3.4 MANAGING RISK IN A HYPERMOBILE WORLD

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The world's biggest mega transport project

The world's biggest mega transport project subsumes all the others. It is the promotion of mobility. It is proceeding at a record-breaking pace. It is creating problems of unprecedented complexity, risk and uncertainty, and transforming the way in which these problems are perceived and managed.

The problems are also unprecedented in scale. All significant participants in the project are now global enterprises. The motor industry measures success by numbers of vehicles sold. Judged by this criterion, despite global over-capacity, it is prospering. Road traffic, in almost all countries, is at record levels and still growing, even in the most highly motorised countries; and projects to provide the infrastructure to carry it are still providing lots of work for multi-national civil engineering firms. Growing still faster is the aviation industry, generating mega projects for plane and airport builders. And railways, after decades in the doldrums, are being revitalised by mega high-speed projects. The result is an emergent *hypermobile society*.

This paper will not pretend to solve these many problems. It will focus on the *social* consequences of this mega transport project and set out some ways of framing discussion of the attendant risks.

Mobility is liberating and empowering. But it is also possible to have too much of a good thing. The huge growth in the numbers exercising their freedom and power is fouling the planet and jamming its arteries. Prodigious scientific and technological efforts are now being made to solve the problems of congestion and pollution caused by the growth of motorised mobility. Let us suppose that they succeed.

Suppose the scientists and technologists were to succeed in inventing a pollution-free perpetual motion engine; the laws of physics dictate that they can never succeed, but this defines the goal towards which the motor industry and environmental regulators are striving. Suppose further that they were to succeed in developing the ultimate Intelligent Transport System (ITS) – a computerised control system that will hugely increase the capacity of existing roads, rails and airports. And finally, imagine a world in which computers are universally affordable and access to the Internet is too cheap to meter; pollution-free electronic mobility is vigorously promoted as an important part of the solution to the problems caused by too much physical mobility. The lion's share of time, money and regulatory energies now being devoted to the pursuit of solutions to the problems caused by motorised travel is currently being spent on these "technical fixes".

If they succeed there will be further large increases in physical mobility. Cleaner and more efficient engines will weaken existing constraints on the growth of travel – either by making it cheaper, or by removing the environmental reasons for restricting it. ITS promises to greatly reduce the time cost of travel by eliminating much of the time now lost to congestion. And electronic mobility, while capable of substituting for some physical journeys is more likely to serve as a stimulus to travel; by freeing tele-workers from the daily commute, it liberates them to join the exodus to the suburbs and beyond where most journeys – to shop, to school, to doctor, to post office and to friends are all longer, and mostly infeasible by public transport; and by fostering social and business relationships in cyberspace it feeds the desires of people at growing distances for "real" face-to-face encounters. In 1950 the average Briton travelled 5 mile per day. He/she now travels over 30 miles a day and is forecast by 2025 to travel more than 60 miles a day.

These trends are creating the *hypermobile society*. The principal characteristics of this society set out in the next section have been arrived at by extrapolation of well-established trends.

The hypermobile society

It will be more dispersed

The process of suburban sprawl will continue. Societies whose members move at high speed over great distances consume more space. It is the longest journeys – by road and air – that are experiencing the fastest growth rates. Walking and cycling – the local, healthy, democratic, and environmentally benign modes of travel are in steep decline. Even with pollution-free perpetual-motion engines there will be unwelcome environmental consequences. More of the country will need to be paved to provide parking places; the extra roads required will scar cherished landscapes and subdivide still further the habitats of endangered species; room will have to be found for new and larger airports; those parts of the world valued for their remote tranquillity will be further encroached upon.

Even in mature motorised societies the growth in dependence on the car continues to set records. In the first seven years of this century Britain's motor vehicle population has increased by more than 5 million. They all need somewhere to park. If one assumes that they are allocated a parking space, each measured by the distance between parking meters, they could all be accommodated in a new car park stretching from London to Edinburgh 60 lanes wide. But this provides only one space for each extra vehicle. Their owners will want parking places at the other ends of their journeys, plus wider roads to get them there. High-tech "solutions" such as congestion charging aided by satellites and tracking devices will, in the absence of constraints on traffic growth, encourage further dispersal into areas where there is still room to move and park.

