EFFECTIVE APPLICATION OF ECONOMIC PRINCIPLES TO BORDER POST PLANNING AND DESIGN: THE MASERU BRIDGE EXAMPLE

F J Botes* and G Serero**

*Hatch Goba (Pty) Ltd, 163 Uys Krige Drive, Plattekloof, Cape Town
Tel: 021 911 5823 Fax: 021 911 5793 Email: fbotes@hatch.co.za
** Department of Transport

ABSTRACT

Decisions about border post location and design are often based on operational, design and implementation cost considerations, without due consideration of the economic impact of these choices. Although the resultant changes in regional and local travel patterns, local impacts on border post users, and the economic opportunities presented to local communities could have a fundamental impact on implementation choices, there is, however, no set uniform procedure for considering these impacts in a consistent manner provided in the available literature.

The approach proposed in this paper considered benefits of a one-stop facility, and the regional transport impacts of relocating all or some of the processing functions to alternative sites. A three-tier approach to assessing economic outcomes was proposed; namely including a conventional cost-benefit assessment; a macro-economic impact assessment; and a wider economic development impact assessment.

In addition to selecting the preferred border post design layout, the appraisal approach demonstrated how the selection of the preferred location for future border post expansion could minimise travel cost, to maximise productivity gains, and to take advantage of economic opportunities. It was, for example, also established that separating freight and pedestrian processing can have substantial developmental and economic advantages. In addition we noted that remote processing of freight can be economically viable under certain conditions, provided that the additional regional travel time does not erode too much of the processing benefits.

Despite the significant potential benefits, the appraisal highlighted the fact that a co-ordinated effort is required between all tiers of Government to integrate border post facilities with the business development opportunities in and around development corridors.

Key Words
Border post, planning and design, economic principles, development opportunities, Maseru

1 INTRODUCTION

Decisions about border post location and design are often based on operational, design and implementation cost considerations, without due consideration of the economic impact of these choices. Based on an extensive literature review of the most recent border post planning and implementation policy documents, including the United States Gateway and Corridors Concept Study (Dowall, P. et al, 2013), the Canadian National Policy Framework for Strategic Gateways and Trade Corridors (Canada, 2010a & b), and the Mexico Multimodal Corridor Master Plan (California Department of Transportation, 2008), it was established that none of these documents includes a comprehensive economic analysis guideline for undertaking the developmental impact of border post upgrading.

The resultant changes in regional and local travel patterns, local impacts on border post users, and the economic opportunities presented to local communities could have a fundamental impact on implementation choices. There is, however, no set uniform procedure for considering these impacts in a consistent manner provided in the available literature.

This paper highlights the importance of looking beyond the obvious implementation and operational challenges and advocates decisions based on broader economic considerations in a consistent manner. It proposes a methodology for undertaking an economic evaluation for border post decision making focussing on a case study of the of traffic decongestion strategies for the Maseru Bridge border post. The appraisal considered processing benefits of a one-stop facility, and the regional transport impacts of relocating freight processing to alternative sites. It adopted a three-tier approach to assessing economic outcomes, including a conventional cost-benefit assessment; a macro-economic impact assessment; and a development impact assessment.

In addition to demonstrating the usefulness of economic appraisal in the selection of the preferred border post design layout, the appraisal methodology describes the procedure for the selection of the preferred site for future border post expansion to minimise travel cost, to maximise productivity gains, and to take advantage of economic opportunities. The paper also highlights a number of lessons and findings which could be transferred to other similar circumstances, and the evaluation of border post upgrades elsewhere.

2 APPROACH

2.1 Overview

The economic analysis was undertaken primarily with a bespoke Cost-Benefit Analysis (CBA) model, supported by a Broad Economic Impact Assessment and Cost Effectiveness evaluation tools which were specifically adapted for this project. The economic analysis methodology and outcomes are fully compatible with Treasury Guidelines (National Treasury, 2014:10), and it is harmonised with best practice from local and international examples. The flow chart in Figure 1 below summarises the CBA procedure.

