Active Travel Toolbox

Active Travel and Economic Performance

A ‘What Works’ review of evidence from cycling and walking schemes

Delivered by Sustrans in partnership with:

Active Travel and Economic Performance: A ‘What Works’ review of evidence from cycling and walking schemes - Making the Economic Case for Active Travel Toolkit
Sustrans Active Travel Toolbox

Written by Sustrans with support from Dr Adrian Davis, Living Streets and The TAS Partnership Limited.

About Sustrans

Sustrans is the charity making it easier for people to walk and cycle.

We are engineers and educators, experts and advocates. We connect people and places, create liveable neighbourhoods, transform the school run and a deliver a happier, healthier commute.

Sustrans works in partnership, bringing people together to find the right solutions. We make the case for walking and cycling by using robust evidence and showing what can be done.

We are grounded in communities and believe that grassroots support combined with political leadership drives real change, fast.

Join us on our journey. www.sustrans.org.uk

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1. Active travel and economic performance

There is increasing, and increasingly strong, evidence that walking and cycling can play a very significant role in optimising the contribution of transport to economic performance.

Our work highlights five key areas where walking and cycling contribute towards economic performance. These are:

- Keeping people and business moving (reducing congestion).
- Supporting local businesses and high streets (quality of life and retail vitality).
- Improving business efficiency (reduced absenteeism as a result of a healthier and happier workforce).
- Direct job creation.
- Leisure and tourism and support for cycling industry.

1.1 Keeping people moving (congestion reduction)

Congestion is getting worse in cities across the UK and current projections have suggested a cost to the economy of £11 billion a year[1]. According to the British Chamber of Commerce the costs associated with congestion are on average thought to cost each individual business £17,000 a year[2]. It is apparent that the wider economy would greatly benefit from a healthier and more efficient transport system.

Reduced congestion is a key output using the WebTAG economic appraisal framework[3], providing an output related to reduced car usage.

1.2 Supporting local businesses and high streets

Retail is a crucial sector of the UK economy. Almost 11% of all employment is in the retail sector. It is the UK's third largest industry and accounts for 13% of all small businesses[4].

Surveys of shoppers have been conducted by Sustrans in Bristol, Swansea and Newcastle:

- On independent shopping streets in Bristol and Newcastle, less than a third of shoppers arrived by car.
- On one of the main city centre shopping streets in Swansea, 50% of shoppers had arrived by car.

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This level of car usage is much less than the predominance anticipated by many retailers. The contribution of sustainable transport to town and city centre shopping areas is much greater than assumed and so any investment would be more suitably focussed on improvements that support walkers and cyclists4.

What would an ideal shopping street look like

Perhaps understandably given the proportion of car-users on the shopping streets, car parking was not the most pressing concern for survey respondents. In Newcastle the three most pressing issues for shoppers were:

- Improved access for disabled people.
- Better conditions for pedestrians.
- Reduction of traffic on the road.

This would support improved links and accessibility within towns and city centres to support walking and cycling, demonstrated through projects such as The Cycling Demonstration Towns, Sustainable Travel Towns, and Connect 2[5].

This also supports previous evidence that an attractive, pleasant townscape will attract shoppers. By altering the streetscape to become more pedestrian-friendly, a “sense of place” can be created, making pedestrians feel more comfortable to spend at ease. It directly affects traders and their shops as most measures e.g. street lighting, plants, widened pavements immediately make a storefront appear more attractive to pedestrians and potential customers[6]. This approach has fed into projects such as Sustrans DIY Streets and Pocket Places.

Increased trade through pedestrianisation

Fear of losing revenue from traffic calming measures and changes in the streetscape create opposition. In contrast, pedestrianisation of York city centre was found to help trade. Large stores such as BHS noted that three months after, their turnover had increased by 30% and Marks and Spencer also were in excess of 20%[7]. People in pedestrianised areas have more time to stop, look, and spend without the hassle of navigating busy roads and worrying about traffic[4].

Sustrans’ survey of shoppers in Bristol in 2006, replicated in Swansea in 2011 and Newcastle in 2012[8] each found that, contrary to popular belief, car drivers are not the most profitable customers. While it is true that on one individual trip, car drivers tend to spend more than shoppers who have arrived by sustainable transport; cyclists, pedestrians and people arriving by public transport tend to visit more frequently and spend more over the course of a month. Such findings are not unique to Sustrans: Transport for London[9], the Cycling Embassy of Denmark[10] and many others have also found the same thing.

