Road Management Policy

An Approach to the Evaluation of Road Agency Performance

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SSATP
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Sound policies lead to safe, reliable, and cost-effective transport, freeing people to lift themselves out of poverty and helping countries to compete internationally.

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The SSATP is a partnership of
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Photo credit: iStock photo - Roadworks on the motorway out of Cape Town, South Africa.

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Foreword

Efficient and effective road transport is central to the economic growth and development of all African countries, this mode accounting for about eighty to ninety percent of the continent's total trade in goods and services. For this reason countries need adequate road infrastructure management policies, strategies and institutions to manage this crucial asset in an optimal manner including systematic means of measuring the performance of the road agencies as a basis for determining those factors that aid or impede the attainment of their desired results.

In an endeavor to deepen the understanding of the factors that affect the performance of road agencies in road asset management, two evaluations of road agency performance using two different approaches have been conducted in Africa during the past five years. The first approach is the Commercialized Road Management (CRM) framework of assessment explained in the SSATP Working Paper No. 92. In this study, the criteria were defined so as to allow for quantitative measurement and comparison of road sector performance across countries. The CRM approach is a broad approach of performance evaluation in that it focuses on the extent of an agency's compliance with the requirements of the four Building Blocks of the Road Management Initiative (RMI) pertaining to Responsibility, Ownership, Financing and Management that are believed to critically affect its ability to operate in an efficient and effective manner. It is based on an analytical study of practices and performance of road agencies in seven countries (Botswana, Cameroun, Ethiopia, Ghana, Tanzania, Namibia and South Africa).

The second approach is the British Standards Institution's Publicly Available Specification (PAS55:2008) for the Optimized Management of Physical Assets as developed by the UK Institute of Asset Management, which applies to all types of infrastructure. It was recently used by the Association of Southern Africa National Road Agencies (ASANRA) in the Peer Review Benchmarking Study of Road Asset Management practices in nine countries, i.e. South Africa, Botswana, Zambia, Lesotho, Malawi, Zimbabwe, Namibia, Mozambique, and Tanzania. The PAS55 approach recognizes that the management of physical assets is inextricably linked to the management of other as-

sets types, such as Human Assets, Information Assets, Intangible Assets and Financial Assets. However, PAS55 is more focused as these assets are only considered where they have a direct impact on the optimized management of the physical assets.

The outcome of the two evaluations has provided valuable information to the road sector stakeholders in Africa in terms of the differing analytical approaches that may be used to quantitatively evaluate road agency performance in asset management. To provide an in-depth insight of the CRM and PAS55 approaches an analysis was undertaken to compare them based on results of road asset management capacity in four countries that participated in both studies, namely South Africa, Namibia, Botswana and Tanzania. The analysis has provided indication on how complementary elements of the two approaches could possibly be used to improve the framework of assessment of road agency capacity and performance based on key benchmarks and indicators for efficient road asset management. The analysis has also highlighted that such evaluations, whilst useful, need to be supplemented by the application of performance indicators to benchmark the agency's operations, report objectively to management, and identify areas for improvement. Performance management using these indicators should be viewed as an integral part of the overall road asset management process and is an area in need of further development.

This working paper is intended to strengthen the knowledge base and awareness on road management good practices that is important for continuous advocacy on road sector reforms in African countries. It provides opportunity for road sector managers, decision-makers and professionals in Africa to broaden consultation for understanding the underlying principles of road asset management performance assessment. The information provided is fundamental for improving existing evaluation frameworks taking into account the contexts in which the road agencies operate. Notably, building on the strengths of both evaluation approaches, succinct recommendations have been given to incorporate the elements of PAS55, essentially the asset management aspects, in the more broadly based CRM evaluation approach in order to come up with a more comprehensive common framework for performance assessment within and across countries in Africa.

