Social Dimensions and the impact of sustainable transport and mobility on social development

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Abstract

This chapter describes the relationship between transport, mobility and society. This is achieved by means of linking the social dimensions and impact of sustainable transport and mobility with approaches, principles and values of social development. Sustainable social transport and mobility uses resources and people as the unit of analysis. The societal role of transport and mobility is explored through reviewing the connection between social development as underpinned by transport and mobility indicators such as access, quality, quantity, service levels and the mobility needs of different transport modes available in South Africa. In addition, the role that transport and mobility has played in the urban development of South Africa is described. Options and strategies for enhancing the integration of social dimensions in transport and mobility projects, programmes and plans are outlined.

Keywords
Development, integration, mobility, social, sustainable, transport

1.0 Introduction and overview

Rural and urban transport systems and technology development evolve to meet mobility requirements of a society. Social dimensions are an important concern for sustainable rural and urban mobility (World Bank, 2008, Chakwizira et al, 2009). Lack of access and mobility prevents people from being able to break out of the cycle of social exclusion. Table 1 presents an overview of South African studies examining the links between transport infrastructure, mobility and local socio-economic development. It emerges that integrating the social dimensions in transport mobility is a growing challenge.

Table 1: Sample Summary of South African studies examining links between transport infrastructure, mobility and local socio-economic development

AUTHOR	GEOGRAPHIC SCALE	INFRASTRUCTURE	CONCLUSIONS
Perkins, (2005)	National (RSA)	Economic Infrastructure Investment.	**Inadequate investment in infrastructure can create bottlenecks and opportunities for promoting economic growth could be missed.**
Dfid:UK (2005)	Republic of South Africa – Municipal and Province disabilities demonstration project.	Low cost technologies for accessible information on public transport	**Access and livelihood opportunities for persons with disabilities can be improved through universal transport designs.**
Chakwizira, Mashiri & Marrian (2008)	Southern Africa Regional Spatial Development Focus..	Spatial focus and impact of infrastructure and non-infrastructure investment interventions.	**Infrastructure and non-infrastructure development and growth interventions are not uniformly spread (benefits and distribution) polarising spaces, people and regions.**
Department of Transport, Republic of South Africa (undated)	National, regional and Local level.	A transport infrastructure and services synopsis on the concept of transport authorities in South Africa.	**Transport Authorities could be one way of strengthening and encouraging better transport governance delivery and services.**
Mpumalanga Department of Transport (2005 to current)	**Province level but targeting former homelands and previously disadvantaged rural remote and deprived regions.**	***Siyatentela* rural low volume gravel roads community based labour intensive maintenance projects.**	**Indigent poor rural households can gain skills and improve livelihood sustenance through targeted inclusive rural infrastructure and services maintenance programs. This can provide alternative pathways out of poverty for previously disadvantaged and marginalised community members.**

Sources: Chakwizira et al, 2008; World Bank, 2008

Transport is a derived demand (Cervero, 2003, World Bank 2008). It is not normally an end in itself but a means to more end(s). The end that it supports is the provision of access to activities of all kinds. The concern is whether or not people can access key services at reasonable costs, in reasonable time and with reasonable ease. Table 2 presents a summary of South African transport legislation useful in understanding the linkages between transport, mobility and society.

Table 2: Understanding linkages between transport mobility and society: A Sample of Legislation & policy documents

Transport Legislation & Policy document Classification	Transport mobility and social dimensions aspects
White Paper on Local Government (1998)	Introduces the concept of developmental local government as government committed to working with citizens and groups within the community to find sustainable ways to meet their social, economic and material needs, and improve the quality of their lives.
OECD transport social development concept	The concept of transport social development is closely linked to the theory of social transport capital which is defined as ''networks, together with shared norms, values and understandings that facilitate co-operation within and among (transport) groups'' (Litman, 2008).
South African Constitution (1996)	Includes an innovative chapter on 'co-operative government' which is conceived as ensuring good relations between South Africa's three spheres of government and is a human rights approach to transport services provision.
Reconstruction & Development Programme (1994)	Makes provision for inclusive and responsive social transport and mobility through the promotion and supporting community-based development and locality based initiatives such as Expanded Public Works Programme.

