13. The emergent role of user innovation in reshaping traveler information services

Glenn Lyons, Juliet Jain, Val Mitchell and Andrew May

13.1. INTRODUCTION

The information age is now in full-flight. It is providing unprecedented connectivity between institutions and individuals, and amongst individuals. It is also accelerating the capacity to collect, manage, process, present and distribute data and information.

This chapter concerns itself not directly with the way in which the nature of the transport system may be in transition but with the way in which, in particular, information services that support the traveler may be in transition. This may, or may not, in turn affect significantly the ways in which our transport system is used.

The changing spectrum of technological possibilities in the information age in terms of communication and information exchange represents a pervasive technical change at the *landscape* level. Against this landscape the chapter identifies the Intelligent Transport Systems (ITS) sector as the *regime* epitomizing how the transport system has evolved to embrace the information age. This concerns the provision of 'top-down' information services to users that seek, typically, to cater for a (perceived) majority need. In turn the chapter raises the profile of, and considers how, *niche* developments of user innovation, especially associated with user-generated data and information and user co-operation, may or may not be gaining momentum as a groundswell of activity set to impinge upon the regime. Information services in the form of user innovation are arguably more agile and attuned to user needs. Developments in this field are mostly recent and rapidly evolving and the chapter contemplates the prospects for how and to what extent niche developments in user innovation may see ITS in transition.

13.1.1. The regime of intelligent transport

Technology has always played a major part in the shaping of our transport systems. It has been integral to the development and refinement of new modes of transport in terms of vehicle design and has underpinned development of the infrastructure in terms of construction techniques. As our transport system has evolved, increasingly technology has been looked to as a means to manage the flows of vehicles (public and private) and people through the system. The arrival of the information age in its early forms saw the

development of a particular field of professional activity in the transport sector, namely 'Intelligent Transport Systems' (ITS)[1]. A number of associations now exist worldwide that promote ITS on behalf of member organizations in the public and private sectors[2]. ITS is seen to encompass the use of technology – especially information technology - to support the management of transport systems and vehicles and to support travelers through the collection of data and its processing into information for operators and users. Traveler information services have been one key strand of ITS, with a now vast array of services making information available both before and during journeys and across a range of media. Such services have often been developed through partnerships between public authorities and industry (Lyons and Harman, 2002). Data for information services has tended to exist as a consequence of being collected for traffic and network management purposes.

The ITS field is now long established and is characterized by a top-down approach to its ongoing development as transport and allied information systems have evolved. The phrase 'Intelligent Transport Systems' merits comment. The word 'intelligent' aspires to reflect the way in which the use of information technologies can allow efficient management of the transport system as well as empower travelers to make fully informed choices about whether, when, where and how to travel. Ultimately, especially from a user perspective, ITS aims to facilitate better use of the transport system. An ever present question is whether or to what extent ITS actually achieves 'better use'?

13.1.2. The prospect of transition through ICTs

The mid-1990s saw the arrival of the Web and the subsequent mainstreaming of the Internet into society alongside the rapid penetration of mobile phone ownership and use. Accordingly the term IT has been superseded by the term ICT (information and *communications* technology). This can be seen to be reflective of the increasing extent to which individuals are now engaged, through information technology, with communicating – both with information services and with each other.

The apparent increase in pace with which the information age is unfolding heightens questions surrounding what this might mean in terms of impacts on the operation and use of our transport systems. One particular question forms the focus of this chapter, namely, given the increasingly widespread availability of ICTs and their growing multifunctional nature, *are we now entering into an era where the transport system user may innovate in using the 'everyday' ICTs around them to address transport challenges and issues they face*? In other words, set against the landscape of technological possibilities, might the top-down regime of ITS now be facing a niche development in the form of ICT-based user innovation? Could this see a transition into a new regime that redefines how ICTs are being employed in the transport sector? Using the transition pathways typology from chapter 3, the chapter goes on to address the matter of whether

[1] See also Chapter 2
[2] For example ITS (UK) - http://www.its-uk.org.uk/

user innovation will follow a transformation path (whereby it fills in some gaps but leaves the rules and routines of the ITS regime unchanged) or a reconfiguration path (whereby it has some knock-on effects that bring about changes in the 'architecture' of the regime).

We draw in particular upon insights from an ongoing research and development project in the UK called Ideas in Transit[3] (funded under the UK Government's Future Intelligent Transport Systems initiative). The project is seeking to better identify and understand the (propensity for the) occurrence of bottom-up, grass roots 'user innovation'.

