



# 59<sup>th</sup> UITP World Congress

## ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

---

**John Stanley,  
Adjunct Professor,  
Institute of Transport and Logistics Studies,  
The University of Sydney,  
Sydney, Australia.**

---

### ***Session 12***

#### ***Mobility, Social Exclusion and Well-Being***

\*\*\*\*\*

#### **1. BIOGRAPHICAL NOTE**

Professor John Stanley is an Adjunct Professor and Bus Industry Confederation Senior Research Fellow in Sustainable Land Transport at the Institute of Transport and Logistics Studies, The University of Sydney. Prior to taking this role, he spent nine years as Executive Director of Bus Association Victoria, after eight years as Deputy Chair of Australia's National Road Transport Commission. He is a Board member of VicUrban, the Victorian Government's urban development agency, and of Victoria's Alpine Resorts Co-ordinating Council. John teaches transport policy to postgraduate students at The University of Sydney and publishes widely on the value of public transport. He has been awarded an Australian Centenary Medal for services to public transport and conservation.

#### **2. ABSTRACT**

This paper reports findings from the authors' work on a major Australian study examining the connections between mobility, social exclusion and wellbeing and the implications for evaluating public transport initiatives. Drawing on data from a purpose-designed sample survey, it shows how a person's risk of being socially excluded is influenced by their social capital, sense of community, income and mobility. This risk of being socially excluded, in turn, is shown to be a direct influence on a person's subjective wellbeing. These concepts are explained in the paper and the links to mobility (trip making) are indicated. Using econometric modelling, the paper shows how *additional trips* are valued very highly,



## **59<sup>th</sup> UITP World Congress**

***Boosting public transport:  
ACTION!***

**Dubai, 10-14 April 2011**

much higher than has been typically recognised in economic evaluations of transport initiatives (by a factor of about four). As a result, the potential value of major public transport service enhancements is much higher than is usually recognised. The monetary values of additional trips so derived are used to illustrate the value route bus services in Melbourne, Australia. This substantially improves the net social value of the relevant services.



## 59<sup>th</sup> UITP World Congress

***Boosting public transport:  
ACTION!***

**Dubai, 10-14 April 2011**

### **The Value of Mobility**

Professor John Stanley

Adjunct Professor

Institute of Transport and Logistics Studies

The University of Sydney, Australia.

#### **1. Mass transit and social transit**

Public transport service improvements can largely be classified as being either for 'mass transit' or 'social transit' purposes. The benefits from 'mass transit' services are primarily user benefits plus the benefits that derive from achieving modal shift from car to public transport, the emphasis being on trunk services (with associated feeder services) operating during congested peak periods. These benefits are primarily economic and environmental in nature, relating to reduced congestion, air pollution, greenhouse gas emissions, a lower road toll and the like. They are a major part of the value proposition for public transport.

'Social transit' initiatives primarily provide mobility opportunities to reduce the risk that people will be socially excluded. In public transport, such services largely comprise local services, often operating at relatively low frequencies, even if they also feed a trunk service. This area of transport policy has historically been given little attention. However, recent Australian research has demonstrated that the value ascribed to service improvements that increase trips for people at risk of social exclusion is much higher than is commonly recognised<sup>1</sup>.

The Australian research has examined links between mobility, social exclusion and wellbeing. This paper focuses on the link between mobility and social exclusion, drawing on that research. It explains relevant concepts and outlines, in Sections 2 and 3, a number of factors that have been shown to impact on risk of social exclusion. It uses this knowledge in Section 4 to impute a value for additional trips (as an indicator of improved mobility). In Section 5, an application of these values to Melbourne's route bus services shows that the social transit benefits of the services are the largest single benefit component of route bus use in the city. Connections to well-being have been discussed in a related paper (Stanley et al. under review)



## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

#### **2. Mobility and social exclusion**

The concept of social exclusion has largely grown from work which sought to better understand and represent poverty. While poverty and social exclusion are related, social exclusion describes the existence of barriers which make it difficult or impossible for people to participate fully in society. There is a growing body of evidence that poor mobility can increase the risk of a person being socially excluded.

Drawing on and extending international research (Burchardt et al. 2002), the Australian study used five dimensions to indicate a person's risk of being socially excluded. Thresholds were set to indicate whether or not a particular risk factor was likely to be operative. These risk factors, with relevant thresholds, were:

- household income – less than a threshold of \$A500 gross per week;
- employment status – not employed, in education or training nor looking after family or undertaking voluntary work;
- political activity – did not contribute to/participate in a government political party, campaign or action group to improve social /environmental conditions, to a local community committee/group in the past 12 months;
- social support – not able to get help if you need it from close or extended family, friends or neighbours; and
- participation – did not attend a library, sport (participant or spectator), hobby or arts event in the past month.

