Research in Transportation Business & Management 7 (2013) 27–34

Contents lists available at SciVerse ScienceDirect

Research in Transportation Business & Management

Valuing active travel: Including the health benefits of sustainable transport in transportation appraisal frameworks

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ARTICLE INFO

Article history:
Received 10 May 2012
Received in revised form 26 October 2012
Accepted 8 January 2013
Available online 1 February 2013

Keywords:
Walking and cycling
Active travel
Social cost benefit analysis
Infrastructure investment

ABSTRACT

Sustainable transport investments linked to improving public transport or designed specifically to improve walking and cycling networks (for example, bicycle infrastructure) typically underestimate the contribution of these active travel modes. This is because the investment appraisal mechanism, social cost benefit analysis, lacks an agreed methodology or well defined parameter values for establishing the demand and the associated health benefits and costs of active travel.
Correcting for the acknowledged benefits of walking and cycling (including contributions to achieving physical activity targets and maintaining health) requires an appropriate framework and parameter values to allow these benefits to be captured in a robust and consistent manner. This paper proposes such a framework for the Australian context and a consequent weighted benefit of $1.68 per km (range $1.23–$2.50) for walking and a $1.12 per km (range $0.82–$1.67) for cycling that includes both mortality and morbidity changes resulting from a more active lifestyle. Investigation of the potential health costs associated with motorised travel and reduced physical activity requires further detailed research.

1. Introduction

Investment decisions about developing and updating public transport infrastructure are among the most expensive, complex and far-reaching faced by governments today. Cities are the powerhouses of modern economies: they need healthy and productive residents, and an efficient cost-effective public transport system plays a crucial role in delivering this requirement. Despite the substantial benefits that better active and public transport can generate (not only for users but also in their contribution to the management of urban congestion and climate change), the sheer size and scale of modern transport systems infrastructure often makes their funding problematic.

Investment (whether public or private) is about restricting current consumption in order to be better off in the future. When investing public money, governments need to ensure that money is well spent since investing means that current spending must be curtailed in order to allow society to be more productive in the future. There are important equity issues both between and within sectors of the economy to ensure that good investments are made.

Social cost benefit analysis (SCBA) is normally the process of investment appraisal undertaken for public sector investment (for example, (Layard & Glaister, 1994; Mishan & Quah, 2007)). In contrast to financial appraisal, typically undertaken by private firms where only the monetary costs and benefits are taken into account, SCBA additionally captures changes caused by the investment which do not have a market price (both benefits and costs) and expresses these in monetary units.

Historically, the SCBA of transport projects has developed by including better methodologies for evaluating non-priced effects of investment, as they become available. For example, in the 1960s valuing travel time savings (VTTS) was in its infancy and their inclusion in the Victoria Line study, particularly for cost savings made by travellers above ground, was greeted with considerable scepticism. Now VTTS are routinely included in a SCBA and it is not unusual for these to provide over 40% of the total benefit of the investment (Metz, 2008). Moreover, improvements in the methodology for estimating VTTS have followed from this first use. With subsequent refinements has come a gradual acceptance that VTTS are properly included in a SCBA.

Walking and cycling as both access and stand-alone modes of travel offer positive health, environmental and economic outcomes. Sustainable transport investments linked to improving public transport or designed for active health specifically (for example, bicycle infrastructure) typically underestimate the contribution of these active travel modes. This is because the investment appraisal mechanism,

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http://dx.doi.org/10.1016/j.rtbm.2013.01.001

SCBA, lacks an agreed methodology or well defined parameter values for establishing the demand and the associated benefits and costs of active travel. As a consequence, SCBA frameworks endorsed by governments for the evaluation of infrastructure projects omit or do not adequately quantify these active transport benefits and inefficient allocation of capital when investing in transport solutions may therefore result.

Moreover there are significant co-benefits of active travel modes due to their role in climate change mitigation and health. There is now global scientific consensus that climate change is occurring and that the most probable cause of our warming planet is human activity, primarily greenhouse gas (GHG) emissions (Intergovernmental Panel on Climate Change, 2007c). There is a need for significant GHG reductions if we are to avoid what has been called "the biggest global health threat of the 21st century" (Costello et al., 2009). Chronic disease and climate change both demand strong public policy responses. The case for aligning policy responses to climate change and public health was cogently argued in a recent Lancet series of papers on Health and Climate Change (Haines, Wilkinson, Tonne, & Roberts, 2009) where the authors reported research on the positive ancillary health impacts of policies to reduce greenhouse gas emissions in the transport, food, housing and energy sectors.

The objective of this paper is to illustrate a methodology for quantifying demand, and the mortality and morbidity change associated with active travel for inclusion in a SCBA for transport infrastructure investment. The methodologies proposed apply to projects including an active travel element as well as dedicated active travel projects. The presentation of this evidence in the public domain is a 'marker' for the routine inclusion of these important benefits in SCBA. The evidence in this paper will therefore provide a starting point for further refinements (both methodological and in quantification) as has been the case with all non-priced effects that are currently included in SCBA (for example, VTTS, value of life, and externalities such as pollution and safety).