1.3 Improving business efficiency

Well-designed employee health promotion programmes can increase employee job satisfaction by between 10% and 25%[11]. Furthermore, it has been shown that most workplace health promotion programmes show return on investment through increased productivity[12].

Reduced absenteeism has been linked directly to increased physical activity among employees, with the economic benefits of reduced presenteeism considered to be even greater.

Absenteeism

Absenteeism in a workplace setting is defined as a habitual pattern of absence from work:

- Workers that undertake physical activity take 27% fewer sick days[11].
- Users of the cycle network, compared to the average worker, take approximately half the number of days off, resulting in a £13.7 billion annual boost to the British economy[13].
- Actively promoting healthier travel options in the workplace has been shown to reduce absenteeism by up to 20%[14].
- Employees who cycle regularly to work are less frequently ill, with on average more than one day per annum less absenteeism than colleagues who do not cycle to work[15]. Furthermore, a dose-response relationship was observed between the speed and distance of cycling and absenteeism.

Presenteeism

Presenteeism is defined as activity impairment, low efficiency and poor performance at work, usually due to stress or problems associated with poor health:

- Physical activity has been suggested to benefit levels of presenteeism in the work place[16].
- Presenteeism has been estimated to cost businesses up to 7.5 times as much as absenteeism[17].

1.4 Direct job creation

Every time Sustrans funds a project or scheme that spends money in the local and wider economy, jobs are created. In 2012, Sustrans' Research and Monitoring Unit began an interim study into the level of jobs sustained by the construction of walking and cycling routes. Data from two infrastructure projects was used to estimate the number of direct and indirect jobs that were supported. The two projects were Community Links in Scotland and the Valley Cycle Network in Wales in relation to

investment in 2011/12. Further work was then completed, revisiting Community Links with the 2012/13 schemes and adding the 2012/13 Links to Communities projects in England. These four infrastructure projects accounted for 127 cycle and walking schemes, and some of the data taken during the monitoring included cost, length, and staff hours of each scheme.

Our key findings were that[18]:

- 12.7 jobs are supported or sustained for every £1 million of investment in sustainable transport infrastructure.
- 1.6 jobs (direct, indirect and induced) are supported or sustained for every km of route constructed.
- The average cost per km of construction was £103,891.

We define the number of jobs created by using the FTE definition[19].

The average cost per scheme was £128,199 and there were on average 0.74 FTE jobs per km of path constructed.

How does this compare with building more roads?

Compared to examples of road construction, cycling infrastructure presents very good value for money. Transport Scotland has published details of several current road building schemes for comparison below[20]. It is not always clear whether indirect jobs have been included, or how long the projects last, but a summary of the available data is in the table below. Very few road schemes report on the number of jobs that are created through their construction.

	Jobs	Cost (million)	Cost per job	Jobs per £1m investment	km	Cost/km (thousand)
Forth bridge replacement	1,500	£1,600	£1,066,667	0.9	2.7	£592,593
M47	350	£445	£1,271,429	0.8	8	£55,625
M8/M73/M74	900	£415	£461,111	2.2	18	£23,056
HS2 Phase 1	9,000	$17,160	£1,900,000	0.5	224	£76,600

This comparison of road infrastructure and work Sustrans has undertaken corroborates with the majority of research into job creation during the construction of transport infrastructure we have reviewed, that shows that smaller scale projects and investment in sustainable transport create more jobs per pound invested[18].

How many jobs does cycling provide nationally?

There is lots of evidence to show that continued reduction of car use through improving sustainable transport infrastructure provides more jobs than it destroys. A study found that a transfer to sustainable transport in the UK results in a net employment increase as together bus, cycle and rail patronage increases employment more in the UK than is reduced by the impact on the motor industry[21]. It found that an increase in the demand for public transport, cycling and walking would create 130,000 jobs by 2010, which more than offsets the 43,000 jobs that would be lost in the motor industry. This work wasn't verified, but there is a growing body of work that supports this assertion.

Cycling as an industry employs an estimated 23,415 people[22] in the U.K, paying annually £514m to its employees and over £106m in tax and N.I. contributions.

The majority of these jobs are in the retail sector but a considerable portion is in the cycling infrastructure and maintenance sector. Together, cycling infrastructure and maintenance account for 2,500 jobs and are estimated to pay almost £80m per annum in salaries, of which Sustrans is responsible for 1,700 jobs and £41m in salaries per annum[18].