Interview surveys were undertaken in both Melbourne and in a Victorian regional area to gather data on these risk factors. A separate survey focused on people who are highly socially disadvantaged.

Table 1 shows the proportion of survey respondents in the Melbourne sample (sample size 535) who exhibited various numbers of social exclusion risk factors. No person demonstrated five risk factors but one or two risk factors were common and over half exhibited at least one risk factor. The relative percentages in these categories are similar to some overseas research.

People exhibiting no risk factors undertook an average of 3.8 trips a day, this trip rate falling to an average of 3.2 for those exhibiting one risk factor and to only 2.8 for those with two or more risk factors. This suggests a strong relationship between mobility and risk of social exclusion. The rate of decline in trip rate was almost identical in both the Melbourne and regional Victorian case studies.

The way a trip is defined in the study, one more trip effectively equates to one more activity being undertaken by the person. When the typical person is only making about 3.5-4 trips a day, one more or



## 59<sup>th</sup> UITP World Congress

***Boosting public transport:  
ACTION!***

**Dubai, 10-14 April 2011**

less trip can be seen as a non-marginal change and can be expected to have a substantial impact on someone's well-being.

**Table 1: Melbourne Survey Proportions Exhibiting Various Social Exclusion Risk Factors**

Risk Factors	% of Survey Respondents (N = 535)
0	45
1	35
2	13
3	5
4	1
5	0

### 3. Factors Influencing Risk of Social Exclusion

The research collected data on a range of variables that were thought likely to influence a person's risk of being socially excluded, with trip making being one of these variables. The key influencing factors which were examined for their relationship with risk of social exclusion were:

- personality variables – where outgoing personality types were expected to be less likely to be at risk of social exclusion;
- measures of social capital and sense of community - where we expected high levels of social capital (e.g. strong social networks; high levels of trust and reciprocity) and a strong sense of community to lower the risk of exclusion;
- household income – where a higher income level was expected to reduce the risk of exclusion; and
- trip rate – our expectation was that a socially excluded person was likely to undertake fewer trips.

The study's interview surveys collected detailed data on these factors, which were able to be linked to travel diaries from a related survey, which provided trip data.

The hypotheses outlined for the dot points above were confirmed by econometric analysis. The research showed that a person is less likely to be at risk of social exclusion if they:



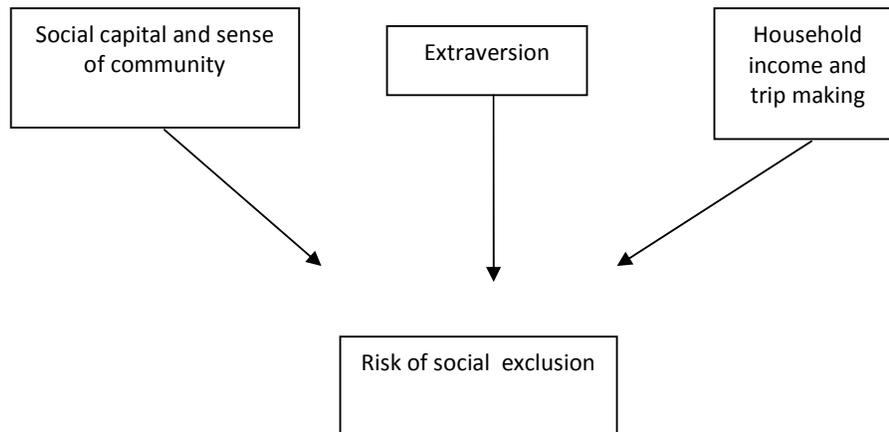
## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

- have a strong sense of community;
- have contact with members of their close family more frequently than once a year (but this can be less than monthly);
- have contact with members of their extended family;
- trust people in general;
- have relatively higher household income;
- are relatively mobile (make more trips); and
- are extroverted.

**Figure 1: Mobility and risk of social exclusion**



Subsequent research has shown that risk of social exclusion is, in turn, a significant influence on self-reported well-being (Stanley et al. under review). The lower a person's risk of social exclusion, the higher their self-reported well-being. Improving mobility can thus have a direct impact on reducing risk of social exclusion and a flow-on benefit in terms of improving reported well-being.

