

SUSTAINABILITY AND FUTURE OF SWAZILAND'S ROAD INFRASTRUCTURE

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ABSTRACT

A paradigm shift to tackle the existing constraints deterring the sustainable efficient and effective provision of roads is required. Conventional road delivery methods, that entail government-controlled road administrators to acquire finance through a general government budget, are increasingly threatened and being replaced by more effective and efficient delivery mechanisms. Commercial principles and disciplines that avail performance improvement opportunities are emerging and are changing the future of road provision as far as policy making; road funding; road administration and execution of construction and maintenance works are concerned. These functions should be entrusted to parties best suited to efficiently and effectively handle them.

Swaziland is no exception to the need for such a paradigm shift, as it is currently conducting a reform study that will culminate in the creation of a RA (RA), an autonomous accountable national roads body, which is representative of the public and private sector and which have clearly defined responsibilities. This paper presents the proposal for a RA and the opportunities it might avail with respect to private sector involvement, performance-based maintenance contracts and shadow tolling.

1. INTRODUCTION

Roads, the dominant mode of freight and passenger transport in Southern African Developing Countries (SADC) and Sub Saharan Africa, are considered to be arteries of socio-economic development due to their large contribution towards productive sectors and employment generation. They should therefore be provided in a sustainable manner. A paradigm shift to tackle the existing constraints deterring the efficient and effective provision of roads is required.

Conventional road delivery methods, whereby road administrators under a government-controlled department secure finance through a general government budget, are increasingly threatened and being replaced with more effective and efficient delivery mechanisms. Today there is a move towards commercial approaches of managing and financing roads, with increased involvement of road users in decision making and the private sector in delivery.

2. STATUS QUO IN SWAZILAND

Swaziland is no exception to the need for the paradigm shifts, as it is currently conducting a reform study that will culminate in the creation of a RA. The country's road network, according to the 2004 statistics, stands at 4 875 km and is categorized into Main, District, Urban and Feeder Roads. The distribution is illustrated in Figure 1 to follow.

Approximately 20% of the network is surfaced. The country must ensure that its road infrastructure is provided and maintained in a sustainable manner if it is to fulfill the country's socio-economic needs.

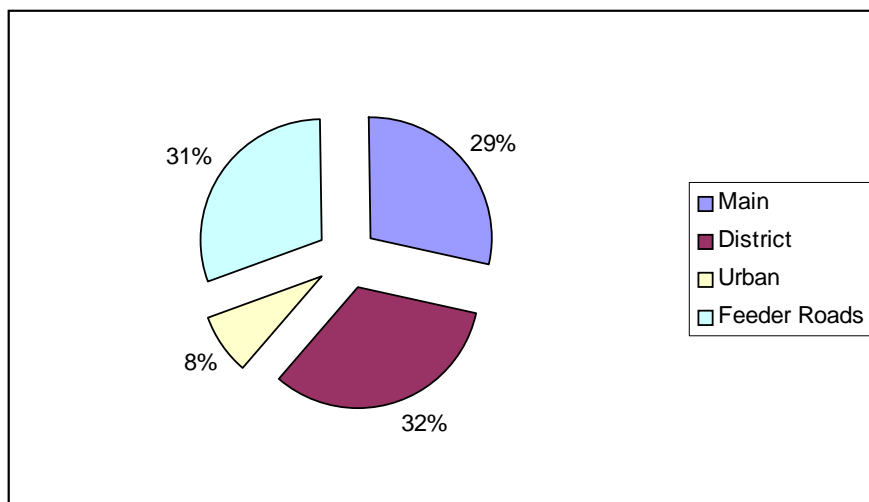


Figure 1. Swaziland Road Network.

Management and financing responsibilities of the road network is shared between Local Authorities and the Roads Department, with Local Authorities comprising Town Councils, Town Road Boards and City Councils. The Local Authorities' management responsibility is only Urban Roads under their prescribed jurisdiction. The Roads Department therefore is responsible for all main, district and feeder roads of Swaziland and is responsible for 89.7% of Capital expenditure and 89.8% of recurrent expenditure thus making it a major role player in the roads sector in Swaziland (Swaziland Road Sector Reform, 2004).