1.5 Leisure and tourism[23]

Tourism is a crucial sector of the UK economy. It is the UK's fifth largest industry[24], employs 2.72 million people (2011)[25] and is worth £115 billion a year[24]. The industry is therefore critical to rebuilding the UK's economy and for generating employment, particularly among young school-leavers and in rural communities[25].

Economic benefits of cycle tourism

Tourism can contribute to the economy through direct spending, indirect spending and social value - determined by a 'willingness to pay' calculation[26]. Cycle tourism represents a growing and valuable tourist market, particularly in rural areas, and can provide new incentives for people to visit an area and help support local trade and businesses[27]. Long distance cycle routes, which are predominantly rural, can generate as much as £30 million per year to the local economy; enough to sustain over 600 full time equivalent jobs[28]:

- Coast 2 Coast (Northern England) carries over 240,000 trips per annum (of which 14,000 is end-to-end usage), simulates a spend of £10.7 million in the route corridor, and supports up to 173 FTE posts
- The Way of the Roses (Northern England) carries over 130,000 trips per annum (of which 7,000 is end-to-end usage), stimulates a spend of £3million in the route corridor, and supports up to 60 FTE posts.

Table 2: Summary of long distance routes, cycle usage and economic impact[28]

Route	Year	Distance (km)	Cycle trips	(...of which end to end)	Total yearly expenditure	Jobs supported
C2C	2006	287	241,051	14,000	£10,700,000	173
Coast and castles	2006	151	68,000	8,100	£3,300,000	53
Hadrian's Cycleway	2006	234	160,242	7,500	£6,500,000	105
Pennine Cycleway	2006	184	39,182	2,100	£1,800,000	27
Celtic Trail	2008	734	940,000	-	£32,500,000	601
Taff Trail	2008	97	400,000	-	£14,000,000	259
Way of the Roses	2012	274	131,000	7,000	£3,000,000	60

Leisure and tourist cyclists have different transport and spending patterns; tourists will normally spend more and may require facilities such as accommodation, transport and parking[27]. Research by Sustrans indicates that, on average, home-based leisure cyclists each spend £9.20 per day and overnight tourists spend significantly more at £22.90 per day[28]. Therefore, despite overnight trips making up less than 1% of the overall volume, their economic contribution is approximately 20% of the total value of cycle tourism[29].

Wider benefits of cycle tourism

There are further benefits of cycle tourism including enhancing personal health and fitness and helping to improve cycling provision for local people, thereby encouraging utility cycling[27]. It can also lead to a reduction in pollution and traffic congestion[29]. Moreover, cycling is a socially inclusive activity and appeals to many ages and demographics[30].

2. ‘What Works’ evidence of the impact of different walking and cycling typologies

2.1 New infrastructure to overcome barriers and link communities

Physical barriers, whether natural or man-made, can strongly influence the extent to which people are willing and able to travel by bike. Local travel can be transformed by overcoming these barriers to enable cycling to become part of everyday cycling for more people.

Benefits to boost economic performance include:

- Improved health.
- Reduced congestion.
- Job creation.
- Increased tourism.

Individual examples of these infrastructure projects from recent years, including bridges, tunnels and traffic-free links demonstrate the impacts of these interventions and the benefits that arise are provided below.

Pont y Werin Bridge, Cardiff

This bridge delivered by the Connect2 programme connects Cardiff and Penarth and carries over 1,300 journeys every day, with a growth in trips across the whole scheme network of 86% following the opening of the bridge. From our monitoring on the scheme 85% of route users said the scheme had helped them to increase their levels of physical activity. The health benefits arising from the intervention are substantial, equating to over £4 million (calculated using the WHO HEAT), contributing to a benefit cost ratio of 3:1.

Two Tunnels Greenway, Bath

Delivered by the Connect2 programme, the re-opening the Coombe Down and Devonshire Railway tunnels a walking and cycling route and the accompanying links into the local network has provided new safe access into Bath. Over 135,000 cycling trips are made on the route, more than a fourfold increase on the number of trips made on the existing parts of the route prior to the tunnels being open – with our modelling estimating over 7,400 car trips being taken off the road network as a result.

Despite the high cost of the project, health benefits of over £8.5 million and amenity benefits of over £4 million contribute to a benefit cost ratio of 3.4 to 1.

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Gellings Greenway, Kirkby

This 2.6km route was delivered by the Department for Transport's Linking Communities 2012-13 programme. The scheme provides a traffic free alternative for cyclists travelling between Knowsley Business Park and the existing networks around Kirkby and Knowsley. The number of cycle trips on the network has increased 126% following the scheme, leading to a benefit cost ratio of 5.2 to 1.