Accelerated Shared Growth Initiative South Africa (2006)	The government's objective of increasing economic growth rate to 6 percent over the medium term can be seen as a commitment towards taking South Africa to a higher developmental level.
National Land Transport Bill (2009)	Provides for land, air, water and underground transportation framework in South Africa including provisions for public participation and consultation in the transportation industry.
Development Facilitation Act (1995)	Provides for the physical planning, integration and migration of previous black townships to standard human habitable settlements including addressing transport mobility and society divide challenges.

Source: UNDP, 2003, Mashiri et al, 2008, Chakwizira et al, 2009

1.1 Concept Definition & Elaboration

Contemporary transport literature stretches the concept of transport sustainability and mobility beyond economic sustainability (World Bank, 1996, 2008, Litman, 2008). Poverty alleviation, distribution, equity and social services to the poor and marginalised strongly feature into the discussion covering sustainability. Figure 1 presents graphically the concept of sustainable social transport mobility.

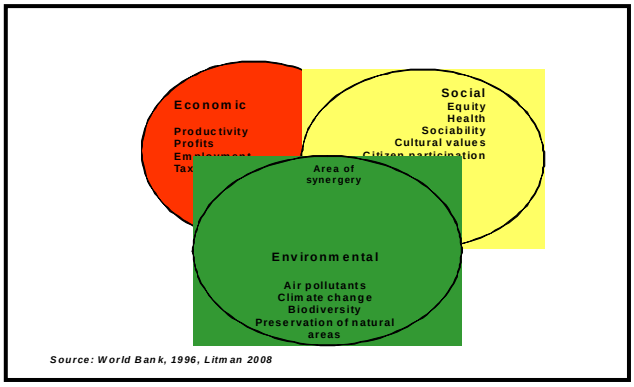

Figure 1: The concept of sustainable social transport mobility

1.2 Principles & Values of sustainable social transport and mobility

Sustainable transport and mobility is underpinned by three values and principles namely equity, accessibility and mobility. All these are aimed at improving the service levels of transport goods and services in a society. Box 1 presents a review of the principles and values under-girding sustainable social transport and mobility.

Box 1: Principles & Values under-girding sustainable social transport & mobility

Transport equity principle and value focuses on making sure that the socio-economic benefits emanating from transport interventions is inclusive in meeting the needs of all segments of the society with particular emphasis on those with special needs such as the elderly, youths, children, disabled, women, lower income residents, those with mobility impairment, those without cars available those living in deprived areas (Sources, Mashiri *et al*, 2007, World Bank, 2008).

Accessibility principle and value is defined as the ease of reaching a place, destination, location or facility (Cervero, 2003) In most cases accessibility is considered from the point of view of the resident, and assessed for access to activities such as employment, shopping and leisure.

Accessibility versus Mobility: Accessibility should not be confused with mobility. Mobility refers to physical movement, but in general, increased mobility tends to increase accessibility. Cities and other major activity centres tend to have a relatively poor *vehicle mobility* (due to congestion), but are socio-economically vibrant due to excellent *accessibility. This owes to* activities that are clustered together and the existence of many travel options. In this regard accessibility is viewed as an over-arching and more comprehensive measure in the pursuit of socio-economic competitiveness (World Bank, 2008).