ASANRA acknowledges the support provided by both the Africa Transport Policy Programme (SSATP) and the UK Department for International Development (DFID), through its Africa Community Access Programme (AFCAP), in undertaking the road agency performance evaluations. In recognition of the need to improve efficiency in road asset management in African countries ASANRA is keen to foster institutionalization of good road management practices through continuous advocacy on

road sector reforms in its member countries. This is important to rebuild the institutional memory on the basic principles of road sector reforms and commercialization of road management, particularly for the new generation of policy and decision makers in the road sector. Also, ASANRA will encourage its member countries to determine optimal strategies for improvement of road asset management, based on appropriate performance monitoring frameworks with refined indicators for standard benchmarking. Such strategies will take into account institutional aspects that are prerequisite for efficient and effective road institutions, and consider all elements important for policy and decision-making processes.

Equally, the African Development Bank has a long experience of road projects in support of both development and maintenance. Good management is critical for the success of these projects, on one side for their sustainability and on the other side for their impact in terms of poverty and economic growth. The present document provides a good foundation for governments and road agencies and departments to identify areas of improvement. Merging the two approaches compared in the document provides the flexibility to adjust performance evaluation to the actual performance and capacity of road institutions, from a broad assessment based on the principles of commercialized road management to the more specific assessment of road asset management. The African Development Bank is committed to continue this work initiated by SSATP and ASANRA to provide an evaluation tool available to all African countries and beyond. This will be an essential complement to the efforts to bridge the remaining road infrastructure gap on the continent.

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Abbreviations and Acronyms

AFCAP	Africa Community Access Programme
AGEPAR	Association of African Directors of Roads
AM	Asset Management
ARMFA	African Road Maintenance Funds Association
ASANRA	Association of Southern African National Roads Agencies
BB	Building Block
BSI	British Standards Institute
CEO	Chief Executive Officer
CRM	Commercialized Road Management
DFID	UK Department for International Development
FMS	Financial Management System
IAM	Institute of Asset Management
IDRC	International Development Research Centre
IOA	Institutional Organizational Assessment
MLP	Model Legislative Provisions
PAS	Publicly Available Specification
PI	Performance Indicator
RAG	Red-Red/Amber-Amber/Green-Green
RAM	Road Asset Management
RAMS	Road Asset Management System
RMF	Road Management and Financing
RMI	Road Management Initiative
SADC	Southern Africa Development Community
SATCC	Southern Africa Transport and Communications Commission
SSA	Sub-Saharan Africa
SSATP	Africa Transport Policy Program

Executive Summary

The potentially catalytic role of road transport in the socio-economic growth and development of many countries in Sub-Saharan Africa has not yet been fully realized despite the enormous investments that have been made in the road sector. In fact, backlogs in maintenance and inefficiencies in road sector operations in a number of African countries continue to impact adversely on many other sectors of their economies with coverage of routine and periodic maintenance averaging 65% and 54% respectively (SSATP RMI Matrix, 2012).

The perceived poor results of road agencies have called into question their capacity for undertaking road asset management in an effective and efficient manner. This has led to various initiatives to evaluate such performance as a basis for determining those factors that aid or impede the agency's achievement of their desired results. This would, in turn, provide a better understanding of what the agencies can or should change to improve their ability to perform in a more effective and efficient manner.

Two organizational assessments of road agency performance have been undertaken in Africa in the past five years. The first assessment was based on the extent to which a road agency has been reformed in line with the Road Management Initiative (RMI) concept of commercialization of the roads sector (the Commercialized Road Management (CRM) evaluation approach, the outcome of which is documented in SSATP Working Paper No. 92, 2012 – *Progress on Commercialized Road Management in Sub-Saharan Africa)*. The second assessment was based on the extent to which a road agency complies with the Publicly Available Specification (PAS) for the Optimized Management of Physical Assets (the PAS evaluation approach as developed by the UK Institute of Asset Management and documented in PAS 55-1:2008). The outcome of this evaluation is documented in a report entitled *Peer Review Benchmarking: Steps to The Future* which was undertaken by the Association of Southern African National Roads Agencies (ASANRA) in 2014.

