



Forum for the Future

ICT as a mode of transport

A review of the use of information and communication technology to achieve transport policy goals

Forum for the Future

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This report was prepared for BT by Phil Callaghan, Head of Policy and James Goodman, Head of Futures

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1 Executive summary

The amount we travel in the UK is rising quickly, and although we travel to gain access to goods, services, people and employment that will boost our quality of life, there are major economic and environmental costs to pay. Congestion and delays cost businesses money, and almost every mode of transport creates pollution and contributes to climate change. At the same time, we are investing ever greater sums in improving Information and Communication Technology (ICT) infrastructure, and we are using it more and more. ICT-use has the potential to reduce the amount we travel, for example by making it easier to work or shop from home. The vision of this paper is that ICT could be treated by transport policy-makers as if it was a mode of transport equivalent to other modes such as rail, car or air travel, and this could help to reduce demand for travel by other modes. ICT moves data around in the way that other modes move people and goods.

We reviewed research on the relationship between travel demand and ICT use and talked to policy-makers in central government departments, the devolved administrations, regional bodies and local authorities, to find out the extent to which ICT was being used strategically to reduce travel demand. What we found was a mixed picture. Some organisations were engaging enthusiastically with using ICT as a mode of transport, most notably the Welsh Assembly Government and the Scottish Executive. For the UK government departments we spoke to, there was a varying level of awareness about the potential role of ICT, but nowhere was it core to policy-making. ICT was all but missing from many important policy documents, including the Transport White Paper, and the concerted effort that would be required to integrate the use of ICT into policy was generally lacking.

The reasons for this are firstly to do with the nature of the evidence for the relationship between ICT and travel demand:

- A perception that this is a new area for research and that little conclusive evidence has been produced to link ICT-use to reduced travel demand
- The difficulty for researchers in making a causal link between ICT-use and travel demand, especially at the national level.

And secondly to a number of policy-related barriers:

- An intuition that demand-side solutions to transport policy might run counter to government economic policy
- The difficulty of joining up different departments and levels of government to implement ICT-based solutions
- Scepticism about using ICT as a tool for government policy.

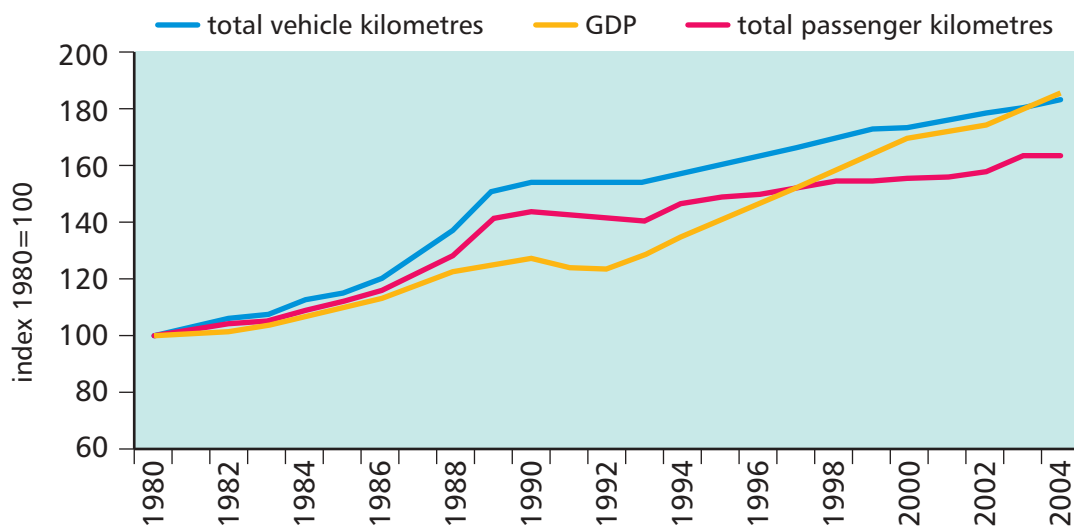
There is a clear need for ICT to be treated more strategically in policy-making in the UK. Despite the barriers that exist, there are a growing number of opportunities to move ICT up the transport policy agenda. Leadership from government, commitment to developing and using a sound evidence base, and taking a more holistic approach to transport policy making, will together result in a transport policy framework where ICT can be seen as a mode of transport, with all the social, economic and environmental benefits that follow.

2 Why 'ICT as a mode of transport'?

Transport demand in the UK is increasing. According to government statistics, since 1980 road traffic has grown by 81 per cent, rail travel by 46 per cent and the distance travelled by air within Britain has more than trebled. Over a quarter of households now have access to two cars or more.¹

The growth is due to a combination of many factors. Our population is growing. People are living in smaller households and are more willing to travel further for work or leisure. People are travelling further because they can travel faster (the average travel time per person has remained stable at about one hour per day for the last 30 years)². Recent planning policy has allowed out-of-town shopping developments and new residential building that 'lock in' the need to travel. Most significantly of all, the British economy is growing, and as the graph below shows, growth in economic output (GDP) is closely linked to growth in travel: this is a correlation that has held more or less true for as long as we can tell.³

Traffic, passenger kilometres and GDP: 1980 to 2004



Travel is necessary to give us access to goods, services, employment and people. But the rapid growth in travel has led to serious social, economic and environmental problems. According to the CBI, congestion costs the UK economy £20 billion a year, while infrastructure is ailing due to historic under-investment.⁴ Congestion causes noise and local concentrations of particulate pollution, and most modes of travel result in the emission of carbon dioxide, the gas most responsible for climate change. Transport accounts for

¹ *Transport Trends 2005 Edition*, (Department for Transport, 2006)
www.dft.gov.uk/stellent/groups/dft_transstats/documents/downloadable/dft_transstats_035650.pdf

² *Travel time in use in the information age*, (Glen Lyons and John Urry 2004, Transportation Research Part A, pages 257-276)

³ *Transport Trends 2005 Edition*, (Department for Transport, 2006)
www.dft.gov.uk/stellent/groups/dft_transstats/documents/downloadable/dft_transstats_035650.pdf

