Arthur D Little

Cambridge
Consultants

2013: creating a better journey

Participants

Jeremy Acklam	TheTrainline.com
Robert Castleman	Highways Agency
Brian Collins	Department for Transport
Tim Gammons	Arup
Andy Graham	White Willow Consulting
Mason Hatton	Peek Traffic
Sanjay Jamuar	Network Rail
Alison O'Connor	Arriva
Phil Pettitt	innovITS
Len Porter	Rail Safety and Standards Board
Chris Scoggins	National Rail Enquiries, ATOC
Richard Stephenson	Transport for London
David Threlfall	Hyder Consulting (UK)
Tony Walsh	Siemens Traffic Controls
Lucy Wickham	Mouchel
Lucas Wildervanck	TomTom

Hosts

Arthur D. Little

Marcus Beard
David Boulton
James Catmur
Axel Kappeler

Cambridge Consultants

Tim Fowler
Alex Geoghegan
Adam Guy
Liz Orme
Patrick Pordage
Laura Rule

Making Connections

Transport is fundamental to the economy as a means of connecting people and moving goods. Years of economic growth have stretched our transport systems beyond levels where they can operate as reliably and efficiently as we demand. In parallel, there is an ever increasing focus on carbon management, with one-quarter of the UK's man-made greenhouse gas emissions coming from transport. Recent sharp increases in fuel prices are also having a measurable impact on travelling patterns and affordability.

These competing demands mean that those in the transport sector - providers, suppliers, travellers and everyone else affected by the movement of people and goods - face ever greater personal and business challenges. New opportunities need to be unlocked if the sector is to avoid a negative impact on business, and benefit from new revenue streams. This requires innovative solutions that balance the traveller's desire for a better journey with the commercial transport sector's need for profitable business, and which also consider the overarching need for carbon efficiency and social inclusion.

Workshop of leading minds in transport

Cambridge Consultants and Arthur D. Little recently hosted a 24-hour event for leaders in the transport and technology sectors. The event - '2013: creating a better journey' - comprised two sets of facilitated workshops. The first sought to understand the breadth of features that might create a better journey, while the second explored how businesses can quickly unlock the opportunities for improvement.

To set the context for the next day's workshops, we invited Brian Collins, Chief Scientist at the Department for Transport, to deliver a keynote presentation. In this, he covered the needs of the traveller, the operator and society, and also specifically considered the investor. Predictable returns and the generation of long term value were highlighted as requirements for investment, and ongoing investment was shown to be of particular importance given the value to the wider economy of the transport network.

This report draws on the valuable discussions at the event, and reflects the views of the delegates on 'the better journey'. It provides ideas for how journeys can be improved, not only for the traveller, but as a means of creating new revenue opportunities for businesses.

'2013 - creating a better journey' was the third such event run by Cambridge Consultants and Arthur D. Little. The focus this year was not on policy, but on how to make better journeys a reality. On this there was consensus - the time is now.

Key Conclusions

By placing the traveller at the heart of the issue, delegates had a rich discussion on the positive and negative features of journeys. This created a framework in which the groups were able to unlock opportunities for the traveller, business, and society as a whole.

During the debate it was notable that organisations have started to recognise the need to consider the breadth of sustainability issues and to view them both in terms of the challenges and the opportunities they present for those involved in transport.

Three clear themes emerged from the discussions:

1. Sustainability

Carbon is an important issue, but sustainable transport is about much more than this. There needs to be a balance between the overall economic prosperity of UK plc on the one hand, and the environmental and social issues on the other, while of course maintaining revenue streams for businesses.

2. The Contextual Journey

Journeys have become more complex, requiring more real-time, relevant, tailored information. This is not only expected but needed if journeys are to be (a) planned in the context of other demands on the transport infrastructure, (b) carried out more reliably and flexibly, and (c) more tailored to the traveller.

