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ACHIEVING SOCIALLY SUSTAINABLE TRANSPORT IN THE DEVELOPMENT CONTEXT

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Abstract

Although transport projects are often seen as key drivers of economic development, mobility and access are rarely recognised within either global or national social development programmes. Conversely, major transport decisions are generally not considered in relation to their social developmental outcomes, whether negative or positive. This paper will argue that it is time to view transport decision-making in a more integrated and holistic way across economic, environmental and social sustainability criteria, particularly within the critical context of transport decision-making processes within developing nations.

Unlike in the western world, where transport systems are already largely fixed, we posit that the development context still offers the broad opportunity to build more sustainable transport networks. It is our contention that, under the emerging *social sustainability* policy construct, existing travel patterns and informal transport delivery systems in developing countries could potentially facilitate greater social inclusion and environmental sustainability goals, if properly supported and maintained by the appropriate governance structures. This could also be achieved at a much lower cost than funding major new transport infrastructure projects and could also potentially facilitate far better environmental and social justice outcomes. However, we also recognise that the delivery of such an integrated policy approach would also require significant changes to transport governance structures within developing countries, as well as to transport financing mechanisms.

In this paper, we argue that part of the problem of promoting such an agenda is the current absence of social sustainability criteria within the transport appraisal tools of major transport investors. This is further undermined by the absence of transport and mobility considerations within the social development goals of developing nations themselves. To this end, we offer an overarching framework for developing a social sustainability approach to transport provision, drawn from across the relevant literatures. We then present three short case study examples taken from our own fieldwork studies in different geographical contexts to support our argument that informal transport services have a vital role to play in providing sustainable transport systems within developing cities.

Keywords: *transport, social development, environmental sustainability, integration, developing countries*

INTRODUCTION

The considerable economic, environmental and social equity challenges posed by the rapid motorization and increased mobility of populations in most developing countries requires the development of fundamentally new ways of thinking about the delivery of urban transportation systems. Motorization is increasing at a rate of more than 10% per annum in many developing cities (Gakenheimer and Dimitriou, 2011) and it is estimated that there will be more than two billion cars globally by 2030, representing a 250% increase in less than 30 years (Sperling and Gordon, 2009). Simultaneously, the growing demand for private motorized vehicles and accompanying road-based infrastructure building often push bicycles and pedestrians off the streets (Goldman and Gorham 2006). This represents a huge threat to the global environment, transport contributing to 23% of world carbon dioxide levels, 60% of which is land transport (International Energy Agency 2007) It is also likely to result in continued and growing social inequities between different population groups, with the consequence of increased social exclusion, reduced social wellbeing and quality of life, leading to breakdowns in community cohesion and greater overall inequality (Banister, 2005).

Despite these negative social outcomes, and an associated loss of the potential benefits of a properly planned and managed transport systems to considerably improve the lives and wellbeing of citizens in developing cities (Finn 2012), it is rare that social development policy takes consideration of transport at either the national or international level and vice versa. Traditionally, transport decision-making (in both the developed and development context) has largely been based upon the premise of meeting the future demand for private vehicle mobility with an increased supply of transport infrastructure, largely through new roads. The specific accessibility and activity needs of local populations are rarely considered and neither are the social and environmental consequences of transport decisions properly taken into account (NGO Forum on the Asian Development Bank, 2010). It has been the assumption of policy makers and the financiers of transport alike that investment in new transport services will automatically lead to the economic development of the areas served and that there will be a 'trickle-down' effect in terms of positive social benefits to local populations (see, for example, Metz, 2011). Yet, it is rarely the case that such trouble-free linear relationships actually occur in practice. For example, following a systematic study of such initiatives, Van de Walle (2002) found little convincing evidence to suggest that rural road building in development contexts had affected social outcomes beyond what they would have been without the new road because most of the local populations in these areas do not have access to motorized transport and remain largely reliant on walking for their accessibility needs. The World Bank, who has so often been the key investor in such projects, now also questions the solidity of this relationship (Kvam et al., 2006).

AIMS OF THE PAPER AND RESEARCH METHODS

In this paper we argue that part of the unsatisfactory transport decision-making in both developed and developing countries lies in the absence of robust decision tools to maximise social and environmental outcomes. To this end, we offer a broad conceptual framework for assessment of social and environmental sustainability of transport decisions. We then use this to demonstrate how lower cost and more localised transport projects, and in particular the incorporation of informal sector transport systems into city-wide transport plans, could potentially offer a more sustainable and effective modal of transport delivery. In the interests of brevity, we limit our focus to the transportation of people only and do not include

consideration of the transportation of goods and services, although we recognise this is also highly relevant to the overall sustainability of cities.

The paper is based on a combination of literature review, informal participant observation and interviews with key stakeholders and the users of transport services in the three case study countries we have drawn upon. These have taken place over a number of different visits as part of other studies that were not directly related to the focus of this paper.