⁴ *Broadband: the role of communications in beating congestion*, (BT, 2004)
www.btplc.com/Thegroup/Regulatoryinformation/Consultativeresponses/BTdiscussionpapers/Congestion/BTCongestionReport.pdf

25 per cent of the UK's carbon dioxide emissions, and there has been a 47 per cent increase in carbon dioxide emissions from transport sources since 1980.⁵

Meanwhile, ICT infrastructure – the networks that connect our phones and computers to the Internet and each other – is growing in capacity rapidly. Over 99 per cent of the UK population is now within reach of a broadband internet connection and around 10 million people are using broadband in their homes.⁶ Companies such as BT are investing large amounts of money into improving connectivity, and this will have far-reaching effects. According to BT:

“This infrastructure will offer people access to all kinds of information, including video and databases, at broadband speeds on any device. These new levels of convergence and mobility will allow all of us to do things differently... we will no longer be tethered to our desks or our TV – what's on offer is the flexibility to have the bandwidth we currently have at our desks, in our homes, on a mobile device, armed with wireless connectivity.”⁷

One of the things that ICT could allow us to change is our travel habits. Many observers have commented that ICT presents us with an opportunity to reduce the need to travel. Francis Kinsman reported in 1987 in *The Telecommuters* that, as far back as 1975, the USA could have saved 75 million barrels of oil and completely eliminated the need to import oil from abroad, if just one eighth of urban commuting had been replaced by teleworking⁸ – using ICT to work from home.

Currently around eight per cent of the UK workforce teleworks, or works in a centre using ICT, and the numbers are growing⁹. Use of teleconferencing and videoconferencing in business is going up, and more and more trade is being conducted online rather than on the high street. For example, eBay has around 10 million users who can be listing over 3 million items for sale at any one time¹⁰. These are emerging long-term trends. But the use of ICT in this way, and its role in reducing the need to travel, appear to be almost absent from government policy on transport and planning. If this is the case, with travel demand relentlessly increasing and climate change acknowledged as the greatest challenge facing the planet, it would be a serious missed opportunity. Even more so, given that this potential policy solution comes at very low cost to the public purse.

We set out to understand the extent to which ICT was being considered by relevant policy-makers – central government departments such as the Department for Transport, as well as regional government and local authorities – as a means of reducing travel demand.

⁵ *Transport Trends 2005 Edition*, (Department for Transport, 2006)
www.dft.gov.uk/stellent/groups/dft_transstats/documents/downloadable/dft_transstats_035650.pdf

⁶ news.bbc.co.uk/1/hi/technology/4903776.stm

⁷ *Broadband: the role of communications in beating congestion*, (BT 2004)
www.btplc.com/Thegroup/Regulatoryinformation/Consultativeresponses/BTdiscussionpapers/Congestion/BTCongestionReport.pdf

⁸ *The Telecommuters*, (John Wiley, 1987, ISBN 0 471 91789 3, pages 9-10)

⁹ *Labour Market Trends*, (National Statistics Office, October 2005)
www.statistics.gov.uk/downloads/theme_labour/LMT_Oct05.pdf

¹⁰ *Revisiting Coupling of Economic, Social Network, and Transport Growth in Light of Cybermobility and Restraint Policies*, (Glen Lyons, 2006), Presentation in the International panel session 'Cybermobility and Evolution of Personal Travel' at the Transportation Research Board Conference, Washington, January 2006)

We wanted to know whether ICT could in the future be viewed as a mode of transport in itself, treated in policy alongside other modes such as train, air or car travel, and planned for accordingly, as part of a strategy to reduce the environmental impacts of UK travel. And if it could, what would the changes in policy be that could make it so?

In the pages that follow:

- We provide a brief overview of the evidence for a relationship between ICT use and travel reduction
- We benchmark the extent to which ICT is considered in relevant policy
- We explore the drivers and barriers to establishing ICT as a mode of transport
- We set out some of the means by which ICT could be realised in policy terms as a mode of transport.

3 'Bits, not atoms' – an overview of ICT use and travel reduction

The basic assumption, that using ICT can reduce the need to travel, seems obvious. Nicholas Negroponte, Director of the Massachusetts Institute of Technology's Media Laboratory, argued clearly in *Being Digital*¹¹ that moving 'bits' of information instead of atoms, i.e. physical objects, would bring a similar benefit for a lot less effort and energy expended. In 2001, Forum for the Future's *Digital Futures* project set out some of the opportunities for travel reduction:¹²

- Teleworking would mean that people could stay at home rather than drive or take the train to work
- Teleconferencing or videoconferencing would mean that business meetings and even personal meetings could sometimes take place over the wires rather than in person
- People could buy products on the Internet and have them delivered by efficient logistics systems, rather than making special journeys themselves.

All of these activities are taking place using ICT today, but what has their impact on travel patterns been? Much of the available research in this area relates to teleworking, and has often been conducted by or on behalf of ICT companies. The most interesting evidence comes in the form of case studies. For example,

- Siemens Nixdorf in Sweden reports that teleworkers save 19km of car travel a day when working at home – 74,600km/year for the company as a whole¹³
- Telia in Sweden reports that home-based teleworkers save on average 2,500 km per vehicle a year¹⁴

¹¹ *Being Digital*, (Nicholas Negroponte, 1995, ISBN 0679439196)

¹² *Digital Futures*, (ed. James Wilsdon, 2001, ISBN 185383789)

¹³ *Case studies of the Information Society and Sustainable Development*, (Lennart Forseback, 2000, IST)

¹⁴ *Case studies of the Information Society and Sustainable Development*, (Lennart Forseback, 2000, IST)

- Teleworkers at BT on average travel by car 193 km less each a week. This includes so-called 'rebound effects' in which teleworkers make extra trips from the home that they wouldn't have if they were in the office.¹⁵

Case studies also exist for the impacts of conferencing. For example, research commissioned by BT and conducted by SustainIT in 2005 concluded, "by a very conservative estimate each conference call is saving a minimum 32kg of travel-related carbon dioxide emissions."¹⁶

Attempts have been made to present a more comprehensive picture of the effects of ICT at a national level, using modelling. For example, the RAC has estimated that through the use of ICT there is potential within ten years for a 15 per cent reduction in commuter travel, 18 per cent reduction in heavy freight and a 10 per cent reduction in shopping journeys by car.¹⁷ Similarly, the Department for Transport (DfT) in its 2004 report *Making Smarter Choices Work* estimated that so-called 'soft measures', including teleworking and travel plans, could lead to a transport reduction of 11 per cent overall and 17 per cent at peak times.