2.1 The Need for Road Sector Reform

The incessant pressure by road users on the Roads Department to prevent and reverse road deterioration and to provide more reliable access to rural areas has in some way implied that the department is inefficient. Road users have become aware of the link between poor road conditions and higher vehicle operating costs (VOC). A purposely-sampled survey with subjects from the Ministries of Public Works and Transport (MOPWT), Finance and the Economic Planning and Development, and experienced Swazi consultants and contractors revealed that the Roads Department is not well organized to react to the requirements of the road users. The need to reform the institutional base of the road sector, which includes its organization, staffing and performance, in the manner in which it delivers its services to road users have now come to a decisive point.

Evidently there is also a need to involve road users and the private sector in the management and provision of the road network, respectively. This will ensure accountability and transparency of huge sums borrowed from foreign funding to finance the country's road infrastructure, as these loans are ultimately paid back using taxpayers money. A significant proportion of the country's disbursed and outstanding debt is mainly

loans for procuring roads. Alternative financing measures to alleviate the limited general budget are also required.

A Road Management Initiative (RMI) was launched by the United Nations Economic Commission and the World Bank in the late 1980s. This RMI initiative formed part of the Sub-Saharan African Transport Policy Program to better understand the underlying causes of poor road maintenance policies and to explore ways of establishing a secure and stable flow of funds (Heggie and Vickers, 1998). This initiative identified a number of underlying causes for poor road maintenance policies. These were:

- 1 lack of private sector involvement;
- 2 weak institutional arrangements;
- 3 And limited focus on management and financing of roads.

These problems, also evident in Swaziland compels the country to reform its current road provision practice so as to combat if not eliminate the constraints. Other problems faced by the Roads Department as revealed by a report (Swaziland Road Sector Reform, 2004) from the consultants tasked with the study of reforming the Roads Department are:

- 1 Constraints in functioning of the Roads Department;
- 2 Budgeting and financing of the road infrastructure;
- 3 Procurement of service providers;
- 4 And the Roads Department's personnel.

These will be discussed in more detail.

Functional Constraints include the implementation of all policy, planning and execution functions by the department rather than being efficiently executed by the party best suited for this such as outsourcing all execution functions to the private sector. There is lack of one-stop budgeting because of two sources of budget, the capital expenditure through the Ministry of Economic Planning and Development (MOEPD) and recurrent expenditure through the Ministry of Finance (MOF) each with its own motivation process. There are weak management systems that lack maintenance management systems to support requested road funding. The Roads Department is subject to Public Service constraints and priorities which are aggravated by non-existent transparent planning and prioritization systems. Uneconomic Public Services such as the Central Transport Agency are still utilized. There is lack of formal consultation with the actual road users, with accountability for road functions taking place through the political and budgeting processes.

Constraints in Budgeting and Financing of Roads include lack of a dedicated source of funding for roads. This situation thus hinders roads to compete for the national budget with other functions in the normal budgetary cycle and thereby rendering the level of funding for roads unstable. Budget allocations are often cut at short notice in response to difficult fiscal conditions with the allocation process flawed and politicized hence the large spending ministry (MOPWT) nearly always loses out in budget debates. Funds are rarely released on time and the consequences of constraints in the budgeting and financing of roads are that national budget turned into a deficit lately. This situation also leads to the inability to plan work effectively. It leads to late payment of contractors and consultants thus forcing them out of business. Regularly impassable rural roads during rainy seasons and a large growing backlog of rehabilitation work are the end result of this confusion.

Procurement Constraints include procurement authorization occurring through two tender boards (Internal and Central) with consequent delays often experienced and strict procurement authorization applying to staff. Procurement is based on standard client-contractor relationships with the use of alternative provision methods such as Build Operate and Transfer (BOT) only planned now. The increase use of contracting out execution functions and professional services, despite these procurement constraints, imply these parties have to wait for long delayed periods of payment through the Government procedures.

