New York City there are two airports and many highways feeding these airports. It might be best to refer to airport-related noises to get a better estimate of the numbers of people annoyed and the degree to which they are annoyed.

Noise is not just annoying but harmful to health

People are not just bothered or annoyed by noise – noise is hazardous to their physical and mental well-being. Government agencies have not only been lax in collecting data on the actual numbers of people

bothered by aircraft noise but they have also failed to recognise the injurious nature of aircraft noise intrusions. This failure has prevented the introduction of transportation policies in the USA that could adequately address the harm inflicted by aviation noise to the millions who live with these noises daily.

One reason for this failure may lie in the oft heard comment, from the industry and from government agencies, that there is insufficient research to support a noise/health link. Even though government and industry representatives acknowledge that noise may be annoying to some people, they mistakenly conclude that most people will learn to adapt to these intrusive noises. However, the literature on the adverse impact of noise to mental and physical health speak to the contrary – people can be harmed by noise and adaptation may come at a cost.

This was not the attitude of the federal government twenty five years ago. In its brochure entitled *Noise: A health problem*, the Office of Noise Abatement and Control, charged with protecting Americans against the dangers of noise, warned readers that noise could be dangerous to their health (US–EPA, 1978). The brochure linked noise to such disorders as hypertension, heart disease, ulcers and sleep disturbances. Even though at that time the existing studies linking noise to health needed to be corroborated by additional research, this federal agency believed that there was sufficient data to support warning American citizens. To quote:

‘Well-documented studies to clarify the role of noise as a public health hazard are still required, but we at least know from existing evidence that the danger is real... This booklet describes the ways that noise endangers our health and well-being.’ (U.S. EPA 1978, p 3)

Furthermore, Dr. William H. Stewart, former Surgeon General, in his keynote address to the 1969 Conference on Noise as a Public Health Hazard, made the following point:

‘Must we wait until we prove every link in the chain of causation?... To wait for it is to invite disaster or to prolong suffering unnecessarily.’ (US–EPA, 1978, p 23)

The then administrator of the Environmental Protection Agency speaking on the dangers of aviation noise before an Inter-Noise Conference in Washington in 1976 concluded:

‘It is time for us all to come together, and to come to grips with the problem of aviation noise, and to build, at long last, an air transportation system that is safe, healthy and quiet... We really know what needs to be done. We have simply lacked the will to do it. Let’s get the job done.’ (US–EPA, 1976, pp 17–18)

What changed the direction of the United States government? Why didn’t the airlines, the Federal Administration Agency, Congress and all interested parties get together to get the job done? Why didn’t they formulate policies that would protect home owners and communities. Before answering these questions, I will first discuss the research exploring the impacts of noise on health.

Research linking noise & health

Reviews of studies examining the relationship between noise and health, including many looking at impacts from aircraft noise, can be found in: Tempest, 1985; Fay, 1991; Kryter, 1994; Bronzaft, 2002). The *Guidelines for Community Noise* issued by the World Health Organization (WHO) (Berglund, Lindvall & Schwela, 1999) sums up existing findings as follows: ‘... the growth in noise pollution is unsustainable because it involves direct, as well as cumulative, adverse health effects.’ Passchier-Vermeer and Passchier (2000) in their review of the literature concluded: ‘Exposure to noise constitutes a health risk.’ They also note that ‘... most public health impacts of noise were already identified in the 1960s and noise abatement is less of a scientific but primarily a policy problem.’

If we were to broaden the definition of health to ‘good health,’ not merely the absence of symptoms, as the World Health Organization has suggested (Berglund, Lindvall & Schwela, 1999), then there would be more evidence today to support the harmful effects of noise to health. When people complain that nearby noises interfere with their ability to carry out the normal activities of the household (e.g. conversing, watching television, reading, falling asleep) as they do so often at meetings around the country held by agencies such as the Federal Aviation Administration, then we know that noise brings about stress.

A decent quality of life includes carrying out normal activities without being intruded upon and stressed by nearby noises. In the study cited above (Bronzaft *et al.*, 1998) that asked residents living near an airport and a matched sample living further from the airport to complete a health questionnaire, those living within the flight path complained that aircraft noise interfered with their right to open their windows, listen to the radio and television, talk on the telephone, converse with others and sleep. When noises cause individuals to stop talking when planes fly overhead, or to miss dialogue on television shows, or prevent them from opening their windows on a nice Spring or Fall day, then their quality of life has been diminished. Hiramatsu (1999) found that Okinawa residents living near two air bases were similarly disturbed in their daily activities. Additionally,

Bronzaft *et al.* found that the residents living near the airport perceived themselves to be in poorer health, and in keeping with the WHO definition of 'good health,' noise was found to have an adverse effect on the health of these people.