Formal studies of the informal transport sectors in developing countries are rare, in part due to the very nature of their informality. Whilst the users of these systems are relatively easy to capture and interview, their operators are often scrutiny shy and wary of intrusion and the owners are virtually impossible to either identify or engage in formal research processes. Systematic and robust data collection and analysis is virtually impossible under such circumstances and so we have relied on opportunism and a non-structured approach. As such, we fully recognise that the observations we make in this paper are both highly subjective and *ad hoc*. We do not therefore attempt to make any claims for the robustness of our analysis beyond that which has been substantiated elsewhere in our cited studies and by the similar observations of others we have identified through literature review.

THE SOCIAL SUSTAINABILITY CONCEPT

We first explain the concept of social sustainability, as it is currently described within the limited literatures on this subject, followed by a discussion of how this might relate to transportation. We begin with the premise that:

Cities need to be emotionally and psychologically sustaining, and issues like the quality and design of the built environment, the quality of connections between people and the organisational capacity of urban stakeholders become crucial, as do issues of spatial segregation in cities and poverty. (Landry, 2007: 11)

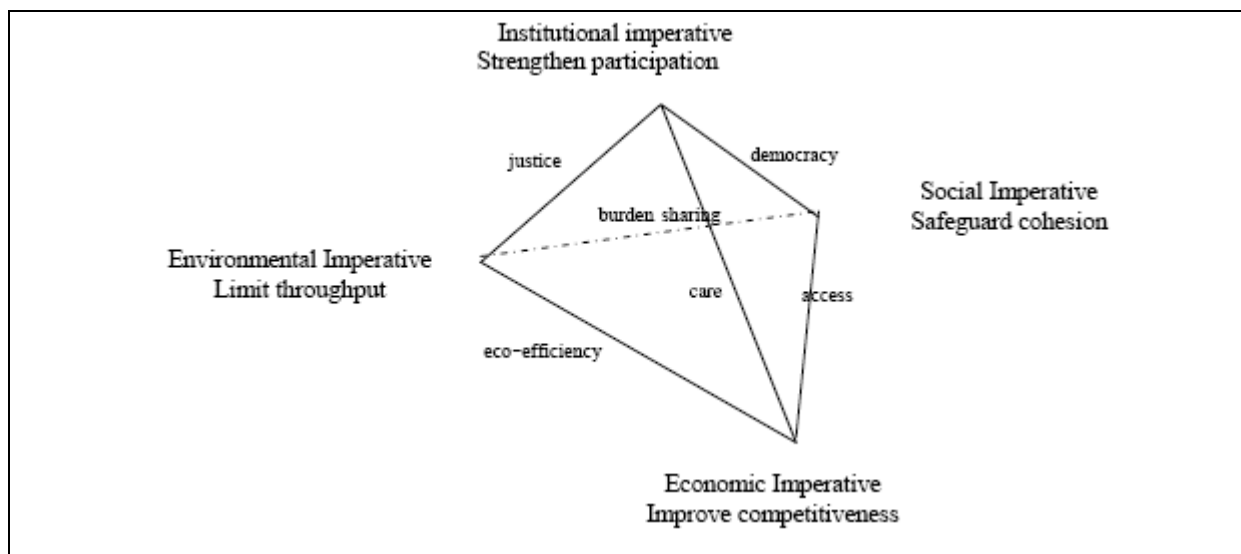
However, both the academic and policy literatures demonstrate that theorists and practitioners, particularly in the transport sector, have largely ignored the social equity and social progress dimensions of the ‘three pillars’ or ‘triple bottom-line’ sustainable development paradigm, particularly concerning the development, designing and appraisal of policy interventions (Manzi et al., 2010). In the case of transport, this is despite a raft of information which has consistently identified that transport policies have major social implications, that both the benefits and disbenefits of transport interventions are unevenly distributed across population sectors across the developed and developing world alike and that the most vulnerable groups within society experience the worst ill-effects of unsustainable transport decision-making (Stanley et al 2011).

The concept of social sustainability has largely arisen from concerns about this oversight. Academics and increasingly key decision-makers in transport (as well as other sectors), such as the Development Banks and local transport authorities, are increasingly recognising the need to more holistically understand the short and longer-term social consequences of their decisions. Social sustainability, therefore:

... is mainly concerned with the relationships between individual actions and the created environment, or the interconnections between individual life-chances and institutional structures...This is an issue which has been largely neglected in mainstream sustainability debates (Jarvis et al, 2001, p.127).

It recognises that, whilst some synergies do clearly exist between a desire to protect the planet and human economic and social advancement, there also may be important tensions between these often quite divergent policy goals. For this reason, it is also essential for policy makers and other key stakeholders to more holistically consider the social consequences of their actions alongside and on an equal footing with economic and environmental considerations. This not only requires explicit recognition of a ‘fourth pillar’ of governance, but also an understanding the complex interplay between ‘access and participation, ‘rights and responsibilities’, ‘benefits and burdens’, ‘democracy and justice’, economic grow and loss of traditional ways of living etc., as is demonstrated by Figure 1.

