

Visions for a walking and cycling focussed urban transport system

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Abstract

This paper presents three alternative visions for the role of walking in urban areas to the year 2030. Each of these visions is based on the UK and represents a substantial change to the current situation and to what might be expected to happen if things continue as normal over the next 20 years. 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 now. The visions show a picture of an urban environment where provision for walking (and cycling) has been substantially enhanced and where dependence on motor vehicles has been reduced (in two of the visions to very low levels).

The visions are based on work which has been undertaken as part of a UK based research project funded by the UK Engineering and Physical Sciences Research Council under grant EP/G000468/1. This work has involved input from colleagues at the University of Leeds and from the 4 other universities involved: Oxford, Salford, East Anglia and Manchester. Tight et al (2009) provides a fuller report of this project.

Author biography

Dr Miles Tight is a senior lecturer in transport planning at ITS. He has been actively researching sustainable travel for over 20 years. He is leading a stream of research funded by the UK Engineering and Physical Sciences Research Council (EPSRC) which is looking at alternative transport futures. The work on which this paper is based relates to a project called 'Visions for the Role of Walking and Cycling in 2030' – essentially a future look to try to understand the role that these modes could play in creating a more sustainable transport system and a more inclusive society and how they might lead to improvements in individual health and quality of life. Most recently he has been awarded a second 5 year project called STEP-CHANGE (Sustainable Transport Evidence and modelling Paradigms: Cohort Household Analysis to support New Goals in Engineering design) which explores how radical change towards more sustainable urban environments might be encouraged.

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1. Background

This work starts from the premise that in the UK (and many other countries) the current walking environment, perceptions of walking, provision for walking and the status and role that this mode plays in society and individual's lives could be substantially enhanced and improved. The discussion here is UK focussed and the examples given are based on a typical UK urban environment. Despite this, the kinds of changes suggested in the visions presented here are felt to provide a useful basis for discussion about similar step changes in other countries. The focus of this discussion addresses the questions what could an urban transport system, which is very much more orientated towards walking and cycling as key modes of travel than currently, look like and how would it function?

Despite the benefits of walking to society and the individual, walking has been in decline for many years in many developed countries. In the UK walking accounted for 35% of all trips in 1975/76, but this fell to 24% in 2006 (DfT, 2007a). This decline is mirrored in the USA where between 1975 and 1995 walking's share of urban trips fell from 9.3% to only 5.5% (Pucher and Dijkstra, 2000). While the proportion of trips in both cases has fallen, walking is still an important mode of transport and in the UK it accounts for 80% of all trips under 1 mile (DfT, 2003). By its very nature walking is something that virtually everyone does though households without a car walk on average 65% further than those with a car. Nearly 30 years ago Hillman and Whalley (1979) concluded that: "in both transport policy and practice, it [walking] has been overlooked or at the least, has been inadequately recognised". This may in part have been due to a feeling that walking "will take care of itself" (Litman, 2003) and that walking is a benign mode of transport in the sense of having few adverse impacts. Pucher and Dijkstra (2000) report that transport and land use policies have made walking "less feasible, less convenient, and more dangerous". 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. Funding for walking provision in the UK is a negligible percentage of total transport funding by government, though added to by the work of independent organisations such as Sustrans.

There is a strong case to increase the amount of walking in the UK to improve health and wellbeing and reduce the impact of emissions on the environment, as well as reduce the levels of local congestion. The potential is substantial as nearly two thirds of trips are under 8kms in length (42% under 3kms), and as 25% of car trips are under 1.6 kms, where their efficiency is at its lowest. In many European countries there is a better record on walking and cycling than in the UK. Recent work by Bassett et al (2008) makes a comparison of proportions of walking and cycling trips between various countries – the UK population makes around a quarter of trips by walk or cycle, compared to just over 30% in Denmark, Finland, Germany and Sweden and close to 50% in the Netherlands.

Visioning as an approach to bringing about change is being used more frequently in the transport area, though very little of this has so far focussed on transport modes such as walking and cycling. Visioning involves describing an end point or a future, often very different from the present (and which would normally have some desirable attributes, at least from the perspective of the

person(s) doing the visioning). Most such visions have tended to focus on the transport system as a whole, mostly using various forecasting techniques to examine how future states might appear. More recently and rarely a few studies have also used backcasting techniques to consider desirable futures. Such techniques are particularly appropriate to walking and cycling as they provide a means by which it will be possible to consider situations and futures which are fundamentally different to those which exist now and which involve significant diversions from current trends or small scale incremental change. The role of backcasting in this context is to provide a means of examining the possible pathways to achieving visions (or end points) by working back from the visions to the present.