3. The three i's

Information, Interfaces and Integration describe three critical factors for successful journeys, each of which are currently falling short of the demands of travellers.

The delegates felt that innovative businesses are recognising the challenges and opportunities in these areas and will change their service offerings to provide new and improved revenue streams. This will involve some new technology, or at least the application of existing technologies in new ways. However, technology is not the greatest barrier to change, as realistic solutions seem achievable. There is an evident need for deep collaboration and partnership between private firms and government bodies, and it is this joining up that is likely to present the greater challenge.

In this report we expand on these themes, and present what we think are four viable short term solutions of key interest to travellers and businesses alike.

How We Travel Today:
"you're never late for your car"

Transport is central to the economy

The transport of people and products is central to continued economic growth, social development and business success.

Whilst we strive for stronger economic success, both Government and society have rising expectations that transport providers will do more to tackle climate change by reducing carbon emissions. The Stern Review concluded that these aspirations are not mutually exclusive, and that only a modest fraction of our GDP is required to invest effectively in carbon reduction. In discussing this, the delegates broadened the discussion to take account of wider sustainability issues, agreeing that transport has a significant influence on society in terms of forming cohesive communities and enabling social inclusiveness.

"London is the most productive part of Western Europe's economy. Working together in densely populated areas has advantages, but this also leads to congestion. The problem is, if you 'mess around with congestion' by trying to reduce it through discouraging people from travelling into London, you undermine the economy"

Expectations for travel

Of course, while we seek to address these issues of sustainability and economic efficiency, our expectations of the journey only ever go up. We all expect better services, improved reliability and comfort, more choice, more up-to-date information, and, of course, little or no increase in cost.

The choices we make

The choices we make about our travel are hugely influenced by the reasons for the trip. The factors that influence the choice of journey for a family going on holiday with heavy baggage and children are likely to differ significantly from those of an individual travelling to a business meeting. We carefully plan some journeys - especially the businessman attending an important meeting with a high emphasis on punctual arrival and comfort - but a vast proportion of our journeys are substantially unplanned. Here the car scores highly.

The car provides us with ultimate flexibility and affords greater control over the journey when an unplanned event like a route closure happens. Even if the journey goes wrong after you set off, at least you will be comfortable and warm, with your choice of music. And of course, you will have a seat, which cannot be said of the packed commuter train.

The increased investment in public transport is a recent transport sector success story. More journeys are being made by rail in Britain than ever before (exceeding pre-Beeching levels). At peak times, parts of the rail network are operating at, or very close to, saturation levels. However, the proportion of journeys made by rail compared with the car is small, and rail will never be a solution for those living far from a station. For obvious financial reasons, public transport providers predominantly serve the most popular routes. Public transport therefore draws more people into heavily utilised transport arteries and any journey outside of these will be more complicated and difficult to achieve using anything other than the car. We now face a reality that increased use of public transport will require significant further investment, or fundamental changes to our attitudes and the way we travel and work.

"The problem with using a car is uncertainty over travel time, but the car offers such great flexibility. Travelling by car allows you to abdicate the need to plan"

Not only has the number of journeys we make increased, but so has the complexity of these journeys. That said, most of the journey components are poorly integrated and there can be a great deal of uncertainty about how reliable the whole journey will be. This often means that more time is allowed as contingency in case of an unforeseen delay. Consider a typical journey in which a person needs to attend a meeting in a major city. The car is the usual choice for moving from home to the station. But is there a car park space available and how much additional time is needed in case alternative parking is required? How much change is needed for the ticket machine? Will there be a seat available on the train so that the travel time can be spent usefully preparing for the meeting instead of being forced to stand? What parts of the journey are not covered by the ticket you buy, and what are the restrictions on the time of travel for the ticket purchased? Even the simplest journey can require many trivial considerations to be made if it is to run smoothly.