Aviation noise harms children

In September 2000, the Federal Interagency Committee on Aviation Noise (FICAN) concluded that:

'Research on the effects of aircraft noise on children's learning suggests that aircraft noise can interfere with learning in the following areas: reading, motivation, language and speech acquisition, and memory. The strongest findings to date are in the area of reading, where more than 20 studies have shown that children in noise impact zones are negatively affected by aircraft.'

A recent paper (Hygge *et al.*, 2002) further stresses the adverse effects of airport noise on children's cognitive performance. These authors found that children's reading and long-term memory worsened following exposure to noise from a new airport while the children who had been living near an airport that was then closed improved their reading and long-term memory skills.

I am called upon by community groups to respond to environmental impact statements in support of airport expansions and have been shocked to discover that the FICAN paper is not cited in documents discussing impacts of the expansions. FICAN is comprised of members from different government agencies, including a representative from the Federal Aviation Administration (FAA). One would assume that the FAA representative would share FICAN report – including those that discuss the effects of noise on children's development – with colleagues working on the documents dealing with airport expansions. Furthermore, the internet provides easy access to research in this area. Thus, there is no good reason for excluding research which examines the effects of noise on children. When environmental impact statements in support of airport development conclude, as many often do, that there are no studies linking airport noise to deficits in children's learning or their cognition, then I believe doubt should be cast on the validity of the entire document.

Why did the U.S. Government lose interest in noise abatement?

In a paper entitled 'A voice to end the government's silence on noise' (1998) I raised some hypotheses as to why the government regressed after starting programs in the 1970s to curtail noise. This was especially true in the area of transportation noise. It had been suggested that Ronald Reagan, who came into the White House in 1980, was eager to transfer authority in a number of

areas to the states, and this included noise control. Thus, the funds to the Office of Noise Abatement and Control (ONAC) were sharply cut and just a skeletal office was left. Congress supported Reagan in this act and former Presidents George Bush and Bill Clinton showed no interest in revitalising ONAC. Today the office is essentially gone and we don't believe President George W. Bush will refund the office, nor is there much hope that Congress will provide the dollars. However, I hypothesised in the above-cited paper that the office was very likely stripped of funds because it was a threat to corporations and businesses who would have to speed up their efforts to lessen noise impacts. These corporations, who through their Washington lobbyists have much influence, prefer to do things at their own pace and don't want to direct their energies toward noise abatement. The air transportation industry is especially powerful in the United States.

For example, there was some effort to replace noisy aircraft with quieter ones but airlines circumvented regulations by introducing hush kits that they claimed would quiet the aircraft; in reality hush kits fell short of meeting desired noise levels. European countries were very critical of aircraft with hush kits and wanted to cease their operation in Europe but the United States prevailed on Europe to give them an extension as American companies don't like to retire their aircraft too early – it's not good for profits!

Airlines had been allowed, before September 11, 2001, to meet the need of customer demand without paying much heed to the noise effects on residents living near airports. In fact, the Federal Aviation Administration, the agency charged with air travel regulation, is extremely supportive of airlines, paying too little attention to community residents who are besieged by aviation noise. Airlines were given a free hand in the introduction of the hub and spoke system which in essence imposed more noise on certain communities because planes were going up, coming down, going up and coming down again at hub centres. Rather than considering rail connections for short flights, as some European countries have, the United States focused strictly on air travel and ignored the potential of short rail trips.

The close relationship between the government and the airline industry was evidenced by how quickly our Congressional representatives bailed out the airlines after the 9/11 disaster. Had the government been more observant, it would have recognised that the airlines were in financial difficulty before 9/11 and without the tragic events of that day these airlines would still be in trouble today.

Refunding the Office of Noise Abatement & Control

There are many anti-aircraft-noise citizen groups in

the USA. They, through the aegis of the League for the Hard of Hearing in New York, urged several congress people to support legislation to reinvigorate ONAC. Such legislation has been introduced for several years now but has not gained sufficient support from members of Congress to succeed. These groups continue to pressure their legislators. ONAC lies dormant while noises, especially aviation noise, overwhelm great numbers of Americans. Two years ago as part of a major piece of Federal Aviation Administration legislation passed in 2000, a section was included that directed the General Accounting Office to study the adverse effects of aviation noise on people's health and on children's learning, to examine whether the measurements employed by the Federal Aviation Administration adequately assess the impacts of noise on residents, and to determine the effectiveness of noise abatement programs at our nation's airports. The General Accounting Office was to undertake this study but then decided the National Academy of Sciences was deemed better suited to carry out an investigation that included examining the physiological and psychological effects of noise. With no funds appropriated to the Academy to move forward on this study, it, like ONAC, lies dormant.

Conclusion

Without the Office of Noise Abatement and Control or any office to protect the right to quiet that Americans were promised when the Noise Control Act was passed in 1972, residents who are subjected daily to overwhelming airport-related noises are not optimistic about these noises being abated in the near future. With little pressure from government agencies, especially the Federal Aviation Administration, the airline industry does not seem to be in a hurry to bring relief to these residents. It had been thought that 9/11 might lead to more rational transportation policies that would question the need for airport expansions, the need to increase airline slots at airports, and the need to continue air routes that could be replaced more efficiently by rail. Such policies would not only lessen the airport-related noises but should prove good for the environment and the American economy. However, evidence that reasonable transportation policies are evolving is lacking.