Personnel Constraints include the department's staff resorting under Public Service regulations, with consequent lack of managerial autonomy and lack of incentives to encourage effective performance. The staff is not held accountable or responsible for their work and complaints of low staff moral are rife. There are a large number of staff positions per road length in Swaziland when benchmarked to other countries which may be indicative of low rates of productivity. Promotions are still made on the basis of administrative criteria rather than on merit.

The above-mentioned constraints are clearly disastrous to the sustainable provision of the road infrastructure in Swaziland, hence the need for a road sector reform.

3. THE PROPOSED REFORM

A study, initiated by the MOPWT in 2000 to investigate restructuring options that would enable commercial provision of road services by the Roads Department, proposed wide-ranging reforms in road infrastructure management and financing that were subsequently presented for approval by Cabinet in 2001. The appointed consulting engineers, engaged to lead the study and implementation program that began soon after the approval, produced a reference guide document for the road sector reform program. This document is updated on a continuous basis as progress is being made to reflect changes in the reform process that may be required. Through this document an autonomous RA in Swaziland as a means to manage the country's road infrastructure effectively, was proposed.

A RA, as described by the SADC Protocol on Transport, Communications and Meteorology, is an autonomous accountable national roads body which is representative of the public and private sector and which has clearly defined responsibilities. The Protocol outlines the functions of a RA as to oversee and manage roads on a commercial basis through effective utilization of road funding, to promote the involvement of the private sector thus promoting competition and to develop a transparent process for procurement of contractors in order to ensure accountability. The RA must promote public awareness of the importance of roads and collaborate with enforcement agencies to strengthen enforcement of road transport and traffic regulations and to review the classification of the national roads system.

Essential for effective functioning of the RA is financial stability that ensures sustainable provision, maintenance and management of a country's road network. Swaziland must therefore establish funding policies based on road user charges such as fuel levies, license fees, and road tolls and cross border charges that will ensure the smooth running of the RA.

To generate a generic model for a successful road reform, the proposed institutional framework also incorporated the "four basic building blocks" as cited by Heggie and Vickers (1998) to have been implemented in Sub-Saharan Africa. These blocks are

ensuring the creation of ownership of roads; securing a stable flow of finance; strengthening the management of roads; and establishing the responsibility for managing roads. The generic model indicating the preferred end state model in Swaziland is shown in **Figure 2**, with splits between the policy, planning and execution functions of the current Roads Department.

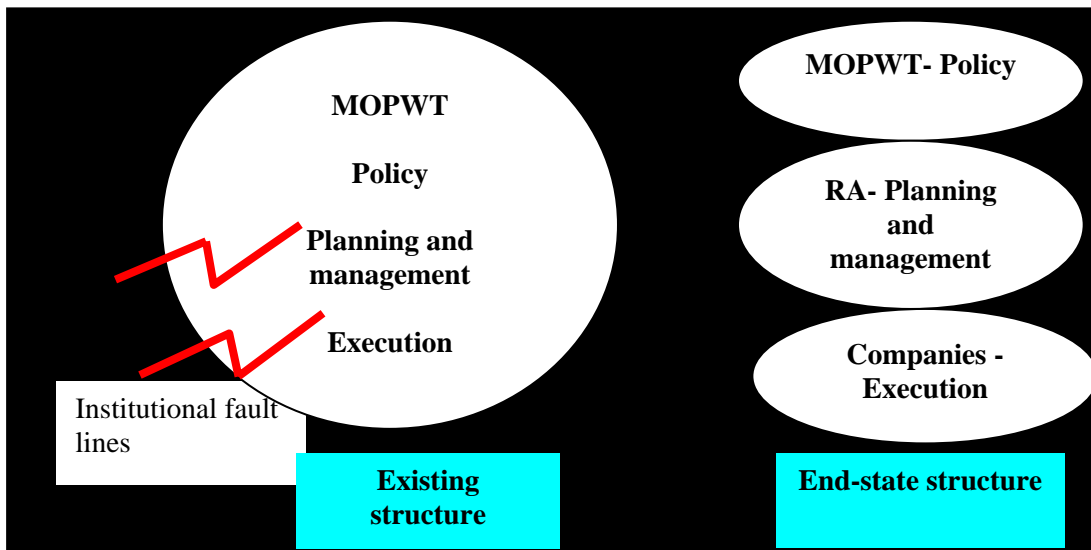


Figure 2. Institutional fault lines for road sector reform.