Figure 1: A multi-dimensional understanding of sustainable development (adapted from EPA Ireland Technical Document, 2004



With this broader conceptualisation to the fore, the next section of the paper offers a critical examination of the perceived role of transport in delivering these four pillars of sustainability.

THE TRANSPORT AND DEVELOPMENT POLICY INTERFACE

Traditional conceptualisations of the role of transport in social development

It has long been proposed that transport infrastructure development can be used to stimulate economic development by increasing the accessibility of producers and markets to consumers and through the accompanying stimulation of development investment in the areas it serves (e.g. Graham, 2007; Gibbons and Overman, 2009). As Banister and Wright (2005) identify, this relationship is subject to a potential for positive externalities to be created within the specific markets that are responsive to improved accessibility, particularly the property, land use, manufacturing and employment sectors. Repeated studies have shown that economic development will not necessarily follow even when there has been significant investment in new transport infrastructure where demand within these markets is low and/or where there is a high degree of competition from more vibrant adjacent economic hubs (Boopen 2006; Goetz 2011), The relationship can also be weakened by the size and nature of the transport investment, often being less strong for public transport compared to road projects (REF) and for fixed rail compared to bus modes (REF).

Perhaps more germane to the arguments presented in this paper, is the extent to which the economic benefits that do often arise from such investments can be said to effectively deliver social development and sustainability as well as on an equitable basis and also whether this is achievable within the boundaries of environmental limits.

The contested role of transport infrastructure investment in social development

Many authors have criticised the policy emphasis on using major transport infrastructure projects as a ‘quasi’ social development tool. In this respect, Mahapa and Mishiri (2001) note the preoccupation of transport policymakers with higher technology fixes and efficiency savings rather than the travel needs of local ‘beneficiary’ communities, which they claim could have resulted in different, less expensive and more context-specific and gender-sensitive solutions. The authors seriously challenge the appropriateness and effectiveness of such infrastructures in lifting low-income population out of poverty (Bryceson et al., 2008).

Similarly, in a recent study conducted in the Mardin region of south-east Turkey, Akyelken (2012) has revealed that political instability combined with a lack of investment by government in social infrastructure, low educational levels and a dominant patriarchal mind-set has meant that women have largely not benefited from the significant investments that have gone into new transport infrastructure projects in the region over the last ten years. Fouracre et al. (2006) have also argued that a more participatory approach to urban transport planning in developing countries would also lead to a better understanding of the effects and implications of travel on the livelihoods of the urban poor.

A review of some Asian Development Bank’s projects found that in almost all, gaps in meaningful consultation with affected communities and sectors “which manifested inefficiencies and injustices in project conceptualization, design and implementation, and resulted in unfortunate development outcomes that negate the realization of people’s aspirations for the betterment of their socio-economic and environmental condition” (NGO Forum on ADB, 2010, p.7). The authors of this paper have identified similar recurring themes across the contemporary literatures in this field.

Large infrastructure projects may be designed to assist industry in major cities at the social and environmental cost of urban settlements along the route. The Southern Transport Development Project in Sri Lanka is the construction of a 128-kilometre expressway which crosses four river basins, more than 100 small and large wetlands and many acres of paddy fields, also necessitating the demolition of more than 1,300 houses (Kent and Simon 2007). A key issue in many of these major transport projects is the unsatisfactory compensation and resettlement program. Many of the resettlement sites lack basic infrastructure and amenities, including roads, drinking water and proper sewerage systems. Inadequate compensation has resulted in a need to borrow money to replace housing, thus increasing indebtedness, as well as increased morbidity and mortality. Vulnerable groups particularly suffer, such as female-headed families, heads of households with physical disabilities, and those with low incomes.

Salon and Gulyani (2010) statistically demonstrate poverty to be strongly negatively correlated with the use of motorised transport in developing countries and identify that affordability is a key issue in the transport poverty of urban slum dwellers in Nairobi, with the situation being particularly bad for slum women and their children. They find that most slum dwellers need to use motorised transport to access education and employment opportunities that could lift them out of poverty, both because of the distance of their housing locations from these key destinations and because of their inability to move physically closer to them due to the absence of affordable housing in the areas where such opportunities are located within the city. As the authors of previous studies have observed, the main problem

of transport and access in the urban development context is not the absence of transport infrastructure or motorised public transport *per se*, because of the almost ubiquitous presence of the privately owned and operated minibus-taxi industry (*matatus* as they are referred to in Kenya, *kombis* in South Africa). Rather, it is because the taxis are reported to be unaffordable, unsafe, unreliable and unsuitable for the long journeys that must often be undertaken to access work and other key destinations. Gakenheimer and Dimitriou (2011) point out, this situation often remains unresolved even where there is substantial investment in public transportation within these cities because of the absence of adequate institutional and governance structures and professional capacities to deal with the complexities of organising and delivering an integrated, multi-modal and multi-operational transportation system.