Generally three factors affect the socio-economic physical accessibility of locations, places,facilities and thus must be taken account of, namely:

1. ***Mobility***, that is, physical movement. Mobility can be provided by means of walking, cycling, public transport, ridesharing, taxi, cars, lorries and other modes. A range of factors such as increased speed, service quality or affordability of a mode improves access of use of a particular mode by people.
2. ***Mobility Substitutes***, such as telecommunications and delivery services influence strongly the use and accessibility of facilities and places. This is because mobility substitutes usually can provide access to some types of goods and activities, particularly those involving information at situ and thereby cancelling the need for the actual physical journey by any preferred mode of travel.

3. ***Land Use***, that is, the geographic distribution of activities and destinations shapes and directs flows and patterns of spatial physical movement and travel. The level of dispersion and clustering of common socio-economic services, facilities and destination increases the amount of mobility needed to access goods, services and activities, reducing accessibility.

Figure 2: Accessibility can be viewed from different perspectives, including a particular location, a particular group, or a particular activity. It is therefore important to specify the perspective being considered when describing and evaluating accessibility.

2.0 *P*roblems & Challenges in engaging in social sustainable transport mobility

Transport is a derived demand. It is therefore important that people can access key socio-economic services at reasonable costs, in reasonable time and with reasonable ease. Accessibility is a multi-dimensional concept that depends on who is measuring it as illustrated in Figure 2.

2.1 Barriers to sustainable transport access and mobility

Transport can be a source of social exclusion and reinforce structural socio-economic poverty in several respects:

1. ***Physical exclusion:*** This can be through the existence of physical barriers to accessing transport and other services.
2. ***Geographical exclusion***: Simply stated the lack of transport provision and services in the geographical area in which the user resides can inhibit a person from participating in mainstream socio-economic livelihood opportunities available.
3. ***Exclusion from facilities***: Lack of access to facilities because of lack of access to transport services may reinforce the cycle of poverty. This may be reflected through inappropriate transport design and technologies that do not incorporate universal design elements such as access of public transport vehicles and buildings to the disabled.
4. ***Economic exclusion***: It is important to realise that someone can be unable to travel because they cannot afford the cost/fare or tariffs associated with utilising any existing transport mode system available. In addition the lack of access to transport can cause income poverty, preventing the user from accessing socio-economic employment or training.
5. ***Time-base exclusion***: Indeed people can be excluded from both travel and other activities because of the time that it takes to travel, or because of the hour of day or night they want or need to travel.
6. ***Fear-based exclusion:*** There exists exclusion of transport, and, consequently, activities requiring travel because of fear of using transport. This can be because of taxi wars, labour action, poor public transport interior designs or gender targeted sexual harassment in specific transport modes etc.

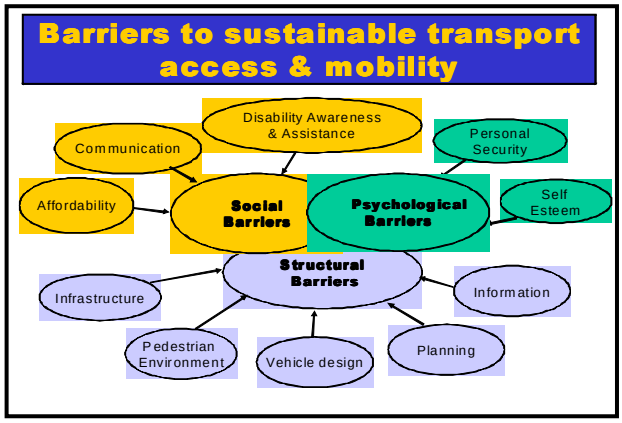

Figure 3 : Barriers to sustainable transport and access
Mashiri et al, 2008

Figure 3 presents barriers to sustainable social transport in South Africa. These range from social, economic to environmental highlighting the need for multi-level and sector interventions if these are to be reduced or minimised.