Three possible visions are outlined below along with an assessment of the current situation. Note that all the visions require an enhanced role for cycling as well as walking – despite the differences in the modes, I find it very difficult to envisage a fundamentally more sustainable urban transport future which has a major role for walking, where the role for cycling is not also appreciably enhanced. The two modes complement each other nicely when thinking about sustainable transport futures. Cycling and walking have a number of 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, both are unlicensed, and both have been somewhat peripheral to mainstream transport research funding in the UK. However, despite these similarities, the two modes are fundamentally different and have different roles and requirements, though the role they play in a sustainable transport system could be seen as complementary. Cyclists typically cover greater distances than walkers and usually require a surfaced road. Walking is almost ubiquitous, requiring little training, while cycling is a less common activity, not popular as a mode with large proportions of the population and does require a degree of learning and confidence. All the visions aim to create an environment where the quality of the experience is improved for those who already walk, but also an environment where substantially more people walk (and cycle).

2. The Visions

Three visions or future scenarios are imagined below. Two of these consider future circumstances where change from the present has been generated through choice and a desire on the part of society for alternatives to the current situation in our urban areas (perhaps driven in part by a recognition of the unsustainability of the current situation); the third has in part been forced upon society by external constraints, in this case a fuel crisis, so the vision represents one way in which society might choose to adapt to this circumstance. 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 visions have been developed by a process of review, discussion amongst the members of the research team and extensive discussion with (largely UK) stakeholders and experts through a series of workshops, project 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. The visions are intended not as definitive statements of how the future should be, rather as a stimulus to debate about what could be possible if there were desire or other good reasons for change. Without recognition of what it might be possible to achieve and a consideration of substantially different futures to now, it seems likely that future change will remain predominantly incremental.

The visions are all based around an imaginary urban area, which is illustrated in Figure 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.