"With journeys as they currently are, you end up having to build in so much contingency"

Our choices under pressure

Our journeys can, and do, go very wrong. Often the pressures are structural and serve to illustrate that good planning on the part of the traveller is not sufficient on its own to deliver better journeys. Examples are not difficult to find, from the Heathrow Terminal 5 opening, through rail infrastructure work overruns, to unexpected snowfall causing travel chaos as our transport systems struggle to cope.

The rising price of fuel is perhaps the most obvious example of how conditions for transport providers and travellers are becoming increasingly tough, introducing another pressure point that will influence the delivery of better journeys.

Evidence is emerging that sharp increases in fuel price are finally having a tangible impact on the journeys that people make, and indeed those they now choose not to make. Fuel sales (by volume) were reported to be down by 20% in a 12 month period from 2007 to 2008[1], and short term bus and rail ticket sales are up. But whilst it may be easy to see this as entirely positive from the sustainability perspective, the reality is more complex. Taking just a few examples:

- The cost of supplying electricity to the rail network has increased by 67% in two years, and is projected to increase further. This can only have an adverse impact on transport providers' revenues and will require fare increases

- Train drivers are being encouraged to change driving behaviour to reduce fuel consumption by coasting into stations, with a potential impact on journey times

- Relatively higher pump prices in the UK are enabling continental lorries to undercut British hauliers, drawing record numbers of them onto our roads

- In a recent survey, over 70% of businesses said that congestion is having an impact on the effectiveness of their staff travelling for work and 80% said they felt that congestion on the UK's roads is getting worse

In summary, there is clear and increasing evidence that, in parallel with the general downturn in the economy, revenue streams for the more traditional businesses that operate in the transport sector are under pressure. This has in turn produced more adverse conditions for journey makers and travel providers alike, which will make it even harder to create better journeys.

[1] International Energy Agency

The Sustainable Journey:
"my other car's a bus"

It is evident that businesses are increasingly recognising the importance of carbon management, and that many are now realigning their operations to enhance sustainability performance and report on progress to stakeholders. For example, Eurostar have declared themselves the world's first 'carbon neutral' train operator, with a 25% carbon reduction target by 2012. Arriva has set a greenhouse gas reduction target of 15% over the period 2006 to 2012.

The Government is also demonstrating a commitment to making the UK's transport infrastructure more sustainable through its transport strategy and through recent investment decisions on issues such as rail electrification and high-speed lines.
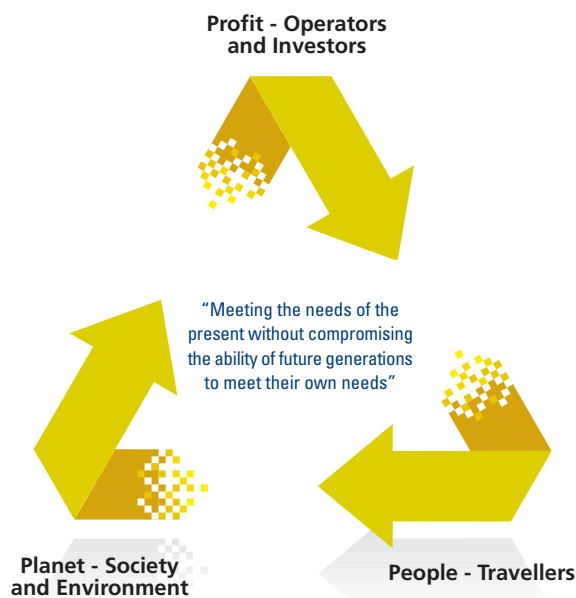
"[we] must improve every part of their travel experience, from leaving their front door to arriving safely at their final destination. If we are to achieve that, we must understand the full end-to-end journey."[2]

However, it is not all about carbon. Sustainability means maximising value to society (People) and the environment (Planet), whilst meeting economic (Profit) requirements. This is as relevant in the transport sector as in any other. We need to provide an effective, safe, comfortable and efficient transport system for people (and goods) that is managed in such a way as to reduce dependency on carbon, and addresses other environmental needs such as noise. Of course, it is also important to recognise that the businesses that have a stake in this sector (perhaps all businesses) need to make profit, or they themselves are unsustainable.