Hockley Viaduct, Winchester

This 4.3km route was delivered by the Department for Transport's Linking Communities 2012-13 programme. The scheme provides a new shared use path from Winchester city centre to South Winchester Park and Ride. The route now carries over 50,000 cycle trips per year, compared to just over 4,000 previously. This had led to the equivalent of over 17,000 car trips being taken off the road and a benefit cost ratio of 3.9 to 1

The route also attracts a high number of recreational cyclists, with an estimated £382,500 being spent per year by tourists and day-visitors, supporting 5.8 direct and 3.9 indirect jobs.

Weymouth

Weymouth already had a number of existing walking and cycling paths but many of these were fragmented and difficult to access. The Connect2 programme delivered several interventions to fill in the gaps, most notably a new bridge over Newstead Road. Of people surveyed on the new bridge, 85% stated it feels safe compared to 77% of people previously using the existing crossing. The proportion of people saying the route is now the most convenient transport option has increased from 86% to 94%

Across the Connect2 route as a whole there has been a 13% growth in the number of cycle trips, with 375,000 trips a year now being made, leading to a benefit cost ratio of 6.8 to 1.

Thame Links to Schools

Located nine miles from Oxford, Thame is a local example of an infrastructure link designed to improve access to a local school which saw the estimated number of trips made by children on the route per year more than double from around 15,000 in 2004 to around 33,000 in 2005. Amongst adults (over 16 years) surveyed on the route following the intervention, there was a broad range of journey purposes with 7.4% travelling to or from work, 9.0% for education and 5.3% for shopping.

Of the 114,000 trips made on the route in 2005, 29,000 were by bike – double the 14,500 cycle trips made in 2004 and contributing to the benefit cost ratio of 3.8 to 1. It should be noted that this benefit cost ratio assessment was calculated with a more conservative ten year appraisal period, compared to the other infrastructure schemes above which are appraised over a 30 year period.

2.2 Rail station accessibility improvements

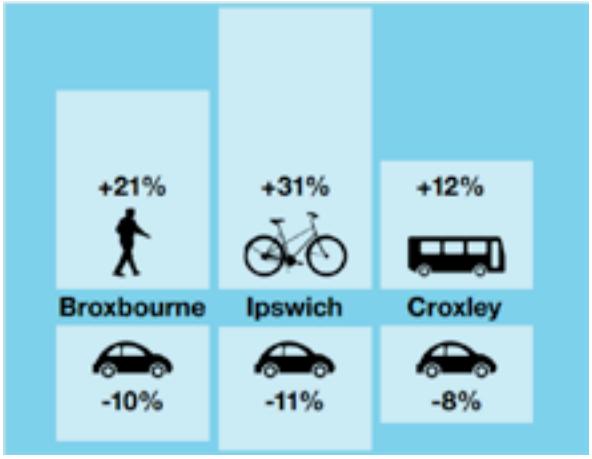
Bike ‘n’ Ride: whole project[31]

- These interventions seek to increase travel by bicycle through the improvement of facilities for cyclists at transport interchanges, train stations and bus terminals.
- The average investment per station is taken as £4.48 million (funding provided for Bike ‘n’ Ride) divided by the number of stations receiving improvements (178), resulting in a cost per station of £25,169.
- Comparison of pre and post survey results from the evaluation of Bike ‘n’ Ride across 120 stations, with around 2,200 beneficiaries, found a six percentage point increase in mode share for passengers travelling to or from the station by cycle (from 6% to 12%).
- The result has formed the basis of the estimated impact for improving facilities for cyclists at stations. The same evaluation found an increase of 12% in the number of parked cycles.

Access to Stations

- The Access to Stations project in Swindon has been running since 2013, addressing local barriers to increase walking and cycling access to stations. Personalised Travel Planning is being used to engage people using Swindon railway station in a conversation about their travel habits and what alternative sustainable transport options are possible. Early results indicate that cycling increased by 15 percentage points from baseline to follow up, while car use fell by 17 percentage points. 68% of respondents agreed or strongly agreed that information gained during PTP was useful for their day to day travel.
- A reduction in car trips has been seen across areas where PTP has been delivered. This has been accompanied by modal shift to active modes such as walking, cycling and public transport.

Figure 1: Example of modal shift across Local Authorities where PTP has been delivered



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2.3 Smarter choice measures

Smarter choice programmes seek to encourage sustainable and active travel decisions through engagement with individuals and communities. Measures range from promotion of routes and events, through to behaviour change programmes that function through challenge, facilitation, encouragement or provision of information. The evaluation of a number of smarter choice programmes has revealed their impacts. These projects can potentially impact on economic performance through:

- A healthier, more active, workforce.
- Reduced congestion.
- Retail vitality, through an improved public realm.