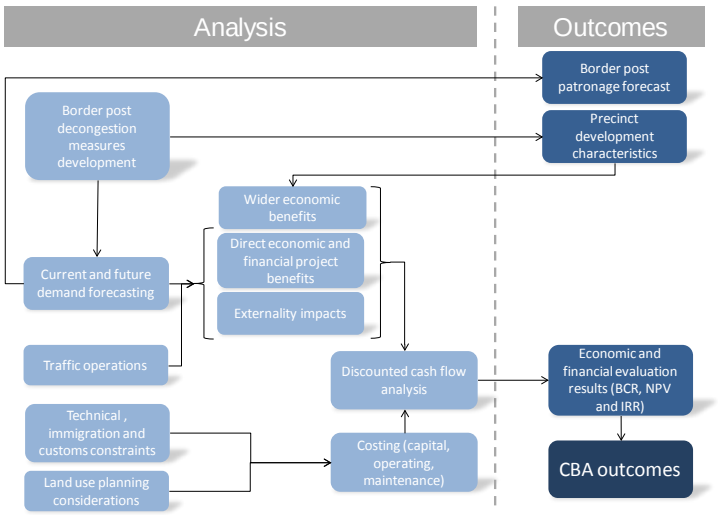

Figure 1: Cost-benefit analysis procedure and outcomes

2.2 Identifying and classifying benefits

There are primarily two methods of assessing project benefits. Traditionally, cost-benefit analysis focussed on measuring socio-economic welfare benefits through changes in the consumer surplus, where welfare in an economic context is seen as the overall well-being of society. Because transport is a derived demand for other goods and services, it is measured in the amount of disutility that people would experience when using transport services, including border posts. 'Willingness-to-pay' forms the basis for monetising changes in the consumer surplus stemming from a public transport improvement (Georgi, 1973:35 & 81).

More recently, greater emphasis is falling on the significant amount of benefits which are not captured through the "willingness-to-pay" approach such as environmental impacts (Botes & Fleming, 2010:5). In addition, not all economic benefits support economic growth, e.g. leisure and home-to-work commuting time that occurs outside work hours does not ordinarily affect productivity, whereas business travel during the day impacts directly on workers' productivity. This means that analysts have started classifying benefits according to whether they contributed to socio-economic welfare or to economic growth. In considering impact on economic growth, which could be measured as the impact on gross domestic product (GDP), the wider economic impact is now being quantified and included in the CBA more often. It also brings to the fore the importance of linking the Economic Impact Analysis, the Social Impact Analysis and the Environmental Impact Analysis in project decision making.

Figure 2 provides a broad classification of benefits according to whether they are welfare oriented, or making a contribution to the GDP. Although some benefits can clearly be classified as welfare or growth oriented, a sizable group could contribute to both growth and welfare. We therefore took considerable care not to double count these benefits.

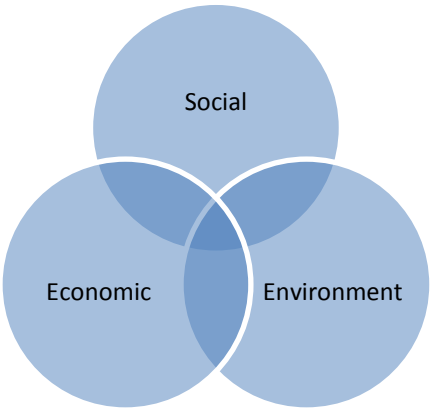

Figure 2: High-level classification of benefits

In order to avoid double counting, the discussion of benefits is structured according to the specific group impacted by the transport improvements. This allowed an aggregation of 'welfare' and 'growth' benefits after they have been calculated in disaggregate form. For the purpose of this evaluation, benefits were categorised in a functional classification, based on beneficiary groups, appropriate for this study:

- Transport user benefits, i.e. benefits which are experienced directly by the users of the transport system, including time savings, travel cost savings and safety benefits.
- Externalities are benefits which stem from transport activities, but are experienced by the wider community. These include environmental and social impacts.
- Macro-economic benefits contribute directly to the GDP, but are not necessarily reflected in travel cost and travel time savings during work hours.