Although we mustn't read too much into the evidence provided by case studies and models, they do point towards an opportunity for policy-makers. Without intervention, trends in teleworking, conferencing, Internet shopping and so on will no doubt continue to develop, but the effect on transport demand at the national level could be negligible. ICT-use could free up capacity on the roads that might then be immediately taken up by additional transport growth, and ICT as a mode of transport would be additional not substitutional. That is why it is so important that transport policy capitalises on these developments, guiding them in order to reduce environmental impact rather than increase transport capacity.

¹⁵ *Is Teleworking Sustainable? An analysis of its economic, environmental and social impacts*, (Sustel, 2004) www.sustel.org/documents/Reports/final%20report%20-%20july%202004%20v2.pdf

¹⁶ *E-working at BT – results of a survey on its economic, environmental and social impacts*, (Professor Peter James and Dr. Peter Hopkinson, 2005) www.btplc.com/Societyandenvironment/Reports/EworkingatBT.pdf

¹⁷ *Broadband: the role of communications in beating congestion*, (BT, 2005) www.btplc.com/Thegroup/Regulatoryinformation/Consultativeresponses/BTdiscussionpapers/Congestion/BTCongestionReport.pdf

4 The direction of travel: the role of ICT in government policy

To what extent are policy-makers exploiting this opportunity? We researched official websites and interviewed officials across all levels of government to answer this question. In general, we found that:

- Reducing the need to travel is not a high priority for Westminster departments whose remit applies mostly to England, but it is being considered more seriously in Scotland and Wales
- ICT is not generally regarded as a mode of transport although in Scotland, Wales and some English authorities attitudes are beginning to change
- ICT is however actively being used in Intelligent Transport Systems (ITS) to improve the efficiency of existing transport infrastructure.

Policy-making in the UK is a complex business. Broadly speaking England, Scotland and Wales¹⁸ are responsible for setting their own transport and planning policies. However, much of the implementation of these policies takes place at the regional and local level and so policy approaches can vary widely. That said, national governments are responsible for putting in place the strategic policy frameworks, and regional and local authorities are expected to implement policy within these frameworks.

At the strategic level the UK government has put in place a framework to ensure that all departments and the devolved administrations develop policies that contribute towards sustainable development. The UK Sustainable Development Strategy¹⁹ guides policy-making with five principles:

- Living within environmental limits
- Ensuring a strong, healthy and just society
- Achieving a sustainable economy
- Promoting good governance
- Using sound science responsibly

This means that policy-makers in different parts of government need to collaborate to produce 'joined-up' and coherent policies that deliver sustainable outcomes. It's difficult to judge whether current transport and planning policies will lead to truly sustainable outcomes. As far as encouraging ICT as an alternative mode of transport is concerned, there is not a strong signal being sent to private and public decision-makers. The message and emphasis change depending upon whom you are talking to and where you are.

The main areas of policy relevant for ICT as a mode of transport are in transport and planning. The two areas are intimately linked: planning policy decides where people live and work and so has a strong influence over how and why people choose to travel.

¹⁸ Our research did not extend to Northern Ireland

¹⁹ *Securing the Future*, (Her Majesty's Government, 2005)
www.sustainable-development.gov.uk/publications/pdf/strategy/SecFut_complete.pdf

Transport policy

Long-term transport policy for England is set out in the Future of Transport White Paper²⁰. The White Paper is predicated on a future world where, as the economy grows, people and goods are expected to travel more and more. There are a range of policies and measures to improve the flow of traffic by road, rail and air, but there is little on reducing the need to travel. This is despite the fact that the DfT has commissioned a number of studies investigating the role of ICT in travel reduction. For example, in 2002 the government commissioned a comprehensive literature review on the evidence supporting ICT's impacts on travel.²¹ And in 2003 DfT published a report entitled Making Our Roads Work, which included estimates for the number of people teleworking and references to the potential for a consequent reduction in travel demand.²² It is fair to say therefore that ICT as a mode of transport is certainly on the DfT's radar as an issue of interest, but the department's priorities currently lie elsewhere, and thus the findings of these two reports mentioned have a low profile in the White Paper.

Scotland and Wales have a much stronger emphasis on reducing the need to travel by car. Scotland's national transport strategy, which went out to consultation on 20 April 2006²³, highlights the potential benefits of teleworking (see box below).

Alternatives to travel: broadband and teleworking

Scotland

The broadband strategy aims to deliver affordable broadband access in Scotland and encourage its use. On 29 December 2005, the Executive met its target of delivering basic broadband to every community. This was achieved through the enabling of telephone exchanges, under a contract with BT. With broadband technology it is significantly easier to telework, which potentially contributes to traffic reduction/ reduced congestion by reducing commuting and business travel throughout the day. We have commissioned research on the potential benefits of teleworking.

There is a potential role for employers in making alternatives to travel (or peak time travel) a reality for their employees. Flexible and home working arrangements can be beneficial to individuals' work-life balance which can have real knock-on benefits to the employer – and congestion and pollution could potentially be much reduced.