2.2 Transport Externalities

One of the biggest challenges facing South Africa's transport authorities is traffic safety. The country has very high accident rates, with approximately 498 000 traffic accidents, 46 500 serious injuries, and 13 000 traffic fatalities annually, of which around 5 300 are pedestrians. The need to improve road safety is a top priority (RMTS, 2008). Key issues here are;

1. The socio-economic costs are highest for the most vulnerable groups of society e.g. the poor, children, women and pedestrians
2. Safety is an issue that affects the poor more acutely.
3. Women and children, who are often pedestrians, are disproportionately the victims of road accidents.

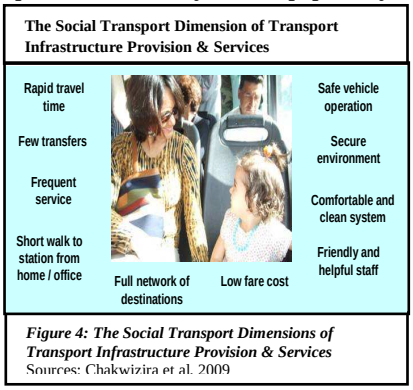

Figure 4: The Social Transport Dimensions of Transport Infrastructure Provision & Services
Sources: Chakwizira et al, 2009

2.3 Social dimensions of transport systems

Vulnerable groups lack mobility which also means reduced accessibility. Figure 4 presents the social dimensions of sustainable transport and mobility. If a transport system, technology and policy action meets most of this criterion, sustainable social transport mobility is achieved, if not the reverse will occur.

2.4 Spatial and human settlements configuration

In South Africa spatial planning fragmentation challenges can be traced to the previous government's spatial segregation policies. The outcome is today's settlements challenges that exhibit far reaching social transport ramifications such as;

1. Low income settlements are located far way from areas of socio-economic opportunity such as industries and commercial centres.
2. Low income earners travel to work and socio-economic facilities takes approximately 65 minutes on average (DoT, 2003).
3. Low income earners spend well over 10% of personal income on transport which is above the stipulated percentage contained in the government white paper on transport (Mokonyama et al, 2007).
4. Low income residents have less family and bonding time with children. The bulk of their energy is consumed day walking or waiting for public transport.

2.5 Gender , Transport, Mobility & Social Development

Travel patterns and transport needs of men and women in the rural and urban social setting are different. In urban areas, for example women's essential trips are more dispersed in time and location while in rural areas trips are short (mostly local), frequent and usually involve carrying heavy loads. Some of the transport constraints women faces include:

- Greater distance between home and employment opportunities which reduces the compatibility between household and non-household activities.
- Irregularity of services on off-peak and non-radial routes.
- Most urban transport systems are not designed to respond to women's needs to combine multiple trips, many at off-peak hours and off the main transport routes.

3.0 Sustainable approaches & solutions to addressing social transport mobility challenges in South Africa

Contemporary sustainable social transport challenges in South Africa maybe can only be tackled using an integrated mix of policy measures and packages. These are briefly described in Table 3.

Table 3: Challenges & Solutions in the delivery of sustainable social transport & mobility

Social Transport & Mobility Challenge and or Issues	Social Transport & Mobility Solution
Contemporary struggles in implementing sustainable social transport development framework	Design, implement and retrofit existing rural areas and cities to comply with universal & inclusive transport and mobility requirements e.g. access, reliability, convenience, security, safety etc. Use transport users as an expert Group in social sustainable transport and mobility [user orientated design approach]
Integrated land use and transport planning	Implement mixed land use and zoning including densification and transit orientated development Establishment and development of functional multi-modal transport