The main objective of the present document on *Road Management Policy: An Approach to the Evaluation of Road Agency Performance* is to analyze the CRM and PAS evaluation approaches for assessing road agency performance in road asset management. The document also considers how the two approaches could be amalgamated to enhance the evaluation of roads agency performance in terms of key benchmarks for

good road asset management practice. Finally, the document reflects on indicators that could be incorporated in an appropriate asset management evaluation framework to: (1) measure the progress being made towards commercialization of road administrations; and (2) monitor the performance of roads agencies in terms of the efficiency and effectiveness with which they undertake their responsibilities in the road subsector.

The evaluation of the CRM and PAS approaches has been guided by the International Development Research Centre (IDRC)-Universalia framework for conducting an Institutional and Organizational Assessment (IOA) which has been successfully field tested in a number of developing countries (Lusthaus et al, 1999). In this approach, the performance of an organization is believed to hinge critically on the key dimensions pertaining to organizational capacity, organizational motivation and external environment, as illustrated schematically below.

Institutional and organizational assessment (IOA) model

The IOA model presented above implies that certain contextual forces drive performance, namely: the capacity of the organization, e.g. strategic leadership, human and financial resources, programming and process management and inter-institutional linkages); forces in its external environment, (e.g. the policy and regulatory environment; and the internal motivation of the organization (e.g. organizational culture, history, mission, incentive systems). Largely, and maybe not surprisingly, these very forces are recognized to varying extents in both the CRM and PAS evaluation frameworks.

Key Findings and Conclusions

Based on the above generic approach to organizational performance assessment, the following findings, conclusions and recommendations emerge from the evaluation of the CRM and PAS approaches.

Comparison of CRM and PAS approaches for assessing road agency asset management capacity

i. The PAS and CRM frameworks for assessing road agency capacity in asset management have been developed in quite different ways, against quite different environmental and cultural backgrounds and are quite differently focused.

ii. The CRM framework is the product of the RMI concept of commercialization which was initiated in response to chronic shortcomings in the ability of road agencies in SSA to manage their road network in an efficient and effective manner. The framework addresses key aspects of road asset management that are perceived as being of critical importance for achieving proficiency in this activity. The framework considers that reforms in the road sector, in line with the commercialization concept, are a necessary prerequisite for achieving sustainable improvements in road asset management. Moreover, follow-up studies have shown that compliance with the requirements of the commercialization concept have generally resulted in improved conditions on the ground.

iii. In view of its relatively broad focus, the CRM framework provides a comprehensive basis for undertaking an overall evaluation of a road agency's performance in asset management in that it addresses all those organizational elements (the 4 Building Blocks pertaining to Responsibility, Ownership, Financing and Management) that affect the ability of roads agency to operate in an effective and efficient manner.

iv. The PAS framework is an internationally recognized benchmark for road asset management that has been developed by the UK Institute of Asset Management and the British Standard Institute in response to demands from the industry in Europe for a standard for road asset management. This standard is based on compliance with an international specification for the optimized management of physical assets and the main focus is on management of physical assets largely through the use of an asset management system including a supporting asset management strategy and related asset

management objectives and plans. Its application, so far, has been in relatively mature and developed road agencies in developed countries.

v. In view of its relatively narrow focus, the PAS framework provides a necessary, but limited, basis for undertaking an overall evaluation of a road agency's performance in asset management. Indeed, many of the problems with road asset management stem from fundamental institutional and organizational weaknesses, often inter-related. Consequently, although some improvements result from addressing asset management issues, this limited approach is unlikely to improve overall performance unless other critical issues central to the concept of commercialized road management such as erratic funding and inadequate quality of staff are also addressed.