3 DIRECT TRANSPORT USER BENEFITS

3.1 Overview

In order to appreciate the impact of location and border post processing efficiency, changes in regional travel distance and time, and precinct processing were calculated separately. Similarly, pedestrian, personal vehicle and freight benefits were segregated, as were trip purpose (business and leisure). The disaggregation of benefits was based on generally accepted economic evaluation practice as described by Georgi (1973:84-101)

3.2 Regional travel benefits

The regional travel distance travelled and travel time by person and vehicle volumes from all main origin-destinations (OD) to Maseru via the Maseru Bridge, Ficksburg Bridge (freight only via a new logistical hub at Harrismith) and proposed Foso Bridge border posts are presented in respectively Tables 1 and 2. The distances in Table 1 were measured from Google maps along the main highways commonly used by cars and trucks.

Table 1: Travel distance (kilometres) to Maseru via three border crossings

Origin-Destination	**Maseru Bridge**	**Ficksburg Bridge**	**Foso Bridge**
Bloemfontein	136		144
Johannesburg	550	610	558
Durban	780	560	788

Note: * Via Lesotho's road network.

Table 2 presents the average travel times to Maseru via three border crossings as measured through travel time surveys from the major centres.

Table 2: Potential travel times (minutes) to Maseru via three border crossings

Major Origin / Destination	**Maseru Bridge**		**Ficksburg Bridge***		**Foso Bridge**	
	Light	**Heavy**	**Light**	**Heavy**	**Light**	**Heavy**
Bloemfontein	84	162			90	174
Johannesburg	330	660		732	336	672
Durban	522	936		672	528	948

Note: * Assume Lesotho's road network is upgraded.

3.3 Precinct processing

The total processing time (see Table 3) was modelled for one-stop, freight only and best practice traditional border posts, and compared to the base case. This involved multiplying the average processing time by the number of people and vehicles respectively, and the amount of freight. Base case processing times were measured through site interviews and time measurements, whereas processing time for the upgraded facilities were modelled through a queuing model using data from international and local best practice facilities.

Table 3: Average pedestrian processing time (minutes)

	Base Case Traditional	**Best Practice Traditional**	**Freight-only**	**One-stop**
Pedestrians	33	27		16
Light vehicles	40	30		25
Trucks	170	160	75	75

3.4 Results

Total travel costs were calculated by multiplying the person and vehicle travel distances presented in Tables 1, 2 and 3 by unit vehicle operating cost (VOC) and time costs, and travel volumes. It was assumed that pedestrians would reach the border post by light vehicle, before they proceed through customs on foot.

Table 4: Disaggregation of 2014 benefits (R'000 000) by regional and precinct

	At Maseru		At Ficksburg		At Foso	
	Regional	**Precinct**	**Regional**	**Precinct**	**Regional**	**Precinct**
A. Best practice traditional	0.0	34.6			-61.9	34.6
B. Freight-only	0.0	18.4	-3.8	18.4	-14.0	18.4
C. One-stop (All)	0.0	72.0			-61.9	72.0

4 BROAD ECONOMIC IMPACT

4.1 Context

The Broad Economic Impact, which separately considered the macro-economic impacts from a national perspective, and the wider economic development opportunities around border posts, supported the standard CBA. Although related to the conventional CBA, it was undertaken as a separate exercise in parallel with the conventional appraisal.

The direct transport economic benefits presented above could be considered to account for partial consumer and producer surpluses, which examine the effects of action in creating equilibrium only in that particular sector or market which is directly affected, in this case the transport market. It therefore ignores the effect in any other markets and industries.