3.1 The Approach to Road Sector Reform

The road sector reform program was structured in two main phases, namely the preparatory (**Figure 3**) and establishment phases (**Figure 4** and **Figure 5**).

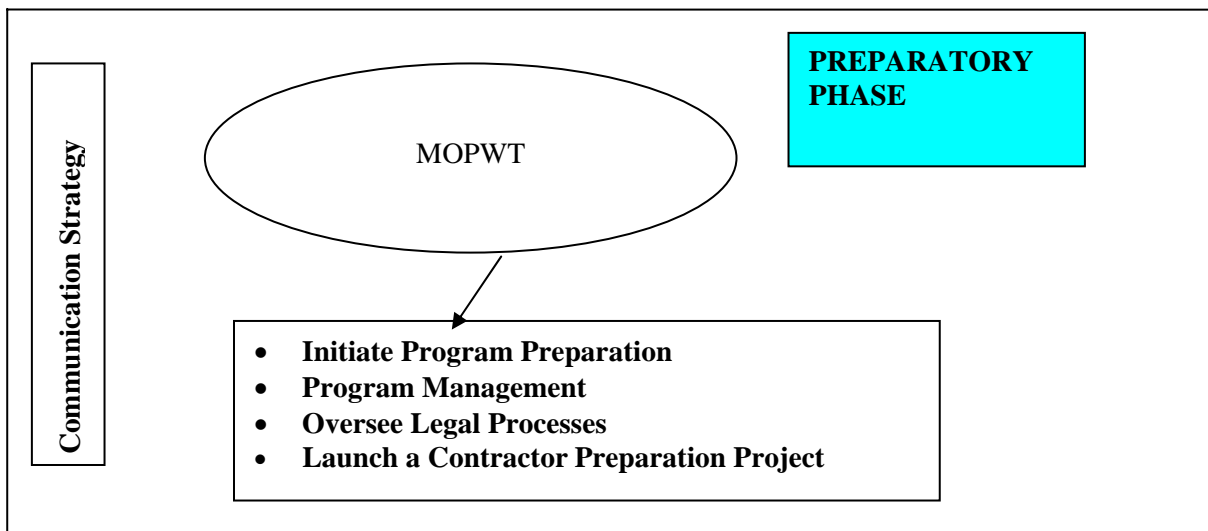


Figure 3. Preparatory Phase.

The Preparatory Phase is to ensure an understanding, broad buy in and support for the road sector reform program. To ensure the program's sustainability, a semi-permanent organization, which is a legal framework, must be created. Essential in this phase is overall focus and sustained support for the program at political level.