Comparison of findings from application of the CRM and PAS frameworks

i. The CRM framework has probed in some detail the factors associated with the achievement of the RMI commercialization concept as included in the four inter-related Building Blocks. Thus, it has pin-pointed fairly specifically the extent of an agency's non-compliance with, for example, those elements of organizational structure, planning, management and financing of roads that critically affect the ability of the agency to fulfil its mandate in an efficient and effective manner.

ii. As a result of the approach embedded in the CRM framework, it has been possible to not only indicate areas of weakness but, also, how to address them in terms of the required improvements/reforms in line with the four Building Blocks.

iii. The PAS framework has probed quite extensively those elements of road agency operations related to the establishment of a road asset management system, including asset management strategy, asset management objectives and asset management plans. Coincidentally, one of the findings of the CRM study was that "Most road agencies are unable to operate their Road Asset Management Systems to produce reliable outputs in terms of optimal network strategies and programs". South Africa and Namibia were the notable exceptions to this finding.

iv. As a result of the approach embedded in the PAS framework, it has been possible to pinpoint what needs to be done to achieve the PAS specification for road asset management, but not how to go about achieving this, which must be determined by the agency in accordance with its assessed needs. For example, the PAS identifies maintenance funding gaps as a major challenge

faced by road agencies but the root cause of the problem in most countries – insufficient, erratic, unsustainable funding –the manner of addressing the challenge, as detailed in the RMI commercialization concept, and the need to attain the elements of Providing Stable Financing, the third building block of the RMI concept, have not been identified as key issues.

Assessments outcome based on application of CRM and PAS frameworks

i. The CRM framework addresses a much more extensive set of parameters that are likely to affect road agency asset management capacity than is the case with the PAS framework. The CRM framework provides a very broadly based approach to determining road agency capacity in road asset management. The framework addresses not just the asset management system aspects, but also other related aspects associated with the institutional arrangements, planning, management and financing aspects of roads, all of which critically affect road agency asset management capacity. In contrast, the PAS framework is more narrowly focused on the road asset management system aspects and much less so on other factors that affect road agency asset management capacity.

ii. From the strict point of view of asset management, both the CRM and PAS frameworks provide very similar results in terms of the overall rating of road agency capacity in road asset management.

Scope for improvement of CRM framework

The CRM and PAS frameworks offer complementarity in assessing road agency capacity in road asset management in that the more broadly based CRM framework can be refined by incorporating the more specifically focused asset management system aspects of the PAS framework.

Performance Indicators

i. Both the CRM and PAS evaluation outcomes are quantitatively based and can be used as performance indicators that measure progress in commercialized road management.

ii. The RMF and SSATP indicators proposed in Working Paper No. 95: *Transport Governance Indicators for Sub-Saharan Africa*, together with the CRM and PAS indicators, offer valuable inputs to the development of a measurement framework and related indicators for measuring and reporting progress in the efficiency and effectiveness of road agency performance.

However, they need to be supplemented with other indicators to cover other aspects of road agency performance including institutional effectiveness, sectoral effectiveness and provision efficiency. Moreover, the indicators need to be defined and specified in a unique manner and the supporting data for calculating them need to be harmonized to ensure consistency in their use.

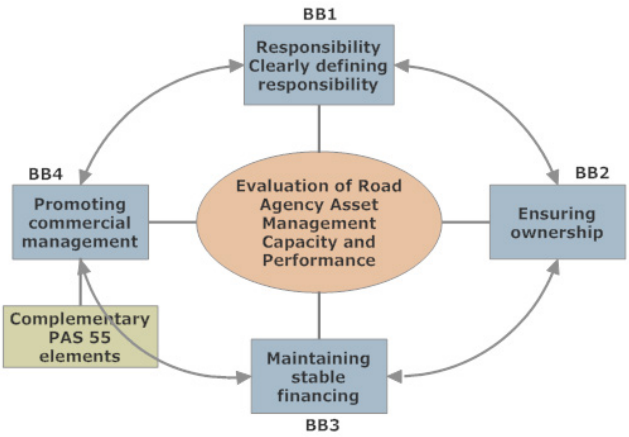
Key Recommendations

The following key recommendations emerge from this review.

