Visions for a walking and cycling focussed urban transport system

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ABSTRACT

Walking and cycling can make a considerable contribution to sustainable transport goals, building healthier and more sustainable communities and contributing to traffic and pollution reduction. There have been many national and local initiatives to promote walking and cycling, but without a long term vision and consistent strategy it is difficult to see how a significant change may be achieved. This paper presents three alternative visions for the role of walking and cycling in urban areas for the year 2030: each vision illustrates a 'desirable' walking- and cycling-oriented transport system against a different 'exogenous social background'. These visions have been developed through a process of expert discussion and review and are intended to provide a stimulus for and desirability of such alternative futures. Each is based on the UK and represents a substantial change to the current situation: in particular, each of the visions presents a view of a society where walking and cycling are considerably more important than is currently the case and where these modes cater for a much higher proportion of urban transport needs than at present. The visions show pictures of urban environments where dependence on motor vehicles has been reduced, in two of the visions to very low levels. The methodological approach for devising visions is informed by work on 'utopian thinking': a key concept underlying this approach is one of viewing the future in social constructivist terms (i.e. the future is what 'we', as a society, make it) rather than considering the future as something that can be 'scientifically' predicted by the extrapolation of current trends.

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1. Introduction

This paper seeks to develop and evaluate three alternative visions for the year 2030 in which walking and cycling play a substantially more central role in urban transportation than is currently the case. The aim is to explore the extent to which these modes could replace our current dependence on motorised transport with a view to creating urban environments which are safer, more sociable and less environmentally damaging. The visions seek to go beyond just small scale incremental changes to the existing transport systems and to explore the potential for more radical change. The focus is on walking and cycling as these modes have a high potential to address (at least in part) many of the problems which currently blight our urban areas, including road accidents, traffic induced air pollution, noise, severance and the

health issues associated with increasingly sedentary lifestyles. The paper is set out in a number of parts: Section 2 provides the rational for the research and some background; Section 3 outlines the methods used and three visions for walking and cycling; Section 4 provides further detail on the implications of each vision; and Section 5 concludes the paper.

2. Background

In the UK and many other places walking and cycling are secondary modes of transport – the environment for these modes and level of provision of facilities is often poor; levels of risk of injury are generally higher than for motorised modes; perceptions are often negative, their status is generally low; and the role that these modes play in society and individuals lives has the potential to be substantially enhanced. Cycling and walking have similarities – both involve the human body as a power system, they are exposed to the weather, both types of user are very vulnerable if

involved in a collision with a motor vehicle and both are unlicensed. However, despite these similarities, the two modes are fundamentally different and have different roles and requirements. Cyclists typically cover greater distances than walkers and usually require a surfaced road. Walking is almost ubiquitous (so much so that it is sometimes not considered as a means of transport) and requires little training, while cycling is a less common activity, not popular as a mode with large proportions of the population, it needs some equipment and does require a degree of learning and confidence.

Cycling and walking are both widely recognised as environmentally friendly and healthy modes of transport and the potential for increasing levels is substantial (for example, in Britain, 66% of trips are under 5 miles in length, a distance which could be cycled by many people in half an hour; while 19% of trips are under 1 mile, a distance which could be walked by many in less than 20 min (DfT, 2009)). Both modes, however, have been in long term decline. Cycle traffic declined from 23 to 5 billion passenger kilometres between 1952 and 2006, though there is evidence of an increase since the late 1990s (DfT, 2007a). Between 1995/7 and 2008 the number of trips per person made by bicycle fell by around 11% and the average distance travelled by 2% (DfT, 2009). Furthermore, there is a wide geographical divergence in the use of cycling, with cities such as York, Cambridge and Oxford having much higher levels than the national average. In Britain walking accounted for 35% of all trips in 1975/76, but this fell to 22% in 2008 (DfT, 2009). Despite this fall it is still an important mode of transport and in the UK it accounts for 76% of all trips under 1 mile (DfT, 2009). Whilst most people walk on a daily basis, the amount of walking is not equally distributed across the population; for example households without a car walk on average 65% further than those with a car.

Internationally, the United States and Canada have even lower levels of cycling, with approximately 1% and 2% of urban trips being made by bicycle in these countries respectively. In contrast, much higher levels of cycling are apparent in some parts of Northern Europe, with 28% of urban trips in the Netherlands made by bicycle (Pucher and Dijkstra, 2000), perhaps partly as a result of provision of high quality facilities and recent initiatives to promote policies such as bike and ride (Martens, 2006). Bassett et al. (2008) compared walking and cycling trips between various countries – around a quarter of trips in the UK are by walk or cycle, compared to just over 30% in Denmark, Finland, Germany and Sweden and close to 50% in the Netherlands. In many European cities, walking and cycling account for over 50% of all trips, and most recently in the UK the Sustainable Travel Demonstration Towns (DfT, 2007b) have already recorded substantial increases in walking and cycling. However, formidable obstacles to walking remain such as low density sprawl generating long trip distances, narrow or non-existent footways, inadequate crossing facilities and the growth of motorised traffic.