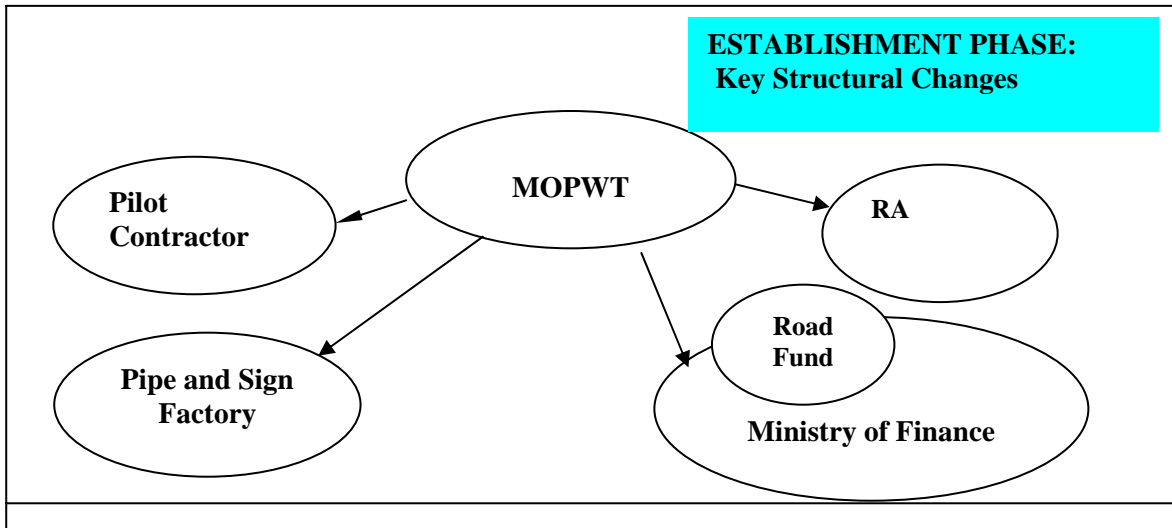


Figure 4. Establishment Phase: Key structural changes.

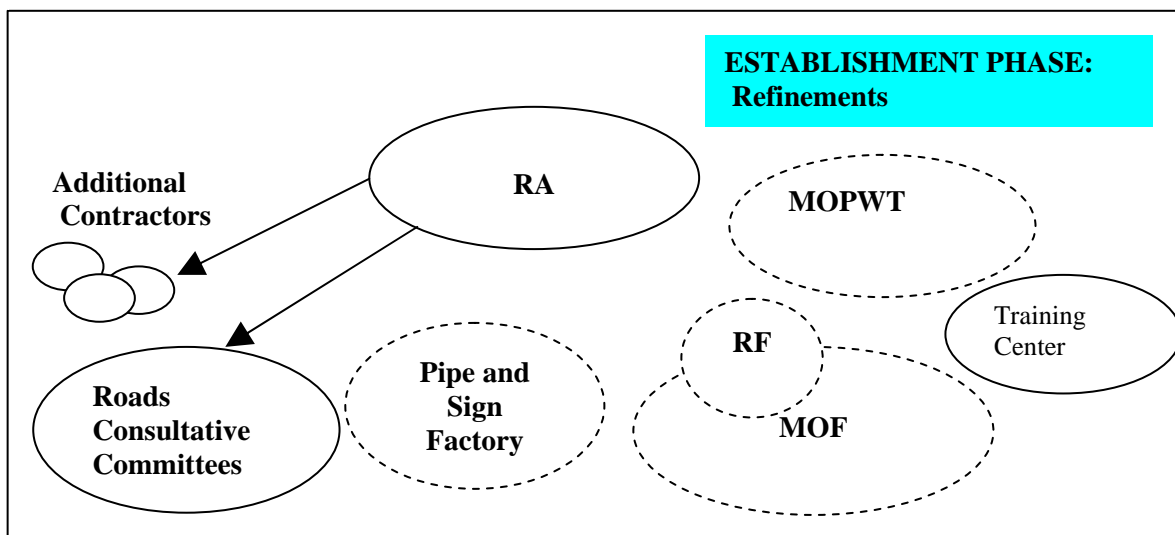


Figure 5. Establishment Phase: Refinements.

The Establishment Phase is to restructure and constitute new legal entities in the roads sector with the initial priority as effecting key structural changes by setting up the broad future road sector structure and separating all execution-type functions from the regulatory functions. The focus is on establishing a RA, a Road Fund (RF), a Pilot Contractor and a Pipe and Sign Factory with corresponding reorganization of the MOPWT to act as a roads regulator also taking place. The RF, it was proposed, that it be operated under the management of the MOF.

The second part of the establishment phase shifts attention to regularizing governance environment through the establishment of appropriate client-contractor relationships as well as agency-client relationships. This implies the creation of additional contractors and roads consultative committees. An industry-wide responsibility for and access to a training centre must also be established.