The consultation on the Welsh Transport Strategy was launched in July 2006²⁴. Reducing the need to travel is a key theme in the draft strategy and ICT is seen as having an important part to play in delivering this goal. The draft strategy emphasises the need to

²⁰ *Future of Transport White Paper*, (Department for Transport, 2005)
www.dft.gov.uk/stellent/groups/dft_about/documents/divisionhomepage/031259.hcsp

²¹ *The Impact of Information and Communications Technologies on Travel and Freight Distribution Patterns: Review and Assessment of Literature*, (HOP Associates, 2002)
www.virtual-mobility.com/Downloads/Report.PDF

²² *Making our Roads Work*, (Department for Transport, 2003)
www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_610510.pdf

²³ *Scotland's National Transport Strategy: A Consultation* (Scottish Executive, 2006)
www.scotland.gov.uk/Resource/Doc/112254/0027311.pdf

²⁴ *Wales Transport Strategy: Connecting Wales*, (Welsh Assembly Government, 2006)
[new.wales.gov.uk/docrepos/40382/4038231141/4038211251/4038211252/WTS_\(English\).pdf;jsessionid=A42331A2376CFD1E1563474B493DDACF.www2?lang=en](http://new.wales.gov.uk/docrepos/40382/4038231141/4038211251/4038211252/WTS_(English).pdf;jsessionid=A42331A2376CFD1E1563474B493DDACF.www2?lang=en)

develop coherent and complementary policies to reduce the need to travel. ICT cannot do it on its own (see box below).

To minimise the need to travel

Wales

ICT has an increasingly important role to play in minimising the need for travel. The expansion of ICT enables more people to make choices about whether they need to travel at all for a range of purposes such as business meetings, education or shopping. As more businesses, education and retail establishments encourage the use of ICT to access services, pressure on the transport network can be reduced (albeit that it is recognised that these journeys may be replaced and reliability improved).

The benefits accrued from planning and ICT interventions to minimise the need to travel will only be maximised alongside more stringent demand management measures. Charging for use of roads within specified areas is likely to provide the greatest change in travel behaviour. Other control measures associated with parking capacity and charging will also contribute to this environmental outcome.

The approach of Scotland and Wales is reflected in some of the English regions.

For example, the East of England Development Agency has recognised the need to ensure its regional economic strategy²⁵ is coherent with achieving positive environmental and social outcomes. Their strategic transport goal is to ensure that transport solutions serve economic growth in a sustainable manner, including supporting initiatives that promote teleworking and ICT infrastructure.

West Yorkshire also takes a holistic approach to transport strategy and states that:

“Exploring the opportunities for encouraging a reduced need for travel, through demand management and ‘soft’ transport measures rather than new infrastructure or services is a central part of the Vision [for transport in West Yorkshire]”

It also acknowledges that:

*“increasing lifestyle choices for home working, teleworking and co-locating residential and employment development will have a role in supporting a reduced need for travel.”*²⁶

Meanwhile, although only a handful of local authorities now employ professional travel planners, flexible working policies are becoming more common. Leeds City Council is using ICT to encourage more flexible working in its official buildings. ICT is used to divert telephones and emails and to allow remote working using laptops and blackberries. The use of videoconferencing is also increasing. At the same time, mileage allowances have been restricted to discourage unnecessary car usage.

²⁵ *A Shared Vision: the regional economic strategy for the East of England*, (EEDA, 2004) www.eeda.org.uk/press_pub_366.asp

²⁶ *Draft West Yorkshire Transport Vision 2006*, (WYLTP, 2006) www.wyltp.com/NR/rdonlyres/8A50DC7B-FA7B-45AE-865A-AF5EBF6FEBCA/0/060330WestYorksVision.pdf

Planning policy

Compared to transport policy, the picture with planning policy is relatively simple. Planning policy operates at two different levels. At the national level in England, Scotland and Wales the government provides statements and guidance that set the broad framework within which planning decisions are made. Planning authorities through regional and local plans decide on the precise size and nature of development with many decisions reflecting very local and particular concerns.

In England, the relevant planning policy for ICT and transport is set out in two policy guidance documents: *Planning Policy Statement 1: Delivering Sustainable Development*²⁷ (PPS1) and *Planning Policy Guidance 13: Transport* (PPG13)²⁸. PPS1 recognises the need to reduce travel and “secure more sustainable patterns of transport development” and PPG13 recognises that ICT can create opportunities to reduce the need to travel (similar guidance exists in Scotland and Wales). Policy is designed to facilitate sustainable development, but how it is actually implemented on the ground is a matter for local planning authorities. Reducing the need to travel through the utilisation of ICT is one of many factors planners should take into account, but the policy guidance does not favour this approach above any other that has the potential to reduce the need to travel.

The government has tried to bring planning, transport and other key aspects of development together in its Sustainable Communities initiative. The initiative seeks to ensure that communities develop economically, socially and environmentally and respect the needs of future generations as well as succeeding now. There are signs that the Sustainable Communities initiative is encouraging developments that build-in ICT as part of the overall development strategy. For example, in the Thames Gateway growth area the intention is to utilise ICT to reduce the need to travel (see box)²⁹.

By 2020, we aspire to a vibrant and prosperous Thames Gateway with a sustainable transport system offering access to town centres, employment areas and local communities by a real choice of transport modes. Public transport is extensive, rapid and reliable, safe, convenient and integrated into local areas. Walking and cycling are preferred options for local access and the need to drive a car is both less necessary and less taken up. Access and transport considerations are at the heart of every planning brief and the Thames has ceased to be a barrier to movement or perception. Land use and technology are creatively deployed to reduce the need to travel and the natural and built environment enhances peoples' lives and daily experience.

Thames Gateway London The Transport Agenda

²⁷ *Planning Policy Statement 1: Delivering Sustainable Development*, (Department for Communities and Local Government, 2005) www.communities.gov.uk/index.asp?id=1143805

²⁸ *Planning Policy Guidance 13: Transport, Department for Communities and Local Government*, (Department for Communities and Local Government, 2001) www.communities.gov.uk/index.asp?id=1144015

²⁹ www.thames-gateway.org.uk/uploadedFiles/transport-agenda.pdf

Key policy documents

“...Advances in sensor technology, computing power and telecommunications can allow us to build intelligence into the infrastructure. This could deliver a future where we have the freedom to choose whether we travel...”