Cycling in countries such as the Netherlands, Germany and Denmark is often perceived as a good example of what can be achieved in terms of quantity and status. However, it was not always the case (Pucher and Buehler, 2008), as levels of cycling fell considerably between 1950 and 1975 in all three countries. It was only through changes in transport and planning policy in the mid 1970s and beyond that the current success story was generated. Together these points illustrate that with thought about the future, planning, effort, appropriate investment and most of all desire, it is possible to bring about change and to achieve desirable objectives. The key is to understand what kinds of transport futures are desirable and meet the aims and objectives of society, whilst still retaining an essential degree of functionality and workability. Without the thinking to conceptualise and define different futures it is unlikely that anything other than incremental change will occur.

Based upon this line of thinking, this paper sets out a number of visions (or future scenarios) for the year 2030 which bring about a step change in the level of walking and cycling in UK urban areas. The visions are intended as a basis for discussion and to help promote thought about what is involved in such futures (in terms of social contexts consistent with the visions) and whether they are desirable. The methodological approach for constructing visions is informed by work on general 'utopian thinking', as described in books by Levitas (1990), Harvey (2000) and Jameson (2005), with a specifically urban perspective addressed by Pinder (2002) and Sandercock (2003). Between them, these texts analyse the history of utopian thinking and examine the need for such thinking in the present day. Furthermore, they highlight past problems with utopian thinking, particularly when it has been perceived that such thinking leads to support for authoritarian regimes and describe approaches as to how such problems might be avoided in future. Of particular importance in this context is the idea that a utopia is seen as an ongoing open-ended process rather than as a fixed presently-determined end-state. The methodological approach is informed by various recent developments described in a special issue on 'Futures Methodologies' in the journal *Futures* (particularly Fuller and Loogma (2009), Booth et al. (2009), and van der Helm (2009)). A key element to these papers, which is followed in our visioning approach, is the concept of viewing the future in social constructivist terms (i.e. the future is what 'we', as a society, make it) rather than considering the future as something that can be 'scientifically' predicted by the extrapolation of current trends.

At the outset it should be made clear that the aim of the paper is to develop and describe the visions, rather than specify the process of achieving them from the current situation. Whilst the latter issue is of obvious interest, the methodological approach in the research being reported is firmly structured as a two stage process through which the visions are firmly established before considering the 'pathways' to the visions. The justification for this approach is that, if it were not followed, debate about the visions would be liable to be overlooked due to the interests in thinking about the next steps (and the problems associated with any particular next steps), thus leading to a generally incrementalist approach. To discuss the pathways to achieving the visions at this stage would inevitably introduce constraints to the visions through concern over what is realistic and achievable in the current political, financial and physical context. Our intention with these visions is to look beyond these constraints at genuine step-changes from the current situation in respect of walking and cycling and to consider how these futures may operate.

3. The visions

The three visions mentioned above focus on the potential role of walking and cycling and develop futures where these modes play a substantially enhanced role across UK urban areas compared to the present day. It is recognised that the visions are not necessarily desirable from the perspective of all types of road users or residents in the areas, indeed some may find the idea of the visions extremely undesirable and would much prefer alternative futures, perhaps focussing more on other modes of transport (these issues are considered further in Section 3). However, such controversy is in fact welcome, given that the role of the visions is to open up debate as to how far walking and cycling could meet urban transport needs, given particular background scenarios, with a view to creating more sustainable urban transport in a relatively short time period.

Although the main focus of the visions is upon their walking and cycling aspects, they also include 'background contexts' which are distinct from each other. The first vision assumes a context that

is 'similar' to the present day, whilst the second vision assumes a background that puts far greater emphasis upon social sustainability than in the present day, involving high levels of egalitarianism, social inclusion and social justice. The context for the third vision is an energy conscious society due to a widespread shortage of fuel. All the visions aim to create an environment where the quality of the experience is improved for those who already walk and cycle, but also an environment where substantially more people will walk and cycle. The context for all of these visions is the UK, though the generic ideas could be extended to other locations relatively easily.

The visions have been developed by a process of review, discussion amongst the members of the research team (drawing on a range of expertise including transport planning, mathematical modelling, urban design, socio-cultural change and computing sciences) and extensive discussion with (largely UK) stakeholders and experts through a series of workshops, project Advisory Committee meetings and presentations. The visions have developed substantially from their initial form as a result of these inputs, though inevitably they do not represent a complete consensus amongst all those involved. Given the complexity of thinking through the multitude of different aspects of how the transport system would change and operate in each of the different visions and the implications for other aspects of life in urban areas, it was considered most appropriate to start the process of development of the visions with experts who might be expected to be familiar with some of the implications of the changes proposed. This was also important as the aim of the project was very much to think beyond small scale changes to what already exists in urban areas, whilst still retaining a degree of realism. Work in later stages of the research will involve different groups of the public in discussions about the acceptability and workability of the ideas developed from their

individual perspectives and explore whether there are alternative visions which are seen to carry more merit. Following the methodological comments included in Section 1, the visions are intended not as definitive statements of how the future should be but as a stimulus to debate about possible futures; without such debate it seems likely that future change will remain predominantly incremental.