Direct benefits, however, account for both increased economic activity created as a spinoff of a reduction in generalised transport cost, and social benefits such as savings in leisure time that do not contribute directly to economic growth. In addition to the adjustments required to the direct socio-economic developments to extract the net economic benefits, the impact of these benefits on productivity gains, and ultimately economic growth, needs to be calculated. These calculations are by no means straightforward, or without controversy, and no definitive methodology exists to measure the macro-economic impact of transport improvements. A number of methods which were considered for this project are listed as follows:

- The most common method to account for the additional productivity gains brought about by a transport project is the so called 'rule of half' method which allocates 50% of the average existing user's transport benefits to newly generated users (Adler, 1987:91). In this context, generated traffic represent new users over and above normal *'trend'* traffic growth which would have occurred regardless of whether the transport improvements were implemented. Apart from the theoretical limitations of this approach related to the shape of the transport demand curve, the main practical difficulty is in estimating generated traffic.
- Input-output modelling uses a matrix representing monetary flows through the national or regional economy (Lipsey, 1980: 489). An input-output model thus depicts inter-industry relationships within an economy, showing how output from one industrial sector may become an input to another industrial sector.

Estimating the causal relationship between transport productivity improvements and sector economic impacts remains a major constraint in successfully measuring the recurring macro-economic impact of transport projects beyond the initial investment. For this reason, input-output models are seldom used in the evaluation of specific transport projects.

- Computational Generalised Equilibrium (CGE) analysis descends from input-output models, but assigns a more important role to prices (Wing, 2004:19). CGE models consist of a set of equations describing relationships between economic sectors and a detailed database of economic variables. The equations often assume cost minimising behaviour by producers, average cost pricing, and household demand behaviour.
- Increase in economic land value could be used as a basis for determining the macro-economic impact of transport improvements. Botes (2003: 8-1) found that there is a positive, significant, quantifiable relationship between accessibility as quantified by means of generalised cost and the economic value of industrial land, which was calculated by means of the shadow price technique. However, in this particular case not all the conditions are met to confidently calculate the increase in industrial production potential to be translated into an equal amount of economic output.
- Calculating wider economic benefits (WEB) in terms of the UK Department for Transport's (DfT) document entitled Transport, Wider Economic Benefits and Impacts on GDP (2005). WEBs are assessed in terms of increase in the labour force, longer working hours, more productive jobs, agglomeration benefits, increased competition, imperfect competition, and tax consequences. In applying these guidelines to the rural environment, it is worth noting that these methodologies were developed for very large transit projects in densely populated cities, where transport could be a significant constraint on growth.
- Economic multipliers provide a good method for calculating the effects of fiscal policy or other exogenous changes in spending on aggregate economic output. In theory, the investment in transport infrastructure would have a knock-on effect in the economy which exceeds the initial investment by a certain factor or multiplier (Shapiro, 1982:89). Similarly, productivity changes could have a recurring impact leading to more goods being produced, higher wages, lower product process and bigger profits. Multipliers therefore also provide a good shortcut method for estimating the full impact of transport productivity gains on the producer and consumer surpluses over and above that calculated by means of the standard partial equilibrium analysis.

Using the multiplier approach as a basis, the macro-economic impact was undertaken according to the following steps:

- Estimating the value of the once-off economic stimulus created by the capital investment in the border post construction.
- Calculating the net present value of direct recurring economic benefits specifically related to productivity gains.
- Establishing the regional multiplier.
- Applying the regional multiplier to the direct investment, and the discounted net productivity benefits.

4.2 Macro-economic impact

4.2.1 Regional multiplier

According to the theory of national income, an increase in productivity will generate additional income that exceeds the initial investment amount and improvement in productivity. This is known as the income multiplier effect. Viewed from a regional perspective, the multiplier can be described as the relationship between the change in regional income and the productivity gain that an investment generates. The regional income multiplier is formulated in equation 1 (Shapiro, 1989:92):

$$M = \frac{1}{1-(1-MPT)(MPC-MPI)} \quad \text{.....(1)}$$

The following assumptions were made in solving for M, the regional multiplier:

- We assumed a marginal propensity for taxation (MPT) of 26% for the target population.
- The marginal propensity to save (MPS) was assumed to be 16%, which translates to a marginal propensity to consume (MPC) of 84%.
- A marginal propensity to import (MPI) of 31% was adopted.

Based on the above input parameters, we calculated that the national multiplier for the purposes of this project is 1.63.