Personalised Travel Planning

The TravelSmart programme encourages people to use sustainable and active travel modes. TravelSmart Gloucester delivered personalised travel planning (PTP) across the areas of Barton, Tredworth and White City during 2005-2006. An Individualised Travel Marketing (ITM) campaign was targeted at 4,000 households, predominantly comprised of information packs and home advice sessions. There were positive changes in travel behaviour, with a 16% increase in cycling, an 18% increase in walking and a 13% increase in public transport trips.

TravelSmart Watford aimed to encourage modal shift towards more sustainable modes of transport across a target population of 25,000 households during 2008-2009. A successful Individualised Travel Marketing campaign was rolled out, in which nearly 13,000 personalised information packs were sent to households. The project recorded a 33% increase in levels of cycling. A noticeable shift away from motorised transport was observed. The greatest modal shift occurred from car-as-driver trips (which decreased by 55 trips per person per year) to walking (which increased by 44 trips).

Street Design projects

DIY Streets is a practical project that combines urban design, community involvement and active travel promotion. The project at Turnpike Lane, Haringey, took place between June 2010 and June 2012:

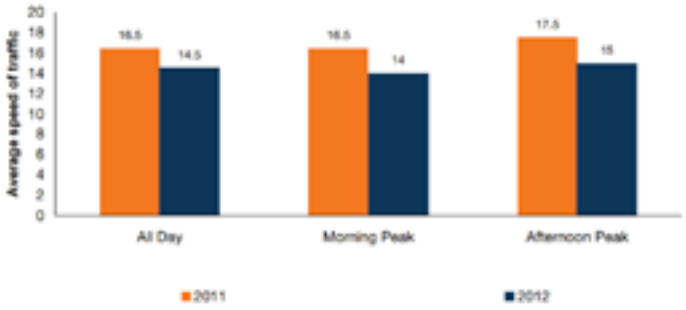
- Before the project, 40% of all vehicles were recorded travelling at 20mph or less, rising to 63% following the intervention.
- Following the project, 11% of residents agreed or strongly agreed that they have cycled more.
- Following the project 39% agreed it would be likely or very likely they would cycle more in future.

Pocket Places for People (PPfP) take existing urban spaces and redesign them to be more useful and appealing for the local community. PPfP projects commonly result in streets that are perceived to be safer and with slower traffic movements,

which can encourage more people to cycle through the space. The Reading scheme commenced in late 2012 and initial monitoring results indicate the underlying need for the project. Baseline monitoring of perceptions indicates that 70% of respondents agree that traffic speeds need to be reduced. Recorded traffic speeds on the residential street Northumberland Avenue showed 38% of vehicles to be travelling over 30mph

A Street Design project in Elgin took place from February 2011 to June 2012. It involved the redesign of Cockmuir Place to make it a safer and more attractive space to socialise in, play in, and travel through by active modes. Beneficiary surveys delivered after the project have highlighted that 83% of residents think the street is safe for children to play (compared to 28% before the project) and 60% think its appearance has been enhanced by the trees, greenery and artwork introduced. The average traffic speed has lowered by 2mph and this appears to have influenced people to change their travel behaviour. The modal share of child cyclists travelling to and from school has increased by 8%.

Figure 2: change in average speed of cars on Cockmuir Place



Challenge projects

The My Journey South Hampshire online challenge was concluded in autumn 2013, with 1,999 taking part. We were able to directly track 179 participants to assess behaviour change and the impacts of these.

As a result of taking part in the challenge these individuals burned over 900,000 calories, saved 1,875 kg of CO2, and saved over £3,600 in travel costs.

Survey results showed increased active travel, contributing to a healthier workforce (27% of participants increased the number of days per week on which they cycle, and 36% of participants increased the number of days per week on which they walk).

Results also showed reduced car usage, associated with reduced congestion (30% of participants decreased the number of days per week on which they use a car and 34% of participants decreased the number of hours per week they use a car). Increased active travel was sustained following the Challenge:

- Participants walked on average 1.4 more miles per week 3 months later.
- Participants cycled on average 4.82 more miles per week 3 months later.
- 7% of participants were not cycling before the Challenge, but were 3 months afterwards.