i. The CRM evaluation framework should be improved (primarily in its aspect of promoting commercial management) by incorporating those elements of the PAS evaluation framework that are not currently captured so as to produce an enhanced framework for evaluating road agency performance in asset management as illustrated below. Such a framework would incorporate the strengths of the individual frameworks, including all four Building Blocks embedded in the RMI commercialization concept.

ii. The various elements of both the CRM and PAS evaluation frameworks should first be reviewed by key stakeholders as a basis for improving the CRM framework. This process will enable stakeholders to reach consensus on the structure of the new framework. By so doing, it will engender their full buy-in and ownership of the final product and, as a result, is likely to lead to more widespread use in future.

Improvement of CRM evaluation framework using complementary PAS elements



iii. The RMF and relevant SSATP indicators proposed in Working Paper No. 95: *Transport Governance Indicators for Sub-Saharan Africa*, should be developed into a performance measurement framework that measures not only progress with commercialization, via the four Building Blocks, but also looks beyond at other performance indicators, as listed below, each with their own performance indicators:

a. Performance Indicator 1. Measures Progress with commercialization

b. Performance Indicator 2. Measures Institutional effectiveness

c. Performance Indicator 3. Measures Sectoral effectiveness

d. Performance Indicator 4. Measures Provision efficiency

e. Performance Indicator 5. Measures Infrastructure provision

iv. In order to ensure successful integration of the PIs into road agency management processes, a number of measures should be observed, including involving all stakeholders in their development, identifying the need for additional data collection, data management, and analytic tools to support the selected indicators, estimating the cost of operating and maintaining the measurement framework and securing a matching budget.

1. Introduction

Context

Road transport is the most pervasive of all transport modes in Africa and is central to the socio-economic growth and development of all countries in the region. To be effective as a catalyst for development, road provision must be institutionally, economically, financially, socially and environmentally sustainable. This remains a challenge in most African countries despite the enormous investments that have been made in the provision of road infrastructure over the past few decades. Indeed, backlogs in maintenance and inefficiencies in road sector operations in a number of countries continue to impact adversely on many other sectors of national economies with coverage of routine and periodic maintenance needs averaging 65% and 54% respectively (SSATP RMI Matrix, 2012).

The ways for the road sector to achieve its potentially catalytic role in national economic development are now well known as a result of the *Road Maintenance Initiative* (RMI) undertaken as long ago as 1987 by the Africa Transport Policy program (SSATP). The RMI initially perceived lack of maintenance as the overwhelmingly important constraint to the development and sustainability of road systems in SSA and, within that aspect, stability of financing was perceived as the central problem.

In 1997, the name of the RMI was modified to *Road Management Initiative* – a change that represented the realization that stable financing in itself is not sufficient for ensuring proper maintenance of the road network, and that aspects of institutional structure, planning, management, and the external environment all strongly influence a road agency's ability to manage the road asset in an effective and efficient manner.

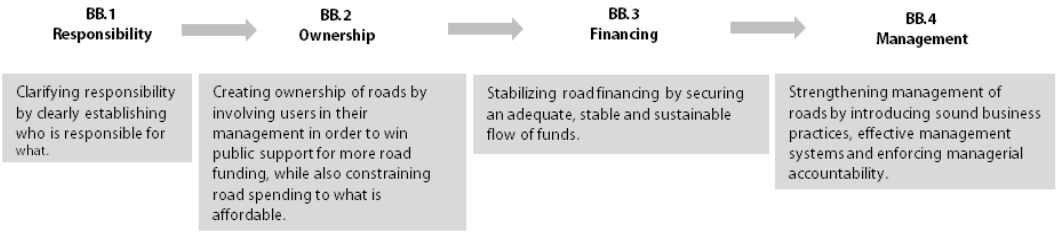
This approach was in full recognition of the main factors that adversely affected the efficiency of road agencies in the 1990s, as more recently re-stated by Queiroz and Kerali (2010):