4.2.2 Once-off investment economic injection

The net additional one-off regional income stemming from autonomous investment in a region is equal to the product of the investment amount and the value of the regional multiplier, minus the investment amount. The present worth of this income (EM_0) is formulated in equation 2 (Shapiro, 1989:93):

$$EM_0 = C_A \times (M - 1) \quad \text{.....(2)}$$

The following assumptions were made in solving for EM_0 to calculate the stimulus gain of the different options which are presented in Table 5:

- the capital infrastructure investment (MPA: 2014:35) (CA).
- The regional income multiplier (M) of 1.63 the investment present worth of the recurring economic benefit.

Table 5: Net economic gain of the capital investment (R'000 000)

	Measure		
	At Maseru	**At Ficksburg***	**At Foso****
A. Traditional	960		
B. Freight-only	78	78	281
C. One-stop	177		376

Notes:
* Exclude road upgrading cost
** Include cost of access road
Source:
MPA Consulting Engineers, 2014:35

It should be borne in mind the net gain is directly proportional to the size of the investment, and not to the productivity gain achieved by the investment. As the option with higher levels of investment does not necessarily reflect the most productivity gain, it is important to consider also consider the recurring productivity gain.

4.2.3 Recurring productivity gain

A productivity gain occurs when fewer resources are spent to produce a similar unit of output. This makes the country more competitive when competing with other countries, thereby increasing the demand for local goods and services, which increases the output. Economic activity and commodity needs largely drives demand for freight transport. Good transport links are, however, also an important differentiator in making growth stimulating business decisions. The ability to respond to access needs influences the extent to which an area attracts industrial and mining investment. Freight transit efficiency not only effects regional and national economic growth, but also directly influences local investment and employment creation.

As mentioned previously, in order to calculate the macro-economic benefits of the proposed investment required the establishing the value of recurring economic benefits which would make a direct contribution to the bottom line of the GDP. The economic benefits in Table 6 exclude all social benefits related to leisure and convenience which do not consume scarce resources, but include the value of truck drivers' time and freight time cost, and time value of light vehicle occupants on business trips.

The data in Table 6 shows that more than 50% of Best Practice Traditional border post benefits, and more than 60% of one-stop border post benefits, could be considered 'economic' benefits which would have a direct impact on GDP. All Freight-only border post benefits could be considered as making a direct contribution to the GDP. It should be noted that, due to significant regional disbenefits (see Table 4), moving the Maseru Bridge border post to Ficksburg or Foso would have insignificant, or even negative, productivity gains and have therefore been excluded from further discussion.

Table 6: Economic precinct processing benefits at Maseru Bridge in 2014 (R'000 000)

	All benefits	**Economic benefits**
A. Best Practice Traditional	34.6	18.5
B. Freight-only	18.4	18.4
C. One-stop (All)	72.0	44.2

4.2.4 Net macro-economic impact

The results in Table 7 combine the once-off stimulus impact and the recurring productivity gain to present the net present value contribution of the project to the GDP of the national economy over the 30 year evaluation period.

Table 7: Total net present value contribution to the GDP over the 30-year evaluation period (R'000 000)

	Measure		
	At Maseru	At Ficksburg	At Foso
A. Traditional	1 357		
B. Freight-only	473	375	376
C. One-stop	1 126		592

4.3 Development opportunities

From a border post planning perspective it is important to appreciate the role that the border post plays in the integrated development planning (IDP) of the relevant local authorities, including the Thabo Mofutsanyane District Municipality whiting which all three considered border posts fall, and the Setsoto and Montsopa Local Municipalities within which respectively Ficksburg Bridge, and Maseru Bridge and the proposed FOSO Bridge border posts fall.

Thabo Mofutsanyane District Municipality noted that some of the smaller towns are dependent on traffic passing through on national roads, but that this causes problems such as damage to local streets, spreading of diseases, and overnight parking of large trucks in streets (Thabo Mofutsanyane, 2010:40). Border post planning should strengthen the positive developmental impacts, whilst mitigating the negative affects by ensuring that traffic remains on designated freight corridors. As a consequence of the drive to kerb vehicle overloading, secondary roads are more frequented by overloaded trucks avoiding demarcated truck routes. The same might occur if traffic is redirected as a result of border post traffic re-arrangements (Thabo Mofutsanyane, 2010:101).