3.2 Financing

The road sector reform report (2004) states that sustainable financing would be ensured by using a Road User Charges (RUC) approach which would be translated into a RUC Model for Swaziland. Optimal road network costs resulting from an optimal maintenance

strategy that should be applied to the main and district road network were determined using the Swaziland Road Management System. The total optimal funding, including capital expenditure, in 2000 was estimated at E166.9 million whilst E109.8 million is required if capital and capacity expansion are excluded. The recurrent expenditure of the Road Department amounted to E114.9 million per year, excluding feeder road network financing. Adding an estimated E16.5 million to account for expenditure on feeder road network, results in recurrent expenditure of approximately E130 million per year, which excludes debt financing.

It is apparent, therefore that the current level of expenditure on roads (E130 million) approximates the optimal expenditure (E109.8 million), excluding capital expenditure and capacity expansion. If these items are added, the optimal expenditure (E166.9 million) is significantly higher than the current expenditure and a notable increase in current fees and charges would be required to achieve this level of funding.

4. RECOMMENDATIONS FOR SUSTAINABILITY

4.1 Private Sector Involvement

Private firms can maintain and manage infrastructure operations more efficiently provided political interference in their affairs is minimized through the implementation of concession schemes (Queiroz, 1999). Such concessions can ease government's fiscal problems by moving infrastructure projects off-budget during the years of construction. This advantage, however, is reduced to the extent that government makes payments that allow dividends to be paid to investors before the facility is commissioned or gives revenue guarantees in excess of the revenue-earning potential of the facility. Reliance on economically sound toll-financed private sector projects may be justified if constraints on public sector finance or public policy preclude the possibility of the road being provided on an un-tolled basis.

Allport (1994), as quoted in Queiroz's article (1999), mentions a number of important prerequisites for the successful development of a private finance program. These are

- ◆ an important government role in planning the network;
- ◆ a strong commitment to private funding;
- ◆ a steady economic growth;
- ◆ the acceptance of some risk-sharing between private and public sectors (although governments should not guarantee normal commercial risks);
- ◆ strong local capital markets;
- ◆ And an entrepreneurial private sector.

Newberry (1994), also quoted in Queiroz's article (1999), states that the selection of a preferred form of public-private partnership and of the specific form of private participation should be based on an analysis of the total social costs and benefits of the alternatives available.

Compensation to the private sector for investing in road works and operations can then be through a variety of evolved frameworks ranging from "pure" toll based concessions to shadow tolling (Perez, 1999). Because of the drawbacks of manual toll collection such as revenue theft, time wasted by vehicle operators and the consequent raised vehicle operating cost (VOC), a recommended alternative to direct charges of vehicles on the road is shadow tolling.

4.2 Shadow Tolling

Shadow tolls, initially adopted in the UK, are amounts paid to road providers based on

roadway usage and/or availability (Perez, 1999). In the UK, where shadow tolls are widely spread, the payments to road providers come from the central budget, where the UK Highways Agency pays the concessionaire an amount which is based on the number and type of vehicles using the road, with adjustments made for lane closure and safety performance.

Roth (1996), as quoted in Quiroz's article (1999), states the main advantage of shadow tolls over real tolls as their avoidance of traffic diversion from tolled roads to parallel roads. Perez (1999), on the other hand, views shadow tolling as a new approach to risk sharing between the private and public sectors and states that this approach has proven attractive to investors. He says the ability to minimize traffic risks is its main benefit, given that drivers do not have to pay tolls. Drivers' choice of travel path is therefore based solely on time, distance and convenience therefore making it easier to predict. This enables concessionaires to project revenue streams accurately enough to obtain financial guarantees from insurance companies thereby floating their own bonds.