Successful businesses are increasingly looking at these issues as a source of business opportunity and advantage rather than as a threat.

Balancing the three issues - People, Planet and Profit - requires us to work at several levels. At the national level, Government must set direction by investing in different transport modes (new high-speed rail lines versus relieving congestion on roads). Regionally, transport investment must seek to influence our choices on how and where we shop,

how we spend our leisure time, and where we choose to live relative to our workplace. Ultimately, the traveller exercises choice based on the values they hold, the specifics of their situation, and the journeys they make. It is therefore too simplistic to talk of a modal shift to public transport. While the car remains the most flexible, convenient option, and while a good proportion of the population do not live close to a rail link, it is the traveller that will ultimately have the final say.

Profit - Operators and Investors

"Meeting the needs of the present without compromising the ability of future generations to meet their own needs"

Planet - Society and Environment

People - Travellers

What the traveller needs to take with them can also influence the choices they make. It might be more sustainable to walk, take the bus, and walk again at the other end, but this is simply not realistic with three children and lots of luggage.

Finally, it is important to recognise that, in many cases, a journey needs to offer more than just travel from A to B. The business traveller requires comfort and reliability, but also expects to be able to use the time valuably through good access to colleagues, clients and the office. The weary family, however, might choose to take a break in the journey to allow the children time to burn off some energy. Therefore, the choices people make will be crucially dependent upon their needs, and these will vary substantially between different travellers.

---

[2] Department for Transport's 'Towards a Sustainable Transport System: Supporting Economic Growth in a Low Carbon World'

The Contextual Journey:
"where am I going anyway?"

The increased complexity of our lives, and of the journeys we make, means that better real-time relevant information is both expected and needed if journeys are to be smarter, and if they are to meet our specific needs. The term 'Contextual Journey' conveys this mix of requirements.

The Contextual Journey is a journey that is planned and made in the context of:

• The traveller's specific needs (business or personal)

• The traveller's personal choices (weighing up conflicting demands)

• What other travellers are doing that may impact on you

Technological advances have meant that real-time, location-aware data is available to travellers, making the Contextual Journey a possibility in the short term. GPS chips are becoming standard in a wide range of communication devices, and so the convergence of map-enabled connected devices that know your diary, where the next meeting is to be held and how long it will take to get there is surely inevitable. Already, car satellite-navigation systems are basing their routing algorithms on user-generated journey time data, rather than assumptions about average speeds on generic road types.

This new way of looking at journeys is valuable, since it recognises the importance of placing the traveller at the centre of the journey as a customer, but does not ignore the much broader social, environmental and economic aspects. Rather than simply trying to move large numbers of people from A to B, it encourages the optimisation of the needs of individual travellers against the broader socio-economic factors that shape our collective need to travel.

Existing systems currently lack sufficiently detailed information about other travellers' plans. If integrated, this information could provide insights into our collective need for travel and enable us to understand the potential impact of other journeys on a specific journey. For example, predicted congestion patterns based on planned journeys or tickets sold for that period are not incorporated into planning engines. Often, the information needed to do this in a meaningful way is not easily accessible.

Journeys in 2008 are largely disaggregated, with the provider of each stage of the journey supporting the delivery only of their section. For the whole journey to be contextually managed, it is critical to successfully integrate the different parts of the journey. It is also critical that users can trust the information given to them. The problems evident with current satellite-navigation technology need to be avoided. For example, each device can in isolation recommend a route to avoid congestion, but the alternative route then gets more congested as the devices and data do not work in concert with one another. The truly contextual journey will go beyond simply recommending the theoretically faster route, and will be truly load-balancing based on user preferences and intelligent information integration.