References

Berglund, B., Lindvall, T. & Schwela, D.H. (1999) *Guidelines for Community Noise* World Health Organization, Geneva.
 Borsky, P.N. (1980) 'Review of community response to noise' In Tobias, J., Jansen, G. & Ward, W.D. (Eds.) *Proceedings of the Third International Congress on*

Noise as a Public Health Hazard (Freiburg) ASHA Reports 10, American Speech-Language-Hearing Association, Rockville, MD.
 Bronzaft, A. L., Ahern, K.D., McGinn, R., O'Connor, J. & Savino, B. (1998) 'Aircraft noise: A potential health hazard' *Environment and Behavior* 30, 101–113.
 Bronzaft, A.L. (1998) 'A voice to end the government's silence on noise' *Hearing Rehabilitation Quarterly* 29, 6–12.
 — (2002) 'Noise Pollution: A Hazard to Physical and Mental Health' in R.B. Bechtel & A. Churchman (Eds.) *Handbook of Environmental Psychology* John Wiley & Sons, New York.
 Fay, T.H. (1991) *Noise and Health* New York Academy of Medicine, New York.
 FICAN (2000) *FICAN position on research into effects of aircraft noise on classroom learning* Federal Interagency Committee on Aviation Noise, Washington, D.C.
http://www.fican.org/download/Effects_aircraft.pdf
 Hiramatsu, K. (1999) *A report on the aircraft noise as a public health problem in Okinawa* Department of Culture and Environmental Affairs, Okinawa Prefectural Government.
 Hygge, S., Evans, G.W. & Bullinger, M. (2002) 'A prospective study of some effects of aircraft noise on cognitive performance in schoolchildren' *American Psychological Society* 13, 469–474.
 Kryter, K.D. (1994) *The Handbook of Hearing and the Effects of Noise* Academic Press, San Diego.
 Passchier-Vermeer, W. & Passchier, W.F. (2000) 'Noise exposure and public health' *Environmental Health Perspectives* 108, 123–131.
 Stenzel, J. (1996) *Flying off course* Natural Resources Defense Council, New York.
 Tempest, W. (Ed) (1985) *The Noise Handbook* Academic Press, London.
 Upham, P. (2002) 'U.K. Regional Air Services Consultations: a summary of & commentary on the RASCO Reference Case' *World Transport Policy & Practice* Volume 8, Number 4, 39–46.
<http://users.macunlimited.net/pascaldesmond>
 US-EPA (1976) *Aviation Noise: Let's get on with the job* United States Environmental Protection Agency, Washington, D.C.
 — (1978) *Noise: A health problem* Office of Noise Abatement & Control, United States Environmental Protection Agency, Washington, D.C.
 Zaner, A. (1991) 'Definition and sources of noise' in T.H. Fay (Ed.) *Noise and Health* New York Academy of Medicine, New York.

The future development of air traffic in the UK

P.E. Hart

Address for correspondence

P.E. Hart

Emeritus Professor of Economics, Department of Economics, School of Business, University of Reading, PO Box 218, Reading, RG6 6AA, UK

<p.e.hart@reading.ac.uk>

Abstract

There is not a convincing case for investing in any of the new runways or airports proposed by the Department for Transport (2002). If air transport covered all its social costs by paying the same fuel taxes as other transport, air fares would increase and hence air traffic would decrease. The case for taxing air transport is so powerful that current international negotiations should lead to new charges on aviation. Extensions of runway capacity, while traffic decreases, would lead to losses on investment. Private investors should not rely on a future government to cover such losses when present government policy excludes public funding of new airport capacity.

Keywords

Airports, aviation, economics, finance, fuel price, investment, public policy, travel

Introduction

This paper responds to the Government's appeal for comments on proposals to increase the number of runways and airports in the UK, as described in *The Future Development of Air Transport in the United Kingdom* issued by the Department for Transport in July 2002. These proposals are based on air traffic forecasts made by the Department in its *Air Traffic Forecasts for the United Kingdom 2000* issued in May 2000. Special reference is made here to the proposed developments in South-east England, though most of the discussion relates to the whole country.

Air transport in the UK is a major leisure industry. In 1998 some 76% of air traffic was for leisure purposes with the remaining 24% for business. Nowadays, UK holiday makers like to go abroad for their vacations, whereas their parents and grandparents used UK seaside resorts. Again, current football fans follow their teams in away matches around Europe (and beyond) whereas their forefathers did not. In 1998 air transport generated some 180,000 jobs. This is a gross figure; there is no estimate of the number of jobs destroyed in UK seaside resorts so we cannot estimate the net number of jobs created by the aviation leisure business. Perhaps the present economic problems of UK seaside resorts are part of the price to be paid for economic progress. This view is likely to be rejected by the MPs and other representatives of these towns, on

the grounds that competition from the aviation leisure industry is unfair because it pays no fuel taxes and thus receives heavy indirect subsidies. The resulting air fares are artificially low, in relation to road/rail transport, and have diverted UK holiday makers abroad, thus damaging domestic holiday businesses severely.