The next part of the chapter develops an understanding of the concept of user innovation and what is likely to distinguish it from the top-down regime. It also considers factors relevant to the context in which user innovation may arise and perhaps flourish. The chapter goes on to illustrate some of the bottom-up innovations that have been emerging of relevance to the transport sector. This is intended to make clear the nature of the niche developments being referred to. The final part of the chapter then discusses the potential for bottom-up innovation to achieve meaningful impacts on passenger transport over and above that being achieved through more conventional ITS approaches.

13.2. EXAMINING THE PROSPECT OF USER INNOVATION

13.2.1. Defining innovation and user innovation

Definitions of innovation are associated with the emergence of a product or service into the market place, but the process of innovation may incorporate both creativity and invention. Thus, to pin point what exactly is innovation, we understand firstly, *creativity* is "the production of new ideas or combining old ideas in a new way" (Heye, 2006); secondly, *invention* is making an idea real (e.g. a prototype); and finally, *innovation* "is an invention that has a socioeconomic effect; innovation changes the way people live" (Chayutsahakij and Poggenpohl, 2002). It can be seen that the three are strongly related – an idea emerges which can then be converted from concept to reality and in turn applied in society. It is the social impact of innovation that is important in considering how niche development may coalesce in regime change.

The term 'user innovation' was coined by Von Hippel (2005) in relation to specific product innovations by users such as those involved in medical employment or sports participants. What then distinguishes user innovation from other innovation? User innovation implies that users have expertise in the field and are able to respond creatively and innovatively to specific user needs that are not met by traditional locations of innovation (e.g. manufacturers).Thus we developed our own definition of

[3] http://www.ideasintransit.org/

user innovation based on the above: *the creation and application of an invention initiated by affected individuals that stems from user need or curiosity to address a problem or challenge within social practice.*

Here the distinction between users and producers in relation to the end product is important. Users are firms or individuals that expect to benefit from *using* a product or service *themselves* as distinct from producers who expect to benefit from *selling* a product or service. Users tend to have a more accurate and detailed model of their needs but less knowledge of the solution approach than a specialized producer. Accordingly, user and producer innovations tend to be different – user innovations focus on functional novelty and are associated with a rich understanding of user needs, while producer innovations often focus on *incremental* improvements on well-known needs associated with requiring a rich understanding of technological developments. User innovation does not preclude subsequent commercial exploitation, although this may not be the main motivating factor.

In transport terms and specifically in relation to information services then the distinction between user and producer innovation could be seen as follows. Governments, transport authorities and operators provide centralized information services that aim to cater for all or most users. Journey planners that can interrogate (vast) databases of information on service provision and produce origin-destination travel options constitute the bedrock. Some such journey planners now combine information on more than one mode of travel. Incremental improvements have subsequently included changes to user interface design, added-value information attached to presented travel options, real-time information updates and refinements in how user requirements for travel options can be stipulated. It is well recognized that such systems will struggle to 'please all the people all of the time' which suggests that there will be a prevalence of unmet needs amongst a diverse user group. Such large systems are encumbered by their legacy approaches and can struggle to be agile in responding to unmet needs and new opportunities for innovation. Meanwhile individuals with such unmet needs, or those believing they can act in the interests of individuals with such unmet needs, may be better placed to focus attention on addressing this in the absence of legacy approach. However, they may potentially struggle to harness the necessary data, data processing and information distribution capability that is associated with institutional approaches.

13.2.2. Factors influencing user innovation

Key motivations for a user to innovate are (after Leadbeater, 2006; and Luthje, 2000):

- a need not being met (adequately) by the market;
- having relevant expertise and capabilities (skills, tools, facilities);
- the fun and enjoyment of the development process (and other incentives such as gaining social capital); and
- having an ability to share ideas (and knowledge/expertise) and work co-operatively with others.

In several cases such motivations are also enablers of user innovation.

Often, direct financial benefit is not a motivation for the user innovator. This orientation of motivation may lend itself more naturally to the generation of innovations that attune to *true* user needs (and thus have market potential) than commercial motivations in a producer innovation context where *perceptions* of market potential may be less well grounded at an early stage in the innovation process. In other words user innovation should be more likely to concern problems looking for solutions as opposed to solutions looking for problems.