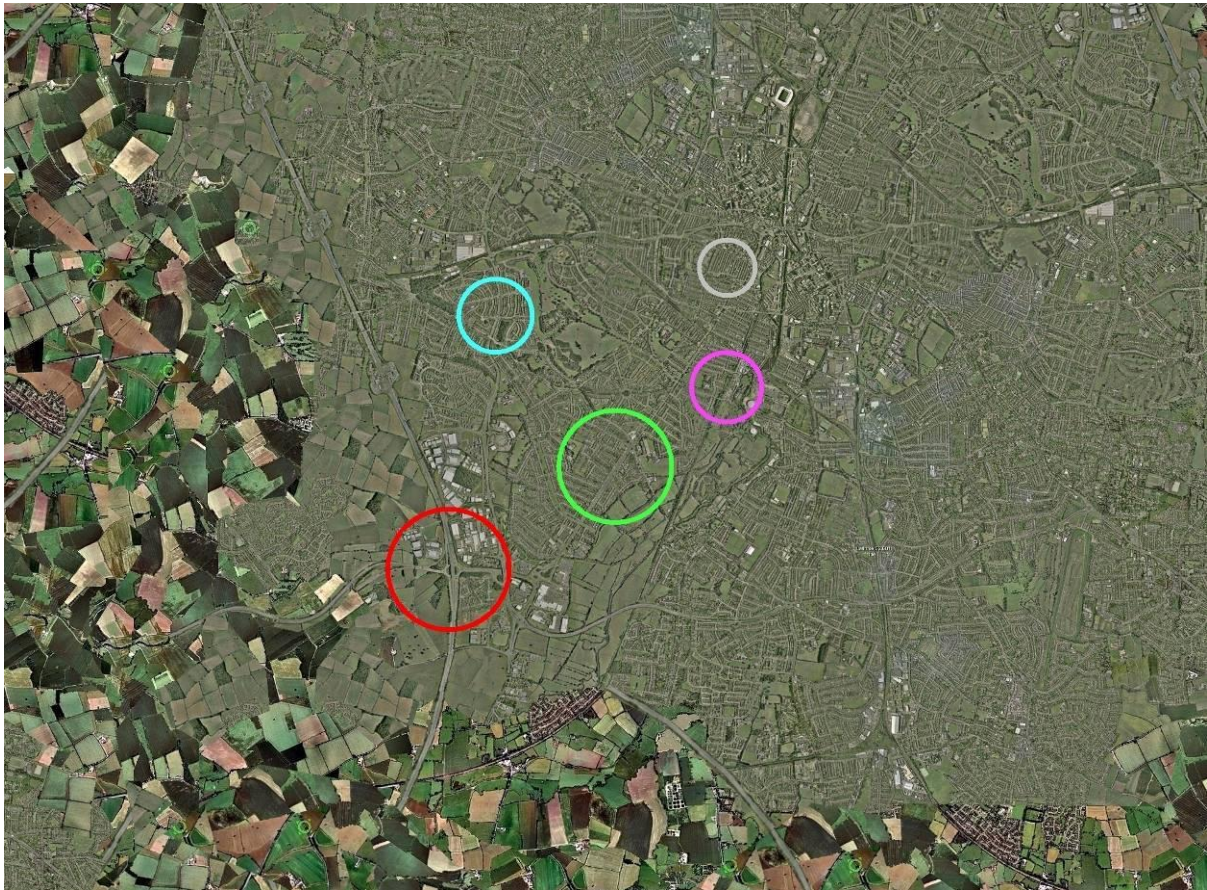


Figure 1 Mock-up of hypothetical urban area (coloured circles show locations of different sections of the area).

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. Five areas of the city have been chosen and are shown as they are in 2010 in Figure 2 and in each of the three visions for 2030 in Figures 3 to 5.

- 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 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 pedestrian friendly environment. The streetscene shown has a large primary school on the left hand side of the road and hence some very time-constrained pedestrian issues at certain times of the day.
- 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 and one where currently the facilities for access on foot and by bicycle are limited.

Each of these locations in the imaginary city of 2010 are not intended to be the best (in terms of their walkability and cyclability) – indeed there are many examples of such locations in UK urban areas where facilities for walking and cycling exist which are much better than those portrayed here. However, nor are these representations the worst of their kind in UK urban areas – indeed many might argue that there are many worse examples.



Victorian Street 2010



Edge of town 2010



Shopping Street 2010



60s/70s estate 2010



Figure 2 Six different locations in the urban area of 2010

Table 1 shows current mode split (trip stages) for the UK and a proposed mode split for 2030 in each of 3 alternative futures. These latter figures are not real, though the figures for Vision 1 are based on the kinds of mode split currently experienced in some European urban areas where 'best practice' is currently applied. The figures for Visions 2 and 3 are part of the vision and are the desired levels to achieve those visions.

Table 1 Approximate mode split (trip stages) for the current situation and the 3 2030 visions

	Current situation (2006) ¹	2030 Vision 1	2030 Vision 2	2030 Vision 3
Walk	28%	32%	37%	40%
Cycle	1%	13%	23%	40%
Public Transport	12%	25%	35%	15%
Car	59%	30%	5%	5%

¹ – source: National Travel Survey, 2006.

2.1. Vision One – European Best Practice

This vision of the future represents a widespread implementation of current best practice towards more sustainable travel behaviour. 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 on 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 adjustments to 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. Figure 3 shows the locations from Figure 2 as they may look in 2030 in the Vision 1 scenario (note that the buildings and physical dimensions of the streets remain essentially as in 2010).



Victorian Street 2030



Edge of town 2030



Shopping Street 2030



60s/70s estate 2030



Interchange 2030

Figure 3 The urban locations as they may look in Vision 1.

The fundamental difference in Vision 1 from the current day is that best practices in terms of infrastructure and supporting measures for walking and cycling have been widely implemented making these modes attractive choices to a much wider range of people than is currently the case. Safer bicycle paths and more pleasant pedestrian environments have meant that a higher proportion of trips are now made by these modes. Attention has also been given to 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 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 Figure 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 in 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 Figure 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 Figure 3d). Road safety has generally improved, though some accidents still occur. Legislation regulates between the different classes of road users in favour of non-motorized road users. Instinctively the notion that driving is a right, and only motor vehicles have a 'right to the road', has been changed by a very active public campaign targeting both safety as well as physical activity levels in the population. Park and ride (or cycle and ride) are provided on the perimeter of the urban area.

Cycling and walking have been boosted by a legal mandate for a proportion of yearly expenditure to be spent on making real improvements to each city's 'core network'. 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 partnerships with shops and police have been expanded to provide marking and prevent selling of stolen bikes. Maintenance and enforcement of the cycle network and footpaths is also exemplary. Street clutter has been reduced 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.