The visions are all based around an imaginary urban area, which is illustrated in Fig. 1. This area has characteristics which are easily recognisable and apparent in many UK urban areas and we have chosen to assume that it has a population equivalent to a medium sized city of around 250,000 people.

Each of the visions are presented partly in the form of a narrative which describes the more general features of these future urban areas and partly through a series of visualisations of how parts of the urban areas might look and how they might function in 2030. The visualisations inevitably only give a partial view of how the urban area has changed which is why the verbal narratives are crucially important to develop a picture of each of the different futures. Although we only present one image of each situation here in the paper, the research has developed a multitude of different visual images of each location and vision as well as animations which permit the user to move through each area. These images were mainly produced using industry standard Studio Max 3D software with some additional in-house programming elements. Our experience shows that these images, coupled with the narratives, are excellent as a tool for helping people to visualise different and possibly unfamiliar futures. In the sections below we give an overview of these narratives, though given the length of the paper it is only possible to give a flavour of each. Five areas of the city have been chosen and are shown as they are in 2010 in Fig. 2 and in each of the three visions for 2030 in Figs. 3–5.
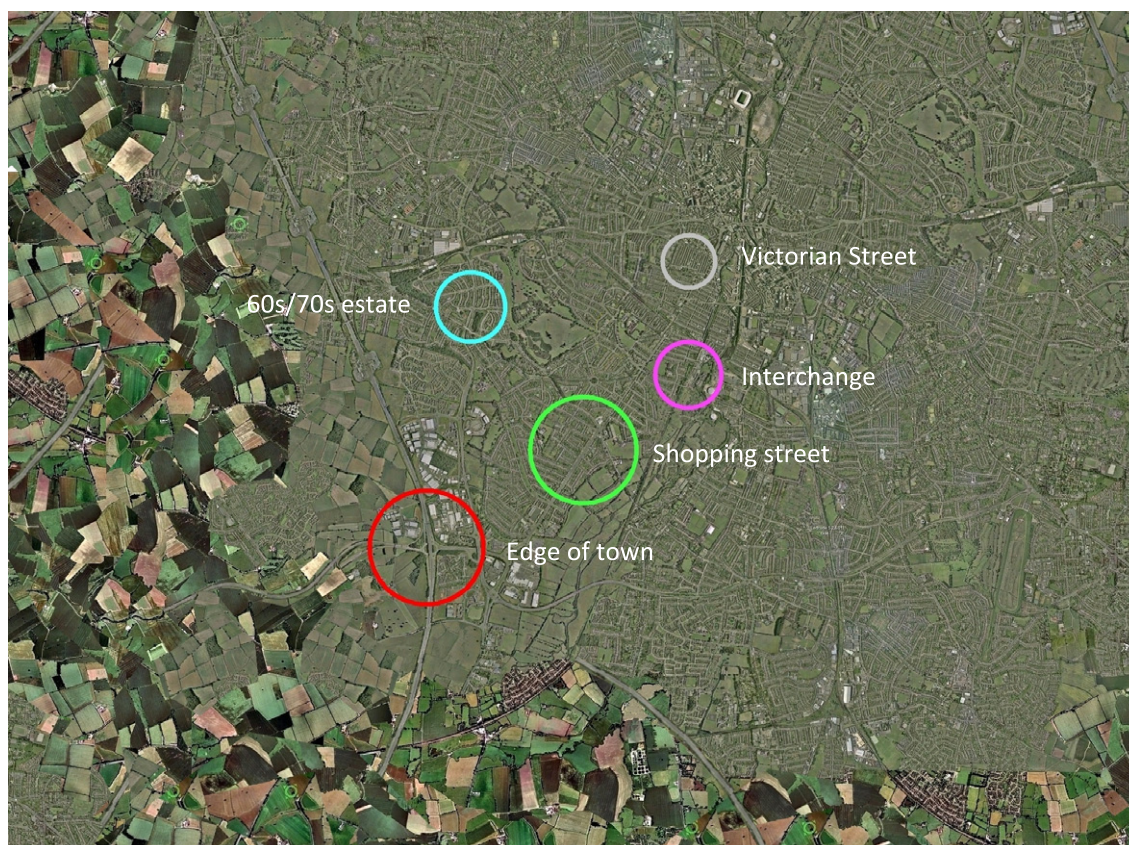

Fig. 1. Mock-up of hypothetical urban area showing location of different focal points for the study.