Financial benefits are much more likely to be a *consequence* of successful user innovation rather than a catalyst or motivator. Grabher et al (2009) note that "financial incentives are often at odds with the collaborative ethos of communities and undermine credibility, which is built on passion and not profit". This underlines a very different motivation behind *user* innovation (as opposed to innovation per se) and suggests a likely difference in outcomes[4]. Gaining social capital as a motivator relates to the important notion of gift relationships. As Currah (2007) observes: "[g]ifts are driven by the accumulation of alternative forms of capital – for example, social capital … or cultural capital… . Quite simply, the overriding objective in a gift economy is to give away resources to secure and retain status."

The ability to share ideas is seen as a key motivator for user innovation. Traditionally this would have been very much dependent upon spatial proximity. However, the peer-to-peer communication now made possible by the Internet greatly assists the centrality of networks and co-operative behavior in user innovation.

It is instructive to recognize a number of design flaws that the Strategic Niche Management literature (Hoogma et al., 2002) identified on the basis of an analysis of from considering various 'experiments' concerning alternative transport approaches. These flaws which may characterize the top-down producer innovation approach (Hoogma et al., 2002) and can be seen to be reflective of the ITS regime:

- insufficient user involvement;
- too much focus on technical learning with the starting point being not a local problem but a solution;
- projects too focused to allow 'co-evolutionary' learning to occur (the combinations of policies, technologies etc. that will impact on travel behavior);
- experiments dominated by insiders who wanted to maintain the status quo; and
- too much of a technology push.

[4] Some individuals are motivated to innovate by the technical/intellectual challenge mores than by community sharing/belonging. Such individuals can be enlisted (outside of our notion of user innovation) as 'creative customers' by producers seeking to innovate - people who either are allowed to develop or customise a product belonging to an organisation or do it anyway. Their innovation is likely to be driven less by need than curiosity.

A key question is whether user innovation is better able to avoid such design flaws or indeed is able to more effectively expose such design flaws that relate to the existing regime in a way that would encourage support for regime transition.

We recognize that innovation constitutes a process or pathway that is followed. A user innovation begins with a trigger that, through creative thinking, becomes a local/personal invention; this may develop into a 'service' and can lead subsequently to wider adoption and diffusion. At each point in the innovation pathway the innovation can either progress, halt or fail. This innovation pathway relates to context (people, problems, environments, cultures, social practices), process (enablers, barriers) and outcomes (attitudes, behaviors, culture change, costs, benefits). Again in the context of co-operation, while the innovator is key, there will be other people (stakeholders) who along the pathway of innovation development play a part in supporting, funding and marketing.

13.3. EXAMPLES OF USER INNOVATION

The previous section has set out some of the factors and principles that are likely to govern the emergence of the phenomenon of user innovation in transport. This section highlights some examples of innovations – or at least inventions - that have already emerged in relation to supporting and influencing people's travel behavior. One element of the Ideas in Transit project has been to develop an *Innovations Portal*[5]. This is an online resource that highlights hundreds of innovations from many different countries that have been identified by the project and which are, in the main, relevant to transport. The reader is encouraged to visit the Portal to explore the richness of innovations that exist and which are continuing to emerge.

The selection of innovations presented here has been chosen with the intention of giving the reader a clear sense of the types of developments that constitute attempts at user innovation in transport as referred to in this chapter. The chosen examples aim to show: some of the diversity of innovation in terms of the problems or challenges being tackled; the centrality of users to the idea behind and creation of the innovation development; and how the use of user-generated data and co-operative behavior between users strong characterize the innovations concerned.

The examples together also provide a reminder that not all developments necessarily conveniently sit entirely within or outside user innovation in terms of the factors above shown to characterize such innovation.

[5] http://www.ideasintransit.org/wiki/Ideas_in_Transit

Further to introducing this selection of user innovations, the final section of the chapter will discuss how theory associated with user innovation and (early) practice come together to offer insights for the future.

13.3.1. CycleStreets

CycleStreets (see Figure 13.1) bills itself as "a UK-wide cycle journey planner system, which lets you plan routes from A to B by bike. It is designed by cyclists, for cyclists, and caters for the needs of both confident and less confident cyclists". At the time of writing the UK national government is still developing its version of a cycle journey planner[6] with limited coverage. Meanwhile CycleStreets draws upon the success of another user innovation - OpenStreetMap[7] (thus an illustration of an *innovation cascade*). OpenStreetMap (OSM) describes itself as follows: "OpenStreetMap is a free editable map of the whole world. It is made by people like you". Individuals voluntarily can input geographic information, a large part of which is transport related and in this case identifiable as relevant to cyclists. The mapping data can be used freely by such innovations.