Fuel Tax

One important indirect subsidy to air transport takes the form of zero taxation on fuel. In comparison, other forms of transport incur heavy taxes on fuel. For example, vehicle drivers have to pay excise duty of 48.82 pence per litre on unleaded petrol (not ultra low sulphur) and 51.82 pence per litre in excise duty on conventional diesel. Moreover, Value Added Tax is payable on top of the excise duty as part of the fuel price. Thus a motorist in the UK pays about 81% of the fuel price as taxation. Such taxes may be justified if they internalise road maintenance costs, pollution costs and reduce the congestion (or even the gridlock) which would arise in the absence of fuel taxes.

If airlines were taxed in a similar fashion, their total costs would increase by about 42%, given that fuel costs are about 10% of total costs, as explained in Box 1. If air fares were increased by 42% to cover fuel taxation, air traffic could decrease by 42%, using the Department's estimate of the price elasticity of air traffic of minus one. The small income elasticity of around 0.6, together with increasing average real income of about 2.5% per annum, would not be sufficient to offset this. If air traffic decreased over the next 30 years, there would be no need to spend vast sums of money on extra runways or airports. If there is an excess demand for flying now, should it be met by increasing airport capacity, or by increasing prices through indirect taxes, or by some combination of both measures?

At the moment, however, the Chicago Convention prohibits taxes on fuel used in international aviation, though the Government is supporting moves through the International Civil Aviation Organisation to remove the exemption of such fuel from taxation. Until a new agreement is reached, it is useful to estimate the effects of fuel taxes on the demand for airport capacity before reaching any decision on such large long term

Box 1. The price of fuel

Denote the total costs of an airline as C where

$$C = 0.1 C + 0.9 C$$

decomposes C into fuel and non-fuel costs (fuel costs amount to 10% of total costs)

Motorists pay the following price, P , per litre of fuel:

$$P = (F + 48.82) * (1.175)$$

where F is the basic price excluding duty and VAT, **Duty** = 48.82 pence & **VAT** = 17.5%

Suppose $P = 74$ and solve for F to obtain $F = 14.16$

Hence the motorist pays $(74 \div 14.16) = 5.226$ times the basic price of fuel as a result of tax.

Impose the same burden on airlines and we have new total costs C^* , given by:

$$C^* = (5.226)(0.1) C + 0.9 C = 1.4226 C$$

So total costs increase by 42.26 %. Different results can be obtained by using different values of P , or different fuels with different duties, but the fundamental point holds: the imposition of tax burdens on airlines similar to those imposed on other forms of transport would result in substantial increases in airline costs and fares. In its sensitivity analyses, the Department for Transport (2000) assumed that all the increase in fuel costs was passed through to fares and this assumption was used in section 2 of the present paper.

In practice, the proportionate increases in fares would vary between the nineteen different market sectors identified by the Department. The number of airlines in each sector is small enough to foster strategic behaviour in pricing policy and the different price elasticities of demand for leisure (-1.3) and business (-0.5) traffic would provide further scope for differential fare increases. The precise increase in fares, following an increase in costs, would vary between different airlines according to their different pricing policies. Competition in terms of quality of service rather than in price might well lead to 'no-frills' airlines increasing their market share. While it is not possible to predict the exact average increase in fares following a 42% increase in costs, it is safe to conclude that it would have to be substantial, if the airlines are to stay in business. The resulting decrease in traffic would make investment in new runways uneconomic. That is, investors in such schemes would lose money, unless a future government changed the present policy of no public funding for airport extensions and came to their rescue.

investments.

The Department's forecasters considered a 10% tax introduced in 2006 which increased to 100% by 2015. This was discussed in the context of internalising the pollution costs created by carbon dioxide. For purposes of comparison, a 10% tax on unleaded petrol would be about 1.4 pence per litre and 100% would be about 14 pence per litre. In contrast, the duty on unleaded petrol is 48.82 pence per litre and VAT is a further 17.5% on the retail price. Clearly, the official forecasters assume that there will be no attempt over the next 30 years to create a level playing field in transport competition by equalising the fuel tax burden. They may well be correct. If they are wrong, all their forecasts of future traffic will be too high. Wrong forecasts lead to wrong investment decisions, which can be very expensive for investors.

