Transport and Tourism: Cycle Tourism – A Model for Sustainable Development?

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Whilst the relationship between transport and tourism has been a subject of discussion in the literature, research has focused primarily on an evaluation of transport as a means to an end rather than as a contextual component of the tourism offering, especially at the destination. This paper evaluates the concept of a planned sustainable transport network, the National Cycle Network in the UK, as a potential model for the integration of transport, tourism and recreation. The paper concludes by exploring a number of implications, which may be considered when developing similar tourism transport networks. A model of sustainable transport development is presented.

Introduction

The inextricable relationship between transport and tourism is of fundamental importance in explaining the tourism system (Leiper, 1990). The pattern of travel which exists between generating markets and receiving destinations has been the focus of past research activity, explaining, for example, the role of transport technology in the economic and spatial evolution of tourism destinations (Hobson & Uysal, 1992). The nature of enquiry has changed, however, in that both academics and practitioners are being urged to translate the principles of sustainable tourism into practical outcomes (Butler, 1999). Within this context, transport for tourism is of prime concern, as it is a part of the tourism system which is heavily dependent on the world's two most energy consuming and polluting forms of transport – air transport and the motorised vehicle (Greene & Wegener, 1997; Royal Commission on Environmental Pollution, 1994). This paper discusses the extent to which a planned sustainable transport system, with an integral tourism element, offers an alternative model for tourism transport development at a destination level. The conceptual framework of the analysis is the 'tourist transport system', the salience of which has been discussed by Page when he refers to the role of transport in the tourism experience (Page, 1999a). Within this context, the paper evaluates the extent to which the National Cycle Network (NCN), which has been developed in the UK on an incremental basis during the past five years, meets the principles of sustainable development as both a transport facility and a tourism transport offering. There are three sections. Firstly, the paper summarises the growth of transport for tourism, and the issues associated with this. The second section evaluates cycle tourism as a form of transport and a tourism experience, with particular reference to the underlying principles of the National Cycle Network in the UK. The final section discusses the potential of a tourism transport model, which could be adapted to provide a sustainable development framework at the destination level.

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Growth of Transport for Tourism

Transport for tourism has grown substantially within the past four decades. The two most important modes of travel serving tourism are air travel and the private motor car. Air travel grew rapidly during the early stages of mass tourism, recording annual increases of between 10 and 17%, and thus supporting the rapid development of many new destinations (Holloway, 1989; Shaw, 1990). Whilst international forecasts of air travel suggest a slowing down of the rate of growth, the market is still expected to increase (Adams, 1996). For example, major airports estimate passenger throughput to rise by 3–4%, per annum, during the coming decade, partly fuelled by increases in national Gross Domestic Products in generating countries, and partly by a switch in household expenditure away from consumable products to recreation and tourism (Chataway, 1996). The motor car has witnessed an equally spectacular growth rate during the past four decades. There has been a tenfold global increase from 53 million vehicles registered in 1950 to 500 million recorded in 1992 (Forward, 2000). Within this context the highly motorised countries of Western Europe and North America generate the majority of tourism related trips and the car remains a significant mode of travel for domestic tourism in developed economies. In Britain, it is estimated that the car (including hired cars) is the most frequently used form of transport for all holidays, accounting for 74% of all domestic holidays trips (UK Statistics, 1998).

A review of the literature raises two fundamental issues. Firstly, the relationship between transport and tourism tends not to be integrated into an overall policy process for sustainable development (Lamb & Davidson, 1996). This is apparent at all levels of planning, including at the destination. Transportation and highways authorities plan strategic transport development, whilst national and regional tourism authorities set out a framework for tourism policy, and there are often only limited connections between the two components (Giannakodakis, 1994; Gunn, 1994). At best, the mutual linkages are recognised in the planning documentation, but for the most part the translation of policy into practice is afforded by different organisations and often there is a variance between professional values, methods and approaches (Goodwin, *et al.*, 1991).

Secondly, despite the broad recognition that increasing transport for tourism is a source of environmental degradation, current transport and tourism planning frameworks continue to prioritise energy intensive modes of travel (Davis, 1991). Resources are still devoted to large-scale projects which encourage domestic car-borne travel and cross-border trips by air in the medium-haul market (Tolley & Turton, 1995). In terms of shorter distance travel, investment in this category has been heavily weighted towards the motor car. Thus, for the most part, car and air travel under-pin the tourism system in both the transitory and destination elements of visitation. This imbalance has resulted in a negative trade-off for other modes, which make up the overall transport system (Hallsworth & Whitelegg, 1997).

Much of the current tourism research has focused on investigating ways of making energy intensive transport systems more environmentally sensitive, or how to lessen impacts stemming from increased tourist traffic. These include, for example, research studies commissioned by airlines to assess the reduction of

fuel consumption, noise and other emissions (Somerville, 1995). Other investigations include an examination of ways to minimise the impact of the car in environmentally sensitive areas, which have recreational or tourism appeal (Cullinane & Stokes, 1998; Dilley, 1993). Whilst this research has provided a critical appraisal of policy and the implementation of practical measures, for example, in terms of reduction of environmental emissions, there remains a principal problem. The demand for travel and tourism is growing at an unsustainable rate and ameliorative measures do not readily provide an answer to unbridled global demand for tourism (Wheeller, 1991). The World Tourism Organisation predicts 1.6 billion international arrivals globally by the year 2020. This represents a twofold increase on the 595 million arrivals recorded in 1996 (Luhrman, 1998). The implication is that there will be a sustained rise in the provision of long-haul air travel, a widespread packaging of fly-drive holidays, and the continued provision of infrastructure to encourage greater use of the car at the destination, which will contribute to an increasingly unsustainable transport system (Lumsdon & Tolley, 1999). As car ownership, and more importantly car dependence, continues to spread across both the industrialised and industrialising world, the transport impacts of tourism are therefore likely to intensify at a national level in many countries. The problems emanating from international tourism traffic and in terms of national transport policies, appear almost intractable:

> As transport is fundamental to tourist travel, some researchers argue that it is not possible to make tourism sustainable without a fundamental revision of the concept of tourism, holidaymaking and the role of travel in modern society. (Page, 1999b: 271)

Cycle Tourism at a Destination Level

Is it possible to design non-motorised tourism transport systems which meet the principles of sustainable development at a destination level? The next section of the paper explores this question in relation to cycling and tourism. It encompasses both recreational cycling ranging from a day or part day casual outing to a long-distance touring holiday. The fundamental ingredient is that cycling is perceived by the visitor as an integral part of an excursion or holiday, i.e. a positive way of enhancing leisure time (Lumsdon, 1995)

An examination of tourism transport at a resort or destination area level might well prove more fruitful in determining how the principles of sustainable development could be applied more readily within a transport tourism network. It is an appropriate line of enquiry, as in many countries the day visit market is expansive and short-distance holiday trips remain the mainstay of tourism demand (Cooper *et al*., 1998). In Britain, 5500 million day visits are made each year. Of these, 5200 million are leisure day visits from home and 218 million from holiday bases. The main mode of transport is the car, accounting for 61% of all trips, followed by walking at 26% of all trips. Within the countryside, the pattern of trip making changes slightly with 59% being made by car and 33% on foot (Countryside Recreation Network, 1996). However, in terms of National Parks, 91% of visitor days involve access by car (Countryside Commission, 1996).

Whilst it is considered unlikely for there to be a significant shift in mode of travel in the transitory element of a holiday, some researchers consider that it is possible to achieve a modal shift at the destination, but only if an integrated approach is adopted (Grant *et al.*, 1997). It is an area of study which is not well documented and the management of transport systems at destinations have often not taken into account the dynamism of tourism development. Where sustainable transport solutions have been developed, emphasis has been placed on public transport, mass transit systems such as the tram, or by supporting measures to sustain or improve bus networks within an urban context. In contrast, non-motorised forms of transport such as cycling and walking have received minimal attention, with the exception of countries such as Denmark, and the Netherlands, where transport planning policies have afforded them a higher priority (Hillman, 1994).

One of the key factors to examine is whether cycle routes or networks can be designed in an integrative manner, serving as a form of transport and simultaneously offering a recreational or tourism experience (Pearce, 1982). This is fundamental in terms of the motivation of visitors and the appeal of alternative, slower forms of travel. In recent decades, there has been a relative lack of interest in the concept of transport as tourism (Speakman, 1988). During the mid-1990s, however, both practitioner and academic interest in classic forms of the tourism transport offerings such as cruises, rail tours and pilgrimage trails, have been increasingly documented (Halsall, 1992; Moscardo *et al.*, 1996). However, in many cases the conceptual framework of integration between transport and tourism tends not to have been explored within a wider context of sustainable development at a destination. There are exceptions; notably the planning and design of cycling facilities such as La Route verte in Canada and the increasing number of multi-user trails being developed in the USA and in Australasia. Within a European context, recent examples are the cycle networks in Denmark and Veloland Schweiz in Switzerland, which have been planned to incorporate an integral tourism element (Travel and Tourism Intelligence, 1999).

The hypothesis, that it is possible to design for and promote sustainable forms of transport as an alternative to the motor car at the destination, relies heavily on the assumption that the tourism market, or part of it, is willing to alter their travel behaviour. Therein lies a problem for transport and tourism planners. People in developed countries are becoming increasingly 'car dependent' and there could well be a resistance to changing patterns of behaviour and also an inertia by planners and suppliers to redirect policy and resources unless prompted by strong market support for a shift in emphasis (Transport Studies Unit, 1995). In transport studies, there is some empirical evidence which verifies that certain segments of the market will switch more readily than others from the car to other forms of travel (Brög, 1982; Curtis & Headicar, 1997). Therefore, in a similar manner, it is imperative to understand attitudinal and motivational factors in relation to tourism transport. For example, there are 200 million bicycles in Europe (in comparison to 160 million cars), but only 10% are used on any given day, of which 4% is estimated to be for leisure purposes (European Union, 1997).Is this latent demand an indication of substantial market potential or will Europeans remain primarily owners rather than users of cycles? Several studies,

for example, record the perceived fear of cycling in traffic as a major deterrent to cycling (Davies *et al.*, 1997).

There are a number of indicators that point to changes in the vacation market. There is evidence to suggest that the demand for the heavily packaged holiday is declining and that the new consumer market is becoming more environmentally conscious (Brady *et al.*, 1993; Poon, 1993). This is verified by evidence from the USA where green issues are becoming more influential in destination choice and activity (Wight, 1994). In the UK, opinion polls suggest that the level of traffic, congestion, fumes and noise generated by highways is a major concern to the population (Transport Studies Group, 1996). Whether these concerns extend to tourism is a more tenuous argument. The level of consciousness regarding over-consumption of finite resources has yet to extend to tourism in a significant way. Whilst there might be a degree of awareness amongst tourist consumer groups, it is not pervasive at a market level (Martin, 1997). There is growing recognition that there are motivational links between health and recreational cycling which also have an impact on the demand for cycling and walking within the tourism sector (Lumsdon & Mitchell, 1998; Owen, 1998). There are also an increasing number of studies which point to the motivational factors of recreational cyclists and cycle tourists, namely, physical challenge; relaxation; escapism; peace and quiet, although the significance of any given factor will vary according to each different market segment (Datzer, 1998; Ritchie, 1998). This initial work is important in terms of explaining motivational factors associated with the tourism transport experience.