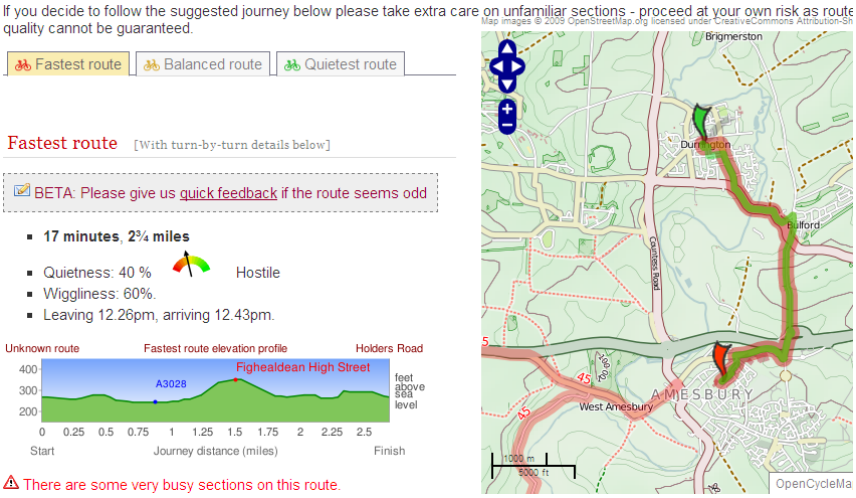

Figure 13.1 CycleStreets - http://www.cyclestreets.net/

Thus CycleStreets depends upon user-generated content for its existence and development while drawing advantage from the fact that users are tailoring information input to needs they know they have. It has been prompted into existence in part because the available information marketplace has not adequately catered for cyclists. Its creators, both regular cyclists, point out that "CycleStreets is being set up as a company

[6] http://www.transportdirect.info/
[7] http://www.openstreetmap.org/

(on a not-for-profit basis) or a charity to act as a vehicle for any incoming funds. We also plan to release the code as Open Source project and enable others to get involved."

The CycleStreets website provides commentary on a recent (April 2010) Freedom of Information request to the UK Government that reveals that the Government's own 'find a cycle route' service has cost nearly £2.4M to develop to date and has processed around 24,000 requests. In contrast, CycleStreets states that its own project "so far has been achieved on under £12,000, and our two main developers have worked entirely unpaid so far… . some 76,107 journeys have been planned in what is still our beta phase".

It can be seen from the above that CycleStreets embodies several of the factors relating to user innovation introduced earlier. The previous paragraph notably suggests that user innovation and its ability to harness the 'power of the crowd' can be highly cost effective.

13.3.2. ParkatmyHouse.com

The Ideas in Transit Innovations Portal portrays the history of the next selected innovation - 'ParkatmyHouse.com' (see Figure 13.2) - as follows "[i]n May 2006 a UK tourist in the USA, Anthony Eskinazi, *(nearing the end of his post-university round the world trip)* was failing to find a parking spot near a major sports stadium in San Francisco on match day when he saw an empty driveway close to the stadium. Realising a business opportunity for both homeowners and drivers he set up Parkatmyhouse.com on his return to the UK in June 2006".

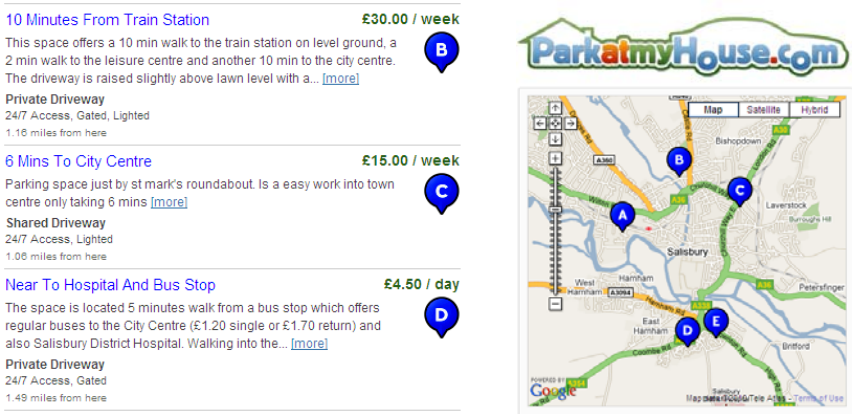

Figure 13.2 ParkatmyHouse.com - http://www.parkatmyhouse.co.uk/

On the innovation's website, Anthony argues "With resident permit holder bays springing up all over the country, car park prices making us wince and fines landing on windscreens at a record rate and with no sign of a slowdown, parking is becoming ever

more restricted, costly and stressful. At the same time, millions of driveways and car parks - next to major public transport hubs, town centres and theatres for example - stand empty when they could be providing parking for motorists and extra income to homeowners and businesses."