Airport Charges

Air passenger duty can be used until aviation fuel taxes are introduced. At the moment this duty is levied

on the carriage from UK airports of chargeable passengers on chargeable aircraft. It could be extended to include freight, which is becoming increasingly important. It could also be extended to include passengers and aircraft arriving at UK airports; some holiday makers depart by sea and return by air so that passenger duty is excluded from their cruise package. These are useful untapped sources of revenue for any hard pressed Chancellor of the Exchequer.

Further extensions of airport charges could cover the pollution costs of the emissions from aircraft engines. Whitelegg and Williams (2000) summarise an important 1998 study by the Dutch Centre for Energy Conservation and Environmental Technology which recommends charges for the emission of carbon dioxide and nitrogen oxide. These could be levied on all aircraft departing or arriving at airports in the European Union. Such charges are not banned by the Chicago Convention and are consistent with the 1992 Treaty of the European Union which states that polluters should pay for environmental damage. Such

charges are being considered by the EU and would require only a qualified majority (not unanimity) in the Council of Ministers to be adopted.

Such charges on fuel outputs could be made equivalent to the banned taxes on fuel inputs. Any non-EU country wanting to introduce emission charges could share the revenue with the EU Member State with which it has agreed routes. Equal shares would be attractive to the relevant finance ministers, especially if they followed the UK example of heavy taxation on fuel used in other forms of transport. A substantial increase in airline costs would lead to a substantial reduction in air traffic. The official forecasters in the Department for Transport simulated the effects of only a very small increase (7.5%) in costs which led to a small decrease (7.5%) in traffic. However, if they had simulated a large increase in costs in their model, they would have obtained a large decrease in traffic.

Emission charges could be added to the existing Air Passenger Duty. In addition to generating extra revenue for the Treasury, they would provide extra flexibility to policy makers. For example, the charges on night time departures and landings could be sufficiently high to discourage them. If night time movements decreased, the extra charges would be very popular. If the official econometric estimates of price elasticities are wrong and night time movements are not reduced, then the extra revenue could be used to increase the grants by the Central Government to local authorities surrounding the airports, thereby providing some compensation for aircraft nuisance through lower Council Taxes. The introduction of emission charges appears to be a win-win policy which all governments are likely to find attractive. The official forecasters may well be wrong in ruling out the equalisation of the indirect tax burden across different transport sectors. Their forecasts of future traffic are extremely important because they have such a large effect on estimated future capacity requirements. If they overestimate future traffic by a substantial amount, because new airport charges are introduced, seriously wrong investment decisions will be made.

Figure 1. Airports & potential airport sites identified in the South-east England aviation consultation



Auction of Slots

The allocation of slots at airports is regulated by the European Commission. The UK Government wants slots to be auctioned and is trying hard to persuade the Commission to change its regulations. Under a system of auctions, airlines would bid for slots at different times at different airports and secondary trading of slots would be made transparent. In short, the market would solve the allocation problem. For example, slots at Heathrow would be expensive while those at Cliffe on the Thames estuary (if this proposed new airport for London is built) would be cheap and encourage airlines to go there. The costs of auctioned slots would be passed on through increases in air fares which would reduce traffic, especially leisure traffic at expensive airports.

The official forecasters did not simulate the effects of auctioned slots in their forecasts. It is dangerous to assume that such auctions will not take place in the next 30 years. All future governments will be aware of the successful auction of licences for the third generation of mobile telephones and are likely to favour similar procedures for the auction of slots. Existing slots have been allocated to airlines without competitive bidding, but there is no reason why such historic practices should continue. Since slots are

public rather than private property, the proceeds would accrue to the Treasury, following the precedent of the auction of third generation mobile telephones.

Outlook

The Government's decision to consult people on the proposals to increase airport capacity is highly commendable. However, the most important consultee is the Government itself. Is it prepared to assume that aviation fuel taxes will never be introduced by future governments in the UK? Will future governments increase airport charges to cover externalities, or to make the tax burden on different forms of transport more equal? Will slots be auctioned in the next 30 years? Answers to these questions are vitally important to investors in extra airport capacity.

In the absence of answers to these questions, the Department has adopted the central forecast that capacity requirements will increase by 4.25% per annum because air fares are assumed to decrease by 1% per annum. Indeed, as the result of 'no frills' or low cost airlines, air fares might decrease by 2% per annum in which case the central traffic forecasts would have to be increased by 20%. If such price decreases are not outweighed by future taxes and charges, demand will increase and exceed present capacity.

In principle, this excess demand could be removed if airlines increased their fares. While the resulting increase in profitability would be welcome, there is always the danger that the Government would respond by reducing their indirect subsidies i.e. by imposing taxes and charges.

Government policy is also crucial to the funding of any extension of airport capacity. The Department for Transport (2002, para 15.3, p 111) states that the Government does not expect to commit public funds to finance any future airport project. If private investors are to provide the finance, they will want to have some idea of the scale of future increases in taxes, levies, charges, etc., which would have such a dramatic effect on the demand for extra capacity. Any estimate of the Net Present Value of an investment in extra capacity, based on the assumption of no significant change in taxes, etc. over the next 30 years, would have to include a high risk premium in the discounting of future returns. As an example, we may consider possible investment in a new freight airport at Alconbury, operating for 24 hours a day.