The growing problem of the environment and climate change

Local policy makers in developing cities are becoming increasingly aware of the need to address the environmental and climate change challenges that will almost inevitably arise from a car-dominant transport system. Transport currently represents around 12 to 20% of a country's greenhouse gas emissions (Goldman and Gorham 2006). This is likely to increase by 57% between 2005 and 2030 with business-as-usual, largely driven by increasing the number of cars, where 80% of this growth will be in developing countries (Global Fuel Economy Initiative 2010). Transport is the only sector with increasing emissions in the EU. Nevertheless, mass car ownership and use is still the vision of many of the national governments of rapidly developing countries and is still used as a measurement of their increased economic vibrancy and 'development' (Dimitriou, 2011).

Many Chinese and Indian cities are already experiencing extremely high levels of atmospheric pollutions from traffic. The major causes of pollution are vehicle emissions and coal consumption, leaving 45 major Chinese cities (4 out of 10 major cities) with poor air quality (Li, 2011). The World Health Organisation (2009) estimates that 531,000 premature deaths occur annually in developing Asian countries due to air pollution. The transport networks of such cities are also already at breaking point, with chronically high levels of congestion, traffic-related accidents and noise pollution.

It has been demonstrated that low-income sectors of the population are disproportionately affected by the negative externalities of road-based transport (Oxfam Australia, 2008) and are also least resilient to global hikes in oil-prices and associated other shocks to the market, such as increased food prices (for example, NIEIR 2007). Indeed, carbon emissions in Australians with the highest income are two and a half times the emissions generated by those on a low income (Stanley and Stanley in press). This discrepancy would be even higher in developing countries. Thus, on equity grounds, carbon reduction policy should be more strongly directed towards the high material consumption in wealthier households, thus bringing in further grounds to question the value of large scale transport infrastructure projects. The high consumption model/high car ownership model cannot be supported on environmental or social grounds. As Nair notes: "Trickle down doesn't work. Consumption-led growth creates a comparatively small middle class floating nervously in a sea of poverty" (Bunting 2011).

Maintaining and facilitating the use of non-motorised transport complemented by an efficient public transport system, such as Bus rapid Transit, would be a cost-effective way of improving transport sustainability in developing countries while assisting mobility for the more vulnerable members of society who needs are not being met by freeway construction (UK aid, undated). . He challenges the development model of rapid urbanisation and calls instead for investment in rural areas to improve sustainable farming methods and raise farming incomes.

Meeting the mobility needs of vulnerable population groups

Past research has extensively demonstrated that access to mobility entails processes that are highly differentiated along the lines of gender, age, class and ethnicity (Priya Uteng, 2011). Less well researched and understood are the complex interactions between physical mobility and economic, social and political mobility, but both have huge implications for how transport systems are developed and delivered in both the developing and developed world (Lucas, 2011). A series of recent reports emerging from the 2010 UN Habitat Agenda in Mombasa highlight the highly uneven nature of current transport policy across the developed and developing world in terms of its beneficiaries. Peters (2010: 1) confirms that:

“Women’s travel patterns are characterized by deep and persistent inequalities. Within any given urban setting, women have inferior access to both private and public means of transport while at the same time assuming a higher share of their household’s travel burden and making more trips associated with reproductive and caretaking responsibilities”.

Similarly, McMillan (2010), identifies that, despite the fact that children and youth are a growing proportion of the population in many urban areas around the world (children and youth under 24 represent 47 per cent of the total population in developing countries and 29 per cent of the population in developed countries), in terms of urban transport they are an overlooked and vulnerable segment of the population. Similarly, the mobility and accessibility needs of most of the older people and those with a disability (who will represent nearly third of the world’s population by 2050) are also often not considered by transport providers, although this has improved enormously in a number of cities due to the introduction of disability discrimination laws (Frye, 2010). Those on low incomes have been shown to travel less, travel diminishing as income levels diminish, both income and travel being statistically related to the risk of social exclusion in Australia (Stanley et al. 2011). Commonly, these populations sectors, as well as the majority of the urban poor within developing cities, rely on walking as their primary transportation mode and yet consistently and systematically the importance of non-motorized modes in maintaining their accessibility to key goods and services is either forgotten or flagrantly ignored by city planners and transport engineers.

Effective transport governance and holistic decision-making

Dimitriou and Gakenheimer (2011: xvi) have suggested that the issue of transport governance is foremost if any progress is to be made with in the delivery of sustainable transport systems and that strong governance is particularly lacking in the case of developing countries.

“The greatest need of urban transport in the developing world is for improved public-decision-making in urban transport policy making, planning and management, supported by commensurate capacity-building to facilitate this”

Notably, absent from transport appraisal is any measure of ‘participative governance’, such as the involvement of communities and other stakeholders in the decision making process, and/or the extent to which traditionally under-represented groups were involved in the decision-making process. Transport has been particularly criticised in this respect for being the regime of predominantly white, older, middle class males and for thus overlooking the needs and perspectives of women, children, older people and other minority interests. This perhaps makes the inclusion of such measures even more important, as many of the concerns these groups have about transport may not readily occur in the mind-sets of the policy makers who are responsible for transport project appraisal.