It seems a compelling proposition and is a service now in use. It raises questions as to whether it supports or aggravates government policies for sustainable transport although the website claims "as part of its green initiative" to have "formed an exclusive partnership with Zipcar, the world's largest car sharing company". While the scale of use is not immediately apparent from the website, there is clear evidence that the service is being used, endorsing perhaps the most distinctive aspect of this example – behind what is a particularly simple and yet highly creative idea is a demonstrable user need (now being met). It does appear that this innovation may have been motivated in part by commercial opportunity and indeed a fee is charged to parking space owners for any successful transactions. However, the origins and perhaps early motivations of the development are grounded in a directly experienced user need. The extent of this need across the car driving population remains to be seen (and may be changing over time).

13.3.3. PickupPal

PickupPal (see Figure 13.3) is based in the USA and on its website highlights a quote about itself from the Financial Post "[t]his innovative start-up using geopositioning technology could soon be as threatening to the status quo as the automobile was to the horse and buggy". This indicates the aspiration if not prospect of user innovation being a niche development that brings about regime transition.

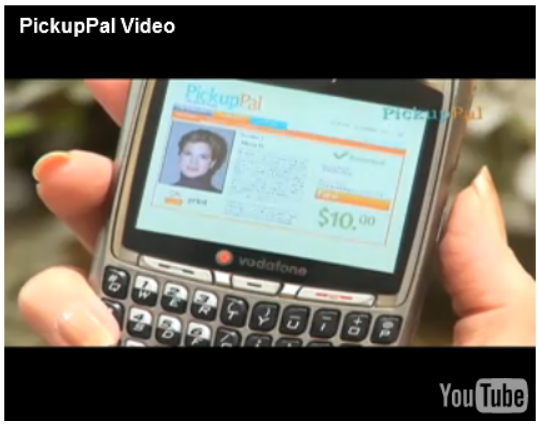

Figure 13.3 PickupPal - http://www.pickuppal.com

CEO and Co-founder, John Stewart states that "PickupPal was hatched while I sat stuck in traffic and wondering how all these vehicles could be harnessed to be more efficient instead of just the one-driver, one route function. I began to imagine a scenario wherein each vehicle was a transportation unit and everyone seeking a ride was a unique participant in a virtual 'transportation marketplace'".

PickupPal connects together drivers and passengers to allow ridesharing and includes the means for drivers to make offers to prospective passengers about the charge for the ride.

Ridesharing as a concept is a longstanding phenomenon but efforts to date to achieve widespread take-up have only met with limited success, reflecting in part people's reluctance to inconvenience themselves as a driver by subscribing to a service and then going 'out of their way' to share their vehicle with someone else. Arguably success has also been constrained by the rather mechanistic ways in which centralized systems try and act as brokers. A new generation of ridesharing brokerage services such as PickupPal capitalize on the connectivity of the Internet and mobile ICTs and also upon the existing social networks and networking that takes place: PickupPal "integrates with the most popular social networking tools, making it easier for people to share rides with others who have similar interests or with whom they are already connected via colleagues or friends". Launched in January 2008, PickupPal has over 140,000 members.

Another ridesharing development is called Carticipate[8] produced in San Francisco. Carticipate is a social network for ridesharing and carpooling available on the iPhone and Facebook which takes advantage of the location based services on the iPhone and matches riders and drives in the user's local area.

While such developments may operate on a commercial footing there is a distinct entrepreneurial spirit behind the innovations and, on the part of the creators, an empathy with, and direct experience of being, users.

13.3.4. TrainDelays

Train operators in the UK have policies about compensation entitlement in relation to delays caused to passengers by late running trains. Passengers have up to 28 days to submit a compensation claim after a delay has occurred. However, it can be cumbersome to identify delays and go through the process of making a claim. A disgruntled rail commuter, Chris Davy, set up a website[9] to make it easy for people to identify delays and submit claims. The service relies on contributors to report delays which can then be shared with others through the service. The service aims to make it easy to then submit claims. "Train Delays is a free service with the sole aim of bringing commuters together to make sure that we all make the claims that we are entitled to".