At a supply level, there is also increasing evidence emerging from North America and Europe that there is a latent demand for cycle tourism. The provision of multi-purpose user trails in the USA has led to a substantial demand for such routes. The most popular attract between 1 and 2 million users per annum (Rails to Trails Conservancy, 1996). Furthermore, the American Nationwide Personal Transportation Survey of 1990 indicates that 55% of all cycling trips in the USA are for social or recreational purposes (Fegan, 1992). La Route verte in Canada forms a 3400 km network of cycle routes which will provide access throughout the Québec region and Eastern Townships, with proposed links to New England in the USA (Pronovost & Joly, 1998). In 1996, the Urbanisation National Research Institute undertook a preliminary study of the potential tourism impacts of the proposed Route verte network. An initial feasibility study estimated a projected level of demand for recreational and cycle tourism trips to be 2.7 million per annum by 2001. The number of cyclists using the Route verte are expected to rise to 2.5 million local trips and day excursionists to 135,615 per year. In addition, Archambault *et al*. (1997) estimated that 13% of cyclists would be people encouraged to ride the network rather than taking their cycle elsewhere by car. The findings were then subject to further analysis by Archambault *et al.* (1997), using an input-output multiplier model to estimate direct and indirect effects of the developing network on the Québec tourism economy. This study estimates that La Route verte will generate user expenditure within the range of $25,894,000 and $31,267,000 of which approximately 10% would be from new visitors attracted by the facility. Retention of existing domestic tourism will generate a further 13% of visitor spending. The analysis concludes that nearly one-quarter of the additional cyclists' spending in the Québec economy will be

attributable to the overall appeal of La Route verte as a tourism attraction in its own right, rather than being simply a transport network (Couture *et al.*, 1998).

In Europe the pattern of demand for recreational cycling is variable. In Germany, 38% of all trips are made for leisure purposes; 9.8% of these are cycling journeys (Hundt, 1998). In contrast only 4% of day visitors cycle as a main pursuit in the UK (Countryside Recreation Network, 1996). The most often cited cycle tourism offering is the Donauradweg (Danube Cycle Route) in Upper Austria as it has stimulated a sustained growth of visitors and has been well integrated with other forms of transport. The Donauradweg was developed as a linear tourism route, primarily for cyclists, but also for walkers, along the banks of the River Danube in 1983, to accommodate an increasing demand for cycling experienced by tourism authorities in the early 1980s. Between 1987 and 1991 the number of cycle trips recorded per annum rose from 738,000 to 1,527,000 per annum, an increase of 48%. In 1994 it was estimated that, between Passau and Vienna, the route generated 80,000 overnight stays per annum, an increase of 27.33% in ten years (Landesverband für Tourismus, 1996). Several towns on the route now depend on cycle tourism with bed-nights from cycling visitors accounting for between 60 and 80% of all stays. The route has extensive links with bus, boat and train services, and several companies offer lightly packaged cycling holidays using these facilities. Similar patterns of market development have been experienced elsewhere, including Münsterland in Germany, the Danish cycle network and on the 'LF' long distance cycle routes in The Netherlands (Cushing, 1997).

In summary, an increasing amount of evidence, albeit incremental, reveals that cycle tourists are looking for casual, healthy, recreational activities, of which, cycling and walking are the two most accessible forms. However, perceived fear of traffic is a major deterrent to recreational cycling. This barrier has been overcome where destinations have provided trails and networks, which are traffic free or traffic calmed. Monitoring exercises record high levels of use, which supports the argument that there is a degree of latent demand.

The UK National Cycle Network

One recent major initiative in the UK, the National Cycle Network (NCN) is often cited as a prime example of sustainable transport. It has been designed to offer an alternative transport network, not only for cyclists but also for walkers and wheelchair users wherever feasible. The network is defined as a linked series of traffic-free paths, traffic-calmed and minor roads, connecting urban centres and the countryside throughout the United Kingdom. Sustrans, a sustainable transport charity, which has pioneered the network, has an overall vision:

> Sustrans (sustainable transport) works on practical projects to encourage people to cycle and walk more, as one starting point for reducing motor traffic and tackling its adverse effects … Sustrans believes that we should move towards sustainable transport programmes, both to improve individuals' quality of life and to respond to the worldwide issue of climate change. (Sustrans, 2000: 2)

The Sustrans flagship project is the National Cycle Network, an 8000 km network which has been developed on an incremental basis over the past five

years and launched in June 2000. It is subsequently expected to double in length by 2005. The network has been designed primarily as a transport system. There has also been a growing recognition within Sustrans and by partner organisations that it could become a major tourism attraction in its own right, either in its entirety, or on sections which have tourism appeal (Sustrans, 1999a). In urban areas, the network functions primarily to encourage utility trips to work, school or the shops. It also enables recreational trips to the surrounding countryside, i.e. trips from town to the near countryside. Between cities, it takes the form of a linear tourism transport attraction, which facilitates access, for example, to appealing landscapes, visitor attractions, villages and small towns as well as providing sightseeing opportunities. The network is designed to enhance the overall appreciation of the tourism offering of a destination, but it also represents an additional visitor attraction in its own right:

> Each section of the journey should be considered as a unique 'Travelling Landscape'. Views can be created, shelters and screens planted, existing structures such a bridges can be enhanced … everything to make the journey through these public spaces as enjoyable an experience as possible for all those who use them. The journey itself becomes a worthwhile experience. (Grimshaw, 1998: 7)

The NCN has been planned and implemented on the basis of limited market information. Route planners have determined estimates of demand on the basis of limited analogous case studies. This is not peculiar to cycling routes, but is considered to be an inherent problem with all route-based tourism (Murray & Graham, 1997).

Data are being collected which provide a more detailed insight into the attractiveness of the network, how visitors use it, and the extent to which it meets the criteria of sustainable development (Bloy, 1999; Cope, 2000). This is important, for many of the earlier studies refer to segregated cycle routes, which were developed as visitor attractions, utilising disused railway lines and publicised as traffic free recreational spaces for walkers and cyclists. Local authorities secured ownership of linear sections of old railway lines, often between 10 and 30 km in length, and developed these as recreational opportunities for the day visitor. Most of these have since been absorbed into the National Cycling Network, but several remain as local recreational facilities.