2.4 Town-wide programmes of mixed infrastructure and smarter choice interventions[5]

Evidence from town-wide interventions demonstrates the benefits of smarter-choices programmes, and how combining these with infrastructure improvements can increase the impact further.

The Cycling Demonstration Towns

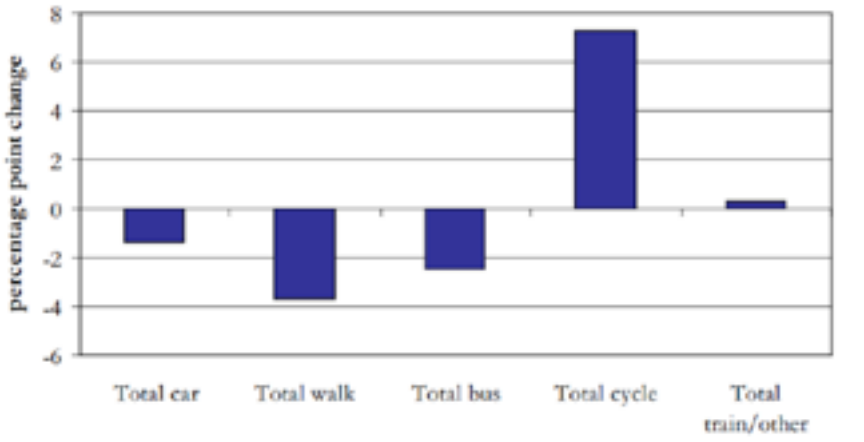
This programme was delivered from 2005 to 2009 and saw total investment equivalent to £10 per head to implement a range of infrastructure and network interventions alongside smarter choices initiatives to promote active travel and provide travel planning.

Across the six towns the health benefits alone are estimated to be £45 million, which gives a benefit cost ratio of 2.6 to 1. When including the additional benefits of amenity improvements, and reductions in decongestion, accidents, and absenteeism the benefit cost ratio rises to 3.5 to 1.

Looking at school travel for example, the percentage of children reporting that cycling is their usual mode of transport (as recorded by the Pupil Level Annual School Census) has increased in five of the six towns, with Lancaster/Morecambe being the exception:

- Aylesbury: 7% increase.
- Brighton: 153% increase.
- Darlington: 12% increase.
- Derby: 50% increase.
- Exeter: 19% increase.

Figure 3: change in mode share between surveys performed at the beginning of the Bike It programme and ten months later at end of the first year of engagement (five towns, excluding Darlington).



Baseline survey: n= 14,896: ex post survey: n=13,200 (pooled data from 60 schools surveyed in September 2006 and July 2007, or September 2007 and July 2008)

Cycling levels have increased in the Cycling Demonstration Towns, for example, Aylesbury.

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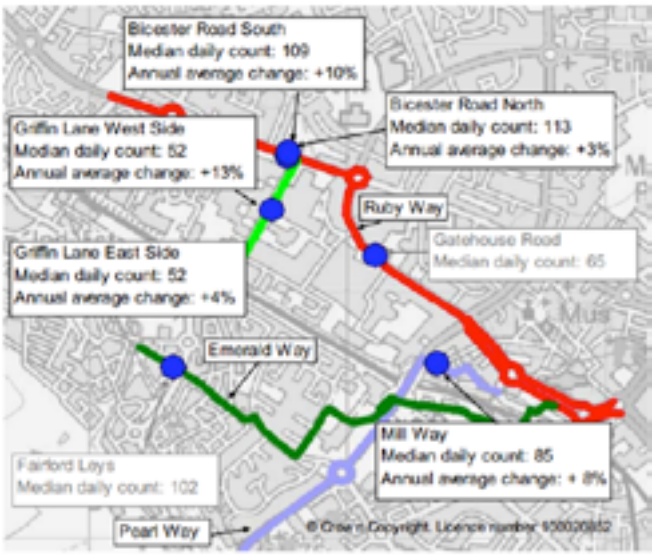
Figure 4: changes in the recorded number of cycling trips along routes in Aylesbury town centre.



Furthermore, Exeter also saw workplace travel monitoring undertaken, with the number of employees stating cycling was their usual mode of travel to work increasing by 5%.

The Sustainable Travel Towns

This project saw the implementation of town-wide smarter choice programmes in three towns – Darlington, Peterborough and Worcester. Funding was again £10 per head of population and ran from 2004 to 2009.