	facilities and interchanges Improve physical access to jobs and amenities and reduce time spent walking & travelling Application of the Integrated Rural Access & Service Planning Concept (IRAP) in structuring and configuring rural spaces
Transport mobility interventions should focus & target disadvantaged groups and segments of society much more	Transport and mobility interventions (design, infrastructure & services) to be crafted and targeted at addressing special transport group users including the poor Promotion and support of alternative mobility lifestyles such as walking, cycling etc
There is a need for deepening the promotion & implementation of social sustainable transport investments since these can serve as powerful and transformational vehicles of socio-economic change.	Programme of action for rolling out of demonstration & pilot projects including their concomitant scaling up Marketing and branding of social sustainable transport investments success stories Enable greater use of intermediate means of transport by improving rights-of-way, interchange infrastructure, and attention to safety Eliminate gender biases by integrating the transport needs of women into transport policy and planning processes
A case for strengthening the social dimensions of appropriate and sustainable rural transport infrastructure & interventions exists. Many rural areas are typically serviced by community level infrastructure – tracks, trails, paths and footbridges – that connects them to the closest village or municipal districts more than the classified network does	The social dimensions of rural transport investments can be strengthened through a mixture of options and strategies e.g. through application and engagement of participatory planning approaches incorporating community determined and set priorities in the generation of sustainable transport interventions etc.
Confronting & tackling large and diverse transport network issues	When dealing with large and diverse networks robust action is required e.g. through the provision of frequent and safe underpasses, footbridges and sidewalks for local traffic, pedestrians, bicycles and other non-motorised traffic etc.
Encouraging inclusive spaces, places and cultures	Mixing of various functions, land uses and people enhances vitality, vibrancy prosperity of spaces and places.
Institutional and policy will and commitment to sustainable social transport and mobility	Engage political champions and institutions much more in sustainable social transport and mobility with the aid of decision support tools etc.
Lack of a critical mass of sustainable social transport and mobility experts to champion activities	Skills development and transfer capacity building and training programmes in sustainable social transport and mobility

Sources: (Crevero, 2003, World Bank, 2008).

Box 2 presents a review of methods that are suggested to better include social concerns in transport planning**.** In utilising these guidelines care should be taken to customise them to the context-specific requirements of the problem being tackled.

Box 2: Techniques & Methodologies for Social Dimension inclusion in Sustainable Transport & Mobility Interventions

Socio-economic surveys**:** Administered to collect baseline and gender-specific information on the target or beneficiary population to assess socio-economic benefits of roads and access services and to establish a set of indicators aimed at measuring the socio-economic impacts of road project.

Semi-structured interviews: An interview questionnaire should gauge households' perceptions regarding their access issues to resources, services, opportunities, transport constraints and needs, priority problems; the importance they assign to improving their transport conditions, willingness to participate in the maintenance of rural road network (roads/paths/trails). The questionnaire should also reveal existing transport options and services available to user groups, frequency of usage, costs of such services and their impact on household income, and preferences for transport options.

Focus group discussions: Key informants to obtain baseline data about the community and an overview of its travel patterns, transport constraints and problems.

Willingness-to-pay surveys: Administered among a select and representative group of beneficiaries and user groups to determine the willingness to pay for and/or maintain rural road improvements and transport services.

Survey questionnaires: Distributed to key service providers, transport operators and distributors to understand the nature of their constraints in service delivery and to establish an estimation of the level, frequency and quality of service resulting from road improvements.

User surveys: Intended to obtain representative data at a household level e.g. data on transport use and satisfaction, trip lengths and times, transport costs, and priorities for improvements.

Participant observation: Collecting qualitative data and developing in-depth understanding of people's motivations, perceptions and attitudes.

Participatory stakeholder workshops: Conducted with beneficiaries and key stakeholders to present findings of surveys, focus group discussions and interviews; to establish and agree on priorities in a transparent manner, and to achieve consensus around project objectives.

Impact Matrix: Identification of the impact of transport interventions to different segments of society in relation to a groups of concern to decision makers (among both residents and businesses) and the objectives and indicators which are of particular concern to them.

Accessibility Measures: By considering accessibility separately for those with and without cars available, or for journeys by car and by public transport, the shortcomings of the existing transport system can be readily identified.

The concept of actor/user: The access is expressed by a person, and user of the transport system.

The needs and willingness to wait of actor/user: qualities of opportunity, but also qualities of movement to reach this opportunity.