Examples of this type of early trail development include the Camel Trail in Cornwall and the trails in the Peak National Park. In each case, the routes attract over 80% of visitors by car and physical carrying capacity is saturated at peak times during summer weekends (Cornwall County Council Visitor Survey, 1998; Lumsdon & Smith, 1997). This raises a fundamental question about sustainable development. In terms of economic impact there are potentially a number of major benefits. In relation to environmental aspects, the generation of car based trips, illicit parking and congestion in nearby communities, raises the question whether or not cycle routes, which are designed as visitor attractions, lead to an overall negative impact. A network of routes, in contrast, might not have the same effect.

One of the earliest sections of the NCN to be surveyed was the Sea to Sea (C2C) route. This spans the northern Pennines between the coastal towns of

Whitehaven and Sunderland and has provided an opportunity to measure the level of demand on a section of the network which has been designed as a tourism transport system. Research undertaken presents a more detailed exploration of the expectations of cycle tourists, and their patterns of behaviour (Cope *et al*., 1998). The route generates approximately 10–11,000 holiday trips per annum across the Pennines. As a consequence, Cope indicates that there has been a considerable stimulus to the local tourism economy in the central section between the towns of Penrith and Consett, whilst there has been minimal social and environmental impact.

There is a lack of comparability in terms of research objectives and methods utilised by the various studies. Nevertheless, there are a number of implications, which can be deduced in relation to sustainable development:

(1) The earlier segregated, recreational cycle routes, which have been designed in isolation from a wider network, have generated similar patterns of demand to visitor attractions. In this respect, cycle routes stimulate day visitation which is predominantly car based. Whilst they comprise a tourism transport experience, such schemes cannot be considered an appropriate form of sustainable tourism transport development.
(2) When such routes are located in attractive countryside, for example in national parks, it is likely that the destination will remain the prime attraction. The activity of cycling serves only to enhance the experience, in a similar way to walking or horse riding. Therefore, it could be argued that visitors would have made the journey by car, regardless of whether a cycle route exists or not. Cycling in this context could be construed as a form of abstraction to car based tourism, but only at the destination. In theory, there is potentially an overall environmental gain to be made if the total distance travelled by car is reduced. This assumption has yet to be tested.
(3) Access to the NCN is of considerable importance in terms of sustainable development. The design of the network seeks to penetrate central zones of all urban areas throughout the UK. Empirical data collected on the Bath to Bristol cycle path and the Taff Trail sections of the NCN, which are partly urban and partly rural, indicate that routes which are designed and targeted to the local resident population offer a sustainable alternative to car based recreation.
(4) In many instances, sections of the NCN network have been developed in order to secure or take advantage of funding opportunities. A consequence of this is the line of route might by-pass visitor attractions or historic villages en route and therefore is less appealing to the cycle tourist. There are also limitations in terms of inter-modality, although there is now a project which seeks to investigate links from railway stations to the NCN.

Tourism Transport Model

The network approach adopted by the developing NCN offers greater potential to encourage trips from home, from railheads and centre-based tours, which include links to the network. It is estimated that the network currently attracts 100 million trips of which 40% are for leisure purposes (Sustrans, 1995). A major concern that a network of cycle routes might generate additional car journeys is

overcome, at least in theory, if the design principles encourage the minimum use of the car for access journeys to it.

The planning and implementation of the NCN illustrates how many of the underlying principles of sustainable development, which have been adapted in Table 1 from the literature, can be incorporated in design features (Pearce, 1993; Litman, 1994; Nijkamp & Vleugel, 1995).

Table 1 The principles of sustainable development applied to the National Cycle Network

Principle of sustainable development	***Application to the NCN***
Re use of existing resources	Fifty per cent of the NCN network uses old railway track beds, canal towpaths, forestry tracks. Nearly 50% utilises quiet or traffic calmed roads, i.e. transport infrastructure which already exists but which is underused.
Reduction of consumption, of waste and finite resources	The reduction of energy intensive car trips is brought about, in theory, by direct substitution, i.e. cycle trips replace car borne outings, or reduce distance travelled by car. The NCN network is being augmented by links to near railheads to facilitate inter-modality, although there are severe limitations with current UK public transport provision for cycle carriage. A Sustrans survey (Sustrans, 1999b) recorded that between 21% of recreational users of the network indicated that they were new to cycling.
Integration within existing tourism planning frameworks	Integration of cycle route planning into the plans of tourist boards, highway authorities and other tourism organisations – the NCN relies on a wide ranging partnership network; the entire network concept is based on integration and partnership with hundreds of organisations. Sustrans acts as the coordinator.
Maximising local economic impacts	A number of studies, including Cope and Doxford's study of the C2C route, indicate that cycle tourists spend very locally, for example in independently owned accommodation, using local tour operators, etc.
Minimising local community impacts	The NCN has been planned with extensive community and landowner participation, seeking local ownership of sections of the network through voluntary ranger schemes.
Promotion of diversity	Routes offer a diversity of landscapes, and cultural appeals from urban to remote countryside. In theory, routes can encourage the conservation of a wide range of flora and fauna (Woods, 2000).
Appropriate timescales	The development of the network has taken a gestation period of 8–10 years to enable consultation and local resourcing of sections of the network. Another 5–10 years of work will be required to develop Stage 2 of the network.
Monitoring and management	The NCN is subject to a monitoring process-counts, user surveys and community feedback.