The areas are as follows:

- An older **Victorian Street** which would have been built initially for very different traffic requirements than is now the case and which has over the years adapted slowly to changing circumstance, not always successfully. It is very much constrained for space by the building line. On-road parking is the norm as the houses were designed before the need for parking was considered. The streetscape is cluttered and the mixed uses are difficult to accommodate. It is not an overly pleasant place to travel or live, and noise, safety and local air pollution are all issues.
- An **edge of town** location where the urban fabric meets open space. The city is bounded by a ring road, though beyond this there is now some development such as business parks and out of town shopping centres. Traffic on the ring road is heavy and pedestrian and bicycle access between the residential zones of the city and the facilities outside the ring road is difficult – most such access is by car for which the facilities have really been designed.
- A **suburban shopping area** containing mid-range shops and perhaps a small supermarket. An area with many competing uses – in part a through route for both traffic and pedestrians,

in part a destination in its own right. It is an area which has many problems, in particular safety issues for pedestrians, problems of parking and a complicated traffic mix, with public service vehicles and freight deliveries common.

- A more modern estate towards the edge of town (described here as **a 60s/70s estate**). This is essentially a residential estate, perhaps slightly run down and with the range of social problems which can characterise such areas. On the positive side there is a lot of space, as the estate was designed on a low density model, and hence, unlike the Victorian street, there is more room to construct a more walking and cycling friendly environment. The street scene shown has a large primary school on the left hand side of the road and hence some distinctively time-bounded pedestrian issues.
- A **suburban interchange**, in this case a rail station. This is an important link between the outer neighbourhoods of the city and the city centre. Access to and from the station on foot can be difficult due to conflicts with traffic. There are limited facilities at the station for bicycle parking.

The images presented in Fig. 2 of the imaginary city of 2010 have been developed from a mix of real life locations drawn from across various urban areas in the UK. They do not represent any

Fig. 2. Five different locations in the urban area of 2010.

Fig. 3. Five urban locations as they might appear in Vision One in 2030.

one location, rather an attempt to develop a typology of types of location that most people would feel familiar with. We have deliberately chosen not to highlight locations which are particularly bad for walking and cycling, or those which are especially good.

Table 1 shows current GB mode split for urban areas based on trip stages (hence, these figures take some account of short walks undertaken at the start and end of public transport and car trips) and a proposed mode split for 2030 in each of three alternative futures.

3.1. Vision One – European best practice

This vision of the future represents a widespread implementation of current best practice towards more sustainable travel behaviour, against a background of a world that is 'recognisably similar to today'. Examples of elements of this vision already exist in many urban areas around the world. Cities such as Delft, Groningen, Copenhagen and Munster in Europe all display aspects of this vision, as do cities such as Portland in Oregon. This vision also reflects the best practice as proposed by documents such as the UK Manual for Streets (DfT, 2007b).

In this vision we foresee moderate increase in walking and considerable increases in cycling relative to the current low base. Public transport usage has also increased, whilst car use within the urban area has substantially declined (see Table 1). One of the principal controls on car use is through control of the amount

and price of parking for cars, though congestion remains a problem and the permeability of the urban areas for car travel is reduced. Controls on driver behaviour such as Intelligent Speed Adaptation (ISA) are generally in place resulting in slower traffic speeds and greater conformity to speed limits. Much of the restricted level of car travel is for trips which remain impractical for either walking, cycling or public transport, and for those for which use of such modes would be difficult or impossible. Fig. 3 shows the locations from Fig. 2 as they may look in 2030 in the Vision One scenario (note that the buildings and physical dimensions of the streets remain essentially as in 2010).

The fundamental difference in Vision One from the current day is that best practices in terms of infrastructure and supporting measures for walking and cycling have been consistently applied, making these modes attractive choices to a much wider range of people than is currently the case: in particular bicycle paths are safer and pedestrian environments are more pleasant and such facilities are the norm in urban areas. There is a stricter land use policy to prevent further sprawl; with a real benefit that many people are within a short cycle ride of shops and other daily needs, though the fundamental structure of the urban area has remained largely the same as now. Walking and cycling are considered more important and central to good transport planning by those responsible for developing the urban transport system than at present, though not yet perceived as such universally by all sectors of society. There is increasing widespread recognition and understanding

Victorian Street 2030

Edge of town 2030

Shopping Street 2030

60s/70s estate 2030

Interchange 2030

Fig. 4. Five urban locations as they might appear in Vision Two in 2030.

of the wider benefits of a greater focus on walking and cycling, including potential benefits in terms of reduced carbon emissions, improved local air pollution, reductions in noise, increased sociability of the urban environment and improvements in health. Attitudes of all road users towards walking and cycling have improved.