In our view, there are two on-going essential governance failures within transport decision-making. Firstly, the transport system is rarely viewed holistically in a way that cuts across transport modes. It is important to note that the transport goals we have listed above are generally not independent from each other, rather they are often inter-related. Understanding of the inherently *dynamic relationship* between the different economic, social and environmental parameters of sustainable development needs to be articulated, which may be cumulative and virtuous or have negative feedback effects. Commonly there is the added value of co-benefits; achievement of one of the targets may also assist in achieving other transport targets. For example, reducing greenhouse emissions by facilitating active transport options is also likely to have health, cultural and inclusion benefits. Environmental, social and economic goals are rarely viewed concurrently. These divisions are often reflected in the functional divisions of government departments making the integrative task extremely hard. The mirror of these divisions is the dominance of particular discipline approaches in each of these specific outcome areas.

Secondly, as discussed above, research has persistently demonstrated that those people who are most in need of improved transport are usually not the main beneficiaries of major transport investments projects, particularly in the developing world. It has also highlighted that much smaller investment in 'social transit' and walking and cycling improvements demonstrate far greater social benefit to cost ratios, whilst also having a much lower impact on the environment. In a report for the World Bank, Kvam et al. (2006) identify a framework for integrating social analysis into the transport project funding and development cycle. The authors recommend that all project assessments require attention to local stakeholder involvement, including the participation of vulnerable and at risk population groups *at every stage of the decision making process*, including i) project identification and design, ii) project preparation and appraisal, iii) undertaking negotiations and approval, iv) implementation, v) supervision and monitoring, vi) the mid-term review and vii) for the implementation completion report.

The report identifies a comprehensive checklist for each of these seven stages of the process for use by decision makers (p.25-32). Vitality, it recommends that assessments should pay attention to social and gender diversity, local institutions, rules and social values, the involvement of key stakeholders outside the transport domain (particular health providers, educators and poverty reduction workers) and the participation of civic society, NGOs, unions and community and local level organisations.

Recognising a new economic imperative

These social and environmental challenges are currently compounded by the global credit crisis, which has led to an inevitable downturn in the levels of finance that are available in the global system through which to fund new transport systems generally (Lucas et al., 2008). This suggests there is an urgent need to re-evaluate the ways in which we think about the development and delivery of new transport systems not only in the developing but also the developed world. Dimitriou and Gekenheimer (2011) suggest that it is likely that new less expensive solutions to the delivery of mass transit will be needed in rapidly urbanising cities, and/or that new financial funding models will need to be developed which require more private and individual investment in transport infrastructure projects. Whilst Stanley (2010) and Lucas et al (2009), among others, argue that policy makers urgently need to find new ways to evaluate the social value of transport projects within their appraisal frameworks.

DEVELOPING AN APPRAISAL FRAMEWORK FOR THE ASSESSMENT OF THE SOCIAL AND ENVIRONMENTAL SUSTAINABILITY OF TRANSPORT PROJECTS

The above evidence suggests that new ex-ante evaluative and appraisal criteria are needed which can, not only bring into balance these hitherto divided economic, social, environmental and governance considerations, but also put greater emphasis on local community participation in transport decision-making processes and local delivery practices. This paper is designed to offer a preliminary framework to help local transport authorities and other key transport and land use delivery stakeholders consider how they might best move forward with this integration agenda. We would argue that the over-arching concept of *sustainability* should be used to guide transport policy decision-making within the development context.

In order to be practically deliverable, the sustainability concept needs to be transcribed into a workable suite of project appraisal criteria. These need to embrace all four of the sustainability dimensions we have outlined above, to include of economic, environmental and social and governance performance measures. Equally, the social development goals of developing nations should consider the mobility and accessibility implications of their own policies for the activity needs of different population groups. For example, whether the transport system can support and sustain reliable, affordable and safe access to employment, healthcare, education, social care and so forth, and is also inclusive for women, older people, disabled people and other vulnerable user groups.

Identifying social sustainability criteria

In a previous paper, Lucas et al. (2007) described their research to identify and validate a set of indicators to assess the social sustainability of transport decisions in the UK context. The work was undertaken in parallel with a similar process to identify and validate a set of indicators for the environmental and economic pillars of sustainable development. The aim of the overall project was to develop a tool that can be practically applied by decision makers in the contexts of both national and local governments to holistically assess the sustainability impacts of transport policies and projects (Marsden et al., 2007). Five core indicators were developed, which we recommend could also be promoted for the assessment of transport projects in the development context, namely:

1. Transport poverty = affordability of public transport relative to income for household below the poverty line;
2. Accessibility = weighted journey times to key centres of a) employment, b) primary, secondary, and further educational facilities, c) primary health care providers and general hospital, d) key food shops;
3. Safety = adult and child pedestrian casualties by social class
4. Quality of life = percentage of residents living within 1,000 m or 15-min “safe walk” to key destinations (e.g. health, educational, leisure and cultural facilities, food, shops, post office, etc.) by relevant social groups
5. Housing availability = lowest 10% value of house prices within x minutes (based on average population local journey times to employment within any given location) to the town centre and key centres of employment.