Of these criteria there are three core elements which require more detailed explanation:

1. Planning and design techniques should make best use of existing resources whilst having regard to minimal impact on the environment

The design of cycling and walking routes almost invariably use existing and often under utilised resources. These include redundant transport infrastructure such as watersides and disused old railways, which account for 50% of the NCN network which incorporates restored Victorian railway structures. The remainder utilises quiet roads where traffic levels are low. There are similar schemes in gestation across Europe. For example, the *Vias Verdes* or greenways of Spain, utilise 7400 km of redundant narrow gauge railway routes. In Wallonia (Belgium) the *Ravel* scheme makes good use of a dense network of canal-side paths and decommissioned railway lines, providing a network of 2000 km or routes. The cycle networks feature a rich industrial heritage.

Sections of the NCN which pass through environmentally sensitive areas are subject to a strategic environmental assessment in order to minimise negative environmental impacts. In some instances, habitats and species are afforded protection by the Wildlife and Countryside Act (1981) and alternative routes are selected. The limited data which is available verifies the work of Cope *et al*. (1998) in relation to the C2C route, i.e. that there is minimal environmental impact. One researcher argues that the network encourages a variety of habitats and a diversity of wildlife (Woods, 2000).

2. The network should generate positive economic and social impacts for the communities through which it passes

The second criterion relates to the tourism economy. Tourism transport facilities are often justified on the basis of their contribution to rural tourism economies, especially in the villages and small towns through which they pass. It is estimated that cycle tourism in the UK generates £635 million per annum (Sustrans, 1999a) As the NCN has developed it has brought sustained, direct visitor spending in local tourism economies (Cope, 2000; Lumsdon, 1999). However, whilst existing surveys provide an indication of the direct level of spend in a local tourism economy, they tend often not to take account of the possibility of abstraction from other forms of tourism.

Whilst the tourism literature is replete with social impact studies it is an area which is less well explored in relation to the development of the NCN (cf. Getz, 1994; Lankford & Howard, 1994). There are, however, numerous studies reported in the USA which indicate minimal impact of multi-user routes (Moore *et al.*, 1992). At least one study points to the increased property prices experienced near to routes (Rails to Trails Conservancy, 1996). Mill (1996), in discussing the principles developed by the National Trust for Historic Preservation in the USA, refers to societal wellbeing in the following way:

> …it is important to find a fit between the community and tourism. By pursuing backward linkages with other sectors of the economy – agriculture, artisans, builders, and suppliers – the local economy is diversified and more people share and participate. (Mill, 1996: 218)

All forms of tourism bring social impact to settlements and a dilemma which faces many rural areas is how to attract visitor spending and job retention without being overwhelmed by the demands of the visitor, at least during peaks in the year. The economic-social linkages to which Mill refers are important, especially within the context of small towns. One recent UK study, for example, points to the positive impact tourism has on the retention of local facilities such as cinemas and restaurants which would otherwise not be trading (Rural Development Commission, 1997). Social impacts are not necessarily evenly spread. They might affect different sections of communities in different ways. Many rural communities are dominated by retired-residential or dormitory sectors, and these residents are less inclined to see direct benefits through participating in the development of a route. It is an area of investigation, which requires further research in order to assess the extent to which change to a local environment through tourism development is acceptable (Bramwell, 1996; Craik, 1995).

3. The system should have the capability to decrease the number of car based recreational trips, hence reducing pollution and energy consumption

The third criterion is as yet unproven, and is an area which requires more detailed research. The long-term environmental gain of tourism transport offerings such as the NCN can only be proven if the potential to switch trips from motorised to non-motorised travel is possible, bringing an overall reduction in car mileage, congestion and pollution. In the short run, it has been argued, cycle tourism might bring about an increase in car-borne trips by encouraging more urban dwellers to take their bicycles by car to countryside locations. The counter argument is that cycle tourism abstracts from car-borne sightseeing trips, i.e. visitors spend the day cycling rather than touring by car. Furthermore, where an acceptable level of public transport provision is made for the carriage of cycles, inter-modality makes a significant contribution (European Cyclists' Federation, 1997). An additional dimension to the discussion is that cycle tourism may well encourage more interest in everyday cycling, although this hypothesis has yet to be tested (Lumsdon, 1997). In the case of the C2C route, the survey undertaken by Cope *et al.* (1998) recorded that 23% arrived by rail at the start of their cycle trip even though there is limited capacity for cycle carriage. In contrast, 85% of holidaymakers cycling on the Tarka Trail in the South West of England arrive by car despite the network being served by a railhead at Barnstaple. Over 40% of local residents using the trail, however, arrive by cycle, and this verifies previous studies, which indicate a desire by people to cycle from their homes (Countryside Commission, 1995; Woods, 1998). The initial findings from the Sustrans route monitoring surveys indicate that outside holiday areas only a small percentage of cyclists had driven to traffic-free paths for leisure trips (Sustrans, 1999b). For example, the Taff Trail, which begins in Cardiff, the capital city of Wales, and passes through several urbanised communities, attracted 315,568 users in 1998. Of these, 78% accessed the trail by foot or cycle. The route also generates an out of area visitor market, and this is expected to increase with the trail's incorporation into the National Cycle Network (Groundwork Merthyr & Rhondda Cynon Taff, 1999). Whilst it is important not to overwork these findings, the preliminary material indicates that the NCN has a potential to encourage a modal switch for recreational and tourism purposes. Continuous

surveys will allow a more accurate evaluation of the extent to which this can be achieved.

Conclusions

In terms of the overall tourism transport debate, there is, prima facie, a case for researching ways in which to reduce energy intensive forms of travel between generating and receiving destinations. There is an equally compelling case for investigating ways of reducing the impact of tourism travel at the destination by way of well-designed sustainable tourism transport facilities.