Sir David King, Chief Scientific Adviser to the UK Government

A number of official documents indicate a growing awareness among policy-makers of the role of ICT as a mode of transport:

- **Intelligent Infrastructure Futures** is a horizon-scanning research project funded by the Office of Science and Innovation’s Foresight Programme. The project looked at how people and goods will move in the next 50 years and how infrastructure could be designed to be robust, sustainable and safe. The results of the study, a set of scenarios, assume ubiquitous and very high bandwidth network technology. The project has published next steps that set out how government will use the findings, including a suggestion for an inter-departmental group coordinated by DfT to consult with stakeholders (including business) and to look at the project’s policy implications.³⁰
- **Smarter Choices** is the DfT’s guidance to encourage action and supporting research on measures such as travel plans to reduce congestion and increase travel choices. Specific references are made to teleconferencing, videoconferencing and teleworking as tools that can cut staff travel. Some regional and local government officials we spoke to saw the inclusion of ICT-based measures as ‘soft measures’ rather than as a hard policy option as a sign that the Government was not really serious about reducing the need to travel.³¹
- **The Sustainable Development Commission** acknowledges in its submission to the Eddington transport study that good information technology, mobile connections and other business facilities could favour travel by train over the more complex inter-modal journeys generally required for air travel.³²

On the other hand, there are other official documents that are silent on the potential for ICT to reduce the need to travel. Chief among these, as we have already noted, is the Future of Transport White Paper. The strategic direction set out by the White Paper assumes that transport growth will continue, and this is reflected in the DfT’s set of Public Service Agreements (PSAs):

- “1 By 2007-08, make journeys more reliable on the strategic road network
- 2 Improve punctuality and reliability of rail services to at least 85% by 2006, with further improvements by 2008

³⁰ *Intelligent Infrastructure Futures*, (Foresight, 2006) www.foresight.gov.uk/Intelligent%20Infrastructure%20Systems/Reports%20and%20Publications/Intelligent_Infrastructure_Futures/Index.html

³¹ *Smarter Choices*, (Department for Transport, 2005) http://www.dft.gov.uk/stellent/groups/dft_susttravel/documents/divisionhomepage/031340.hcsp

³² *Submission to the Eddington Transport Study*, (Sustainable Development Commission, 2006) www.sd-commission.org.uk/publications/downloads/Eddington-Transport-Study.pdf

- 3 By 2010, increase the use of public transport (bus and light rail) by more than 12% in England compared with 2000 levels, with growth in every region
- 4 By 2010-11, the ten largest urban areas will meet the congestion targets set in their Local Transport Plan relating to movement on main roads into city centres
- 5 Reduce the number of people killed or seriously injured in Great Britain in road accidents by 40% and the number of children killed or seriously injured by 50%, by 2010 compared with the average for 1994-98, tackling the significantly higher incidence in disadvantaged communities
- 6 Improve air quality by meeting the Air Quality Strategy targets for carbon monoxide, lead, nitrogen dioxide, particles, sulphur dioxide, benzene and 1,3 butadiene (joint with Defra)
- 7 To reduce greenhouse gas emissions by 12.5% from 1990 levels in line with our Kyoto commitment and move towards a 20% reduction in carbon dioxide emissions below 1990 levels by 2010, through measures including energy efficiency and renewables (joint with DTI and Defra)³³

ICT as a mode of transport is also notably absent elsewhere:

- The Climate Change Programme, which sets out the UK government's programme of policies and measures to meet its national and international climate change commitments. There is no mention that the government intends to look seriously at reducing the need to travel, although teleworking and teleconferencing are mentioned briefly as actions individuals could consider doing. The transport measures essentially reflect English transport policy.³³
- The sustainable development action plan for the Department for Transport. Under the government's sustainable development strategy, all departments are required to set out their own Action Plan describing how they will help to deliver on the strategy's goals. The Department for Transport's action plan is to deliver the policies set out in the Future of Transport White Paper.³⁴
- Telework Guidance: DTI provides guidance to employers on how to encourage and establish teleworking in their organisations. This gives plenty of helpful advice on health and safety, taxation and practical working issues, but mentions nothing about the potential environmental benefits of teleworking.³⁵

In addition to this, the DfT's National Transport Model, a computer-based tool used to predict policy impacts and long-term trends, does not include the impacts of ICT use in its forecasts. The 'Intelligent Infrastructures' project however has raised awareness about how ICT might impact on travel and DfT modellers have discussed with DTI about how the model might capture such impacts in the future. The current lack of robust data means it is unlikely that ICT can be built into the model as an alternative mode of transport in the short term, but it might be possible to impose parameters on the model to reflect the extent of actual and predicted levels of ICT use that substitutes for travel.

³³ *UK Climate Change Programme*, (Her Majesty's Government, 2006) <http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/ukccp06-all.pdf>

³⁴ *Sustainable Development Action Plan*, (Department for Transport, 2005) www.dft.gov.uk/stellent/groups/dft_about/documents/pdf/dft_about_pdf_610981.pdf

³⁵ *Telework Guidance*, (Department for Trade and Industry, 2003) www.dti.gov.uk/files/file27456.pdf

So the overall picture is mixed. Planning policies in England, Scotland and Wales do not hinder teleworking and teleconferencing but neither do they positively encourage the use of ICT as a means to reduce the need to travel. Strategic transport policy in Scotland and Wales is currently under consultation, but both administrations have signalled that reducing the need to travel should be part of their future strategies and ICT will have a role to play. Policy in England, on the other hand, does not generally seek to reduce travel demand or positively promote ICT as a means to do so.

5 Barriers to ICT as a mode of transport

Our research uncovered a number of reasons why ICT is not being used strategically as a mode of transport by policy-makers. They fall under the two general headings of 'evidence' and 'policy'.

Evidence

One of the chief barriers to implementing ICT in transport policy relates to the nature of the evidence base. Overall, our research suggested that many policy-makers are not convinced that there is an overwhelming argument for the contribution that ICT-based policies could make. There are a number of issues here.