The Ficksburg CBD) is connected to the border post by an activity link (Thabo Mofutsanyane, 2010:68). The border post plays an important role in developing and promoting businesses around these areas. An eco/agri-tourism corridor has been identified stretching from Marquard and Clocolan to the southern parts including all scenic and mountainous areas along the parts bordering with Lesotho (Thabo Mofutsanyane, 2010:79). This raises a potential conflict between tourist and freight traffic if trucks are diverted to these roads.

In terms of transport provision, the Setsoto Local Municipality IDP (2012) focuses entirely on public transport and road upgrading for personal travel. The Ficksburg Bridge border post is accessed through Ficksburg along Bloem Street and De Villiers Street (Setsoto, 2012:18). Substantial increases in traffic could therefore create negative traffic impacts in the town. Apart from the Ficksburg CBD, a secondary business node has developed at the border post. Businesses that occur in this node include petrol filling stations, light industries, a taxi rank and wholesale stores (Setsoto, 2012:22)

Despite being the primary border post with Lesotho, the Mantsopa Local Municipality IDP (2010) makes no reference to freight transport and the importance of the Maseru Bridge border post to its development. However, it specifies funding for the Maseru border post Taxi Rank phase 2 (Montsapa, 2010:37, 164), and mentions the importance of the Maloti Tourist Route(Montsapa, 2010:15).

In terms of development opportunities it was noted that there is currently very little development on the South African side of the Maseru Bridge border post. Further expansion and improvements to the border post would not automatically translate into land use changes supportive of business development near the border post, particularly as the Mantsopa Local Municipality IDP makes no reference to freight transport and the importance of the Maseru Bridge border post to its development. There is thus a risk that the community in and around Ladybrand would not capitalise on the development opportunities of upgrading Maseru Bridge, and that encouraging travel along the N8 would continue to support the N8 development corridor. Despite the negative impacts of large trucks overnighting in towns, many small towns could benefit from trade from passing traffic. This impact could be offset if the planned freight only border post is situated near Ladybrand to integrate the border post activities more closely with businesses in the town.

If the freight-only border post at Maseru Bridge is relocated to a remote processing facility near Ladybrand, it would encourage development closer to the Ladybrand CBD. Bringing the border processing closer to the town would likely have commercial spinoffs to existing businesses and could trigger new development.

Although creating specialist border posts at a number of border crossings could potentially spread development opportunities more widely, the dispersed nature of the development may mean that critical development mass is lost. Furthermore, a new border post at Foso would not be near any existing South African urban settlements or business opportunities. It therefore would have little potential benefit to existing local communities, and would likely erode the viability of existing businesses, due to a loss in revenue if trucks were to be diverted.

Based on the above strengths, weaknesses, opportunities and constraints, Table 8 presents the results of a comparative analysis of the identified border post locations providing the best development opportunities according to seven micro drivers of economic growth which can be achieved through transport efficiency gains (Eddington, 2006:20). The results show the both the Maseru Bridge and Ficksburg options offer good development opportunities, with the Maseru Bridge providing marginally better commercial opportunities if the specialised freight processing facility is relocated near Ladybrand.

Table 8: Comparative Development Opportunities Analysis

	Measure		
	At Maseru*	At Ficksburg	At Foso
Investment and innovation	✓✓✓	O	✓✓
Increasing business efficiency	✓	✓✓	X
International and domestic trade flow	✓✓	✓	O
Clusters and agglomeration	✓✓	✓✓✓	X
Competition and market access	✓✓	✓✓✓	O
Attract globally mobile activity	✓✓✓	✓✓	O
Efficiency of labour markets	✓✓✓	✓✓	✓
OVERALL	**✓✓✓**	**✓✓**	**X**

Notes:
* Assuming a new freight only border post is constructed near Ladybrand.

Scoring:
✓ - positive impact
O - neutral
X - negative impact

5 CONCLUSIONS

Based on the Cost-Benefit Analysis and the Broad Economic Impact Assessment results, we demonstrated that separating freight traffic and private vehicular/pedestrian processing can have substantial developmental and economic advantages, and noted that remote processing of freight can be economically viable, provided that the additional regional travel time does not erode too much of the processing benefits.