Cycle tourism, in theory, offers the potential to switch trips from energy intensive and polluting forms of motorised transport at a destination or sub-regional level, as many trips for any given purpose are short (Hydén, 1998). The appeal of recreational cycling or cycle tourism lies in providing a tourism-experience which visitors desire, such as offering a challenge or an overall feeling of relaxation and well-being. The lesson learned from the early stages of implementation of the National Cycle Network and other schemes such as La Route verte, and the Danish, Dutch and Swiss national cycle networks, is that an improved infrastructure, which is essentially traffic free, can generate a substantial demand. The application of refined techniques will enable researchers to measure overall impacts more accurately in the coming decade.

A major question remains as to whether or not the NCN meets the criteria outlined within a framework of sustainable development? It is difficult to respond at this stage of development, given that the route usage monitoring survey has only recently been initiated. Analysis of recent studies and the early evaluation of the NCN surveys enables the researcher to build a generalised model which might be applied to the development of a tourism transport system, which seeks to integrate core elements of sustainable development. In this model, environmentally sensitive modes of travel at a destination are prioritised both in terms of policy and also resource commitment, whilst more polluting forms of transport will be managed more effectively. This is outlined in Figure 1.

The model represents a four-stage approach to the planning of a sustainable tourism transport network. The first stage involves an analysis of existing policy frameworks, in relation to an audit of existing infrastructure and available data on the market. In the second stage, it will be necessary to re-appraise existing land use and assess future proposals for tourism development against, for example, core sustainability indicators. In terms of the likely criteria to be adopted, proposals for new tourism attractions, for example, would be assessed in relation to access on foot and by cycle in contrast to the current trend towards extensive car park provision. The third stage would include a synthesis of work undertaken in stage two, in the form of policy guidance or documentation. The aim would be to secure an appropriate balance in the tourism transport system, which might be different according to local conditions at each destination. In devising a tourism transport network, priority would be given to modes of travel which enhance the visitor experience, but the process would involve a weighting of this gain in relation to social and environmental impacts on residents. The final stage involves implementation and continuous monitoring in terms of both software and hardware requirements of the tourism transport network.

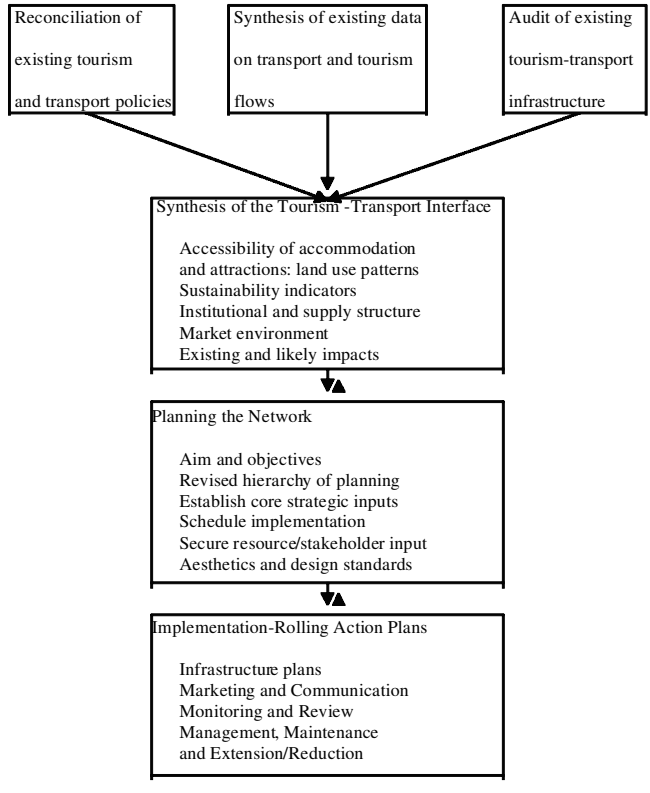

Figure 1 Planning sustainable tourism-transport networks

There are limitations to such a preliminary model, and applied research would be appropriate in order to examine in more detail the relationship between tourism and transport in different contexts. There is also a need to examine the degree of fragmentation of the market and the propensity of different user segments to consider a modal switch, for if such networks are to succeed they will need to be attuned to differential visitor requirements.

The development of cycle tourism on the NCN provides a useful case study; with continuous monitoring it will be possible to build a more refined model. Monitoring of the network should provide measurable outcomes which can be set against the core criteria, in order to evaluate the extent to which the National Cycle Network provides a sustainable alternative to existing tourism transport.

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References

Adams, J. (1996) Can technology save us? *World Transport Policy and Practice* 2 (3), 4–17.

Archambault, M., Giguére, N. and Joly, P. (1997) *Les retombées de la Route vert.* Montréal, Université du Québec à Montréal.

Bloy, D. (1999) *Cycle Route Survey, Interim Findings* (2nd edn). Leisure Industries Research Centre, Sheffield Hallam University.

Brady, Shipman and Martin (1993) *Urban Environment: The Problems of Tourism, Final Report* (p. 16). Brussels: Commission of the European Community, Directorate General XI Environment.

Bramwell, B., Henry, I., Jackson, G. and Van der Straaten, J. (1996) A framework for understanding sustainable tourism management. In B. Bramwell, I. Henry, G. Jackson, A.G. Prat, G. Richards and J. van der Straaten (eds) *Sustainable Tourism Management: Principles and Practice* (pp. 23–72). Tilburg University Press.

Brög, W. (1982) Acceptance of policies to encourage cycling. *Transportation Research Record*, 847.

Butler, R.W. (1999) Sustainable tourism: State of the art review. *Tourism Geographies* 1 (1), 7–25.

Chataway, C. (1996) Airports in the 21st Century. *Proceedings of The Chartered Institute of Transport in the UK* 5 (4), December.

Cope, A.M., Doxford, D. and Hill, A.I. (1998) Monitoring tourism on the UK's first long-distance cycle route. *Journal of Sustainable Tourism* 6 (3), 210–223.

Cooper, C., Fletcher, J., Gilbert, D. and Wanhill, S. (1998) *Tourism Principles and Practice*. London: Longman.