In this vision public transport links more effectively with walking and cycling (see Fig. 3c and e) and provides the means for using these modes as part of longer journeys. In general public transport is substantially improved over the current situation in terms of key performance indicators such as reliability, comfort, convenience, cost and frequency. Interchange facilities between public transport and walking and cycling are improved.

The road hierarchy has become more transparent, particularly as it relates to walking and cycling. Specific spaces for these modes are the norm on all streets (see Fig. 3 all images) and some differentiation has been made for fast and slow cycling. The networks for walking and cycling are more highly connected and legible than is the case at present. Online information on routes is widely available and waymarking and signposting are commonplace (see Fig. 3d). Road safety has generally improved, though some accidents still occur. Legislation regulates between the different classes of road users in favour of non-motorised road users. Instinctively the notion that driving is a right, and only motor vehicles have a 'right to the road', has been changed. Park and ride (or cycle and ride) are provided on the perimeter of the urban area.

There is a legal mandate for a proportion of yearly expenditure to be spent on making real improvements for cycling and walking. In particular, Local Authorities are now required to implement a 'core network' of cycling paths and quality walking spaces with legal minimum levels of provision (including parking) based upon density of population. To combat bicycle theft there are partnerships with shops and police to provide marking and prevent selling of stolen bikes. Maintenance and enforcement of the cycle network and footpaths is also exemplary. Street clutter is reduced from present day levels to make movement through the urban area on foot as easy as possible and to ensure minimum standards for footway width.

Freight transport and deliveries are still largely undertaken by lorries and vans (though with a greater dependence within the urban area on electric vehicles). Significant advancements have taken place in home delivery systems and 'freight windows' for stock deliveries in city centres.

3.2. Vision Two – a car-free public transport orientated future

In this vision there is a substantive difference in transport behaviour in urban areas: walking, cycling and public transport mode shares are much higher than in Vision One and the base case (see Table 1), accompanied by lower car use (so that it is now a minority mode). As said above, the background for this transport

Victorian Street 2030

Edge of town 2030

Shopping Street 2030

60s/70s estate 2030

Interchange 2030

Fig. 5. Five urban locations as they might appear in Vision Three in 2030.

Table 1
Approximate mode split (trip stages) for the current situation and the three 2030 visions.

	Current situation (2006)[a] (%)	2030 Vision One (%)	2030 Vision Two (%)	2030 Vision Three (%)
Walk	28	32	37	40
Cycle	1	13	23	40
Public transport	12	25	35	15
Car	59	30	5	5

[a] Source: National Travel Survey, 2006.

vision is a society that puts far greater emphasis upon social sustainability than in the present day, involving high levels of egalitarianism, social inclusion and social justice.

Fig. 4 shows the same five locations as in Figs. 2 and 3 and how they may look in 2030 under the Vision Two scenario.

In Vision Two car use in urban areas is curtailed through government action and through the positive appeal of alternative modes of travel. Most people do not own or use a car (see Fig. 4 all images) and the principal private car users are those with mobility difficulties who cannot realistically use 'active' modes and a small number of people whose mode of transport needs to be prompt (doctors doing home visits may be an example). Where practicable all these car users make use of car pooling and integrate car use with the enhanced public transport network. Car design takes on board latest technological developments, for

example to support automatic speed reduction and carbon emission reduction.

Most school children walk and cycle to school, whilst enhancing walking and cycling is a central concern for transport planners. Small scale technological developments are commonly used by pedestrians, including: electronic navigation for people who benefit from additional support; pedometers and accelerometers available free from health centres; and careful use of surveillance. Technological developments that have increased take-up of cycling include electric bicycles and electronic navigation.

Public transport is generally of a higher quality than in the present day, so that it fulfils many of the transport needs previously fulfilled by the car (see Fig. 4e), and there is substantially more public transport than in Vision One. Short trips in urban areas are undertaken on foot or bicycle with easy access to public transport interchanges, while longer trips within the urban areas are typically undertaken on public transport, although the walking and cycling enthusiast may choose these modes in lieu of public transport. Door-to-door public transport provides access to high standard dial-a-ride systems.

Land use patterns in urban areas support the infrastructure for improved public transport, and while the road network is essentially similar to Vision One, the distribution of space on the road network has changed with a greater focus on walking and cycling (see Fig. 4 all images). Easily accessible transport interchanges are provided in neighbourhoods within close proximity to most residences and there is increased use of streets as social spaces for children and others.

Whilst there would inevitably be an increase in the number of public transport vehicles, it is in general expected that these would be segregated from the walking and cycling networks. However, within residential neighbourhoods smaller public transport vehicles will share road space with pedestrians and cyclists (see Fig. 4a and d).

Freight is transported from distribution centres by a fleet of small electric vans which would be segregated from the walking/cycling network where possible.