It will be more polarised

The increase in the mobility of the average Briton described above conceals a growing gap between the mobility-rich and the mobility have-nots. All those too young, or old, or otherwise disqualified from driving will get left behind, along with those too poor to

afford cars and plane tickets. They will become second class citizens dependent for their mobility on the withered remains of public transport or the good-will of car owners. And as the world runs away from them to the suburbs most journeys will become too long to make by foot or cycle. World-wide the mobility have-nots are still increasing. In 1950 about 2.5 billion people did not own cars. Despite a ten-fold increase in the world's car population since then – to about 600 million – because of population increase over this period the number of people who do not own cars has more than doubled – to about 6 billion. And despite the much more rapid increase in air travel over this period the number of people in the world who have never flown has also increased. In Britain, and worldwide, the onrushing trends are fostering a mobility apartheid.

It will be more dangerous

For those not in cars there will be more metal (or perhaps carbon fibre) in motion. The increase in danger is not well reflected in accident statistics. The fact that in Britain there are now about one third as many children killed every year in road accidents as in 1922 when there was hardly any traffic and a nation-wide 20mph speed limit, does not mean that the roads are now three times safer for children to play in; they have become so dangerous that children are not allowed out any more. The retreat of pedestrians and cyclists of all ages will continue. As traffic increases, fewer will venture out on foot or bicycle – one of the reasons why diminishing numbers of people know the name of their next-door neighbour.

It will be more hostile to children

Children's freedoms will be further curtailed by parental fears, and the social catalyst of children playing in the street will disappear. In Britain, as recently as 1971, 80 per cent of 7 and 8 year old children got to school on their own unaccompanied by an adult. Now virtually none do, and the Government issues guidance to parents warning that allowing children under the age of 12 out of the house unaccompanied is irresponsible. As the world becomes ever more choked with traffic it becomes increasingly full of strangers; primary schools routinely run "Stranger Danger" campaigns – amplifying parental fears and inculcating paranoia at a tender age. Children become captives of the family chauffeur. The loss of traditional childhood freedoms denies them the experience of mixing independently with their peers and learning to cope without adult supervision, experience essential to the process of socialisation.

It will be fatter and less fit

Children with parental chauffeurs no longer acquire the habit of walking or cycling to school, friends or other activities. As functional walking and cycling for both children and adults disappear, we will have less exercise built into daily routines, although this is a trend that appears to be being partially offset by the growing numbers of people who drive to health clubs to run on treadmills. The US Centre for Disease Control and Prevention identified America's dependence on the car as the principal cause of the country's epidemic of obesity, declaring that "decades of uncontrolled suburban sprawl conceived around the motor car have left Americans unable to walk even if they wish

to."[1] And the return of infectious diseases like tuberculosis to the developed world is attributed, at least in part, to the growth of international air traffic.

It will be less culturally varied

The McCulture will be further advanced. Tom Wolfe captures the phenomenon in *A Man in Full*: "the only way you could tell you were leaving one community and entering another was when the franchises started repeating and you spotted another 7-Eleven, another Wendy's, another Costco, another Home Depot" (Wolfe, 1998). Tourism becomes an industry. Travel writers urge their readers to rush to spoil the last unspoiled areas on earth, before others beat them to it. The moving pavement that now speeds tourists past the Crown Jewels in the Tower of London to maximise throughput is but one example of the triumph of Fordist efficiency that now characterises mass tourism

It will be more anonymous, less trusting and more paranoid

Fewer people will know their neighbours. Gated communities and Neighbourhood Watch – attempts to recreate some of what used to happen naturally – are symptomatic of the angst of anomie. Even when they live in close physical proximity to each other the mobile wealthy and the immobile poor live in different worlds. The poor are confined by their lack of mobility in prisons with invisible walls. They are continually tempted and taunted – in a way that prisoners confined to cells with opaque walls are not – by the freedom and conspicuous consumption of the affluent. The wealthy can be seen and heard flying overhead, or driving along motorways through the ghetto, or on television, enjoying privileges that remain tantalisingly out of reach. To the wealthy, the poor are often invisible; because of the height and speed at which they travel, the wealthy tend to see the world at a lower level of resolution. A hypermobile world is full of strangers, and people place less trust in strangers than people they know. Lack of trust is conducive to paranoia.

It will be more crime ridden

The strained relations between haves and have-nots will generate more crime and fear of crime and, since 9/11, fear of terrorism. As with danger on the roads this phenomenon is not reliably captured by crime statistics. Homes become better defended with stronger doors and locks and alarm systems. Prisons fill to over-flowing. People, especially women, retreat from the areas where they feel threatened, especially the streets and public transport, and growing numbers of motorists travel with their doors locked. Policing will become more Orwellian.