We would suggest a further three appraisal criteria should be added to this previous list in the development context, in view of the particular concerns we have highlighted in relation to the need for improved social equity and inclusion and transport governance structures, as follows:

1. Health and well being - including protection from road deaths and injuries, freedom from pollution and other adverse effects such as noise, major roads dissecting communities, traffic congestion, promotion of healthy travel and absence of and social exclusion.
2. Equal opportunity to participate in society - including availability, accessibility and cost of transport (for present and future generations and all sectors of the population), thus facilitating both social exclusion and equity goals.
3. Transparent and accountable transport governance structures - at every layer of decision-making, e.g. public enquiries, referenda and engagement exercises, community representation within transport organisations
4. Access to decision-making processes and recourse to legal justice - including governance and planning structures, which allow bottom-up, community decision-making processes to occur e.g. local community for a and community-led local transport plans.
5. Integration - a cross-cutting governmental agenda for transport across multiple policy sectors including, but not exclusively, housing, city planning, public utilities, health, education, environment and social welfare sectors, e.g. indicators of levels of population accessibility to key activities, such a employment, education and healthcare included within the policy performance measures for these sectors.

DELIVERING SUSTAINABLE TRANSPORT IN PRACTICE: RECOGNISING THE VITAL ROLE OF THE INFORMAL SECTOR

While large roads-based infrastructure developments have until now been the first choice for transport investment in most developing countries, often at the cost of the loss of other transport alternatives, there is a growing movement to question many of the concepts on which this development is based. Khayesi et al. (2010) identify a fixation on facilitating motor vehicle transport has led the governments of numerous developing countries to ignore the associated disadvantages of high rates of oil consumption, environmental pollution, greenhouse gas emission, as well the huge social inequities in who benefits and loses from such investments. Furthermore, traditional settlement and activity patterns and forms of transportation such, as cycling, walking and animal-powered vehicles have been constructed as ‘old-fashioned’ and ‘counter to the interests of progress and prosperity’ and discouraged and sometimes even banned from sharing the same infrastructure as motorized vehicles.

Whilst not seeking to deny the rapidly modernising cities the potential benefits of new and emerging technologies and advanced engineering solutions, we would agree with these authors that it is often the *smaller and simpler solutions* which offer the greatest social benefits to the greatest number of people, whilst also posing the least threat to the local and global environment. Pedakur (2011) argues that what is urgently required in developing cities is the introduction of a new, people-centred hierarchy of transport management measures, which would include a combination of rapidly improved infrastructure for non-motorised roads, modern traffic control equipment, better trained traffic police and more strict legislation and enforcement, as well as the education of all road users but especially car drivers to respect the rights of others to use the roads. He criticises the transport profession for its exclusive emphasis on facilitating *automobility* and the speed of motorized traffic at the expense of the majority of low-income people. In particular, he calls for international investment agencies and other foreign investors to:

“... move away from the dogma of ‘urban road investment = transport improvement = economic development’ and to the new paradigm of ‘sustainability through increased NMT [non-motorised transport] use’” (Pendakur, 2011: 229).

Gulyani’s (2010) assertion that the poorest of citizens in rapidly developing urban contexts require motorised transportation in order to facilitate even their basic everyday activities is true. However, the switch to more sustainable transport modes should be actively encouraged for all sectors of society and car use more stringently restricted, then the poor population would also be provided with improved sustainable mobility options – in fact they would be better off under a non-private car model of transport within cities due to reduced accidents and exposure to pollution. However, the need to deliver effective, cheap and flexible motorised transport systems within rapidly developing cities is also often forgotten by city planners and development agencies (Wright, 2011).

In the absence of adequate formal public transport systems, informal private sector providers have stepped in to fill the gap that the public authorities have left. All too often, the outcome is a ‘bedlam’ of unregulated, uncoordinated and unruly array of minibus taxis, jitneys, rickshaws, many of which compete with the few unreliable, inconvenient and badly routed public services buses that do operate (Cervero, 2000; Cervero and Golub, 2007). In their attempts to upgrade the formal urban transport systems of such cities, transport planners most usually conceptualise these chaotic, informal transport services as part of the problem (Bordreaux, 2006).