Cope, A. (2000) Monitoring cycle tourism on the C2C cycle route during 1999. University of Sunderland.

Cornwall County Council (1998) *Camel Trail Visitor Survey 1997*. Cornwall County Council, Truro.

Countryside Commission (1995) *The Market for Recreational Cycling*. Cheltenham: Countryside Commission.

Countryside Commission (1996) *Visitors to National Parks*. Cheltenham: Countryside Commission.

Countryside Recreation Network (1996) *UK Day Visitor Survey*. Cardiff: Countryside Recreation Network.

Couture D., Jollicoeur, M. and Pronovost, J-F. (1998) *Bicycling in Québec in 1995 and 1996* (Vol. 1) (pp. 25–27). Ministère des Transports, Gouvernement du Québec.

Craik, J. (1995) Are there cultural limits to tourism? *Journal of Sustainable Tourism* 3 (2), 87–98.

Cullinane, S. and Stokes, G. (1998) *Rural Transport Policy*. Oxford: Elsevier Science.

Curtis, C. and Headicar, P. (1997) Targeting travel awareness campaigns. *Transport Policy* 4 (1), 57–65.

Cushing, S. (1997) European cycle tourism. *European Cycle Routes* (pp. 10–12). Sustrans.

Datzer, R. (1998) Fahrradtourismus -wirtschaftliche Bedeutung und perspektiven für die Tourismusentwicklung in Nordrhein-Westfalen. *Proceedings: Workshop Qualitätsoffensive für den Fahrradtourismus in Nordrhein-Westfalen* (pp. 9–11). ADFC, Marl, 16 May.

Davies, D.G., Halliday, M.E., Mayes, M. and Pocock, R.L. (1997) *Attitudes to Cycling: A Qualitative Study and Conceptual Framework*. Crowthorne: Transport Research Laboratory.

Davis, A. (1991) The need for society to move towards environmentally sound transport. In P. Thompson (ed.) *Global Warming, The Debate*. Wiley: Chichester.

Dilley, R.S. (1993) Roads and traffic in the English Lake District National Park, problems and planning options. *Tourism Recreation Research* 18 (1), 33–37.

European Union (1997) *European Transport in Figures*. Brussels: Directorate DGVII.

Fegan, J.C. (1992) National bicycling and walking strategy, results and recommendations. *The Bicycle: Global Perspectives* (p. 154). Montreal.

Forward, S. (2000) Walking at the beginning of the 21st century: Attitudes and motivations. *Walk 21 Taking Walking Forwards in the 21st Century*. London, 21–22 February

Getz, D. (1994) Residents' attitudes towards tourism: A longitudinal study in Spey Valley, Scotland. *Tourism Management* 15, 247–258.

Giannakodakis, G. (1994) Transport planning: A holistic systems approach. *Road Transport Research* 3 (3), 4–21.

Goodwin, P., Hallett, S., Kenny, P. and Stokes, G, (1991) *Transport: The New Realism*. Oxford: Transport Studies Unit.

Grant, M., Human, B. and Le Pelley, B. (1997) More than getting from A to B: Transport strategies and tourism. *Insights* (English Tourist Board) A27–A32, March.

Greene, D.L. and Wegener, M. (1997) Sustainable transport. *Journal of Transport Geography* 5 (3), 177–190.

Grimshaw, J. (1998) cited in Woods, M.J. (1998) *A Strategic Environmental Assessment of the National Cycle Network*. Cheddar: Michael J. Woods and Associates.

Groundwork Merthyr and Rhondda Cynon Taff (1999) *Taff Trail Users Survey 1997*. Aberdâr.

Gunn, C.A. (1994) *Tourism Planning* (3rd edn) (p. 76). Washington, DC: Taylor and Francis.

European Cyclists' Federation, (1997) *Position Paper on Bicycle Transport on International Trains*. Brussels: European Cyclists' Federation.

Halsall, D. (1992) Transport for tourism and recreation. In B.S. Hoyle and R.D. Knowles (eds) *Modern Transport Geography* (pp. 155–177). Belhaven.

Hallsworth, A. and Whitelegg, J. (1997) Summary and conclusions, looking around and looking ahead. In R. Tolley (ed.) *The Greening of Urban Transport* (pp. 453–461). Chichester: Wiley.

Hillman, M. (1994) Curbing car use: The dangers of exaggerating the future role of public transport. *Transportation Planning Systems* 2 (4), October–December.

Hobson, J.S.P. and Uysal, M. (1992) Infrastructure: The silent crisis facing the future of transport. *Hospitality Research Journal* 17 (1), 209–215.

Holloway, J.C. (1989) *The Business of Tourism* (3rd edn). London: Pitman.

Hundt, G. (1998) Touristische Fahrradrouten in NRW-Thesen zu einen Markenkonzept für Nordrhein-Westfalen. *Proceedings: Workshop Qualitätsoffensive für den Fahrradtourismus in Nordrhein-Westfalen* (pp. 9–11). ADFC, Marl, 16 May.

Hydén, C. (1998) How to enhance walking and cycling instead of short car trips and to make these modes safer. *Conference Proceedings Velo Borealis, International Bicycle Conference* (pp. 137–139). Trondheim, 23–26 June.

Landesverband für Tourismus (1996) *Die Radreisenden auf dem Donauradweg* (pp. 3–4). Linz.

Lankford, S.V. and Howard, D.R (1994) Developing a tourism impact attitude scale. *Annals of Tourism Research* 21, 121–139.

Lamb, B. and Davidson, S. (1996) Tourism and transportation in Ontario, Canada. In L. Harrison and W. Husbands (eds) *Practising Responsible Tourism: International Case Studies in Tourism Planning, Policy and Development*. Chichester: Wiley.

Leiper, N. (1990) *Tourism Systems: An Interdisciplinary Perspective*. Massey University, Palmerston North, Occasional Paper No 2.