Information, Interfaces & Integration:
## *Location, Location, Location*

Consider a typical journey that is more than just getting in the car and driving to your destination. Whatever the purpose of the journey, there are going to be interfaces - purchasing tickets online or at a ticket desk, parking the car in a car park, delivering a couriered package to a customer's house, checking in luggage at an airport, signing in at a car rental company, completing a taxi job. Any interface will introduce some complexity and uncertainty into a journey. However, the disaggregated nature of our transport network exacerbates the negative aspects. Arguably, we do not have a transport network at all, but a complex web of different systems. For example, when booking a flight or train online, it is rarely possible to book a car park space or transit bus at the same site. At some rail stations, even when parking is available, cash payment may be required - another inconvenience. Integrated ticketing is making some headway (for example, Oyster in London) but it is being rolled out piecemeal across the public transport network in different parts of the country, and it is questionable whether the various systems are truly interoperable. It is these types of interfaces that pose challenges for the traveller, and make the journey much less certain and more prone to problems. They also introduce barriers to accessing information relevant to the traveller as no one source can provide all we need.

Advances in information and communications technologies (such as the mobile internet) mean that individuals expect more and more information to be easily available regardless of their location. But does this translate into an ability to meet the demands of the traveller? The delegates thought not.

Firstly, the information that is available is highly fragmented, incomplete and difficult to access. It is underpinned by a disparate range of data sources, limiting the scope for portals to provide high quality, integrated, real-time predictive solutions. Various websites have attempted to provide trans-modal information on the options for travelling from A to B. For example, Transport Direct (www.transportdirect.info) goes some way towards providing what is needed by offering a multi-modal planning tool for the journey. These services are also available (in a cut down form) on mobile platforms. However, current services do not combine an understanding of the personalised needs of the traveller with algorithms that can reliably plan a realistic journey. This does not inspire confidence in the systems. Crucially, the true cost of the journey is difficult to ascertain at this planning stage.

Secondly, from a social perspective, not everyone is aware of the technology that can provide travel information. We must not just consider the 'travel addicts' with smart phones and electronic diaries. The majority of the travelling public have neither the desire nor the wherewithal to use such devices to their full extent.
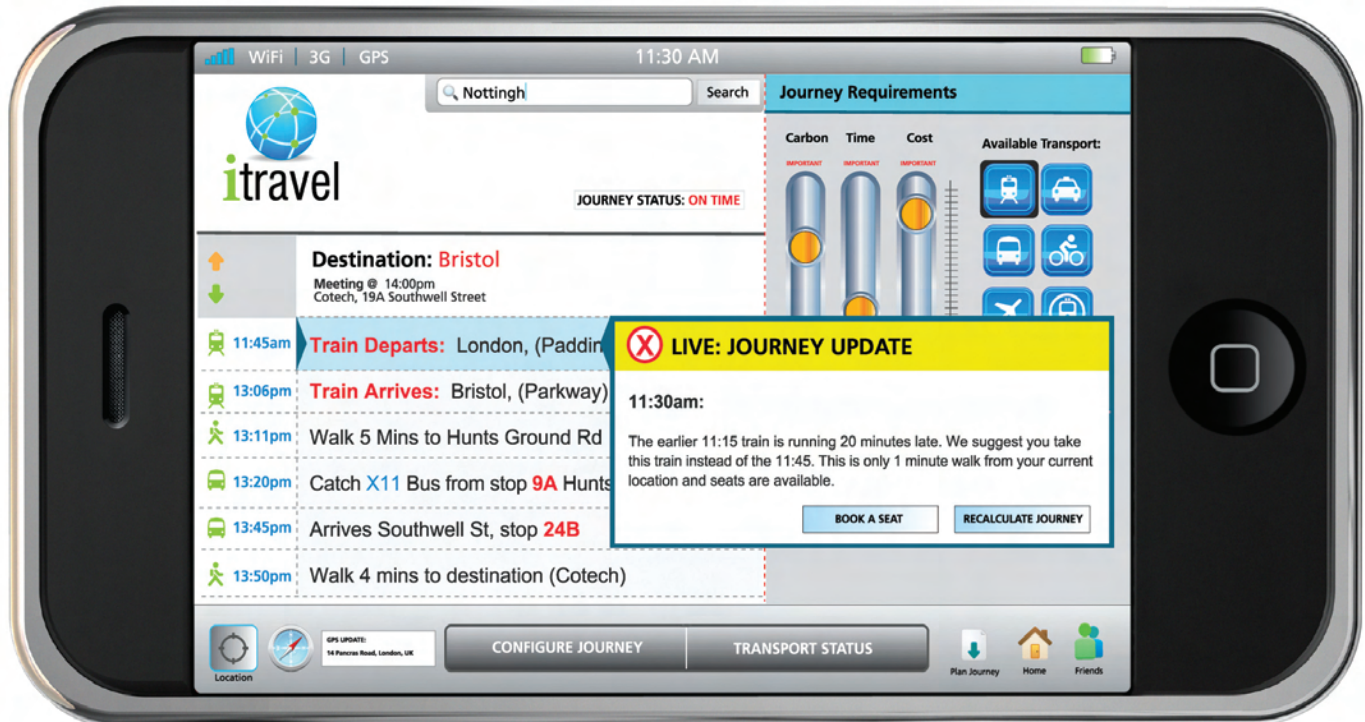
Thirdly, information is still generally a 'pull' service - the traveller needs to look for information, which takes effort and time. Ideally, highly relevant and timely contextual travel information would be 'pushed' to the user at critical points of the journey - before (is the planned journey congested?), during (available connection options at the next interchange), and after (data pushed back to data warehouses to provide better data for future planning of journeys).