Prior to the project, around 40% of the towns' population drove a car for all trips, while an additional 24% were passengers for all trips. All three towns established similar programmes that focused on developing:

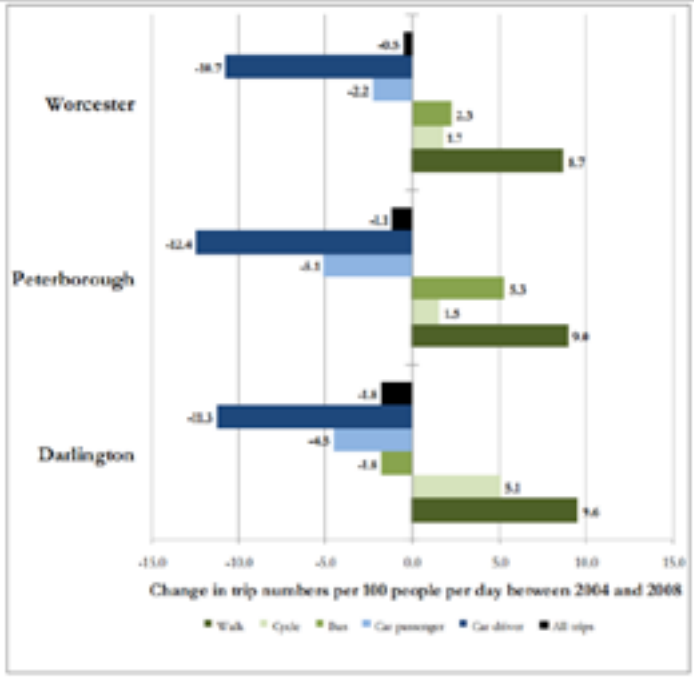
- A clear brand identity.
- Large-scale personal travel programs.
- Travel awareness campaigns, including loyalty schemes, advertising and media campaigns.
- Cycling and walking promotion, including cycling festivals, guided rides and walks, training, cycling route signage and bicycle parking.
- Public transport information and marketing campaigns and bus network improvements.
- School travel planning, which complemented the DFT's Travelling to School Initiative.
- Workplace travel planning that engaged employers to encourage their employees to adopt travel planning.

Across the schemes the following results were observed:

- Car trips decreased by 9%.
- Bus trips increased by 10% to 22%.
- Cycling trips increased by between 26% and 30%.
- Walking trips increased by between 10% and 13%.

A benefit cost ratio of 4.5 to 1 was calculated based only on the reductions in congestion, which can be considered a conservative estimate due to this narrow focus.

Figure 5: Changes in number of trips of different modes made by Sustainable Travel Town residents between 2004 and 2008



Notes: Data are for numbers of trips of <50km, weighted dataset. Base: between 11,954 and 12,909 trips by approximately 4,000 respondents in baseline and ex-post surveys in each town. Trips by other modes not shown for purposes of clarity. For an indication of scale of change, absolute number of trips <50km per 100 people per day in 2004 (aggregated dataset)=292, of which walk=72; cycle=9; car driver=124; car passenger=63; bus=20; train=1; other=3.

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3. Where to target interventions

The evidence indicates that different types of intervention can successfully add to the UK economy across both urban and rural settings, although the type of intervention should be targeted to the area.

A survey by the British Chambers of Commerce (BCC) found congestion to be a problem for around 90% of businesses, with around 45% viewing it as a significant problem[32].

Following publication of the recent PTEG Transport Works report[32], PTEG chair David Brown indicates that urban locations should be targeted to stimulate economic growth through business. David Brown said that:

'the report shows…how much harder transport could work for the economy, if there was much more focus on concentrating investment on congested city regions or there were more focus on concentrating transport investment on congested city regions. [Transport Works] suggests that urban transport is one of the best investments the Government can make in order to let business do what it wants to do which is to cluster together efficiently for easier access to staff, clients and shared resources'[33].

Given that 68% of all journeys made in the UK are under 5 miles and can be reasonably made by walking and cycling, and that 80% of the population live within densely populated cities and towns, urban settings also provide great scope for walking and cycling interventions . It is therefore recommended that interventions target urban locations to maximise economic impact in relation to improved business efficiency. This can be achieved through infrastructure and revenue programmes to tackle the commute to work:

- Reduced congestion, through reduced car use at peak times.
- Reduced absenteeism and presenteeism.
- Improved connectivity and access in our towns and cities.

Leisure and tourism routes provide a very different solution, demonstrating a viable boost to the economy through the development of longer leisure and tourism routes through rural settings.