This paper is structured as follows. The next section highlights the theoretical context for this paper. The paper then outlines the method of demand forecasting to identify active travellers and the monetary value of morbidity and mortality changes for active travellers (over non-active travellers). This is followed by a discussion of how the evidence provided in previous sections could advance SCBA processes. A section on 'Implications for managerial practice' focuses more directly on the impact of the recommendations upon practitioners as well as providing a step by step guide for implementation. The final section presents conclusions and areas for further research.

2. Theoretical context

This section outlines the theoretical context for this paper. The links between climate change mitigation, the impact of emissions on health and the links to sustainable transport investments are considered first. This is followed by a brief overview of cost–benefit analysis and current procedures utilised to estimate the health benefits accruing to an active transport mode in a stand-alone or as part of a multimodal investment proposal. The section concludes by identifying the current procedural gaps in transport costing addressed in this paper.

Australia's per capita greenhouse gas emissions are the highest of any OECD (Organisation for Economic Cooperation and Development) country and among the highest in the world (Garnaut, 2008). Climate change will impact health in a range of ways, with potential direct human health impacts via pathways including expansion in the range of tropical infectious diseases, more arid lands and poor agricultural yields, more extreme storms and weather events, indirect human health impacts via damage to the health of ecosystems because of climate change, and massive disruption of human populations due to sea levels rising (Intergovernmental Panel on Climate Change, 2007a; McMichael, Woodruff, & Hales, 2006).

Globally, transport's GHG emissions are rising faster than any other energy using sector. Emissions are predicted to be 80% higher than the current levels by 2030 (Intergovernmental Panel on Climate Change, 2007b). In Australia, transport is dominated by the car and around 80% of Australians use private cars to commute to work (Australian Bureau of Statistics, 2010). Policies that encourage alternatives to car travel need to be supported. Active travel (walking, cycling and using public transport) is frequently identified as a strategy to mitigate and reduce the impacts of climate change (Capon & Rissel, 2010; Rissel, 2009; Woodcock et al., 2009). Public transport is usually included because it typically involves some walking or cycling to access and egress transport nodes from their origin or to the final destination. As a non-greenhouse gas generating and physically active form of transport, active travel should be a clear transport and health policy priority. It is increasingly being recognised as an important strategy for sustainable and liveable cities in Australia (Australian Government, 2010).

As identified in the introduction, this paper addresses the challenges of valuing active travel in the sustainable transport investment appraisal framework. Proposals for active travel infrastructure, in common with other publicly funded infrastructure, are evaluated using the well established methodology of Social Cost Benefit Analysis (SCBA). Most governments have an established process for conducting a SCBA (Australian Transport Council, 2006; Her Majesty's Treasury, 2011) with common elements. Broadly the process involves a definition of the project objective: this is an important step for the comparison of projects since a project aimed at health outcomes may take a different form from one aimed at decongestion of the road network, even if co-benefits are common. Next, options which meet the defined objectives need to be defined together with an appropriate 'do minimum' reference point. For each of the options, including the 'do minimum', capital and recurrent costs need to be identified. Furthermore the impact of the investment on the number of people affected by the investment needs to be forecast as an important component of the 'benefit' side of the equation.

In tackling the benefit side of the equation, the first step is to define the appropriate quantifiable benefits for each of the investment options. For an investment designed to enhance the numbers of people actively travelling, this could include health benefits (Genter, Donovan, & Petrenas, 2008) and decongestion of the road and/or public transport network (Cityrail, 2009). Alongside this there could be reduced vehicle operating costs (from the less congested network) (RTA, 2009), avoided or deferred infrastructure provision (because less demand for road or public transport might mean that capacity constraints take longer to bite), lower emissions (Victoria Transport Policy Institute, 2004) and other environmental costs to society (RTA, 2000). Customised to each economy, Treasury usually specifies the duration over which the appraisal should be undertaken and the discount rate applied with sensitivity analysis carried out around a specified rate.

In contrast to the relatively mature techniques for forecasting motorised travel, including increasingly sophisticated behavioural models, forecasting demand for active travel is not well established. There is sparse data available on current active travel engagement and little revealed or stated preference data on which to predict demand in different environments. Unlike motorised trips, usually undertaken to 'consume' an activity at the destination, many active travel trips are discretionary and occurring for their own sake. Moreover, active travel engagement rates are influenced by urban form and network connectivity, such as the state of the footpaths or the ease of using a bicycle, along with attitudes to health and fitness and by whether active transport is being used to access public transport as a mode to travel to a destination.

Although the recent literature includes studies investigating the evaluation of active transport infrastructure, the results are typically