4.3 Performance-based Maintenance

Zietlow (2004) mentions the introduction of new ways of contracting out road maintenance as a means to reduce road maintenance costs and improving road conditions so as to meet the challenges of financial constraints faced by road providing entities. Several Latin American countries, with technical assistance from International Road Federation (IRF), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and the German Agency for Technical Cooperation (GZT) have initiated so-called, Performance-Based Road Management and Maintenance Contracts between 1995 and 1998. These Contracts have only spread to the European, African and Asian countries more recently, where such efforts are strongly supported by international donors like the World Bank, the European Bank for Reconstruction and Development and the Asian Development Bank.

Performance-based contracts cover routine and periodic maintenance and in some cases road rehabilitation as well. They define the minimum road, bridge and traffic conditions a contractor must accomplish where the minimum conditions might include other services such as the collection and management of asset inventory, call-out and attendance to emergencies and response to public requests, complaints and feedback. The contractor's remuneration is then based on compliance with predefined performance standards, also included in the contract, and not on the amount of works and services executed.

Predefined performance standards (Key Performance Indicators, KPIs) might vary as per individual contract and may depend on that country's acceptable minimum standards. However the following are examples of KPIs extracted from different contract scenarios.

For all the KPIs a performance unit and target must be set with which to compare performance. Performance contracts define a product where the contractor decides on how to achieve the product leaving the works selection, design and delivery to the contractor's discretion.

Despite higher allocation of risks to the contractor due to this result-oriented approach as compared to traditional arrangements, such an arrangement opens up opportunities to increase the contractor's margins through improved efficiencies and effectiveness of design, process, technology or management and thereby reducing the cost of achieving the specified performance standards.

Asset class	KPIs	KPI Description
Pavement	Absence of potholes	Repair of potholes
	Control of cracks	Cracks must be sealed
	Control of rutting	Low rut exposure
	International Roughness Index	Minimum road surface roughness specified
Shoulders	Absence of potholes	Repair of potholes
	Control of cracks	Cracks must be sealed
	Joints with pavement	Minimum allowed or must be sealed
Drainage systems	No obstructions	To allow free flow of water
	Structures to be without damages or deformations	Any damages and deformations rendering structure to be unsound
Road signs and markings	Complete and clean road signs	Presence of all necessary road signs, that are free of dirt or foreign markings and must be unobstructed
	Complete and visible road markings	Presence of all necessary road markings that are clearly visible
	Reflectivity of road markings	As specified
Right of way	Minimum vegetation height	As specified
	No foreign elements	As specified

Hybrid contracts have also been in existence in Australia, where some of the works were paid based on quantities and rates and others based on a performance criteria. The main advantages of contracting out road maintenance using Performance Contracts are the reduction of maintenance costs through the application of more effective and efficient technologies and work procedures, the provision of transparency for road users, road administrations and contractors with regard to the conditions in which roads have to be maintained, the improvement, control and enforcement of quality standards and the improvement of overall road conditions.

The primary objective though is to preserve road assets according to predefined performance standards on a long-term basis with the main task being to develop performance standards that will ensure that the objective is met as effectively and efficiently as possible. To avoid ambiguity these performance indicators have to be clearly defined and objectively measurable. It should be noted that Performance Contracts might not result in cost savings immediately. However, road users will know exactly the road conditions they can expect and demand.

5. CONCLUSIONS AND RECOMMENDATIONS

This paper presented a proposal framework for a RA in Swaziland, together with the opportunities it might avail, which would ensure more effective and efficient delivery mechanisms for road administrators in that country. The status quo in the Road Department of the MOPWT in Swaziland revealed constraints in the functioning, budgeting and financing of roads, procurement and personnel, which could be addressed through the implementation of the proposed RA.

The preferred end state model, details on how the reform would be approached and financing of the reform through RUC, were proposed. For sustainability of the reform it was recommended to make extensive use of the private sector in managing and maintaining

road infrastructure operations. The use of Performance-based contracts would ensure value for money service delivery by these private sectors. These private companies can then be compensated for the services rendered through shadow tolls.

6. LIST OF ABBREVIATIONS

RA	Roads Authority
RF	Road Fund
MOPWT	Ministry of Public Works and Transport
MOF	Ministry of Finance
RUC	Road User Charges

7. REFERENCES

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