Whilst we would agree that there is clearly a need to better regulate the providers of such informal transport services, we would also argue that both their efficiency in terms of coverage and their inherent value to many lower income citizens should also not be overlooked and neither cannot this easily be replaced by the new formal systems that are being introduced within developing cities. As such, we recommend that the informal sector should be treated as an important *complementary tier* of transport provision within the urban system, with a particular focus towards social inclusion and community connectivity for low-income populations. However, in order to achieve this goal the informal sector also needs to be subjected to all aspects of the social sustainability criteria outlined above, not merely those of economic efficiency and/or universal access, as currently can so often but need not necessarily be the case, as the following examples can demonstrate.

Case study 1: Kombi Taxis in South Africa

The informal *kombi* minibus taxi industry emerged in South Africa during the period of apartheid, largely in response to a complete failure by government to provide adequate public transport for its non-White population. What began as a small-scale concern within the townships of Johannesburg and Soweto quickly came to dominate the whole of the mass transit sector in South Africa and until recently, the industry has remained largely impervious to regulation, organic and spontaneous to demand.

It provides accessible, fast and efficient motorised transport to more than 85% of the population and is available to all but those the living remotest rural settlements (Republic of South Africa Department of Transport, 2005). For the vast majority of South Africans living on low-incomes it is the only form of transportation that is available to them (apart from walking) for accessing work, school, healthcare and other key services (*ibid*). It can also access places where formal urban public transport can’t function i.e. in the very dense and informal urban slum settlements, in areas of enormous urban sprawl and connecting semi-rural settlements to the urban core (Stanley et al, 2008). The flexibility of this mode; employing smaller vehicles, stopping more often and travelling along secondary routes, also

means that it is more accessible to the elderly, for children, woman and people with disabilities, allowing them to connect on a activity/needs basis with their dispersed daily duties and routines. This would suggest that kombis are highly successful in meeting the many of the social sustainability criteria we have identified.

The sector also performs well against economic sustainability criteria and has been described as a key economic success story within the post-apartheid free market system of transport delivery. It operates on a strictly for profit basis, requiring no government subsidy or capital assistance (Cervero and Golub, 2007), and as such has been hailed as a new form of 'heroic entrepreneurialism' by Boudreaux (2006). Operators are highly competitive and ultra-responsive to new market conditions and emergent economic trends. Although they usually charge much higher fares than competing rail or bus services, they consistently retain their customer base, due to shorter access, egress distances, journey times and other economic efficiencies. The industry also supports hundreds of thousands of jobs. According to various estimates, there are currently between 150,000 and 170,000 taxi owners and operators in South Africa. If queue marshals, taxi ranks officials, cleaners and drivers' assistants are added to this figure, the number increases to more than 600,000 people employed across the industry as a whole (Boudreaux, 2006). This is in the context of a country with a persistent 27% rate of unemployment.

Taxi owners have also been hailed as 'key agents of change' and 'political entrepreneurs' in the post-apartheid regime, in recognition of this they have recently been brought to the table by government as powerful entities in delivery of the new bus rapid transit systems that are being introduced in South Africa's major cities. However, the true political sustainability of the sector can be questioned and some commentators have accused taxi operators as operating as 'criminal mafias', with a total disregard for the rules and regulations of progressive society (Cervero, 2000). Passenger and pedestrian safety is regularly compromised through reckless driving and unsafe vehicles, minimum standards of comfort are frequently applied, reliable schedules neglected in favour of 'cream skimming' and vehicles loaded beyond their legal limits (Lucas, 2011). Passengers are often made to wait for long periods of time, are subjected to harassment from operators and inappropriate sexual behaviour and incidents of rape have been regularly reported by female passengers (ibid). Furthermore, taxi workers are often vulnerable to exploitation by their owner operators because their businesses are not registered and therefore not accountable. Wages tend to be well below prescribed limits and drivers are subjected to long hours of stressful work and their jobs provide limited scope for promotion or future ownership (Boudreaux, 2006). Studies with different user groups have also identified them unaffordable for many passengers to use on a regular basis, particularly when compared with the incomes of most users (Lucas, 2011)

The environmental performance of the sector is also mixed. On the one hand, kombis provide a flexible form of mass transportation with vehicles operating at maximum levels of energy efficiency in terms of their passenger loadings. On the other hand, many of the vehicles are old and highly polluting in terms of their emissions and yet they are currently precluded from the compulsory CO2 tax mechanism for motor vehicles. Government has met with limited success in trying to introduce a vehicle scrapage scheme and so the sector remains resistant to the introduction of new technologies such as electric vehicles. It also often runs vehicles in direct competition with less polluting public transport vehicles, thus undermining their impact in reducing CO2 and other local emissions and adding to the problem of urban congestion. So whilst the kombi taxi in South African can be said to perform very well against a number of the social sustainability criteria we identified earlier, it performs very poorly in other respects; most notably in terms of its safety, environmental

performance and related regulation, as well as in terms of the transparency of its governance structures and public accountability.