Uncertainty in the planning phase of a journey extends into the journey itself, where the traveller has limited access to good quality, up-to-date information that keeps pace with changes in real-time and which could impact on decision-making. Information about delays or problems is frequently only available at the point of departure, making it impossible for travellers to use the information effectively once underway.

"Current travel planning websites are to a large extent great … but the data they use isn't"

Bringing information into transport through better integrated systems, and use of embedded intelligence and communications, is an emerging trend. The power of integrating information systems is that they enable a blurring of the boundaries between personal and public transport. In this way, we can give one mode many of the beneficial characteristics of the other. For example, nowadays you can listen to your choice of music whilst travelling to work on a commuter train or use a train's wi-fi access point to connect to the internet and send emails whilst in transit (assuming you can get a seat).

Pragmatic Solutions for the Short Term

Government is setting the longer term agenda for transport, recognising the criticality of its role in economic growth whilst accepting the need to address the sector's carbon dependency within the broader sustainability agenda. Government policy aside, it is clear that there is shorter term potential for businesses to more effectively contribute towards better journeys and, in so doing, safeguard their own revenue streams.

A wide range of ideas were generated through the facilitated workshops at the event and were drawn together into a number of themes. Four emerged as being potentially attractive from both a commercial and sustainability perspective, whilst being applicable within reasonable timescales:

- **Contextual journey assistant**. We need real-time, context-aware services that act as true assistants for us in making our travel choices when planning our journey. These would extend beyond the current web-based and mobile phone planning tools by tailoring the journey to meet our specific requirements and maintaining an awareness of the expected and actual status of other travellers. Key to the success of advanced journey planning would be real-time access to data warehouses of transport information, including timetables, costs, bookings and current usage of the relevant transport network. Integration of the new service with existing ubiquitous portals such as Google or Yahoo maps would provide a real incentive for businesses to offer their data.

- **Pocket travel buddy**. As a means of reaping the full benefits of the 'Contextual Journey', information will need to be 'pushed' to the traveller wherever they are, including during their journey. Recent advances in technology mean that this should not be a barrier.