    Orwellian is the only adjective that can be applied to the vision of the Department of Trade and Industry's Foresight Directorate. The Directorate's Crime Prevention Panel published a consultation document entitled *Just Around the Corner* (DTI, 2000). It surveys the potential for new technology to "create new opportunities

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[1] Despite the concern about rising levels of obesity in Britain, and the associated campaign against junk food, the real culprit appears to be declining levels of exercise. On average Britons today consume 750 fewer calories per day than 30 years ago – but burn off in exercise 800 fewer calories (House of Commons Select Committee on Health, 2004).

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for crime and crime prevention." It concludes with two scenarios. The first, "TECHies" (Teleworking Executives Co-Habiting) is the Directorate's *optimistic* scenario, in which advances in crime-prevention technology out pace advances in crime-promotion technology. It might best be described as *1984* with a *Brave New World* gloss – but which appears oblivious to Huxley's satirical intent. It depicts a world in which *identity theft* is kept in check by all-pervasive surveillance technology, DNA fingerprinting, odour detectors and probabilistic profile matching. The second "socially exclusive" scenario is less cheerful – *1984* without the gloss: most people live in walled estates and don't venture out much because "all public space is potentially hostile." With the rising tide of refugees and the destruction of the World Trade Center by terrorists the Foresight Directorate's grim vision is acquiring a global reach. Gated communities are being superseded by gated nations.

This high-tech policing, decried by civil libertarians is an inescapable cost of hypermobility. The alternative is ineffectual policing. If terrorists and criminals avail themselves of modern means of mobility – physical and electronic – and the forces of law and order do not keep pace, the latter will become impotent.

It will be less democratic

Individuals will have less influence over the decisions that govern their lives. As we spread ourselves ever wider and thinner in our social and economic activities the geographical scope of political authority must expand in order to keep up with the growing size of the problems that require governing. Political authority migrates up the hierarchy from Town Hall to Whitehall, to Brussels and ultimately to completely unaccountable institutions like the World Bank and the World Trade Organisation.

Democracy is government by the people. Its purest form (setting aside the plight of women and slaves) is widely held to be Athenian democracy – everyone in the forum had an equal say. Beyond a certain scale this becomes impractical, and the preferred model becomes representative democracy. But as the scale of issues requiring collective management increases still further, representative democracy also breaks down. Either the number of representatives becomes unmanageable and the limits of the Athenian model are reached again – that is the forum becomes overcrowded – or the number of voters per representative reaches a level that renders the individual voter insignificant. In the whole of the genre of science fiction devoted to speculating about futures in which distance has been conquered by science and technology one can find no plausible examples of democracy. From *Brave New World* and *1984* to *Star Wars* and *Blade Runner* the form of government is invariably tyrannical hierarchy. The possibility of an individual voter being of any significance is defeated by scale.

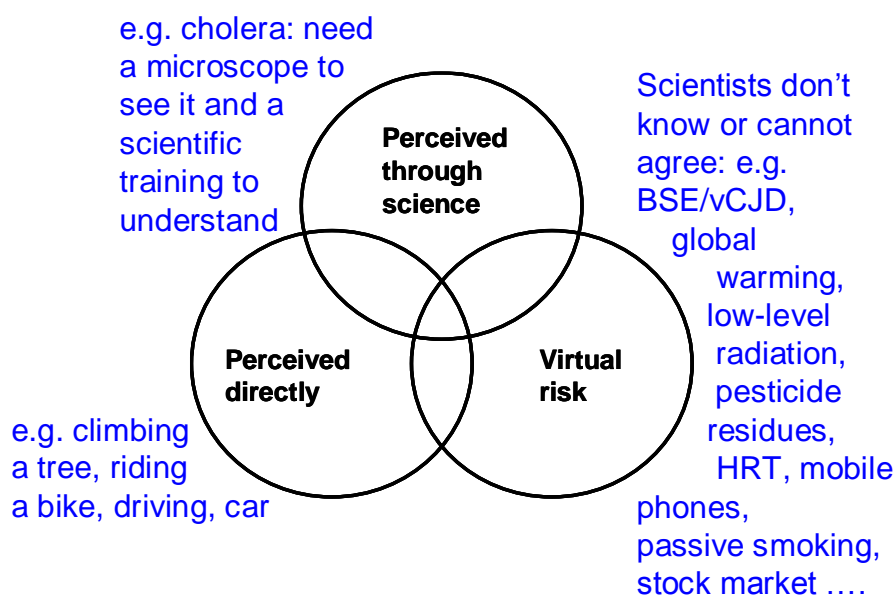### Unprecedented complexity, risk and uncertainty: framing the problem

The emergent hypermobile world presents an intriguing paradox. Manifestly life has become less risky. Collectively we have never been healthier, wealthier or longer-lived – or, as a consequence, more numerous. And yet there is little evidence that we have become happier and considerable evidence that we are becoming more anxious.