Freight & Night Flights

Air freight in the UK doubled between 1989 and 1999 and is forecast to grow even more rapidly in future. About 70% is now carried in the holds of passenger aircraft but in future dedicated air freighters will carry an increasing proportion. Firms carrying express parcels want 'next day delivery' and require an airport with 24-hour operation. i.e. they

want aircraft movements all through the night. In the year 2000 there were 13,000 air freighter movements at the four London airports between 2200 and 0600. By 2030 some 40,000 night-time movements are likely to be wanted. It is proposed to construct a new 24-hour runway at Alconbury, near Huntingdon, on the grounds that there are not too many people there to oppose night-time flights.

There is likely to be very strong opposition from local MPs and other area representatives which private investors would have to bear in mind when deciding whether to finance such a project. Any future closure of the new runway during the night, as a result of community groups successfully lobbying Parliament, would severely reduce investment returns.

In addition to the standard arguments on pollution and noise, opponents would probably stress the fact that air freighters use untaxed fuel, whereas competing road hauliers using the Channel Tunnel have to pay substantial taxes on their fuel. If air freighters had to pay 51.82 pence per litre in excise duty (plus 17.5% VAT) for their fuel, air freighters would have to increase their freight rates and the demand for their services would be reduced. Of course, such taxes cannot be introduced at the moment because of the Chicago Convention, but an equivalent sum in the form of emission charges could be imposed. Such a policy would create a more level playing field in transport competition. In any case, road haulage would be required to serve Alconbury and its customers, so road haulage firms might well argue that they could provide a superior service (without transshipment) from many towns across the Channel by using the tunnel, if they did not have to pay fuel duties and VAT.

In short, it is not difficult to imagine those opposed to Alconbury persuading Parliament to ban operations between 2200 and 0600 hours. This could make any investment in such a project unprofitable. Investing in an indirectly subsidised industry may be fine in the short run because investors benefit from the subsidy. In the longer run, it may be disastrous when the subsidy is withdrawn. These lessons for private investors are highly relevant to the various proposals to extend airport capacity in the rest of South-east England.

Options for South-east England

When appraising various proposals for extra airport capacity in South-east England, the Department for Transport (2002) assumes that there will be ample capacity in the rest of the country until 2030 (para 14.4, p 102). It provides an extensive discussion of proposals for a new runway at Heathrow, one to three new runways at Stansted, a new runway and realignment at Luton, a new hub airport at Cliffe with up to four runways, and various other

developments at other airports including Alconbury.

The Department stresses the advantages of hub airports, which attract many passengers connecting from one flight to another, and which provide more frequent flights to more destinations. The benefits to leisure and business traffic are listed but there is no discussion of whether passengers would be prepared to pay the extra costs of a new hub airport in South-east England rather than to take a feeder flight to Paris. Indeed, would a new hub airport provide a competitive rate of return to private investors, bearing in mind that public funds will not be available?

A new hub airport at Cliffe would be a massive investment project and it is likely that BAA plc would have to seek finance from the capital market. The same is probably true for the new runway at Heathrow, which would provide BAA plc with a huge compensation bill and massive expenditure on infrastructure, including putting the M4 spur and A4 roads into a tunnel. It might be possible for BAA to finance a cheaper project, such as a new runway at Stansted, from undistributed profits generated by increased landing charges or more shopping malls. Even so, the directors of BAA plc would have to consider the alternative uses of such funds, so rates of return and risk would still be relevant.

The exclusion of public funds rules out investment projects based on prestige rather than on rates of return. There is no point in comparing the prestigious Charles de Gaulle airport in Paris with a privately financed airport in the UK. While a new hub airport at Cliffe might not attract sufficient private finance at the moment, it is possible that a future government might provide public funds as part of a public programme to regenerate the Thames Gateway. It would also enable aircraft to avoid flying over London, thereby reducing the risk of a disastrous crash on a heavily populated area.

The proposed new runway at Heathrow involves removing about 260 residential properties, one Grade I listed Tithe Barn, one church, eight Grade II listed buildings, 25% of the Harmondsworth Conservation Area and 230 ha of Green Belt in addition to putting the A4 and M4 spur into a tunnel. This project is very large scale, which is why BAA plc would probably have to go to the capital market to finance it. The new runway would be small and could be used only by small narrow-bodied planes. The political resistance to such a project would be formidable. In these circumstances, private investors would have to consider whether the extra revenue generated would provide a satisfactory return on their investment. They would probably prefer to invest in projects which do not involve such large and expensive alterations to the landscape. A new runway at Stansted and the proposed modifications at

Luton fall into this category. Even if they are less expensive than the Cliffe and Heathrow projects, they still might not attract finance from private investors.

