

Review article

Safety accessibility and sustainability: The importance of micro-scale outcomes to an equitable design of transport systems



N. Tyler

University College London, Centre for Transport Studies, Gower Street, London WC1E 6BT, United Kingdom

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ABSTRACT

This paper discusses the potential conflicts that can arise when trying to design a transport system to be sustainable, safe and accessible. The paper considers first the overarching vision that drives such an aim and how that determines choices for design and implementation of such schemes. Using the example of a shared space project, Exhibition Road in London, to illustrate how these issues come to arise and how research could help to resolve them, the paper then considers how science is able to support better design and implementation. This raises questions for scientific methods that could support better consideration of such issues, learning from the small-samples analysis of transport safety research to be amplified to include the detailed research that drives accessible design.

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1. Introduction

In the desire to achieve safe and sustainable outcomes from transport decisions, it is important to ensure that people with restricted mobility are included in the analysis and their needs incorporated in the design of the systems that are implemented as a result. This presents a challenge because sometimes the needs of people with restricted mobility conflict with the design approaches directed to safety or sustainability – and sometimes with both. There is therefore a necessity for a method to consider all three elements together so that transport systems can be truly safe, sustainable and accessible.

This paper considers first the context in which such decisions are made and describes some models that help to frame the questions that need to be addressed by transport decision-makers. It then discusses these in the example of a shared space scheme implemented in London in 2012. This involved exploratory experiments in a laboratory and consideration of conflicts between groups with different outcomes and this has given rise to a reconsideration of the way in which the science used to support transport decisions might be deployed so that such conflicts are highlighted and resolved before implementation.

2. Context

The three terms in the title each has potential for confusion, so it is important to frame the discussion in this paper with a statement about

E-mail address: n.tyler@ucl.ac.uk.

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what each is taken to mean in the present context. So, for the purposes of this paper:

1. Safety is the ability of society to provide an environment in which risk is acceptable to individuals in pursuance of their desired activities, while ensuring that the risk to any individual does not increase involuntary risk to others. Security is a particular sub-branch of safety: security is the state engendered by society so that people can move freely without risk caused deliberately by the actions of others. In the context of this paper, security is considered within the overall concept of safety.
2. Accessibility is the ability of a person to reach and undertake the activities they desire and need, such that such accessibility is available in an equitable manner to the whole of society.
3. Sustainability is the ability of a society to thrive, given the interactions between the equity it affords its population, the impacts on the environment it causes and the ability of its economy to support the needs of the people into the foreseeable future.

Sustainability, accessibility and safety are thus all issues which are routinely conceived, considered and measured in societal terms, yet are the results of cumulative but quite separate actions performed by individuals. This gives rise to a disconnect between the actions of an individual and the development of societal measures and policy, which are necessarily posed at the macroscopic scale. This disconnect reveals itself in three ways. Policy failure is where policies do not work or are not taken up. Unintended consequences arise where policies are different, or result in different actions, compared with what was intended. Hyper-successful policy describes the situation where a policy is taken up much more strongly than anticipated, with unfortunate results. Sustainability, accessibility and safety can very easily conflict with each other – a clear example in current city planning is that of shared space, where sustainability drivers lead a city to want to introduce a shared space, accessibility brings desires to remove obstacles (some of which are there, notionally at least, to provide a safe environment), and the safe mix of vehicles and pedestrians relies on confidence that drivers and pedestrians come to an understanding on an individual basis about who has precedence in a particular space at a particular time.

Fig. 1 shows how the three drivers come together in a Venn diagram, and indicates that the sweet spot of an accessible, safe and sustainable outcome requires very specific conditions for each driver. Beyond that point, there are compromises – for example, a scheme could be ‘safe and accessible’, but not necessarily sustainable, or ‘safe and sustainable’ but not necessarily accessible. As always, the issue is not one where everything can be satisfied, but where compromises need to be made – how to determine how far away from the ideal it is possible to move for a particular scheme. The nub of this paper is how to appraise or evaluate a scheme that is, by its nature, prone to such conflicts of interest, in a way which depicts the situation in an appropriately objective way. This, of itself, is not new. Allsop [1] discussed the issue of how to find the compromises that can be made to mitigate these conflicts, and the OECD produced a comprehensive report [2] on the difficulties of finding and implementing compromises to enhance the safety of vulnerable road users without an attendant change in perception by all parties involved. However, the combined issue of all three factors, in light of newer policy approaches relating to the rights and responsibilities of citizens within an urban context highlights the need for a deeper consideration of the issues.