In May 2004 I typed "risk" into Google and got 40 million hits. By mid-2006 the number of hits had risen to 1.2 billion before Google called a halt. At the time of writing it stands at 355 million. A crude measure of global anxiety, granted, but

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consistent, I suspect, with the experience of most readers. In addition to the fears of traffic, strangers, crime and terrorism discussed above we, at least in the "developed" world, find ourselves beset by daily alarums about potential harms in our diet and the air we breath, by rising insurance premiums, by growing demands for risk assessments of all our activities, and by an increased awareness of the existence of no-win-no-fee lawyers.

One needn't read all the hundreds of millions of Google hits before discovering that there are numerous unnecessary, and often acrimonious, arguments resulting from the fact that people are using the same word "risk" but meaning different things by it, and shouting past each other. Figure 1 presents a typology that can help to eliminate some of the unnecessary debates.

Figure 1: Types of risk

e.g. cholera: need a microscope to see it and a scientific training to understand

Perceived through science

Scientists don't know or cannot agree: e.g. BSE/vCJD, global warming, low-level radiation, pesticide residues, HRT, mobile phones, passive smoking, stock market ….

Perceived directly

Virtual risk

e.g. climbing a tree, riding a bike, driving, car

Traffic presents a variety of *directly perceptible risks*. These are risks that we manage using *judgement* – some combination of instinct, intuition and experience. We don't undertake a formal probabilistic risk assessment before we cross the road, but judgement usually sees us safely to the other side.

Other risks are undetectable by the naked eye but *perceptible with the help of science*: with the exception of worn or badly tuned engines, most emissions of cars and airplanes are detectable only with the help non-human measuring devices, and their effects only with the assistance of disciplines such as atmospheric physics, biology and epidemiology. The collection and analysis of accident statistics also falls into the scientific circle of Figure 1. This is the circle that defines risk as probability X magnitude of consequence; practitioners in this circle believe that meaningful numbers can, and should, be attached to both. This is the circle that contains most of the articles published in the peer-reviewed literature on risk and safety.

The third circle, *virtual risk,* contains the complexity, uncertainty and chaos that are the subject of this book. It contains Harold MacMillan's "events dear boy" and Donald Rumsfeld's "unknown unkowns". And it contains all the long-running

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arguments about the risks of hypermobility. Virtual risks are liberating; if science cannot settle the argument people feel free to argue from their beliefs, preconceptions, prejudices or superstitions. Here we find arguments about globalisation: is it lifting the poor of China and India out of poverty, or miring the poor of Africa deeper in it; is it generating harmful food miles, or facilitating the delivery of aid to starving populations, is it causing global warming, or is technology going to head it off ….

The most intense and heated debates are usually to be found at the intersection of all three circles in Figure 1. Most people feel strongly about the direction in which "events" are leading, and whether they are positive or negative. They bring to the discussion personal experiences, scientific evidence that they have read about, and "hunches", things they feel in their bones.

One frequently encounters the distinction between "real" or "actual" risk (what the experts know) and "perceived" risk (what the rest of us believe). But *all* risk is perceived. Risk is a word that alludes to an uncertain future – that exists only in the imagination. The mix of types of evidence, and the different standards of proof to which people appeal, usually makes for messy, inconclusive, debates about how the future should be managed. Figure 2 sets out a simple model of how we manage risk (or uncertainty).