This example returns us to some of the key factors characteristic of user innovation: a problem or frustration being faced by users that has prompted the idea; an individual who is a user experiencing this problem and who has the expertise and capabilities to do

[8] http://www.carticipate.com/
[9] http://www.traindelays.co.uk

something about it; a motivation that is not derived from financial gain (in terms of the innovation helping others); and an emphasis upon co-operative working amongst users to help the innovation flourish.

13.3.5. MyBikeLane

An individual cyclist living in New York built and launched MyBikeLane (see Figure 13.4) in 2006 and continues to maintain it single-handedly. He writes on the website "MyBikeLane was conceived after repeated frustration at having to dodge cars illegally parked in the bike lanes. Several near crash experiences as a result of people too lazy to find valid parking motivated me to build this site". The site's aim is to use the power of the community to make the problem of illegal parking more prominent through exposure to the media and public officials in the hope of contributing to pressure to have something done about it. Contributors to the site can upload photos of illegally parked vehicles and indicate when and where the incident occurred and the license plate information.

Figure 13.4 MyBikeLane http://www.mybikelane.com/

Both this example and the last are reflective of how user innovation can arise from, and be a means to react to, frustrations about 'injustices' seen to exist within the operation of our transport systems.

13.3.6. Slugging

This last example is included as a reminder that user innovation is not new in transport but perhaps is now being accelerated or at least being made more visible through the Web. Slugging is an informal carpooling system that started in Washington, DC in the 1970s when high occupancy vehicle (HOV) lanes were introduced. A car needing additional passengers to meet the required 3-person HOV minimum will pull up to one of the known slug lines. The driver either displays a sign with the destination or calls out the destination. The people first in line for that particular destination then get into the car and are given a lift to the destination. No money is exchanged because of the mutual benefit; the car driver needs riders to access the HOV lane and the passengers

need a ride. Slug-Lines.Com comments that “[n]ot only is it free, but it gets people to and from work faster than the typical bus, metro, or train. It's unique because it is not a government sponsored commuter program, but one created out of ingenuity from local citizens to solve commuter problems”.

User innovations are not necessarily dependent upon the Internet but the set of examples presented here highlight how significant the connectivity it has brought about is for many innovations that rely upon a ‘self-help’ collaborative culture amongst users. The examples reflect targeted achievements, often with modest resource, which can emerge from as little as one person’s imagination, motivation and capabilities.

13.4. THE PROSPECTS OF TRANSITION

This final section of the chapter reflects upon developments in the user innovation space associated with transport in the context of the existing ITS regime and looks to the prospect for significant transition from this regime.

13.4.1. Uptake of user innovations

The creation of the Innovations Portal and its growing list of over 200 identified innovations could suggest a substantial groundswell of niche activity set to impinge upon the transport sector. However, there is a need to return to the essence of what defines an innovation: an innovation is an invention whose take-up influences social practice, i.e. changes the way people live or, in this case, travel. One can certainly find, in examining some of the example innovations above, that there are highlighted instances of individuals who offer praise for the development having had direct experience of it. However, there is precious little indication as yet that these ‘innovations’ have moved much further than the innovator and possibly early adopter stage in terms of the diffusion of the innovation (Rogers, 1962).

Even in the case of such examples as PickupPal with its 140,000+ members there is a distinction to be made between curiosity in the ideas which attracts membership (and media coverage – which several of the examples described in the last section have enjoyed) and application of the idea in social practice. Ridesharing schemes have been long known for their diminishing numbers from the stage of stated interest in the prospect, through sign-up to membership to actual ridesharing.

It can be suggested that the Web has made it easier to both (a) make visible creative ideas and inventions, and (b) to seek them out which may create an inflated impression of innovation at least in terms of the prospects for take-up and influence on social practice.

Several of the selected examples above are only a few years old. It could be the case that they have yet to be brought properly to the attention of a large audience of prospective

users (albeit that some, as noted, have enjoyed at least limited national media coverage). Conversely, it could be argued that some are long-enough established that were they to be truly holding the prospect of (appreciable) social change then electronic word-of-mouth made possible through ICTs would have seen more dramatic levels of membership/use. The question that follows is: what are the *future* prospects for large(r) scale take-up of (some of) the user innovations in the transport sector?