The city is much more 'civilised', insofar as it operates on a model of greater sociability and accessibility, so for example neighbours assist with helping each other to move around, thus reducing isolation; there is respect for other passengers using public transport; road safety is significantly improved (serious collisions between vehicles are extremely rare, and, when they do happen, involve vehicles travelling at relatively low speeds); noise and pollution from traffic is reduced; and levels of public health across the population are substantially greater than those in 2010.

3.3. Vision Three – a localised energy efficient future

In this vision serious constraints on energy usage have made the traditional car virtually obsolete and represents a radical shift towards more sustainable travel behaviour. Walking and cycling are associated with high levels of 'smart technology', leading to high use of Human Powered/Assisted Vehicles (HPVs) and are the predominant modes of urban transit (see Table 1). Buses and trams, accounting for only 15% of the modal share, are restricted to segregated and direct routes to and from the urban core. The principal car users are those with mobility difficulties who cannot realistically use 'active' modes.

Whilst the levels of technology for walkers and cyclists exceed those in Vision Two, their extent is somewhat limited by energy constraints. Examples include: 'neighbourhood electric vehicles (NEVs)'; electric bicycles; 'airport-style' moving walkways; covered/weatherproof walking and cycling networks; electronically-assisted bicycle security; and electronic navigation technology for cyclists, pedestrians and those who are partially-sighted (see Fig. 5a, d and e).

Road safety has significantly improved; serious collisions between vehicles are extremely rare and, when they do happen, involve vehicles travelling at relatively low speeds (~20 mph). As in Vision Two the city is also much more 'civilised', insofar as it operates on a model of greater sociability and accessibility; traffic noise is almost non-existent and levels of public health are substantially greater than those in 2010. Moreover, private cars are no longer the status symbol they once were.

Land use has changed considerably from 2010 patterns. Local, neighbourhood facilities predominate at the expense of 'out of town' shopping centres (see Fig. 5d) and residents living within the urban area can easily travel as a pedestrian or by bicycle for the majority of their trips. Individuals entering the city from surrounding areas, where required, are able to hire bicycles from 'mobility hubs' situated around the city boundary (see Fig. 5b) and either cycle or walk into the urban core.

Freight is transported from distribution centres at the edge of the urban area to locations in the city through a mix of bicycle transportation and electric goods vehicles, supported by online delivery-booking technology and mobility hubs at the edges of the urban area.

4. Critical interrogation of the visions

In this section we interrogate the visions given in Section 2 in order to dig deeper into exactly what is involved with each vision, with respect to their walking and cycling aspects and with respect to their background contexts. Many of the issues covered in this section were raised in the series of workshops, project Advisory Committee meetings and presentations mentioned in Section 2. Whilst more attention will be paid to the descriptive narratives than the visualisations, the latter will be mentioned at appropriate times. Where phrases from Section 2 are used in this section they are given in (double) quotation marks.

4.1. Are the visions desirable and, if so, in what respects?

It is clear that, in contrast to traditional *forecasting techniques*, by which (current) trends are extrapolated to a future target year, the methodological approach described in Section 2 is based upon the creation of *desirable futures* (which will almost certainly involve trend-breaks). However, in saying this, a number of awkward questions arise. The most obvious such question concerns whether Vision Three is at all desirable, given that it involves a vision that has "serious constraints on energy usage". A simple response to this question is that, given a (presumably) undesirable context, the response by society in terms of providing attractive walking and cycling facilities is desirable. However, this response immediately raises the issue of the dividing line between, on the one hand, walking and cycling aspects of the future, and, on the other hand, background aspects. This issue will be further addressed below. For the present, it is sufficient to say that a clear dividing line (whilst attractive for conceptualisation) probably does not exist in reality.

A second awkward question with respect to desirability concerns the perspective from which something is judged to be desirable. Clearly, advocates of walking and cycling will find many of the aspects of the three visions desirable. However, it should not be assumed that all such advocates support all aspects of the visions. For example, some cycling enthusiasts might object to the fact that, in Vision One, the physical layout shown in the Victorian Street scene (Fig. 3a) would require them to move relatively slowly (at least in residential areas). Furthermore, those who are not advocates of walking and cycling might find many of the aspects of the visions undesirable. This is particularly the case in Vision One, in which walking and cycling are "not yet perceived...by all sectors of society" as being "more important and central to good transport planning...than at present". The narrative describes a number of restrictions which are put on car use that some in the present day (and perhaps in the future) might find excessively coercive.

A final point about desirability concerns the related issues of choice and political control in the visions. Whilst the background context to Vision One is similar to 2010, Visions Two and Three have widely different contexts. Who is making the decisions in the latter two visions and how are decisions made? Is there a need for 'strong government'? These questions will be addressed further below. Even in Vision One, which is 'similar to 2010', travel mode choices made by individuals will be significantly different to those that can be observed today and, as indicated above, questions arise as to whether these choices are at all coerced. These questions in turn lead to further questions about what 'coercion' means exactly. Furthermore, all these questions need to be viewed from a perspective of 'social change'. Whilst, as stated at the beginning, it is not the aim of this paper to describe particular pathways to the visions, some introductory thinking can be made about processes of change that will influence the pathways: the subsequent questions in this section help lay down some foundational issues for such thinking.