Figure 2: The risk thermostat
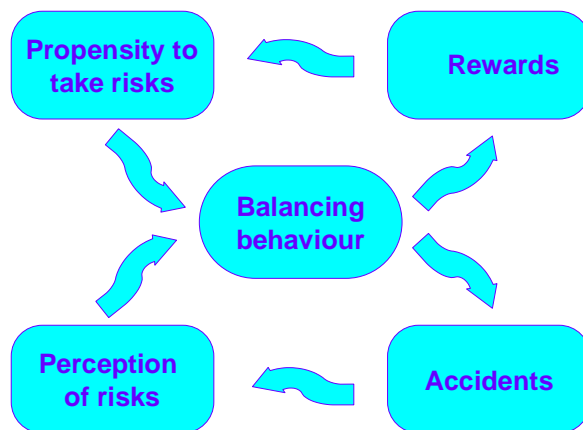
The model postulates that:

- everyone has a propensity to take risks;
- this propensity varies from one individual to another;
- this propensity is influenced by the potential rewards of risk taking;
- perceptions of risk are influenced by experience of accident losses – one's own and others';
- individual risk-taking decisions represent a balancing act in which perceptions of risk are weighed against propensity to take risks; and
- accident losses are, by definition, a consequence of taking risks; the more risks an individual takes, the greater, on average, will be both the rewards and the losses he incurs.

Under a different name, "moral hazard" this model has long been recognised by the insurance industry. Experience has taught the industry that the purchase of insurance modifies their customers' behaviour; people with house contents insurance are less careful about locking up. Similarly with anti-lock brakes; initially the industry did not recognise the similarity and offered discounts for cars equipped with these manifestly superior brakes. It no longer does. Cars fitted with ABS brakes did not have fewer accidents. They had different accidents, accidents typical of high performance cars. The potential safety benefit was being consumed as a performance benefit.

The first five postulates illustrated by Figure 2 now enjoy almost universal acceptance. The sixth, which is a corollary of the first five, often meets fierce resistance by institutional risk managers. On the second of June 2001 the British Medical Journal announced that it was "banning the inappropriate use of "accident" in our pages." It was, it explained, an exculpatory word that encouraged negligence.

What this stance failed to acknowledge was that accidents could only be eliminated by eliminating risk taking, which would also eliminate the rewards of risk taking. Most institutional risk managers, as distinct from individuals crossing the road, exhibit bottom loop bias. They are often enjoined not to have their judgement about what is safe or dangerous compromised by contemplation of the rewards of risk taking. Britain's Health and Safety Executive, whose mantra is "Reducing Risks, Protecting People", provides a good example. Its bottom-loop ethos has for many years inspired the work of traditional highway engineers. The result has been a host of safety measures – guard rails, pedestrian underpasses and overpasses, traffic lights and signs, speed humps and road markings – all which treat road users as obedient automatons, not as responsive individual risk managers.

This traditional approach is now meeting a strong challenge. The Shared Space Project, a collaborative venture involving projects in communities in the Netherlands, Denmark, Germany, Belgium and Britain, is demonstrating that, by replacing obedient automations with individual risk managers, it is possible to produce urban environments that are much less cluttered, much more attractive and convivial, and safer.

Figure 3 presents another challenge to the scientific, quantitative, approach to risk management. It suggests that the way in which acceptance of a given actuarial level of risk is likely to vary widely with the perceived level of control an individual can exercise over it and, in the case of imposed risks, with the perceived motives of the imposer or controller.

With "pure" voluntary risks, the risk itself, with its associated challenge and rush of adrenaline, is the reward. Most climbers on Mount Everest know that it is dangerous and willingly take the risk. With a voluntary, self-controlled, applied risk, such as driving, the reward is getting expeditiously from A to B. But the sense of control that drivers have over their fates appears to encourage a high level of tolerance of the risks involved.

Cycling from A to B (I write as a London cyclist) is done with a diminished sense of control over one's fate. This sense is supported by statistics that show that per kilometre travelled a cyclist is 14 times more likely to die than someone in a car. This is a good example of the importance of distinguishing between relative and absolute risk. Although 14 times greater, the absolute risk of cycling is still small – 1 fatality in 25 million kilometres cycled; not even Lance Armstrong can begin to cover that distance in a lifetime of cycling. And numerous studies have demonstrated that the extra relative

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risk is more than offset by the health benefits of regular cycling; regular cyclists live longer.