In contemplating this question there are insights relating to human behavior to suggest that the answer could be: 'rather limited' – inertial forces against change appear to exist. In the field of travel information services, it is now being recognized that most people, most of the time, do not need information in order to undertake their travel (Lyons, 2006). This stems from the fact that much travel undertaken by the public overall is local and routine: it is travel that people are familiar with to the point that their behaviors have become habitualized. Habit becomes prevalent because, it can be argued, many (or most) people are content with satisfactory options and outcomes to their travel. In other words they are adopting 'good enough' travel options rather than optimum (utility-maximized) solutions. People have other things on their minds aside from travel and this encourages them to look for short-cut decision making in relation to travel.

While a major short-cut is habit itself (i.e. an automated behavioral response such as always drive alone to work in the morning), another short-cut relates to the notion of anticipated regret (Loomes and Sugden, 1982). In this case an individual will only review their travel choice (and in so doing perhaps seeking further information) if they anticipate regretting not doing so with respect to the outcome of their travel choice (e.g. being late for an interview because of traffic could force consideration of travel options).

Added to the above, there is a sense that the challenge faced by society at large, and reflected in policy objectives, is not necessarily the challenge faced by each individual that makes up that society. Goodwin and Lyons (2010) have examined public attitudes towards congestion. UK evidence revealed that in 2005, 87 per cent of people thought congestion was a serious problem for the country as a whole (DfT, 2007). Yet other evidence from 2005 found 63 per cent of adults saying that road congestion was either not a very serious problem or not a problem at all for them personally (in spite of only 8 per cent indicating that they had not experienced congestion in the last month). For many, congestion is now seen as just a fact of life.

Not only could there be limited appetite for ICT-based innovations to help address travel behavior but there is evidence to suggest that ICT products are capitalizing upon people being on the move and upon being 'stuck in traffic' through their ability to make people's passing of travel time more bearable, enjoyable or productive and to help time *seem* to pass more quickly (see Lyons et al (2007) for evidence on such matters in relation to rail travel).

Such limitations to the take-up of developments intended to support or influence travel behavior are not unique to user innovations but apply to all such developments. For example, Farag and Lyons (2008) highlight what they argue to be a straightforward yet key observation: the effect of using public transport on using public transport *information* is stronger than the other way around. In other words, the propensity of people to consider using public transport is what affects people's need for information – the availability of information does not in itself prompt people to consider changing their behaviors.

Hence the question of uptake of user innovations may reside in what will motivate people to review their behavior. For example, it may need the cost of motoring to increase sharply before ridesharing services such as PickupPal truly flourish; cycling facilities may need to improve substantially, coupled with heightened awareness of public health before more people will choose to consider cycling - at which point the need for CycleStreets will become more pronounced; or parking may need to become truly intolerable in urban areas before people will seek out innovations such as ParkatmyHouse.com.

User innovations have distinctive characteristics to set them aside from, and seem more expressly attuned to user needs than, the top-down developments of the ITS regime. However, it can be suggested that this seemingly more socio-technical approach remains rather deficient in terms of its grasp of human behavior, in which case doubt remains concerning the scale of uptake and impact on travel behavior of user innovations.

13.4.2. Transformation or reconfiguration?

At present, the ITS sector (with its partnerships between government and industry) continues to rely upon its strength in terms of the infrastructure and systems put in place that provide for the gathering and management of data which in turn support (through data agreements) the provision of information services for operators and users of the transport system. An important question is: will the user innovations now emerging reconfigure the ITS regime or will they be transformational (filling in the gaps)?

The picture is not altogether clear. In relation to data there are signs that user innovation is both seeking to substitute for ITS provision and in some cases do things that traditional ITS is unable to. The example of OpenStreetMap is a case in point. National mapping agencies have traditionally been the custodians of geographic data able to support information services. Such data comes with assurances about accuracy and completeness. It has also tended to come at either a cost or with terms of use restrictions. OpenStreetMap is a new model for the generation of geographic data. As the level of contributor activity has grown so too has the coverage, accuracy and completeness of the mapping. The data is not subject to costs and restrictions for use in the same way as for the national mapping agencies (though see later) and this is seeing a spawning of subsequent innovations such as CycleStreets. OpenStreetMap brings into question the notion of 'completeness'. National agencies can ensure their mapping is

complete according to the defined elements that they presume to make up the set depicting mapping detail. Meanwhile, OpenStreetMap allows users to define and extend this set to include new elements specific to what are seen to be relevant to their, or the community's needs.