#### **4. The Value of Mobility**

Because the research indicates that a person's household income and their trip rate are both significant influences on risk of social exclusion, the relative influence of these two variables can be used to impute the value of an additional trip. The resulting value is between \$A19.30 for a person whose household income level is at the average (this value is derived in Stanley (2011)).



## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

What does this mean in a public transport context? Essentially, it means that, for anyone who is able to undertake a new (or additional) trip because of the availability of new or substantially improved public transport services, the value of that trip is about \$A20, if their household income is about average. Thus if a new or substantially improved bus or rail service leads to new trips being undertaken, a value of about \$A20 per trip can be ascribed to these new trips in evaluating the case for the improvement.

It is important to note that this benefit is measured at the level of the individual traveller. It does not include the wider social benefits that will usually flow from reducing risk of social exclusion. Such benefits will include, for example, improved health, increased employment participation, a reduced crime rate and lower welfare benefit payments. These flow-on benefits need to be quantified to complete the picture on valuing the benefits of improved mobility as a means of promoting social inclusion.

Economists frequently use the “rule of a half” to value trips that are “generated” by a transport improvement, such as an improved public transport service. Generated trips in this context might be (for example) new trips, trips that are now longer than before, or trips that involve a mode change. These “generated” trips are typically credited with about half the unit benefit that is attributed to trips that were made both before and after a particular improvement.

The \$A20 figure is about four times as high as this generated traffic benefit measure if travel by car or public transport had been a prior possibility. It is broadly similar to (in fact a little higher than) the value that would flow from applying the “rule of a half” on the assumption that the option of a taxi was the only available alternative before the improvement. This is consistent with the view that the benefit is associated with a new trip, since taxi travel is expensive and will discourage many people. The resulting value is consistent with the view that a new trip (or activity) is a non-marginal change in someone’s activity patterns and that this will have a high value.

Interestingly, the Australian analysis has suggested that the value of an additional trip increases strongly as household income falls<sup>ii</sup>. This is not unexpected, because lower income people tend to undertake fewer trips. To the extent that some public transport services are used by lower income households, the value of substantially improving such services is likely to be very high indeed.

#### **5. A Melbourne Route Bus Application**

Analysts occasionally seek to estimate the value of public transport to society. The “mass transit” argument leads to efforts to quantify the “externality” benefits such as congestion cost savings, greenhouse gas reductions, a lower road toll, cleaner air, etc. To these items should now be added the value of trips that would not be undertaken if public transport services did not exist. This “social transit” value is likely to be very high relative to the other benefit components. A Melbourne application of the values derived above shows the importance of this finding.



## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

The value of public transport in Melbourne (and elsewhere) is essentially about two things:

1. the benefits the system creates for its users, which are largely involved with provision of access to economic and social opportunities and issues that arise therewith; and also
2. how it can reduce the negative externalities that arise from people's travel choices, particularly externalities from car use.

There is also growing interest in the role of public transport in promoting positive externalities of agglomeration, particularly as these arise from clustering of growth in cities (and in activity centres, primarily Central Activity Districts). Agglomeration benefits are particularly relevant for rail but Bus Rapid Transit is also a candidate for such potential benefits.

So far as Melbourne's route bus services are concerned, service benefits primarily relate to direct user benefits and savings of the external costs from car use that would arise if buses were not available. These externality benefits are mainly economic or environmental in origin. There are six major quantifiable external costs that can be reduced by the operation of an effective urban bus (public transport) service. These are:

1. the costs of traffic congestion;
2. greenhouse gas emissions, which are implicated in climate change;
3. local pollution effects (e.g. air, noise);
4. energy security;
5. safety and health; and
6. social exclusion.

Drawing on research by Aftabuzzaman et al. (2009), Stanley (2010) has estimated the externality benefits from Melbourne's route bus services. Aftabuzzaman et al. (2009) reviewed a range of data to estimate how (hypothetical) cessation of public transport services would affect use of other modes. Their analysis suggests:

- increased car use would be the major response to a major cessation/disruption to public transport services, the scale of increase being quite variable but typically 40-60% of the lost public transport patronage;
- some of this increased car use (typically about half) would arise as car passenger trips, some of which involve ride sharing but others would require a chauffeur (i.e. requiring another person to act as a lift giver);
- additional walking and cycling (limited data) can be important;



## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

- cancellation of trips accounts for about one in ten public transport trips..