Figure 3: What kills you matters
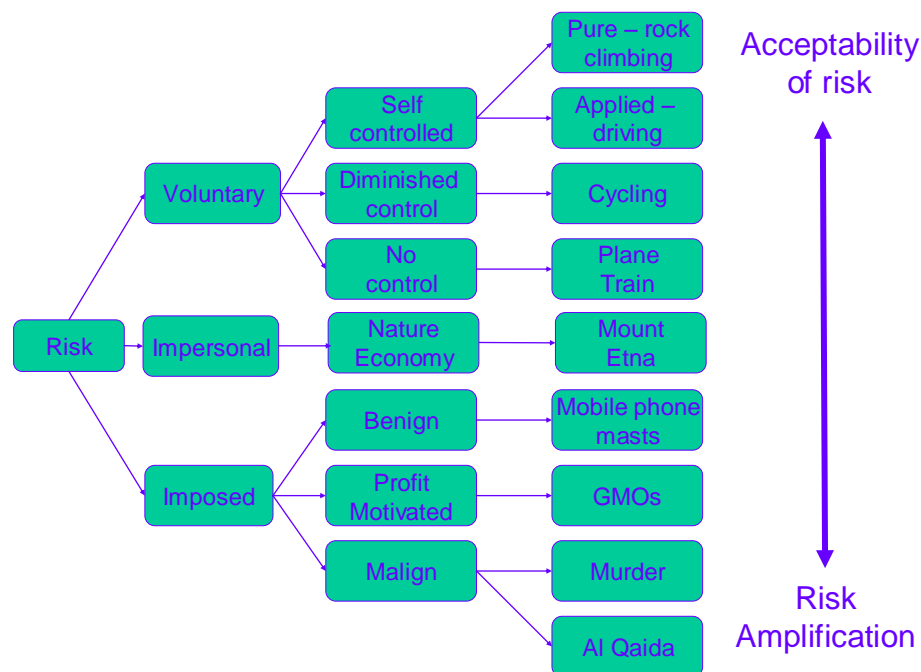
While people may voluntarily board planes, buses and trains, the popular reaction to crashes in which passengers are passive victims, suggests that the public demand a higher standard of safety in circumstances in which people voluntarily hand over control of their safety to pilots, or to bus or train drivers.

Risks imposed by nature – such as those endured by those living on the San Andreas Fault or the slopes of Mount Etna – or impersonal economic forces – such as the vicissitudes of the global economy – are placed in the middle of the scale. Reactions vary widely. They are usually seen as motiveless and are responded to fatalistically – unless or until the threat appears imminent.

Imposed risks are less tolerated. Consider mobile phones. The risk associated with the handsets is either non-existent or very small. The risk associated with the base stations, measured by radiation dose, unless one is up the mast with an ear to the transmitter, is orders of magnitude less. Yet all round the world billions are queuing up to take the voluntary risk, and almost all the opposition is focussed on the base stations, which are seen by objectors as impositions. Because the radiation dose received from the handset increases with distance from the base station, to the extent that campaigns against the base stations are successful, they will increase the distance from the base station to the average handset, and thus the radiation dose. The base station risk, if it exist, might be labelled a benignly imposed risk; no one supposes that the phone company wishes to murder all those in the neighbourhood.

Less tolerated are risks whose imposers are perceived as motivated by profit or greed. In Europe, big biotech companies such as Monsanto are routinely denounced by environmentalist opponents for being more concerned with profits than the welfare of the environment or the consumers of its products.

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Less tolerated still are malignly imposed risks – crimes ranging from mugging to rape and murder. In most countries in the world the number of deaths on the road far exceeds the numbers of murders, but far more people are sent to jail for murder than for causing death by dangerous driving. In the United States in 2002 16,000 people were murdered – a statistic that evoked far more popular concern than the 42,000 killed on the road – but far less than the 25 killed by terrorists.

Which brings us to terrorism and Al Qaida. How do we account for the massive scale, world-wide, of the outpourings of grief and anger attaching to its victims, whose numbers are dwarfed by those of other causes of violent death? The terrorist bombs set off in London on 7 July 2005 killed fewer people than die on the roads of Britain every week. Their deaths were commemorated by a nation-wide three minute silence and thousands gathered in Trafalgar Square the following Sunday to demonstrate … what? Thousands do not gather in Trafalgar Square every Sunday to grieve over the greater numbers killed on the roads in the previous week. *What* and *who* kills matters, not just numbers.

Up to this point we have been discussing individual responses to a range of risks. Terrorism targets *governments*. Terrorists pose a threat not just to individuals but to the social order – *and* to those who purport to maintain it. Murderers and careless drivers are not seen as threats to the ability of the government to govern.

This suggests a need to fit the risk thermostat with perceptual filters – Figure 4. The operation of risk thermostat might be considered a form of cost benefit analysis without £ or $ or € signs. It is not a model into which one can plug monetary values and extract a decision. The *rewards* and *accidents* boxes contain too many incommensurable variables. In addition to money the rewards of risk taking can include power, glory, food, love, sex and rushes of adrenalin, and the accidents box the loss of such things. Numbers collectable by actuaries play only a small part in most risk management decisions.