A subsidiary of BAA plc owns Stansted airport, and Luton Borough Council owns Luton airport. Whether they are prepared to provide the private finance is crucial. If BAA plc is prepared to finance an extra runway at Stansted while Luton Borough Council is not prepared to fund modifications of its airport, then the choice falls on Stansted. If the investment at Stansted proves to be unprofitable, possibly because of the future 'charges, auctions and other mechanisms' mentioned by the Department for Transport (2002, para 15.15, p 113), then BAA plc and its shareholders will suffer. The investment decision is theirs.

Conclusion

The Department for Transport believes that, at current levels of air fares, there is an excess demand for airport capacity, particularly in South-east England. It does not discuss the use of higher air fares to remove this excess demand, though it does refer to better price signals to airlines and passengers (para 15.15, p 113). In principle, increases in air fares could be implemented by imposing taxes on fuel, increases in air passenger duty and emission charges, and by passing on the extra costs resulting from the auction of slots. Such increases could be justified by internalising pollution costs and by creating fair competition with other forms of transport.

Presumably, the Department does not consider using the price mechanism to remove any excess demand because it assumes that no government will adopt such policies in future. This assumption is dangerous. If it is wrong and if air fares increase substantially, then the demand for airport capacity will fall. In which case the proposed investment projects would be unprofitable. Private investors rather than the general taxpayer would have to bear the losses, because the Government rules out the use of public funds.

The restriction of finance to private investors simplifies the choice between the different investment proposals. For example, if private investors are willing to finance a new Charles de Gaulle airport at Cliffe (assuming planning permission is granted) then the project should go ahead. All the detailed advantages and disadvantages would be examined at the planning inquiry and the granting of planning permission implies that the advantages are thought to outweigh the disadvantages.

Of course, even if planning permission is given for a particular project, it does not follow that the investment will take place. Private investors might prefer to invest in projects other than those which increase airport capacity. The attitude of private

investors is all important. The Department for Transport issued a questionnaire to ascertain public opinion on its various proposals to increase airport capacity. It did not contain questions such as 'Would you be prepared to invest your money in any of these projects? If so, which project? How much would you invest? What return would you require before undertaking an investment?' Such questions would concentrate the minds of respondents to the questionnaire and would help the Department to assess the strength of public opinion in favour of a particular project. It is all too easy for questionnaire respondents to vote for a prestigious new hub airport at Cliffe if they do not have to pay for it.

If private investors have to finance extensions to airport capacity, they are likely to require such high risk premiums on the massive projects at Cliffe and Heathrow that the required finance would not be forthcoming. The less expensive projects at Stansted and Luton stand a better chance of obtaining the required finance. Whether even these more modest projects would be profitable depends on the reliability of the Department's air traffic forecasts. In turn, the accuracy of such forecasts over the next 30 years depends on future government policies on fuel taxes, airport charges and auctions of slots. The likelihood of such policies will be included in the risk premium

attributed to each project by private investors and it is possible that they would not be prepared to finance either the Stansted or Luton proposals. In the event of such a clear failure of the market testing of such projects, it would be very difficult for any future government to change policy and provide public funds for them.

Acknowledgements

I should like to thank S.J. Prais, P.W. Reed, N. Robertson and J. Whitelegg for their criticism of an earlier version, but they are not responsible for any shortcomings which remain.

References

- DfT (2000) *Air Traffic Forecasts for the United Kingdom 2000* Department for Transport, London.
<http://www.aviation.dft.gov.uk/atfuk2000/>
- (2002) *The Future Development of Air Transport in the United Kingdom : South East* Department for Transport, London.
<http://www.aviation.dft.gov.uk/consult/airconsult/se/>
- Whitelegg, J. & Williams, N. (2001) *The Plane Truth: Aviation and the Environment* Transport 2000/The Ashden Trust, London.
<http://www.aef.org.uk/PDFs/5389SainsburyDoc.pdf>

Letter in response to the Editorial on London's congestion charge, Volume 8, Number 4 (2002)

Simon Norton

The London Congestion Charging scheme is certainly an excellent start but it must be seen as only a start.

Perhaps the biggest priority should be to broaden it to other areas, starting with the rest of Central London (as I understand is being considered), but eventually extending to wherever traffic exceeds the environmental as well as the physical capacity of the road network.

However, we also need to deepen it by seeking higher traffic reductions than the current 20% or so. Has anyone done any studies into how much car traffic is actually essential to the life of cities and how much could be transferred to other modes if suitably developed? I would hope that traffic could be reduced to (not by) 20% of pre-congestion charge levels.

For a start, let's use the reduced traffic levels not to

increase the speed of motoring but to reallocate space to cyclists, pedestrians and buses. Let's aim to reduce traffic to levels where ordinary cyclists can come out without having to put up with the stress that afflicts them at present, where pedestrians don't have to be shunted aside to allow traffic to pass at capacity levels. And would it be possible to create a comprehensive network of bus lanes so that bus passengers were unaffected by traffic?