Precinct processing constitutes a relatively small proportion of the total journey time. For example, person travel time to the existing Maseru Bridge border post is 4.5 times that of the total average processing time. In addition, travel to the border post also involves considerable vehicle operating cost, which, for all practical purposes, does not occur during processing. The viability of border post measures is therefore highly sensitive to even the slightest changes in regional travel distance and time. Border post efficiency should be able to compensate for dis-benefits incurred if the border post is moved to a less favourable location in terms of regional travel.

Productivity gains make a substantial contribution to total precinct processing benefits. In the case of freight-only facilities, 100% of the benefits would result in productivity gains. Converting productivity gains into GDP uplift is controversial, but could add significantly to the decision making process. However, care should be taken when incorporating the once-off investment multiplier as this may skew the outcome towards a high cost option which delivers less recurring benefits.

Local development opportunities and job creation are dependent mainly on the location of the facility. Unlike the macro-economic impact on the GDP which grows the overall economy, local area development opportunities at one location could be to the detriment of development opportunities in other areas, i.e. it may merely shift development opportunities from one location to another. A robust discussion of the local impact of border post upgrading is essential for leveraging all potential benefits for the local community. It is therefore important that district and local municipalities recognise development opportunities and constraints related to border posts.

6 REFERENCES

Adler, H.A. 1987. *Economic Appraisal of Transport Projects*. The World Bank, Johns Hopkins Press, London.

Botes, F.J. 2003. *A model to forecast the impact of road accessibility on the economic development potential of industrial land in urban areas*. PhD dissertation, University of Stellenbosch, South Africa.

Botes, F.J. & Fleming, D. 2010. *The importance of rigorous economic evaluation approaches for bus service improvements and small capital investments*. UITP 3rd International Conference on Public Transport Financing. 15-19 November, Hong Kong, China

Canada. 2010a. *Asia-Pacific Gateway and Corridor Initiative*. Ministry of Transport.
Canada. 2010b. *Atlantic Gateway and Trade Corridor Strategy*. Ministry of Transport.

California Department of Transportation. 2008. *California-Baja California Border Master Plan*. U.S./Mexico Joint Working Committee.

Dowell, P., Villa, J. C., Hutson, N. & Black, T. 2013. *FHWA National Gateways and Corridors Concepts*. U.S. Department of Transportation, Federal Highway Administration, Office of Planning, Washington, DC.

Eddington, R. 2006. *The Eddington Transport Study*, Department of Transport, UK. http://www.hm-treasury.gov.uk/stern_review_report.htm

Georgi, H. *Cost-Benefit Analysis and Public Sector Investment in Transport*. Butterworth, London.

Lipsey, R.G. 1980, *Positive Economics*. Weidenfeld and Nicolson, London.

Mantsopa Local Municipality. 2010. *Integrated Development Plan Review 2010/11.*

MPA Consulting Engineers. 2014. Feasibility Study on Traffic Decongestion Strategies for Maseru Bridge: Benchmarking Report. Department of Transport, Pretoria.

Pienaar, W.J. & Schutte, I.C. 1996. *Characteristics and operating costs of South African vehicles*. Department of Transport, South Africa. Constants updated by Pienaar, W.J. 1998. University of Stellenbosch, South Africa.

Republic of South Africa. 2014. *Capital Planning Guidelines*. National Treasury. Pretoria.

Setsoto Local Municipality. 2012. *Integrated Development Plan (Draft)*.

Shapiro, E. 1989. Macroeconomic Analysis. Harcourt, Brace, Jovanovich, New York (NY).

Thabo Mofutsanyane District Municipality. 2010. *Integrated Development Plan 2010/11*.

United Kingdom. 2005. *Transport, Wider Economic Benefits and Impacts on GDP*, Discussion Paper, July, Department for Transport.

Wing, I.S. 2004. *Computable General Equilibrium Models and Their Use in Economy-Wide Policy Analysis*, Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, Cambridge, MA.