Awareness of the evidence

Among the people we spoke to, awareness that ICT could be used to reduce the need to travel varied substantially. No-one was completely unaware of the arguments, but only a few could be described as well informed. Several interviewees were interested to find out more and asked us to send them relevant research reports.

This variation also existed within organisations, suggesting that convincing a handful of people in a department will not necessarily result in that whole department investigating the potentials of ICT as a mode of transport fully, and more targeted or high profile advocacy is required.

The quality of the evidence

Some who were well informed about the arguments questioned the quality of the evidence that ICT-use does reduce demand for travel. They were aware of the fact that the majority of the evidence is of a case study nature, and although there may be a reasonable number of good case studies, these do not amount to a convincing argument in themselves.

A good example of this view about the quality of evidence available can be found in the Greater London Authority report, *Connecting the capital: information and communications technology in London*:

"The impacts of new technology on our individual lives – perhaps in terms of making working from home easier; or in terms of our home lives being invaded by work; in terms of being infinitely better connected, or socially more isolated; through to reducing the need to travel and resulting congestion (from homeworking or Internet

shopping) to increasing the volume of travel (by making the commuter's cars available for trips from home, or stimulating hundreds of deliveries to our homes from suppliers around the globe) – all these potential impacts are poorly understood and in their earliest stages.”³⁶

There is a lack of robust and comprehensive national-level data to support the case for ICT as a mode of transport, beyond this kind of speculation. In large part, this reflects the difficulty of conducting research in this area.

The complexity of the relationship

Although the relationship between ICT-use and travel reduction seems like common sense, in reality it is complex, for several reasons. Firstly, causality is hard to prove: for example, if a city or region where ecommerce is particularly popular shows a reduction in travel, how do we prove that it is the ecommerce causing the travel reduction? There are a lot of other factors involved: how can we be sure that the relationship is between ecommerce and travel and not other factors that may be untested, such as fuel prices or potholes in the local roads? Secondly, research has to deal with ‘rebound effects’. Rebound effects are caused by changes in behaviour as a result of increased efficiency or capacity, that result in reducing that efficiency or capacity. For example, when people telework from home, they may make additional journeys in their car that they wouldn't have if they had driven to work. This kind of behaviour is difficult to track and measure.

These complexities can be addressed in research, but they do make the findings of studies easy to question. For example, one person we spoke to was aware of case studies showing fewer car miles driven by teleworkers at BT, but questioned whether rebound effects had been taken fully into account, and on that basis discounted the research. In fact, research for BT does include rebound effects, in terms of additional journeys made by teleworkers. But other rebound effects are harder to capture, such as people deciding to live further away from work and opting for fewer, but longer, commutes. Case study findings in large part depend on where the research boundaries are drawn, and in this case that makes it easier not to support the idea of ICT as a mode of transport.

Scepticism about the evidence

Much of the evidence cited for ICT-related transport substitution has been developed or funded by a small number of organisations, and as many of these are ICT companies, they are seen to have a vested interest. Although this could be expected, it still detracts from the strength of the argument, and policy-makers we spoke to across the public sector held this view. There is research going on that is not funded by ICT companies, for example, the University of the West of England's study *Travel Time Use in the Information Age*,³⁷ but it is how such research feeds into the policy-making process that will determine how it is utilised by policy-makers. For this particular project the DfT and the Telework Association are stakeholders.

³⁶ *Connecting the capital: information and communications technology in London*, (GLA, 2004) www.london.gov.uk/gla/publications/e-london/connecting_capital.pdf

³⁷ *Travel Time Use in the Information Age* gow.epsrc.ac.uk/ViewGrant.aspx?GrantRef=GR/S58287/01

Policy

There were those who considered there was a strong case for promoting ICT as a mode of transport more actively, but felt that the barriers to acting on it lay in the broader policy framework. The key issues concerned the nature of economic policy (or as one interviewee put it, “the dominant ideology of economic growth”), joining up policy, and the attitudes of policy-makers to ICT as a policy tool.

Economic policy

Many officials at the regional and local level in England felt that there was not a strong lead from national government on developing demand-side measures for transport. Their feeling was that government policy tended towards short-term rather than long-term solutions and was focused strongly on delivering economic growth not sustainable development.

Government views increasing levels of travel as an indicator of a healthy economy, based in part on the well-established relationship between transport growth and economic growth, shown in the graph on page 4. Currently there is an intuition that measures taken to reduce transport demand might undermine economic growth. This assertion is hard to verify by referring to official documents and is not mentioned explicitly in writing, but it is the overwhelming message we encountered in our research. Economic growth is a sacred cow in most areas of government policy. Developing policies expressly to reduce travel demand are seen by many policy-makers as counterintuitive and potentially threatening to economic growth. However, the use of ICT as a mode of transport may decouple economic growth from transport demand, meaning that the economy can continue to grow while transport demand halts or declines and is replaced by more environmentally efficient ICT use³⁸.

Therefore, policies implemented at the regional and local level to mitigate the environmental impacts of travel tend to be more supply-side solutions, such as the use of Intelligent Transport Systems (ITS), which includes the provision of real-time information about congestion or car-parking, and traffic monitoring and management. The DfT has given a strong signal in support of the implementation of ITS and authorities are responding by investing heavily³⁹. However, while improved traffic management through ITS undoubtedly has produced economic, environmental and social benefits, the concern is that it will become harder to generate benefits over the long-term against a background of ever-increasing traffic levels.

The imperative of economic growth does not only affect public sector decisions of course, but is an important factor in private sector delivery of transport solutions too. The transport sector is fragmented and companies are driven by the financial bottom line. The incentive to reduce travel demand and thereby serve the wider public good is low compared to the need to operate a successful profit-making business.