Conversely, a small survey of the impacts of major outer suburban bus improvements in Melbourne, undertaken by Busvic, has suggested that about half the trips made by bus users in outer urban areas would either:

1. not be made or
2. be undertaken with the assistance of a lift-giver or
3. be undertaken by taxi

if there was no bus service available (Loader and Stanley 2009). It is argued in Stanley (2010) that each of these three categories of user should be eligible for the value of \$A20/trip (at average household income levels, or at a higher unit value of household incomes are less than average).

On the basis of the Aftabuzzaman et al. (2009) research and the BusVic analysis, Stanley (2010) assumed that, if Melbourne's route bus services ceased to exist:

- 50% of bus users would switch to driving themselves or car sharing car (about 40 million additional annual car driver trips assumed);
- a further 20% would take a taxi or be chauffeured, adding another 20 million trips to car use, taking the total proportion switching to car to 70%. This is slightly above the top end of the range reviewed by Aftabuzzaman et al. (2009). This assumption reflects the present author's belief that, because of (1) the lack of alternative public transport choices in many areas of Melbourne where buses operate and (2) relatively long trip lengths in these areas, car use will be the main alternative to bus. The chauffeuring proportion recognises the high use of buses by young people, who do not have the option of driving themselves;
- a further 13 million people who were making bus trips would now not travel (cancelling their trip). This takes the proportion in trip categories 1, 2 or 3 above to about one third, which is lower than suggested by BusVic surveys but seems to be broadly consistent with the work reported by Aftabuzzaman et al. (2009). This data is used in the subsequent valuation of social inclusion benefits ;
- 17% would walk or cycle. It might be argued that this share could perhaps be higher. However, given the relatively longer average trip distances in areas where bus is the main form of public transport, it is thought to be a reasonable assumption.

Figure 2 summarises these assumptions.

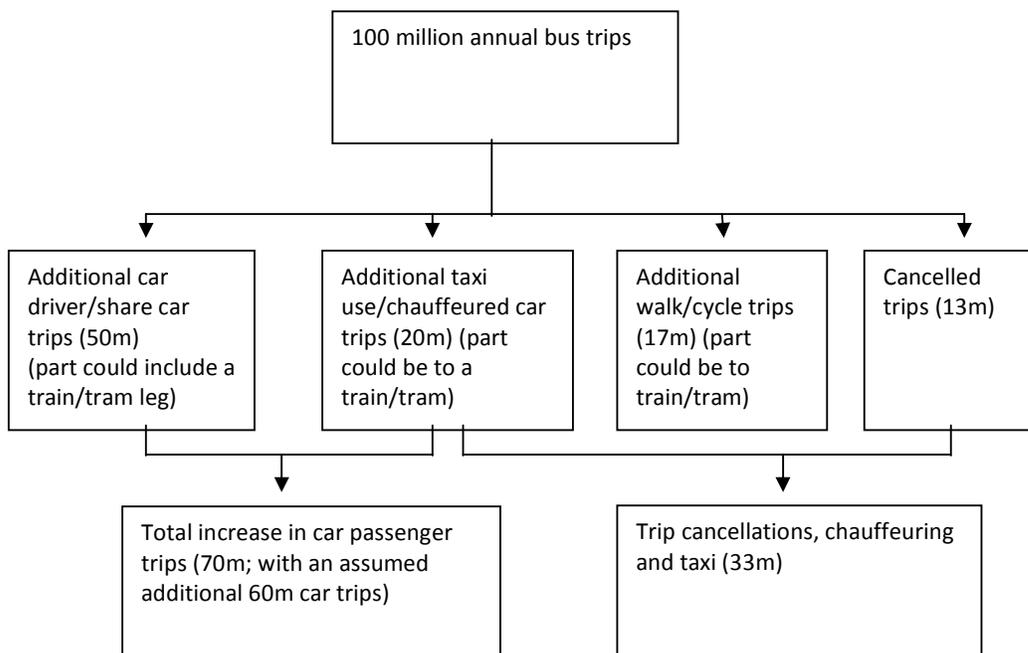


## 59<sup>th</sup> UITP World Congress

***Boosting public transport:  
ACTION!***

**Dubai, 10-14 April 2011**

**Figure 2: Assumed changes in modal splits if Melbourne had no route bus system**



Stanley (2010) uses these travel behaviour change assumptions, and draws on the travel time/speed/cost and travel distance estimates from Aftabuzzaman et al. (2009), to derive estimates of how (hypothetical) removal of Melbourne's route bus services would affect congestion costs, local pollution costs, greenhouse gas emissions, energy security, health and safety and social exclusion costs.