OpenStreetMap relates to geographic information. The opening up of data extends beyond this. There is scope for more user innovation to occur for example if public transport service information is made openly available by transit agencies and public transport operators. There are already early indications that when this happens, innovations can emerge quite rapidly and at minimal or no costs to the agencies or operators. This is in contrast to the slower and more costly traditional approach in which datasets are closely guarded and made available for use in carefully established and agreed partnerships between industry and public authorities to develop information services.

The rapidly developing culture of user generated content that the connectivity of the Web has made possible could have the potential to shake the foundations of the traditional ITS sector unless it adapts. Users have the capability through crowd behavior to generate data quickly and of a sort that may be difficult or impossible for top-down systems to address. Adaptation may take the form of established information service providers making using of user-generated data but it may also be the case that the market is opened up so widely by the availability of user-generated data that established providers are overwhelmed by more agile and numerous entrepreneurs who are now able to rapidly bring services to market.

So, there are real prospects for user innovation, or at least innovations derived from peer-to-peer and user generated data, to challenge the existing ITS regime. However, at the same time, some of the user innovations are more evidently filling in the gaps in terms of what may remain niche user needs - for example the services aimed at expressing user frustration with service provision such as MyBikeLane and TrainDelays.co.uk. To some extent the challenge to the existing regime may be dampened by the earlier points associated with human behavior concerning what can affect up-take of developments.

Another issue associated with how user innovation may interact with the ITS sector is that of whether or not the two can work together. In other words, is it conceivable for example that CycleStreets could in some way be 'taken over' or supported and managed by government and its suppliers? Could Ordnance Survey, the UK's national mapping agency, collaborate with volunteer mappers, and integrate professionally sourced and user generated data? In this way one might argue that the establishment can take advantage of users as a source of information that enables better services to be delivered back to users. However, it could be suggested that one of the things that motivates individuals to contribute to user-generated data services is that such services are 'outside of the establishment' – institutionalizing user generated data could fundamentally undermine its vitality.

13.4.3. Looking ahead

The picture concerning data and its role within the regime and amidst niche developments is not clear and the interactions with and between actors are not fully understood. However, added to this the picture continues to change. Indeed recent change suggests greater prospects for reconfiguration of the ITS regime. In the UK in March 2010, Prime Minister Brown made a speech entitled "Building Britain's Digital Future'[10]. He claimed that Government would support "unleashing the entrepreneurial, innovative and dynamic talents we have in Britain". He referred to the next generation 'semantic web'[11] and "new enterprises spun off from the new data, information and knowledge that flows more freely". The vision was of "the radical opening up of information and data" with an intention to bring about "making public data public". In stark contrast to how the UK's national mapping agency – the Ordnance Survey – has operated its business model as addressed above, the former Prime Minister announced that "from 1st April, we will be making a substantial package of information held by Ordnance Survey freely available to the public, without restrictions on re-use … Any business or individual will be free to embed this public data in their own websites and to use it in creative ways within their own applications".

Of course the wider automobility regime discussed elsewhere in this book is much more than only about data and information services. However, in terms of the ITS regime centered upon in this chapter the way in which information services are being developed could be fundamentally changing: data is being opened up for third parties (including users) to access freely; other data is being generated by users; there are then prospects for the different types of data to be made to work together; and user innovators and the power of the crowd are joining forces to deliver new information services that were not formerly possible. It would seem that at the very time of writing we are indeed experiencing the beginning of a transition in the way we conceive of, develop, engage with and experience using information services.

However, the significance of this regime transition for the higher level regime of automobility is bound into whether it affects, differently or to a greater extent, travel behavior. This itself may well be fundamentally dependent upon externalities such as oil prices, climate change pressures on policy and public health concerns. These may stimulate the public appetite for reappraising its travel behaviors and for entertaining adjustments to social norms (such as the norm of driving alone). In turn, the sorts of services sought by the travelling public may very much be those that user innovation is trying to deliver, based strongly upon peer-to-peer information sharing and needs matching.

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[10] http://www.number10.gov.uk/page22897

[11] The Semantic Web is an evolving development of the World Wide Web in which the meaning (semantics) of information and services on the web is defined, making it possible for the web to "understand" and satisfy the requests of people and machines to use the web content" - http://en.wikipedia.org/wiki/Semantic_Web

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[12] The Technology Strategy Board's role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. www.innovateuk.org

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