I am sure that this, together with the provision of alternative routes for extraneous public transport users, could be achieved for far less than the cost of new underground lines to allow public transport users to travel in reasonable comfort without being delayed by road traffic.

Simon Norton
 Hertford St., Cambridge, CB4 3AG, UK

Contributions to *World Transport Policy & Practice* are welcome. Whether you are a novice author or an experienced one, the Editor would like to invite you to consider sharing your thoughts and experiences with others like yourself. We can promise a considered and constructive review of your article and, for contributions deemed suitable, publication in *World Transport Policy & Practice*.

Read through the following guidelines and feel free to contact John Whitelegg, the Editor, who will be pleased to offer comments on drafts, work in progress, or ideas which could be made into an article.

Editorial objectives

The journal aims to provide validated information about the latest developments in transport policy to enable local authorities, governments, consultancies, NGOs and supra-national organisations to speed up their policy development and implement new ideas from around the world. It will:

- cover all passenger and freight transport
- deal with global as well as local issues
- include the development of the ideas of sustainability, the design of cities and rural areas, transport corridors and international links to improve health, the economy and the environment.

Article composition

Articles should normally be between 2,000 and 4,000 words. Shorter articles can be published as 'Comment' pieces. Responses to papers which have appeared in the journal, either as letters to the Editor or as response articles, will be welcomed.

Submitting articles

1. By e-mail

Articles for publication may be submitted by e-mail attachment to Pascal Desmond. It is useful if authors indicate what software is required to read any attachments and if they include the letter combination 'zq' in the title. Please DO NOT name articles 'whitelegg', 'wtp' or variations of these. Authors are advised that they may need to provide a version on paper and/or on 3.5" disk prepared on an Apple Macintosh or PC system.

2. On paper

Three copies of articles, typescript and double spaced with wide margins are needed. Manuscripts will not normally be returned, so you should ensure you retain a copy. Provide the article on paper of no less than 80 gsm weight with high quality print. This will enable electronic scanning if needed. Please supply the same version of the article on a 3.5" disk prepared on a Macintosh or PC system in ASCII format. Mark the disk clearly with your name, the article title and the software you have used. Where there is ambiguity, the disk version will normally be considered definitive.

Presentation

Headings and subheadings should be used at approximately 500–750 word intervals. Ensure that headings and subheadings are clearly identified.

Charts, diagrams & figures

These should be called 'Figures' and numbered consecutively (e.g. Figure 1, Figure 2, etc.). Make sure they are clear and can be reproduced easily. In addition, provide the raw data so that we can redraw them, if necessary.

Indicate where in the text they should appear ('Figure 1 about here'). Each figure should have a brief title (e.g. 'Figure 1. Schematic of the Programme').

Tables

Tables should be numbered consecutively, independently of figures. Indicate in the text where they should appear. Give them a brief title. Ensure that they are clear and legible. Authors should not use many tabs or spaces between columns of data – normally, one tab is sufficient.

Maps

Maps are especially welcome as 'tiff', 'pict' or 'jpeg'. They should be numbered consecutively, independently of figures and tables and their location in the text should be indicated. Ensure that they are clear, uncluttered and legible. They should have a title.

Measurements

SI units should be used throughout.

Abstracts & Keywords

Write an abstract of 75 words or so which summarises the main points of the article. It should be sufficient for a reader to decide whether or not they want to read the whole article. Also note up to six keywords which describe the content of the article. These could include geographical area, if specific, industry, functions, managerial activity and process.

References

Authors should keep references to a minimum, ideally no more than ten to fifteen. References should be confined to essential items only and those that are necessary to establish key steps in an argument or key areas of support for a particular proposition.

Reference citations within the text should be by the author's last name, followed by a comma and year of publication enclosed in parentheses. A reference list should follow the article, with references listed in alphabetical order in the following form:

Books: Surname, Initials (Year of Publication) *Title* Place of Publication, Publisher.

Articles: Surname, Initials (Year of Publication) 'Title' *Journal* Volume, Number, Pages.

Originality

The author should indicate if a paper has been presented elsewhere. If the author does not do so, the Editor will assume that the paper is an original contribution. Papers appearing in *World Transport Policy & Practice* should not be published elsewhere without the written consent of the Publisher of the journal.

Copyright

Authors submitting articles for publication must warrant that the work is not an infringement of any existing copyright. Papers and contributions published become the legal copyright of the publisher, unless otherwise agreed.

Contact details

World Transport Policy & Practice, Eco-Logica Ltd., 53 Derwent Road, LANCASTER, LA1 3ES. U.K.

Telephone: +44 1524 63175 Fax: +44 1524 848340

Editor: Professor John Whitelegg <ecologic@gn.apc.org>

Business Manager: Pascal Desmond

<pascaldesmond@eircom.net>

<http://www.eco-logica.co.uk/WTPPhome.html>