When considering suboptimal outcomes (i.e. where the outcome means some reduction from optimality in one or more elements), it is crucial to consider how a scheme fits with the overarching vision of the society and city in which it is being implemented. It is this vision that drives the choice of compromises that need to be evaluated and these compromises need to be evaluated as a whole set, not just individually – hence the importance of Fig. 1.

2.1. The Five Cities model

In setting up and evaluating city visions, we have used a technique developed from the analysis of cities that have been through stark transformations [3,4], which we call the ‘Five-Cities Model’. This views a city through five lenses and sets the framework for choosing between compromises when making both macro and micro decisions. The vision acts as a ‘pull factor’ for all decisions to be taken by the city, including the strategy for implementation. The test is to satisfy the five criteria as completely as possible, recognising that there could be imperfect solutions in which all five are not completely satisfied, but that such suboptimal outcomes need to be recognised and dealt with in another way. Fig. 2 shows a conceptual diagram of the five city model, indicating (1) that the primary aim of the city is directed towards the people – usually expressed in a form such as ‘improve the quality of life of the people’, (2) the five criteria that need to be satisfied in order to be able to achieve that aim. These are deliberately not sectoral, but are based on the achievement of a quality life: a city in which people have mutual respect for each other (the Courteous city), a city in which there are sufficient activities (economic, educational, leisure...) to satisfy the needs of the people and that these must be accessible to all (the Active & Inclusive city), a city which people enjoy and feel that they own – with all the responsibilities that this implies (the Aesthetic and Public city), a city which actively delivers good health (the Healthy city), and a city in which change is designed-in, recognising that the needs of future generations will almost certainly be different from the needs of present generations and that we should be making decisions now that recognise that such change is inevitable and facilitate that change when it occurs (the Evolving city).

Fig. 2 is important, because it shows how the desire to have sustainability, accessibility and safety as key drivers in transport projects helps to drive towards the overall vision. This applies throughout – each of the five cities has calls on this desire, although some might be more prominent in some of these cities than in others. Accessibility, for example, clearly figures in the Active and Inclusive city, but it is also a major player in the Courteous city, the Aesthetic & Public city, the Healthy city and the Evolving city. Safety is a key player in the Aesthetic & Public city and in the delivery of the mutual respect in the Courteous city, but also in reducing both mental and physical health issues in the Healthy City and ensuring that access to the activities is safe in the Active & Inclusive city. Decisions taken now and in the future can deliver safety in the Evolving City. Sustainability clearly has a role to play in the Evolving city, but without economic and other activities available to all in the Active & Inclusive city, and the societal cohesion required for Courteous and Aesthetic & Public cities, sustainability will not be delivered. Sustainability also requires healthy outcomes from the Healthy city to deliver a sustainable future.

Having established the set of priorities emanating from the overarching vision, it is then necessary to establish how sustainability, safety and accessibility can work together within these boundaries to create a satisfactory outcome. As shown in Fig. 1, each has sub-themes – the three pillars of Equity, Economics and Environment in the case of sustainability, Personal and Systemic in the case of safety and the consideration of the Person, the Environment and Activities in the case of accessibility. The least familiar of these are the ones related to accessibility and these will be considered further now.

2.2. The Capabilities Model

The Capabilities Model [5,6] was developed in response to the Social Model of Disability, following the principles of capabilities and functioning outlined by Amartya Sen [7]. For Sen [7], functionings are ‘the various things that [a person] manages to do or be in leading a life’ and the Capability of a person ‘reflects the alternative combinations of functionings the person can achieve, and from which he or she can choose one collection.’ Sen [8] explored the relationship between a person’s capabilities and their well-being and the point to emphasize here is that there is a

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