³⁸ For example *Revisiting Coupling of Economic, Social Network, and Transport Growth in Light of Cybermobility and Restraint Policies*, (Glenn Lyons, 2006), Presentation in the International panel session 'Cybermobility and Evolution of Personal Travel' at the Transportation Research Board Conference, Washington, January 2006)

³⁹ *Understanding the Benefits and Costs of Intelligent Transport Systems – a Toolkit Approach*, (Department for Transport, 2005) www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_039894.pdf

Joining-up policy

For ICT to be considered as a mode of transport, close cooperation across many government departments is required. In England, the Department for Transport, the Department for Communities and Local Government, the Department for Food and Rural Affairs and the Department for Trade and Industry all have a strong policy interest. But bringing those interests together to form a coherent policy position is easier said than done. Different departments have different perspectives and priorities. Our sense is that people have not had the opportunity to step back and think strategically about how ICT could change the way we think about travel or achieve the goals that travel is designed to deliver. The Intelligent Infrastructures project follow-up work potentially offers this opportunity, but how soon this will work into current policy is not clear. There are many examples of how joined up government can produce sustainable outcomes. Homezones is a relevant initiative, where transport and planning measures have been implemented together to a common purpose (see box).⁴⁰

Home Zones

Home Zones are residential streets in which the road space is shared between drivers and other road users with the wider needs of residents (including people who walk and cycle, and children) in mind. The aim is to change the way that streets are used and to improve the quality of life in residential streets by making them places for people, not just for traffic.

This demonstrates close working between the Department for Transport and the Department for Communities and Local Government to produce a policy that delivers both planning and transport policy goals. Using planning policy to design out the car by capping road capacity means that people are incentivised to use other means to access goods and services not by travelling, but for example through buying goods online.

In Wales and Scotland the more joined-up approaches reflect leadership from key individuals and, in Wales, the fact that sustainable development is embedded firmly into the policy-making ethos of the administration.

At the regional and local levels there are similar pressures on officials. Sustainable development co-ordinators have important roles to play in bringing together the various departments, and we observed that their work was helped greatly when senior management provided strong leadership for sustainable development. However, even local authorities with a strong sustainable development ethos can find it hard to join policies up. For example, in one local authority we spoke to, a company applied for planning permission for a new office building, wanting to minimise the impacts of staff travel. The company developed a travel plan that combined teleworking with incentives to use public transport, cycle or walk, and in the plans for its new building made no provision for car parking space. This contravened local planning guidelines that specified a maximum level of car parking provision in all such buildings. The forward-looking company may therefore be forced to build its headquarters with a car park, following the proscription that a building of X m² must have Y parking spaces. The intention at the

⁴⁰ *Home Zones – challenging the future of our streets*, (Department for Transport, 2006) www.dft.gov.uk/stellent/groups/dft_susttravel/documents/divisionhomepage/031337.hcsp

moment therefore is to cover the car park with landscaping so it is put beyond use, at least for the current owner.

Attitudes to ICT as a policy tool

Our research uncovered a range of attitudes to the use of ICT in reducing transport demand that would hinder its full adoption at a policy level. We should stress that these are not official government attitudes, but it is important to appreciate the perspectives of individuals concerned, as these views will inevitably be reflected to some extent in decisions taken on policy.

Many people we spoke to were not convinced that the promises coming from ICT companies about substantial improvements in network capability would be achieved in reality, at least in the short term. In particular, local and regional authorities were quick to point to localities where network connectivity is worse than officially claimed by technology providers – technology ‘not spots’ rather than ‘hot spots’ – and were able to hark back to the dotcom boom for instances where the claims of what new technology could deliver were overblown. Therefore, the likelihood of a step-change in the impacts of ICT use on travel patterns, even if guided by new policy, was met with some scepticism.

We encountered some resistance to the overt use of technological solutions to policy challenges. In part this was due to a reluctance to be seen to be choosing one particular type of technology over another, and being vulnerable to accusations of favouring certain companies not certain technologies. It was also due to a feeling that authorities of all types had frequently had their fingers burnt over large ICT contracts and would now exercise extreme caution in embarking on new projects.

There was also nervousness about the fact that behavioural change is necessary for ICT as a mode of transport to have a significant effect. People will need to be persuaded that teleworking is beneficial, and will need to change their habits. This is notoriously difficult to legislate for, and policy-makers are keen to facilitate rather than proscribe. Some people we interviewed felt that, given this aspect of the agenda, government should either wait for the behavioural trends to become more evident, or didn’t need to intervene with policy measures, as the number of people using ICT instead of travelling appeared to be increasing of its own accord.

Finally, we heard from some of our interviewees about a degree of institutional inertia in the transport sector generally. Travel planners, who have been exposed to more holistic and creative methods of developing transport policy, still have a relatively low status in transport policy circles. Traditional transport policy tends to focus on hard measures and big infrastructure projects such as road building. Softer measures are easier to implement and cheaper and can be very effective, but don’t require the skills of traditional transport planners. It is also difficult to see the short-term impacts of softer measures, whereas a road has an immediate and obvious effect.

Take all of these barriers together – the sense that there is a lack of convincing evidence, the nervousness that demand-side measures might affect economic growth, as well as the need to join up different areas and levels of policy and overcome the attitudes of some policy-makers to using ICT as a policy tool – and establishing ICT as a mode of transport looks like a challenge. However, this must be balanced against the fact that

there is growing recognition of the agenda, and there are many opportunities to promote it and so achieve a more holistic approach to transport policy in the UK. In the final two sections of this report, we'll describe the major steps that could be taken to establish ICT as a mode of transport, and then identify some of the actions that could be taken by the ICT sector to get us there.

6 Achieving the vision

For ICT to be used more strategically by policy-makers in the way that we have suggested, we need commitment and leadership from government, a better evidence base that is better used, and a more holistic approach to transport policy. We'll take each of these in turn.

Commitment and leadership from government

Despite the barriers that exist, and which we have explored in the preceding pages, there is a clear need for ICT to be treated more strategically in policy-making in the UK. ICT offers a low-cost and more sustainable solution to many of our transport and planning problems, and yet across the country as a whole the approach is piecemeal. Government should make a high-level commitment, stating that ICT has an important role to play in reducing travel demand. National governments and their departments should send a clear message to this effect, and as a result:

- The DfT should publish a supplement to the Transport White Paper setting out government policy on ICT and travel demand reduction
- DTI's guidelines on teleworking should address the social, economic and environmental benefits of teleworking
- Westminster departments should employ ICT in their travel plans as part of their own sustainable development action plans
- Westminster departments should commit to working collaboratively to ensure that the opportunities presented by ICT are exploited.