4. Benefits of a holistic approach[34]

There is a belief that a programme of mixed interventions will have a greater impact than a scattering of uncoordinated projects, i.e. the impact of multiple projects delivered in close proximity should be greater than the sum of impact of the individual projects in isolation. Unfortunately there is limited evidence to support this widely held belief[31].

Sloman et al. (2014)[35] explored the optimum balance of capital (broadly speaking infrastructure) and revenue (behaviour change) investment in sustainable transport projects. The report highlighted the difficulty of quantifying what the ideal balance is, and concluded that a proportion of revenue funding in the range of 20-40% seemed capable of delivering higher BCRs.

Benefits of co-delivery rather than just infrastructure[34]

A further indication of the impact of co-delivery is provided by Wardman et al. (2007)[36] research into the propensity to cycle to work. The research estimates the impact of delivering a combined package of route improvements, facilities for cyclists in the workplace (e.g. showers) and behaviour, in this case through subsidy to individuals to change mode. The report gives multiple scenarios but taking just a single scenario for analysis, it can be shown that the combined impact of the three individual interventions fails to fully account for the impact seen when the interventions are delivered as a package. Other scenarios see an even greater additional impact.

5. Overview of economic benefits, associated setting and project types

Economic benefits	Indicators	Setting	Types of Project	
			Infrastructure	Revenue
Reduced congestion	Reduced car use	Primarily Urban	New routes (on and off road) Links Improved access	Personalised Travel Planning Workplace Travel Planning
Support to local businesses and high streets	Quality of Life Retail vitality	Urban Rural	Links Improved access	Community Street Design Personalised Travel Planning
Improved business efficiency (reduced absenteeism, presenteeism and costs of recruitment)	Increased physical activity, as a result of increased active travel	Urban	New routes (on and off road) Links Improved access	Personalised Travel Planning Workplace Travel Planning
Direct job creation	Jobs created per £ investment and/or jobs created per km of new route	Urban and rural	New routes	
Leisure and tourism	Increased usage on routes Retail vitality surveys	Long-routes (urban and rural)	New routes	Promotion of new and existing routes

6. Benefit Cost Ratios for different project types

Using the Department for Transport's (DfT) transport appraisal framework, WebTAG, the benefit-cost ratio (BCR) of previous Sustrans projects have been calculated. Our results show that these projects are generally 'very high' value for money (VfM), defined by the DfT as BCR values exceeding 4.0[37].

These findings are not unique to Sustrans projects or projects in the UK. Cost-benefit calculations of various traffic safety measures using European data for cyclists and pedestrians show very positive BCRs[38]. These include measures to restrict speed of car traffic, separate cycle paths and advanced stopping lines at junctions with BCRs of 9:1, 9:1 and 12:1 respectively. However these figures from European projects are based on calculations using different frameworks and methodologies so cannot be used as direct comparisons to those calculated using WebTAG.

Bus schemes are also generally 'medium' to 'high' value for money, ranging from 1.5:1 to 3.1:1 for bus interventions such as the National Travel Concession and local government expenditure to non-commercial bus services[40]. In contrast, large rail infrastructure projects such as HS2 often have considerably lower BCRs. The predicted BCR for the whole HS2 network is estimated at 2.3:1 and 1.7:1 for phase 1 alone (London to Birmingham)[39].

Economic benefits	Indicators
New infrastructure to overcome barriers and link communities	Projects such as Connect2 and Linking Communities that deliver new infrastructure see overall average BCRs of 6.3:1 (8:1 when children are included[40]) and 10.9:1 (13.8:1 when children are included[41]) respectively. The BCRs of individual schemes range greatly from 3:1 to 32.8:1[42].
Rail station accessibility improvements	To date WebTAG has not been used to assess BCRs for rail station accessibility improvements.
Smarter choice measures	Smarter choices projects would not typically use WebTAG to calculate BCRs, given the framework is designed primarily for infrastructure projects. However, the 'Get Britain Cycling' APPCG Inquiry[43] states that "there is substantial evidence that cycling initiatives, like other smarter choices give very good value for money indeed – better than most infrastructure projects – in line with a decade of discovery that small, local, cheap improvements to the quality and ease of transport…. typically give benefit cost ratios (BCRs) in double figures, with benefits that may be 10 or 20 times as large as costs, or more".
Town-wide programmes of mixed infrastructure and smarter choice interventions	The Cycling Demonstration Towns have seen BCRs of 2.6:1 to 3.5:1 over 10 years, rising to 7.8:1 over 30 years[41]. The Sustainable Travel Towns see an overall average BCR of 4.5:1 (considered a conservative estimate as based only on the reductions in congestion)[5].

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