Figure 4: The risk thermostat with perceptual filters
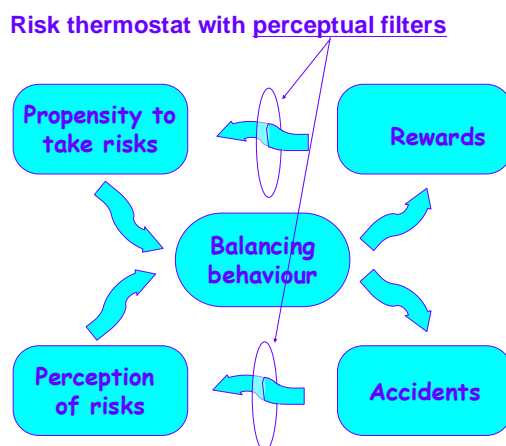
A further complication is the role of the risk manager. Figure 5 presents a cartoon version of significant participants in most risk-management decisions. Reference is frequently made to "public" or "societal" perceptions of risk. Figure 5 makes the point that, with respect to reactions to risk, there is no such thing as society.

Figure 5: The public
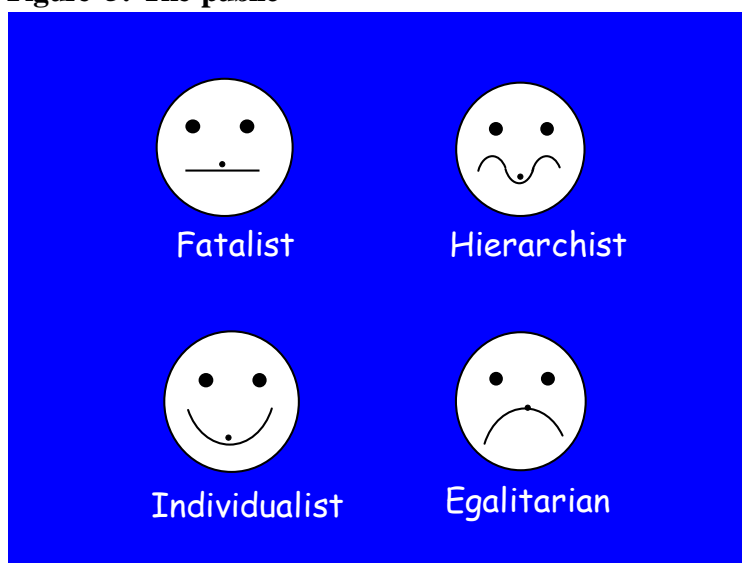
Individualists are enterprising "self-made" people, relatively free from control by others,and who strive to exert control over their environment and the people in it. Their success is often measured by their wealth and the number of followers they command. They are enthusiasts for equality of opportunity and, should they feel the need for moral justification of their activities, they appeal to Adam Smith's Invisible Hand that ensures that selfish behaviour in a free market operates to the benefit of all. The self-made Victorian mill owner or present-day venture capitalist would make good representatives of this category. They oppose regulation and favour free markets. Nature, according to this perspective, is predictable, bountiful, robust, stable, and forgiving of any insults humankind might inflict upon it. It is the benign context of human activity; it is resilient and able to recover from human exploitation, not something that needs to be carefully managed. It is to be *commanded* for human benefit.

Egalitarians have strong group loyalties but little respect for externally imposed rules, other than those imposed by nature, or ideology, or theology. Human nature is – or should be – cooperative, caring and sharing. Trust and fairness are guiding precepts and equality of outcome is an important objective. Group decisions are arrived at by direct participation of all members, and leaders rule by the force of their arguments. The solution to the world's environmental problems is to be found in voluntary simplicity. Members of religious sects, communards, and environmental pressure groups all belong to this category. Nature, for occupants of this quadrant, is to be *obeyed*. It is fragile, precarious and unforgiving. It is in danger of being provoked by human greed or carelessness into catastrophic collapse. The objective of management is the protection of nature, or God's creation, from Man. People must tread lightly on the earth. Their guiding risk-management rule is the precautionary principle.

Hierarchists inhabit a world with strong group boundaries and binding prescriptions. Social relationships in this world are hierarchical with everyone knowing his or her place.Members of caste-bound Hindu society, soldiers of all ranks and civil servants are exemplars of this category. The hierarchy certifies and employs the scientists whose intellectual authority is used to justify its actions. Nature is to be *managed*. Within

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limits it can be relied upon to behave predictably. It is forgiving of modest shocks to the system, but it needs scientific expertise to determine where the limits are, and regulation to ensure that they are not exceeded. The risk-manager's style is interventionist.

