

## **The Economic Justification of Road Investment**

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Roads are regarded as public as opposed to private goods and are accordingly in general invested in, in accordance with economic criteria. Cost Benefit Analysis has traditionally been performed to deliver Present Worth of Cost or Nett Present Value (when considering individual projects) but the most common used measure today for proposed road investments is the Economic Internal Rate of Return (EIRR) around which the World Bank's Highway Design and Maintenance Model has been developed.

The advantage of the HDM is that it looks at road networks and expresses an IRR for each managed link in the network, as well as presenting a globular necessary road budget. Each road link is ideally monitored annually using the Visual Classification Index technique and the benefit of maintaining, rehabilitation or building a new road can be quantified through considering the cost of the proposed expenditure against the saving in maintenance cost to the road agency; the saving in operating cost to the road using vehicles; the saving in accident reduction; and the saving in time.

Most countries have had these values calibrated for them. In South Africa the Department of Transport Economics of the University of Stellenbosch monitors and calibrates the figures on an annual basis.

Typical IRR's obtained in South Africa range between 15% and 60% with a median value of approximately 23%, when calculated using a discount rate of 8%. This rate is determined annually by the National Treasury.

All roads in the proposed national roads capital programme, which runs in terms of a three year budgetary cycle, are then ranked from highest IRR to lowest and funds made available dependent on all national infrastructure priorities. However regional (provincial) budgetary allocations are also made in terms of a formula which reflects on economic (GGP) and social (population and infrastructure backlog) criteria so the allocation made to a province may not be sufficient to address all road needs in a particular road programme. (A solution to this adopted by some provinces is to 'ring fence' their road budgets. This means that the budget submitted by a provincial legislature for roads, for example is considered fixed and should the overall budget allocated to the province be lower than requested, the road vote is held constant. The right however always exists to a provincial government to reallocate funds within its own budget to either favour or disfavor roads in general or primary roads against access roads.

This last practice has led to a general deterioration of the primary provincial road network since democratization in South Africa and use is now being made of the World Bank's Rural Economic Development (RED) Model to determine provincial road priorities. The RED model was developed by the World Bank as a response to criticism that the HDM favoured vehicles over people so allocating financial

allocations to primary roads to the detriment of distributing roads. In economic terms the HDM makes use of producer surplus for prioritisation, while the RED makes use of consumer surplus.

Other research has been done in recent years into Social Accounting Matrices (SAM) towards endeavouring to find a societal acceptable prioritization model which addresses all economic and social needs of a particular area (generally a District Municipal level) for infrastructure investment (viz. energy, water and sanitation, communications and transport). These are still being calibrated by the University of Stellenbosch but we look forward to the results as they emerge.

The presentation addresses the different methods and gives some results. It is important to note that both the HDM and the RED assume that effective road maintenance is programmed into the road management process. This all too frequently does not occur. From recent work undertaken by the DBSA the lack of effective maintenance of roads, particularly provincial primary roads can lead to a reduction of 3% of GDP, this as a result of pushing vehicle operating costs up and reducing the anticipated 20 year life of a road and requiring far more expensive rehabilitation (between 5 and 20 times the routine maintenance cost if this were incurred in time).

Particular reference must also be made to the World Bank developed RNET model (Version 2.00) produced by Rodrigo Archondo-Callao for the Sub-Saharan African Transport Programme (SSATP) and released in January 2009. This is a very valuable tool which automates much of the calibration of the HDM and RED models based primarily on Visual Classification Indices, Road Length and Country size.

The African Infrastructure Country Diagnostics Study, released this month, is also a very valuable contribution to infrastructure in general, as is the OECD Publication 'Infrastructure to 2030'.