4.2. Do the visions represent systems that are stable or are changing in terms of walking/cycling use and facilities? If the latter, what aspects of them are changing?

The methodological approach of creation of (future) visions is very similar to the approach used in the creation of (future) utopia,

a subject that has captured the imagination of a number of thinkers over more than two thousand years (an early example of a utopia being the political organisation of society described by the Greek philosopher Plato). As mentioned above in Section 1, an important and continuing critique of many types of utopia is that they represent a future in which nothing is changing (see in particular Levitas, 1990). Whilst it might seem strange to some people to think of society as not being in a state of dynamic evolution, the fact is that many creators of 'traditional utopias' made exactly such an assumption, and it is inevitable that some traces of this approach still appear in (some) present day utopian thinking. As stated above, the alternative to creating a fixed view of the future is to think of the future as a dynamic process, in which the representation of a specific future year is the representation of a particular stage in such a process. With respect to the three visions, various comments can be made. Firstly, the visualisations (shown in Figs. 3–5) are inevitably snap-shots of specific moments in time, and it is difficult to judge from these whether they represent a static picture or a stage in a (dynamic) process. To make such a judgement, it is necessary to analyse the narrative descriptions of the visions. This analysis greatly benefits by distinguishing between different aspects of the visions, with three broad categories of aspects being considered: technological; infrastructural (including both transport infrastructure and general urban form); and social (covering peoplés attitudes and behaviour, both individual and collective). With respect to the last of these categories, some degree of social change must occur at some point before 2030 (particularly in the case of Visions Two and Three): however, it is not clear from the narrative descriptions as to whether change is still taking place in 2030. However, with respect to technological and infrastructural aspects, the narratives throw more light on this issue. In general, Vision Three has a greater degree of both technological and land use change than Vision Two, which has a greater degree of change than Vision One. Given that technological and land use changes inevitably take place over a long time cycle, it can be concluded that Vision Three certainly represents a system in a process of dynamic change in 2030, and that the same can probably be said (though with less certainty) for Vision Two.

4.3. Do the visions imply any causal relationships?

The answer to the previous question put the spotlight on the issue of change, and in particular change between the present day and 2030. Whilst it is beyond the scope of this paper to examine processes of such change in any detail, it can safely be asserted that, in order to understand change, it is important to understand the relationship between factors involved in change. In particular, it is useful to consider if any factors are *caused* by other factors. To initiate such thinking, we can examine the visions to see if it is implied that any factors are *causally dominant*. The first point to make here is that, in both Visions Two and Three, the background contexts have a strong causal impact on walking and cycling. This issue will be discussed further below. With respect to the transport sector, the main two *immediate* causal factors are: (i) walking and cycling becomes more attractive (as is well illustrated in the visualisations); and (ii) car use becomes more restricted, i.e. less attractive. In Vision Two, an extra driving factor is the substantial improvement in public transport. The question then arises as to whether any *secondary* factors are specified (or at least implied) which cause these transport factors to change. This issue is most directly tackled in the narrative for Vision Two in which it is stated "car use in urban areas is curtailed through government action through the positive appeal of alternative modes of travel". This immediately raises a fundamental question as to whether strong government is essential for bringing about low energy futures, and in particular whether strong national government is necessary.

This is the implication in Vision One, for which there "is a legal mandate for a proportion of yearly expenditure to be spent on making real improvements for cycling and walking", implying that national government takes a strong role with respect to local government issues or new governance structures are established that provide local or regional authorities with more fiscal sovereignty than in the current UK system.

4.4. What is the role of the concept of background contexts in this analysis?

The question of background contexts has already been raised above. In general, in this type of visioning exercise there is an attraction in thinking of a strict division between an *exogenous* (future) background society and an *endogenous* transport sector that operates against this background (and is, to an extent, causally determined by it). However, how *realistic* is this conceptualisation? The first point to note here is that the levels of mode share for walking and cycling in Visions Two and Three (shown in Table 1) are simply unbelievable unless strong (background) changes have taken place in society. It follows that changes in exogenous background cannot be ignored; though it should not be forgotten that Vision One also represents a radical change for the UK transport system. The question about realism is thus more concerned as to the realism of the (assumed) strict division between an exogenous background and an endogenous transport sector, and whether it is realistic to assume that exogenous factors have (only) one-way causal impacts on endogenous factors. Two points can be made here. Firstly, if it is believed that the transport sector has an important impact on society (as would be implied by the New Mobilities Paradigm (Sheller and Urry, 2006)), the division between exogenous and endogenous becomes more (conceptually) complex (though not necessarily less attractive). Secondly, in the case of the visions presented in this paper, these questions can probably only be fully resolved by examining the pathways that lead (from the present day) to the visions, and not by considering the visions themselves in isolation. As already stated, the consideration of pathways goes beyond the remit of the current paper. However, even without examining pathways, there are still useful insights that can be gained from further analysis of the exogenous backgrounds to the visions, and these insights are now presented.