Fatalists have minimal control over their own lives. They belong to no groups responsible for the decisions that rule their lives. They are non-unionised employees, outcasts, refugees, untouchables. They are resigned to their fate and see no point in attempting to change it. Nature is to be *endured* and, when it's your lucky day, *enjoyed*. *N*ature is unpredictable. The appropriate management strategy is again laissez-faire, in the sense that there is no point to management. Nature capricious; the future may turn out well or badly, but in any event, it is beyond his control. The non-manager's motto is *que sera sera*. His management strategy is to buy lottery tickets when he can afford them.

So who's in charge?

The mega projects subsumed by the Hypermobility Project – Trans European Networks, airports, motorways, high-speed rail lines – all have directors, commonly with the rank of President, Prime Minister or CEO. The Hypermobility Project itself, by contrast, has no one in effective command, no supreme manager of all the risks that it entails.

The sub-projects of which it is comprised usually have clear organisational structures and quantified objectives – most often to provide the capacity to meet forecast demand. But the goal of the mega-project is unbounded: more mobility is better than less. Occasionally it is argued that "access" should be substituted for mobility – that the purpose of the mega project should be not to generate more movement but to provide people with access to things at a distance that they desire. In practice it makes little difference.

The past decade has witnessed record-breaking increases in both physical and electronic mobility. The promotion of access has encouraged more physical mobility. The principal means proposed by the advocates of access is electronic mobility – the use of telephones, faxes, emails and the Internet – in place of physical mobility. The growth rate of electronic mobility has been explosive, far higher than that of any of the physical modes. However the hope that electronic mobility would substitute for, and reduce the use of, physical modes of travel has been dashed. They have proved much more a stimulus to physical mobility than a substitute for it. The Internet travel agency and on-line booking have greatly reduced the transaction costs of many journeys. And the ability to compute to work rather than commute to work, while it has reduced the numbers of some commuting journeys, has liberated people to live wherever they please, commonly in places where all other journeys – to school, to shop, to doctor, to friends – are much longer, and not achievable on foot, or by bicycle or bus.

The centre of gravity of the debate about transport futures appears, at the time of writing, to be shifting. For most of the past century the principal drivers of the growth in mobility have been individualistists. The freedom offered by the car and affordable air travel, and latterly the Internet, liberated individuals from the constraints of old-fashioned geographical communities and allowed them to lead their lives in aspatial "communities of interest." This individualistic appetite was energetically catered for by individualistic leaders of big business: the builders of cars, planes and infrastructure, the providers of fuel and the disparate collection of electronic entrepreneurs who developed

the Internet. And all of this has taken place with strong hierarchical support. Legislators, regulators and planning authorities paved the way, sometimes literally, for the twentieth century growth of mobility.

The force of egalitarian concerns about the "side effects" of this growth was brushed aside for most of the last century. But these concerns increased in force during the latter decades of the century and now, with the dramatic increase in anxieties about global warming, appear to be offering significant resistance to historic trends. To date these anxieties have focused on the security of energy supplies and the damage caused by emissions, principally carbon. From the Individualist quadrant of Figure 5 come promises that technology and markets will solve the problem. The Hierarchist corner offers regulation and legally-binding targets. But only the Egalitarian corner, with its call for demand restraint addresses, not only the concerns about energy consumption and emissions, but also the social consequences of hypermobility sketched out at the beginning of this essay.

A contingent prediction

The form of government found in all science fiction novels in which distance has been conquered by science and technology is tyrannical hierarchy; the scale of the problems that need governing renders democracy impossible. But there is growing evidence that it renders tyrannical hierarchy impotent as well. At the time of writing the United States is "reviewing" its Iraq strategy. The greatest military power in history, with high-resolution satellites capable of surveying the whole world, and the ability to direct rockets to any chosen target with remarkable precision, has discovered that it is incapable of bringing order to a small, technologically inferior, country with a population of 24 million.

Hypermobility breeds fatalists. Without egalitarian restraint of present trends, dystopian science fiction appears likely to provide our best guide to the future.

References

DTI, (2000) *Just Around the Corner* .
Wolfe, T. (1998) 'A Man in Full', Farrar, Straus and Giroux, New York.