Planning guidelines should be moved from taking a passive stance (i.e. providing no impediments to planning for ICT as a mode of transport) to an active stance, asking explicitly for measures to reduce demand in travel using ICT to be implemented.

Better evidence, better used

Government should continue to commission research to investigate the relationship between ICT-use for teleworking, ecommerce, teleconferencing and so on, and travel demand, such as that recently published by the Scottish Executive.⁴¹ This should build on the large and growing body of case study evidence to show whether individual examples of best practice are scaling up to the national level and having an effect on the total amount that UK citizens travel. The data should also indicate further how policy-makers can intervene in this relationship to maximise the environmental, social and economic benefits.

⁴¹ *Scoping study to assess the implications of E-working and other ICTs on travel behaviour and traffic reduction in Scotland* www.scotland.gov.uk/Publications/2006/05/23112408/0

Empirical data is difficult to generate in this field, but efforts should be made to link research to the operation of the National Transport Model, so that the Model is able to reflect and predict changes in ICT infrastructure and use and related behaviour changes, allowing more accurate projections of travel demand and policy testing.

Furthermore, government should monitor the implementation of its policies and their outcomes, to ensure that the effect is as desired and to pick up on any unexpected outcomes.

A more holistic approach to transport policy

Government should encourage a more holistic view of transport policy and not implicitly view with scepticism measures that may appear to undermine economic growth. As discussed earlier⁴², people need access to goods, services, people and employment to maintain their quality of life. Travelling is one means of accessing these things, and ICT now increasingly provides another. Both physical transport and the production and use of ICT are economic activities that contribute to GDP, and therefore a replacement of transport growth by growth in ICT-use need not be viewed as a threat to economic prosperity.

There should be an automatic presumption against investing in further infrastructure capacity as a solution to transport policy challenges. New roads and runways should be the last resort for policy-makers, not the first. Transport and planning policy should work together to provide an environment in which people have access to the things they need without having to travel. This necessitates a certain amount of communication between different government departments and between local, regional and central government. It also necessitates the promotion and acceptance of soft measures within the transport industry itself.

⁴² *Revisiting Coupling of Economic, Social Network, and Transport Growth in Light of Cybermobility and Restraint Policies.* (Glenn Lyons, 2006), Presentation in the International panel session 'Cybermobility and Evolution of Personal Travel' at the Transportation Research Board Conference, Washington, January 2006)

7 How the ICT sector can contribute

Through our research, we uncovered a number of current opportunities that the ICT sector should take if it wishes to influence the direction of government policy now.

- **Intelligent Infrastructure Futures Project.** The next steps of this substantial project are for government to consider how it accommodates the policy possibilities that ICT presents, from e-government and procurement to travel demand reduction. The Department for Transport will coordinate an inter-departmental group and will engage with a range of stakeholders, including ICT companies. ICT companies should be following this process closely and advocating a coherent approach with ICT as a mode of transport at its heart.
- **Transport Strategy Consultations in Scotland and Wales.** Both the Welsh Assembly Government and the Scottish Executive are consulting on their transport strategies. It is important that the ICT sector participates constructively in these policy-making processes.
- **Transport Innovation Fund.** The DfT has recently launched its Transport Innovation Fund.⁴³ There is an opportunity to bid for funds for projects that make innovative use of ICT for transport policy goals.
- **Transport Research.** We understand that DfT is planning to establish a virtual Transport Research Centre with substantial funding in order to research:
 - Transport and economic competitiveness
 - Transport and the environment
 - Transport and society
 - Transport and mobility
 - Transport and technology
 - Transport and policy

The uses of ICT as a mode of transport could fit into these themes and the ICT sector should consider how it could best participate.

In the longer term, the ICT sector should continue with targeted and coordinated advocacy. The ICT sector is already beginning to organise around this agenda. But even individual companies are sending out mixed messages in the various different forums they are involved in. The message that ICT can be used strategically as a mode of transport should be promulgated by all parts of companies, whether they are talking to local authorities, the NHS or the Department for Transport. Advocacy to government should focus on the following:

- Setting up mechanisms to monitor and evaluate the impact of existing planning policy guidance
- Changing the emphasis in planning guidance from a passive stance to active encouragement of the use of ICT for travel demand reduction
- Investigating how the National Transport Model can be enhanced to build in ICT as a mode of transport

⁴³ *Transport Innovation Fund* www.dft.gov.uk/stellent/groups/dft_about/documents/page/dft_about_611056.hcsp

- Amending DTI's guidance on telework to include information about the positive social and environmental aspects
- DfT advocating teleworking as one facet of the development of holistic travel plans, in the same way that it advocates the use by local authorities of Intelligent Transport Systems
- Government departments and all other public sector bodies developing their own sustainable transport plans, with ICT at the heart
- Reviewing existing strategic transport and planning policies through the lens of sustainable development. Ultimately, a different approach to transport policy that sees travel as a means to an end is needed. Policies should be developed that guarantee access to goods, services, people and work, and ICT should be seen as one mode of accessing these things, alongside traditional modes of transport such as road, rail or air.

ICT is not currently used as strategically as it might be by policy-makers in the UK, but there are a number of opportunities opening up now to move ICT up the transport policy agenda. The ICT sector has a central role to play in advocating to government a more holistic approach to transport policy-making that makes appropriate use of ICT, with all the social, economic and environmental benefits that will result.

Annex – organisations consulted

Our thanks to the 18 people we spoke to from the following organisations, for their time and interest:

Department for Environment, Food and Rural Affairs

Department for Transport

East of England Development Authority

Foresight team at the Office of Science and Technology
(now Office of Science and Innovation)

Gloucestershire County Council

Leeds City Council

Office of the Deputy Prime Minister
(now Department for Communities and Local Government)

Transport for London

University of the West of England

Welsh Assembly Government

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