



Proposed framework for sustainability screening of urban transport projects in developing countries: A case study of Accra, Ghana



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ABSTRACT

This paper documents a framework suggested for screening urban transport projects in developing countries to reflect local issues relevant to sustainability. The framework is based on the integration of indigenous and scientific knowledge to reflect the sustainability of candidate projects. This is achieved through a participatory approach to integrate inputs from system users and providers to produce a term defined as the Localized Sustainability Score (LSS). The LSS of the projects are then used to produce a relative ranking of potential projects, for use as a decision support for project screening and selection. Proof-of-concept development of the proposed LSS framework is presented via a preliminary case study in Accra–Ghana and the results indicate that the framework adequately represented local sustainable transport needs, priorities and perceptions. The LSS determined for some selected projects maintained the original relative rankings that were already derived using conventional methods. The LSS also has the added advantage of evaluating projects of different scales, which were not easy to evaluate together by conventional methods.

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1. Introduction

During its early development, transport planning was described as “an exercise in data handling” due to the large amounts of data and information that must be “stored and manipulated” (Schofer and Levin, 1967). The current understanding of transport planning connotes a process based on the Rational Planning Model (RPM) that emphasizes efficient decision-making through a systematic, step-by-step process (Black, 1990; Szyliowicz, 2003; Khisty and Arslan, 2005; Timms, 2008). Such an understanding, while implying considerable precision, may ultimately limit the applicability within certain transport planning contexts (Goetz and Szyliowicz, 1997; Roorda et al., 2006; Handy, 2008; Hatzopoulou and Miller, 2009). Wilson (2001) states that transport planning “assumes that urban transport systems operate in mechanistic, predictable ways – that immutable laws about travel behavior can be discovered and used for prediction.” Indeed, the four-step planning model (based on RPM foundations) is used to develop travel demand forecasts from land use or activity patterns (measured or estimated) on which to base decisions regarding transport infrastructure investments and improvements (i.e., projects) (Black, 1990; Meyer and Miller, 2001; Khisty and Arslan, 2005).

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In practice, transport planning is typically used to identify and prioritize transport projects (Schofer and Levin, 1967; Meyer and Miller, 2001; Banister, 2002; Sun et al., 2007). Prioritizing projects can be accomplished at multiple levels. Detailed analyses can be conducted to determine a list of candidate projects to be implemented and to advise their programming (i.e., funding and scheduling). Projects can also be prioritized at a high level, or screened, to determine which best meet a predetermined set of criteria.

This paper documents a framework proposed for screening urban transport projects in developing countries to reflect locally derived sustainability criteria. The framework is based on the integration of indigenous (i.e., local) and scientific knowledge of how specific projects might support sustainable transport development. It is a participatory process that integrates input from system users and providers to produce a Localized Sustainability Score (LSS). The LSS of each candidate project can then be used to produce a relative ranking of potential projects.

The framework is proposed on the basis that resources for conducting detailed project analyses are relatively scarce in developing countries. Also, transport projects in developing countries are often funded by international agencies/partners that require, or at least desire, objectivity and accountability in local decision-making processes. The proposed framework and its results can be used to implement and document a screening process by which candidate projects can be chosen and/or prioritized for further consideration. It is understood that transport planning in developing countries can be a rather subjective, political process. In such cases the LSS, can provide a mechanism to engage system users and document their input as part of the process. Proof-of-concept development of the proposed LSS framework is presented via a preliminary case study carried out in Accra, Ghana (Tefe, 2012).

2. Background

Myriad definitions of sustainability and sustainable transport have been offered in which a common underlying theme is the desire to balance competing needs among economic, social and environmental issues (Beatley, 1995; Gudmundsson and Hojer, 1996; Deakin, 2001; Jeon and Amekudzi, 2005; Litman and Burwell, 2006; Hatzopoulo and Miller, 2009; Amekudzi et al., 2011). Sustainable transport issues are both common to and vary between developed and developing countries (Amekudzi and Vanegas, 2006). Transport planning in many developing countries follows conventional approaches developed for and used by industrialized nations (Dimitriou, 1992; Jennings and Covary, 2008; Feng et al., 2010). These methods generally reflect automobile-dominated Western transport systems, which in many cases do not evaluate alternative modes in an integrated manner. For instance, developing countries often conduct alternative analyses among road projects using the Highway Development and Management (HDM-4) model. HDM-4 is a quantitative model that requires extensive data collection for the analysis of road management and investment alternatives. Public transport, pedestrians, bicycles and other non-motorized transport (NMT), which are important in developing countries, are not included in such approaches and are typically evaluated separately (Morosiuk et al., 2006; Feng et al., 2010; Zheng et al., 2011; Samberg et al., 2011).

Promotion of sustainable transport also requires attention to both direct and indirect impacts of transport (Gudmundsson, 2001; Banister, 2002; Litman, 2003; Jeon and Amekudzi, 2005; Samberg et al., 2011). This suggests that sustainable transport planning cannot be limited to quantitative analyses, which are the core of conventional processes, still widely used throughout the developing world (Sun et al., 2007; Jennings and Covary, 2008; Awasthi and Omrani, 2009). Accounting for direct and, especially, indirect impacts of transport requires knowledge of specific local conditions. Many such conditions, however, are not easily quantifiable and are only realized via an understanding of the local context.

Developing countries offer a particularly unique local context with regards to urban transport and the integration of modes. In spite of the deteriorating travel conditions, car ownership continues to rise with increasing population growth and wealth (Gakenheimer, 1999; McMichael, 2000; Gwilliam, 2003). The result is rapid motorization in cities, which hitherto depended on public transport services (World Bank, 2008). Nonetheless, public transport remains a vital source of mobility and accessibility in developing countries. For example, public transport accounts for roughly 70% of urban vehicular trips in Accra yet comprises only about 30% of the vehicle traffic mix (World Bank, 2004).

Public transport faces many challenges. External forces to privatize and failure of governments to supply organized public transport has induced the proliferation of privately operated minibuses, auto-rickshaws, scooters and, in some cases, “okada” (motorcycle taxis), which are often operated under substandard and unsafe conditions (Kumar and Barrett, 2008). Public transport becomes unattractive to the middle class and further increases the demand for private cars and, ultimately, increasing vehicle-kilometers of travel (VKT) on an underdeveloped road system. The net effect for developing countries is premature traffic congestion at relatively lower levels of car ownership, a deteriorating urban environment, and ultimately, reduced mobility, accessibility and safety for all system users. These effects are particularly acute for the urban poor (Gwilliam, 2003).

From 2000 to 2010, developing countries were reported to have spent 19% of total investment on road infrastructure (World Bank, 2003). This supports the assertion that much of the transport infrastructure expenditure in developing countries goes towards roads, which are developed to cater for automobile traffic (World Bank, 1996; Ahmed et al., 2008; Freeman, 2009). Such a focus inhibits the ability of developing countries to develop truly integrated transport systems that promote safe and efficient utilization of public transport and NMT (Riverson and Carapetis, 1991; Porter, 2007).

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