4.5. If the exogenous backgrounds are different to the present day, is this difference local or 'global' (national, continental or worldwide)? What is the relevance of this difference to walking and cycling?

As has already been mentioned, the exogenous backgrounds of the three visions are summarised as: similarity to the present day (Vision One); a high degree of social change (Vision Two); and a fuel shortage accompanied by a high level of technological development (Vision Three). It follows that the issue about *local* versus *global* dimensions of exogenous change is only relevant to Visions Two and Three. Taking Vision Three first, it is not actually spelt out in the narrative whether the fuel shortage is global or not. However, for the impact of the shortage to be as strong as it is (and for the world not to descend into continuing war over fuel resources) it must be assumed that the shortage is global. Whether the high level of technological development is a global phenomenon, or restricted to a national/continental region, is underdetermined by the description. It is highly unlikely though for such development to exist purely on an individual city level. With respect to Vision Two, the characterisation of global versus local is also underdetermined by the narrative description, and a number of highly different variants are consistent with the vision. At one extreme, Vision Two can be seen as representing an isolated 'civilised' city enclave which has changed in the midst of a world that

has (in relative terms) stood still. At the other extreme, Vision Two can be seen as involving a future in which high levels of social change have occurred throughout the world. Many other possibilities (such as change limited to regional, national or EU level) lie between these extremes.

What difference does the global/local distinction make for walking and cycling? A first point to make here is that the visions only describe urban transport, with virtually no mention being made about what happens outside the city. Clearly the political relationship between a city and its periurban/rural surrounding areas will have a large impact on many issues concerned with walking and cycling in the city. For example, if the surrounding areas of a pedestrian/cyclist-friendly city enclave are seen as being car-friendly, what will be the demographic effect? One scenario could envisage that those in the surrounding areas that are favourable to walking and cycling will migrate to the city, whilst those city-dwellers who feel attached to their cars will move in the opposite direction. At first sight this might seem to be an attractive solution. However, many boundary issues will inevitably arise, given that those living outside the city will presumably need to visit the city at some time, and those living in the city might wish to travel outside (which could be difficult without a car). Furthermore, a question arises as to whether the overall impact of this relocation might lead in fact to an increase in fuel use (aggregating the city and its surrounding areas). On the other hand, if periurban and rural areas become highly pedestrian/cyclist-oriented, what will this entail in terms of practical lifestyles in such areas?

5. Conclusions

This paper has set out a number of visions for the year 2030 which bring about a step change in the level of walking and cycling in UK urban areas. The visions are intended as a basis for discussion and to help promote thought about what is involved in "pedestrian and cyclist friendly futures" and whether such futures are desirable. Vision One assumes a social context "similar to the present day" and focuses upon circumstances which largely exist already in a number of continental European urban areas and elsewhere. Visions Two and Three assume radically different social contexts to the present day and the urban areas described in these visions are very different to what exists in 2010. The benefits of the "walking and cycling" aspects of all three visions are potentially extensive – reduced local noise and air pollution, decrease in emissions of greenhouse gases, improved safety, better fitness levels of the population, as well as changes which are more difficult to quantify such as greater sociability of the urban environment, increased freedoms for children to use the environment and an overall improvement in urban quality of life.

Given that the visions have been developed specifically in the context of a medium sized city of 250,000 people, an important question relates to their transferability to urban locations of different sizes in the UK and to urban areas outside the UK. Even within the UK context, it is difficult to assess whether the changes represented in the visions will be more difficult or easier to achieve in

smaller or larger communities and this question will be addressed in the remainder of the research. However, given that many of the measures which are present in the visions are localised to neighbourhoods, it can be speculated that it is unlikely that there will be additional problems with these, regardless of the size of the overall urban area. On the other hand, some of the cross urban area features such as networks and overall connectivity for walking and cycling may conceivably be more difficult to achieve in larger cities. For mega-cities such as London it is possible that there may be problems with potentially long travel distances, though land-use change and localisation of activities may go some way to ameliorating these.

The next stages of the work will focus on exploring pathways or storylines by which these visions might be achieved, that is to look at what kinds of things would have to happen and when to move from the current situation to each alternative 2030. It is intended to work through these storylines for both the hypothetical city described here in this paper, and also to attempt to work with a number of local authorities and other transport stakeholders in some UK urban areas to explore how the kinds of changes discussed here might be mapped onto or adapted to fit real life locations.

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