Table 2 presents the resulting benefit estimates. It shows total benefits at about 3.5 times the gross financial cost to government of service provision (costs being as embodied in gross cost service contracts). As indicated above, these benefits do not include the wider social benefits from reducing risks of social exclusion.

The major single benefit estimated to flow from Melbourne's route bus services is the social inclusion benefit, which was valued at \$A767m annually, or 44.4% of total estimated benefits. This benefit estimate was derived using the unit trip values (of about \$A20) presented in this paper, increased to allow for bus users average household income levels being below the Melbourne average. This outcome shows



## 59<sup>th</sup> UITP World Congress

### **Boosting public transport: ACTION!**

**Dubai, 10-14 April 2011**

how important the new Australian research is to valuing the benefits from public transport service provision. The second largest benefit was congestion time and cost savings of \$A588m, accounting for 34.1% of total benefits.

**Table 2: Indicative Annual Value of Melbourne's Route Bus Services**

<b>Value of route bus services in metro Melbourne</b>	<b>\$A pa</b>
Congestion time (\$A518m) and fuel (\$A70m) benefits	\$588 M
GHG (\$A7.5m), local pollution (\$A12.2m), energy security (A\$1.6m)	\$21 M
Accidents savings	\$15M
Bus user benefits of social inclusion = 33 m trips @ \$A23.25 per trip	\$767 M
User benefits for other bus users = 67 m trips @ \$A5 per trip	\$335 M
<b>Total value (externality + user benefits)</b>	<b>\$1.726 B</b>
Gross financial cost to budget	\$486 M
<b>Benefit Cost Ratio (BCR)</b>	<b>~3.5</b>

### **Conclusion**

New Australian research is helping to build understanding of the importance of mobility in terms of reducing a person's risk of social exclusion. This research shows that there is a clear and significant association between trip/activity levels and risk of social, exclusion, allowing for other factors that also influence this risk. Improving mobility is likely to reduce risks of social exclusion. The association between trip making, household income and risk of social exclusion, has enabled the value of improved mobility to be estimated and this has been shown to be much higher than is currently assumed in conventional transport cost-benefit studies. The important consequence is that public transport improvements which enable new trips to be undertaken should be rated much more highly than at present and the overall community value of public transport will be higher than estimated to date..

An application of the research to Melbourne's route bus services has led to the striking conclusion, that the reduced risk of social exclusion that is associated with the existence of the Melbourne route bus



## 59<sup>th</sup> UITP World Congress

### ***Boosting public transport: ACTION!***

**Dubai, 10-14 April 2011**

services is the largest single benefit from those services. This finding is expected to be even stronger for services in regional cities and towns, where users are more captive to the route bus service.

The findings from this research are very important to the value proposition of public transport. They show how important the social transit role can be, especially in relatively low density settlement patterns where travel choices tend to be relatively narrow.

#### **References**

Aftabazzaman, M., Currie, G. and Sarvi, M. (2009). Modeling the spatial impacts of public transport on traffic congestion relief in Melbourne, Paper presented to Transportation Research Board Annual Meeting, November.

Burchardt, T., LeGrand, J. and Piachaud, D. (2002) Degrees of exclusion: Developing a dynamic, multidimensional measure. In Hills, J., Le Grand, J. and Piachaud, D. *Understanding Social Exclusion*, Oxford University Press, Oxford, pp.30-43.

Loader, C. and Stanley, J. (2009). Growing bus patronage and addressing transport disadvantage – the Melbourne experience. *Transport Policy*, 16, 106-114.

Stanley, J. (2010), The Value of Melbourne's Route Bus Services, Report prepared for BusVic, November.

Stanley, J.K., Hensher, D.A., Stanley, J.R., Currie, G., Greene, W.H. and Vella-Brodrick, D. (2011). Social Exclusion and the Value of Mobility, *Journal of Transport Economics and Policy*, Vol. 45, Part 2, May.

Stanley, J.K., Hensher, D.A., Stanley, J.R. and Vella-Brodrick, D (under review), Mobility, social exclusion and well-being: exploring the links, *Transportation Research A*.

---

<sup>i</sup> Australian Research Council Industry Linkage Program Project LP0669046: "Investigating Transport Disadvantage, Social Exclusion and Well Being in Metropolitan, Regional and Rural Victoria".

<sup>ii</sup> It suggests that halving household income levels doubles the value of an additional trip.