Actor/user opportunity cost: To cancel the distance separating from opportunity, an individual is obliged to spend a certain quantity of four types of resources: time, money, the availability of discomfort and environmental care. The resources represent the factors of access enabling us to appreciate the characteristics of the access.

3.2 Towards a social transport sustainability framework of assessment indicators

Chakwizira (2009) argues for the need to entrench a transport social sustainability indicators assessment framework in South Africa. For comprehensive and balanced transport analysis in South Africa, it is recommended that transport social indicators sets should include indicators from each of the major categories of issues, such as those listed in Table 4.

Table 4: Proposed Sustainable Social Transport & Mobility Assessment Indicator Framework for South Africa

ECONOMIC	SOCIAL	ENVIRONMENTAL	GOVERNANCE
Accessibility quality	Equity/fairness	Air pollution	**Transport Monitoring Indicators Framework**
Traffic congestion	Impacts on mobility disadvantaged	Climate change	**Transport Governance & Anti-Corruption Strategy**
Infrastructure costs	Affordability	Noise pollution	**Transport Public Expenditure Reviews/Hearings**
Consumer costs	Human health impacts	Water pollution	**Government wide anti-graft initiatives**
Mobility barriers	Community cohesion	Hydrologic impacts	**Project Specific Fiduciary Measures**
Accident damages	Community liveability	Habitat and ecological degradation	**Transport Governance & Accountability Action Plans**
DNRR (Depletion of Non-renewable resources)	aesthetics	DNRR	**Transport Governance Integrity Systems**
LIFE CYCLE ANALYSIS			

Source: World Bank, 2008, Litman, 2008; Chakwizira et al, 2009,

Box 3 presents a summary of the changing face of transport and mobility in South Africa. This is analysed in the context of the growth of urban development in South Africa.

Box 3: The changing Face of Transport & Mobility in South Africa

South Africa Transport Industry Prior 1994

- Exclusive Transport development and social development agenda.
- Fragmented human settlement development where townships for blacks were essentially located as far as feasible from socio-economic opportunity areas and suburbs through even the creation of buffer zones (i.e. spatial differentiation, segregation and demarcation).
- Massive focus on infrastructure investment in roads (such as highways and freeways), railway lines and infrastructure development, airports, seaports etc.
- Scant attention paid to the externalities of the transport industry such as noise, emission levels etc.
- Concerned with economic return, benefit and financial viability of transport infrastructure investment.
- Promotion of car and road based mobility for example.

South Africa Transport Industry Post 1994

- Inclusive transport socio-economic transformation development agenda.
- Integrated human settlement development through the densification and mixed zone development (i.e. compact cities and integrated rural spaces).
- Increased emphasis on the development of multi-modal infrastructure facilities and interchanges.
- Strong movement towards sustainable transport mobility.
- Focus towards people and users in the transport industry i.e. gender, disabled, marginalised, co-creation and cooperative governance in transport industry investment and sustainability.
- Stretching of the concept of sustainability beyond economic return, benefit and financial viability to include social impact assessment, environment impact assessment and user/beneficiary needs.
- Promotion of people based and alternative public transport mobility.

4.0 Conclusion

The pursuit of sustainable social transport and mobility presents a challenge. Actions are needed to limit the environmental and other costs of traffic movements. Yet these must be reconciled with aspirations for economic growth and social demands for access to services and leisure activities. Indeed social transport dimension to transport mobility is an essential social development dimension. Integrating the needs of the captive users of transport facilities, pedestrians and bicyclists on the highways as well as urban areas is recognizing the social dimension of transport planning. The understanding of differential needs of the urban and rural poor, transport strategies and programs can be designed to provide the poor with better physical access to employment, education, and health services. Therefore a balance must be struck. The solution is widely perceived to lie in an integrated approach, combining economic instruments, regulations, new technologies, infrastructure investment and other policy actions.

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