Wireless communication is becoming more widespread, and devices are location aware, know our diaries, and will understand how to feed us relevant information when they think we need it. For example, Zoe's device knows she will be at home in Reading the night before a meeting in Bristol (and verifies this by checking the location via GPS). It will suggest the 'best' option for her journey around her personal requirements and the need for her to be at the meeting by 11am. Any problems that arise en-route that could affect Zoe's journey would trigger suggestions that are sent to her so that she can take action. And when she arrives at her meeting, there is no need for her diary to remind her of the "meeting in Bristol at 11am" because it knows she's already there!

- **Mobility budget.** We have seen a significant increase in the number of organisations embracing the sustainability agenda by developing and integrating sustainability strategies into their businesses. The mobility budget takes another angle on this, providing a 'budget' for employees and suppliers that can be used to 'purchase' company-related journeys through the year. The scheme would demonstrate commitment to reducing carbon emissions and could reduce travel expenditure by making the actual cost of business journeys explicit to the traveller, encouraging them to manage their journeys by weighing up their true value. Journeys with a smaller environmental impact would 'cost' less to budget holders, thereby encouraging more sustainable travel. The ideal solution might be a Government-led tax scheme, whereby the mobility budget would act as a new type of tax band, discouraging unnecessary journeys and encouraging the choice of more sustainable options. However, companies can - and are already able to - implement this without such governmental schemes.

- **Virtual mobility.** In this report we have discussed the impact of sharp increases in fuel cost and congestion on the economy. There is evidence that people are looking to change where they live and where they work to shorten their commutes - a reversal of the trend seen in the last 50 years. But whilst this might be seen as a threat to the transport sector by some, the smarter players could treat it as a market to be targeted to generate new revenue. It is certainly easy to see how the change could support reduced travel and expense costs for businesses. One business opportunity coming out of this is for companies to develop or invest in community-based offices. These would be office spaces close to where people live, in which desks and equipment can be rented short term, giving the advantage of good IT facilities, and the social benefits of going to work. All this with a short walk or bus ride to the 'office' in place of a one-hour commute.

A further three themes were recognised as having potential but were either not commercially attractive or too difficult to achieve in the timescales. Firstly, awareness of the planning options available could be improved through marketing activities, but the question is "who pays?". Secondly, demand profiling could help shape our collective journeys but this was seen as too futuristic. Finally, seamless ticketing could support many new services but a realistic timeframe for delivery remains some years off.

Conclusion

The needs of those making journeys today are not being fully met. Recurrent issues such as congestion and reliability are readily apparent, but beyond these travellers lack easy access to context-relevant information about their journeys that is well integrated across its interfaces. Compounding the challenge are factors including increasing transport costs (particularly fuel) and the broad range of sustainability issues that are more relevant to transport than ever before.

Solutions exist, and successful businesses are beginning to exploit them, but for the parts to come together into a meaningful whole:

- providers of transport services need to be more innovative;
- providers of information need to develop applications targeted at the transport sector;
- the rich data currently held in isolated pockets needs to be made more intelligently accessible;
- new entrants need to be encouraged to bring new services to the market; and
- new ways need to be found for regaining revenue lost where travellers forego their journeys altogether.

The message to businesses is clear: you don't need to wait for changes in Government policy to direct how journeys are managed. Instead, you should look for solutions now to improve journeys today, thereby providing advantage in both the short term and for the future.

Cambridge Consultants

Dr Liz Orme

Science Park
Milton Road
Cambridge
England CB4 0DW

Tel   +44 (0)1223 420024
Fax +44 (0)1223 423373

Liz.Orme@CambridgeConsultants.com
www.CambridgeConsultants.com

Arthur D Little

James Catmur

Science Park
Milton Road
Cambridge
CB4 0XL

Tel   0870 336 6700
Fax 0870 336 6701

catmur.james@adlittle.com
www.adlittle.uk.com

Printed on recycled paper