Litman, R. (1994) Quantifying bicycle benefits for achieving TDM objectives. *Transportation Research Record* 1441, 134–140.

Luhrman, D. (1998) Crystal ball gazing. *Tourism*, Spring, 12–13.

Lumsdon, L.M. (1995) Cycle tourism: The tourism potential of the National Cycle Network. Paper presented to 'Bike to The Millennium' Conference, York, 8 December.

Lumsdon, L.M. (1997) Recreational cycling: Is this the way to stimulate interest in everyday cycling? In R. Tolley (ed.) *The Greening of Urban Transport*. Chichester: Wiley.

Lumsdon L.M. and Smith, M.W. (1997) Developing the potential of recreational cycling in the Peak National Park. *Velo City '97 Conference Proceedings* (pp. 511–514). Barcelona, 15–19 September.

Lumsdon, L.M. (1999) *EuroVelo The Market for Cycle Tourism*. Brussels: EuroVelo.

Lumsdon, L.M. and Mitchell, J. (1999) Walking, transport and health: Do we have the right prescription? *Health Promotion International* 14 (3), 271–279.
Lumsdon, L.M. and Tolley R.S. (1999) Techniques for planning local networks: Developing a walking strategy. *World Transport Policy and Practice* 5 (1), 38–49.
Martin, A. (1997) Tourism, the environment and consumers. Paper presented at *The Environment Matters* conference, Glasgow, 3–4 April.
Mill, R.C. (1996) Societal marketing-implications for tourism destinations. *Journal of Vacation Marketing* 2 (3).
Moore, R.L., Greene, A.R., Gitelson, R.J. and Porter, E. (1992) *The Impacts of Rails-Trails*. U.S. Department of the Interior, National Parks Service and The Pennsylvania University.
Moscardo, G., Morrison, A.M., Pearce, P.L., Lang, C.T. and O'Leary, J.T (1996) Understanding vacation destination choice through travel motivation and activities. *Journal of Vacation Marketing* 2 (2), 109–122.
Murray, M. and Graham, B. (1997) Exploring the dialectics of route-based tourism: The Camino de Santiago. *Tourism Management* 18 (8), 513–524.
Nijkamp, P. and Vleugel, J. (1995) In search of sustainable transport systems. In D. Banister, R. Capello and P. Nijkamp (eds) *European Transport and Communications Networks* (p. 287). Chichester: Wiley.
Transport Studies Group (1996) Public attitudes to transport policy and the environment. An in-depth exploratory study. University of Westminster, London.
Owen, H. (1998) Visions of the future: Cycling and the health of nations. *Conference Proceedings Velo Borealis, International Bicycle Conference* Trondheim, 23–26 June.
Page, S.(1999a) *Transport for Tourism* (p. 8). London: Routledge.
Page, S. (1999b) *Transport for Tourism* (p. 271). London: Routledge.
Pearce, D. (1993) *Blueprint 3, Measuring Sustainable Development*. London: Earthscan.
Pearce, P.L. (1982) *The Social Psychology of Tourist Behaviour*. Oxford: Pergamon.
Poon, A.(1993) *Tourism, Technology and Competitive Strategies*. Oxford: CAB International.
Pronovost, J-F. and Joly, P. (1998) Economics of a national bike route: 'La Route verte'. In conference proceedings *Pro Bike Pro Walk 98 Creating Bicycle Friendly and Walkable Communities: Building for the Next Generation* (pp. 249–253). Santa Barbara, September 8–11.
Rails to Trails Conservancy (1996) *RTC White Paper Report: The Local Economic Benefits of Rail-trails*. Washington.
Ritchie, B.W. (1998) Bicycle tourism in the South Island of New Zealand: Planning and Management Issues. *Tourism Management* 19 (6), 567–582.
Royal Commission on Environmental Pollution (1994) *Transport and the Environment*. London: HMSO.
Royal Commission on Environmental Pollution (1994) *Transport and The Environment* Cmmd 2674. London: HMSO.
Rural Development Commission (1997) *The Economic Impact of Recreation and Tourism in the English Countryside* Salisbury: Rural Development Commission.
Shaw, S. (1990) *Airline Marketing and Management* (3rd edn) (p. 84). London: Pitman.
Somerville, H. (1995) Airlines, tourism and environment. In A.V. Seaton *et al*. (eds) *Tourism the State of the Art* (pp. 638–646). Chichester: Wiley.
Speakman, C. (1988) Transport as tourism. *The Tourism Industry*. London: Tourism Society.
Sustrans (1995) *The National Cycle Network*. Bristol: Sustrans.
Sustrans (1999a) *Cycle Tourism* TT21. Bristol: Sustrans.
Sustrans (1999b) *Network News*. Bristol: Sustrans.
Sustrans (2000) *Supporters' Review 1999*. Bristol: Sustrans.
Tolley, R.S. and Turton, B.J. (1995) *Transport Systems, Policy and Planning: A Geographical Approach*. London: Longman.
Transport Studies Unit (1995) *Car Dependence*. Oxford.
Travel and Tourism Intelligence (1996) Rural tourism in Europe. *Travel & Tourism Analyst* 6. London: Travel & Tourism Intelligence.

UK Statistics (1998) Holiday tourism by the British in 1997. *Insights* (English Tourist Board) July, F1–18.
Wheeller, B. (1991) Tourism's troubled times. *Tourism Management* 3 (2), 91–95.
Wight, P. (1994) Environmentally responsible marketing of tourism. In E. Cater and G. Lowman (eds) *Ecotourism … A Sustainable Option?* Chichester: Wiley.
Woods, M.J. (1998) *A Strategic Environmental Assessment of the National Cycle Network*. Cheddar: Michael J. Woods Associates.
Woods, M.J. (2000) The National Cycle Network – ways for wildlife. *Countryside Recreation* 8 (2), 18–20.