2.2. Vision Two – A car-free public transport orientated future

In this vision there has been a substantive change in transport behaviour in urban areas, going well beyond the changes experienced in Vision 1 (see Table 1). Walking, cycling and public transport have increased considerably compared to Vision 1 and to the base case. There has been a dramatic reduction in car use so that it is now a minority mode. As well as changes in the transport system we envisage that this vision is only really achievable with major changes in other aspects of society which have lead to a willingness and acceptance of the need and desirability of the changes involved.

Figure 4 shows the same 5 locations as in Figures 2 and 3 and how they may look in 2030 under the Vision 2 scenario.



Figure 4 The urban locations as they may look in Vision 2.

In Vision 2 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 Figure 4 all images). 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.

Walking and cycling are considerably more important modes both than in 2010 and in Vision 1 in 2030. These modes have undergone a radical change both in the volume of activity, in the enhanced way that they are perceived by society as a whole and in the level of provision. Thus, for

example, most school children walk and cycle to school, whilst enhancing walking and cycling is a central concern for transport planners. Small scale technological developments have encouraged the increased take-up of walking, 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 has been considerably enhanced to fulfil some of the transport needs previously fulfilled by the car (see Figure 4e). There is substantially more public transport than in Vision 1 and as in that vision there have been improvements in terms of key performance indicators such as frequency, convenience, reliability, safety, accessibility and comfort. Short trips in urban areas are undertaken on foot or bicycle with easy access to public transport interchanges. 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. Hence, public transport is taking on a role which had hitherto been fulfilled for many people by the car. Door to door public transport provides access to dial-a-ride systems (which have been significantly improved from present-day examples of dial-a-ride).

Land use patterns in urban areas have changed particularly to support the infrastructure for improved public transport, though in general this change has been slow and incremental. The road network is essentially similar to the Vision 1 although the distribution of space on the road network has changed with a greater focus on walking and cycling (see Figure 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 Figure 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. Furthermore, 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.

2.3. Vision Three – A localised energy efficient future

In this vision serious constraints on energy usage have rendered the traditional car virtually obsolete. Parallel developments in 'smart technology' have enabled walking and cycling to become the predominant modes of urban transport. This vision of the future represents a radical shift towards more sustainable travel behaviour. Walking and cycling (Human Powered/Assisted Vehicles (HPVs)) are the predominant modes of urban transit. 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.



Victorian Street 2030



Edge of town 2030



Shopping Street 2030



60s/70s estate 2030



Interchange 2030

Figure 5 The urban locations as they may look in Vision 3.

In this vision supporting technological developments have enabled walking and cycling to become more convenient modes for a far greater proportion of the population than is currently the case in 2010. These technological developments exceed those in Vision 2, though their extent is somewhat limited by energy constraints where renewable sources of energy are not available. 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 Figure 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 (~20mph). As in Vision 2 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 Figure 5d). 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 Figure 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.

3. 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 whether such futures are firstly possible (i.e. how would society have to change to make them happen and what kinds of activities which are currently possible would no longer be so) and desirable. Vision 1 is probably largely achievable without major changes to the way in which society works (indeed, the vision is based on circumstances which largely exist already in a number of continental European urban areas). Visions 2 and 3, if they were to happen, will require changes to society and to the attitudes and behaviour of people within society – there would need to be a willingness (or perhaps a need) to make such changes in order to bring the visions about. The benefits of such changes 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. The urban areas described in visions 2 and 3 and the way in which those urban environments work will be very different to what exists now in 2010.

It is interesting to speculate on what the chances are for such radical changes and shifts in urban transportation (and more generally, particularly for Visions 2 and 3, in society as a whole) over what is a relatively short period of time into the future. Clearly such changes would involve a considerable degree of consensus that such futures are desirable and possible to achieve and also a concerted effort across a range of different scales to bring about. However, it is probably true to say that if we do not think about the possibilities for such radically different futures and consider the pathways by which we might achieve them (and the implications of such pathways for lifestyles, social and economic functioning and society), then we have almost no hope of achieving such substantive change and gaining the potential benefits it could bring – we will instead be constrained to incremental changes.

Acknowledgements

This chapter has developed from work being undertaken in the UK funded by the Engineering and Physical Sciences Research Council under grant EP/G000468/1. Due acknowledgement is made to the inputs of colleagues at the University of Leeds and in the partner Universities involved in that project who have contributed to the development of these ideas.

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