Case study 2: Mototaxis in Recife, Brazil

Currently approximately 45% of the Brazilian population has access to a car. Despite their minority status, cars dominate the road network in most Brazilian cities, which is at gridlock for large parts of the day. The public transport network is relatively well developed within most of Brazil's major cities and many people rely on buses and trains for most of their daily travel. The local municipality also subsidises local community bus services or *colectivos* to serve more peripheral low-income communities. They are usually run by a variety of local organisations and small business that tender for these services under a contracted agreement and work under a set of loosely regulated guidelines in terms of fare setting and operating conditions. In recent years, illegally operated and unregulated motorbike taxis have emerged as a popular additional informal mode of transport. They are particularly popular because they are very cheap and also able to serve the *alto favela* communities that have been built into the Brazilian hillsides.

Alto Santo Thereza is one such community situated at the outskirts of the metropolitan of Recife, which is the administrative centre of a rapidly urbanising growth area in the North Eastern region of the country. Walking is the predominant mode of transport for the majority of people living in Santo Thereza because many of its houses are located on extremely steep hillsides that are impossible to access even with small community buses. This had made the motorbike taxi a particularly popular mode of transport for local residents, especially for return trips from the shops and other local services, most of which are located on the main road at the foot of the hillside. They are also seen as a lifeline for older and less mobile residents to get them to their health appointments.

A key challenge for the metropolitan planning authority is how to better connect people living in these hillside communities with the increasingly formalising economy of the city and the new jobs and educational opportunities that will arise from this. Despite their poor safety record and questionable legal status, the authority is beginning to feel that motorbike taxis should at least play a part in the overall community transport mix.

Case study 3: Flexible Urban Transport in Melbourne, Australia

Finn (2012) talks of the role of informal transport services as a complementary to more traditional forms of public transport in order to satisfy social sustainability and inclusion criteria within developed cities. This may be in the form of demand responsive buses, minibuses or shared-taxis, or dedicated services for people with reduced mobility or other special needs, or through car-pooling, car sharing and community-based vehicle hire schemes.

Such a demonstration model has been established under a social enterprise model in a regional centre in Melbourne, Australia. A central booking office coordinates all available transport to unmet transport needs, offering passengers transport information about all available services – informal, public transport, taxis, car-pooling and share cars, and transport itself where no other option is available. The service meets social and environmental sustainability needs by provision of a service and maximising the use of the service – maximising emission and cost effectiveness (Stanley and Stanley 2012).

However, the provision of such services within the developed world most usually requires high levels of public subsidy both in terms of their capital and revenue costs if they are to offer more than an occasional and voluntarily run community minibus service. In this instance, State of Victoria Department of Transport supports these services, partly because they offer good value for money when compared to offering traditional bus services in areas

of relatively low demand and partly because they are able to serve the unmet transport need groups that cannot use conventional services. A huge issue in providing these flexible and bespoke services, therefore, is their long-term economic viability particularly in times of economic downturn and the rollback of public funding. Another concern is the extent to which they are available to all sectors of the population, as most often they have eligibility criteria that target them towards people with mobility difficulties and elderly populations.

Whilst these three brief case study examples can offer only a flavour of the richness, variety and complexity of the informal transport sectors in these very different geographical contexts, they do allow an opportunity to consider their performance against some key economic, environmental, social and governance sustainability performance criteria. Each example falters against some but not all of these measures and lessons could effectively be drawn from each.

CONCLUSIONS

In writing this paper, the authors recognise that all cities are developing to a lesser or greater extent and so there are many different types of ‘developing’ city, each with their own unique patterns of land use, transport systems and legal and governance frameworks. Inevitably, no one solution will fit all and as such, we agree with Dimitriou’s (2011) recommendation that to deliver integrated and socially sustainable systems of public transport in these cities, it is essential that city planners, transport professionals, financial investors and other decision makers explicitly recognise the *specific contexts and pre-existing conditions* in which they are working and to have a high degree of regard for the *accessibility needs of the mass population*, rather than acquiesce to the hypermobility demands of the few.

To achieve social and environmental sustainability will take an approach that is different to the path that is being currently pursued. This will be far from easy to achieve, the first step being heightened awareness of the outcomes of current funding decisions, systemically applying a sustainability approach to transport policy and project appraisal and communicating long term vision which fundamentally transforms the thinking of development banks and other agencies about how to best meet human mobility and accessibility needs in rapidly developing and currently poorly provided for cities. It is time to recognise that it is simply not possible to meet the all mobility and accessibility needs of urban populations via the private motorized vehicles model of provision (even when these vehicles utilize the best in innovative ‘green’ technologies). Neither is it realistic to expect that traditional fixed-route public transport services will meet these needs (however, well-planned and efficient).

The informal transport sector thrives in developing cities for a reason. It is highly, flexible, responsive to demand, readily available and relatively cheap to run. It needs better regulation and governance and to be appropriately integrated with the formal public transport network. A careful and well-considered approach is needed to do this in a way that will maintain its entrepreneurial and streamline qualities, whilst protecting the safety and welfare of its users.

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