- outdated management structures
- lack of clear responsibilities
- human resource constraints
- weak management information systems

- inadequate financing
- perception of roads as a public good

In view of the above, the RMI focused on finding ways and means of reversing the process that was trapping governments in the cycle of road building, roads deteriorating prematurely and roads being rebuilt long before the end of their design life. The key concept to emerge from the RMI program was that of *commercialization* of the road sector (Heggie, 1995; Heggie and Vickers, 1998), i.e. using market concepts and discipline in road management and introducing a fee-for-service element in the financing. However, since roads are a public monopoly, and ownership of most roads will remain in government hands for the foreseeable future, commercialization requires complementary reforms in four key areas – the so-called four Building Blocks (BB) (Figure 1).

Figure 1 – Four Building Blocks necessary for commercialized road management



Essentially, the RMI defines a number of regulatory essentials and provides guidelines, which have to be accommodated to ensure effective and efficient road management and funding irrespective of what the institutional framework will ultimately look like. These regulatory essentials may be summarized as follows:

- a clear demarcation and allocation of authority and responsibility for road financing and management;
- significant private sector participation, and in particular from transport users, in road financing and management decision-making forums;
- adoption of appropriate financing principles and practices in order to secure:
  - adequate and stable sources of funding through road user charges;
  - arrangements to allocate funds in an unbiased and transparent manner to relevant road authorities/agencies;

- performance-based fund allocation; and
- adoption of sound commercial management principles and practices.

The RMI vision was developed on the basis of extensive discussions between stakeholders and sector specialists. It recognizes from historical experience that many of the problems with road management are caused by institutional and organizational weaknesses, which are often inter-related. Thus, although some improvements are likely from addressing a particular aspect of a road agency's operations, much greater benefits are likely to occur by ensuring that each change fits within a consistent and broader structure of improvements, as represented by the four BBs.

The RMI vision has been widely accepted as a basis for policy reform in many countries. In Africa, it is embedded, for example, in the Southern African Development Community (SADC) Protocol on Transport, Communications and Meteorology (SADC, 1999) as well as the SADC Model Legislative Provisions on Road Network Financing and Management (SATCC, 1999). Over the past two decades, a number of countries have embarked on wide-ranging road sector reforms largely in accordance with the RMI vision. This has included the establishment of independent road funds and, to a somewhat lesser extent, autonomous or semi-autonomous road authorities. Table 1 shows the status of road sector reforms that have taken place to date in Africa.

Table 1 – Countries with established Road Funds and Road Authorities in Africa

Countries with Road Funds			Countries with Road Authorities		
1. Benin	10. Gabon	19. Namibia	1. Burkina Faso	10. Mozambique	19. Zambia
2. Burundi	11. Ghana	20. Niger	2.Congo Republic	11. Namibia	
3. Cameroon	12. Guinea	21. Rwanda	3. Cote d'Ivoire	12. Rwanda	
4.Congo Republic	13. Kenya	22. RCA	4. Ethiopia	13. Senegal	
5. Chad	14. Lesotho	23. Tanzania	5. Ghana	14. Sierra Leone	
6. Cape Verde	15. Madagascar	24. Togo	6. Kenya	15. South Africa	
7. Cote d'Ivoire	16. Malawi	25. Zambia	7. Madagascar	16. Sudan	
8. Djibouti	17. Mali	26. Zanzibar	8. Malawi	17. Tanzania	
9. Ethiopia	18. Mozambique	27. Zimbabwe	9. Mali	18. Uganda	

Source: RMI Matrix (2006) ▭ Country with both a Road Fund and a Road Authority

Subsequently to the long involvement of the SSATP in promoting the RMI principles, three regional road associations were mandated to advocate the RMI principles and monitor their application. These associations are:

i. The Association of Southern Africa National Roads Agencies (ASANRA) was established in 2001 and is comprised of representatives of national road agencies, educational institutions, industry/private sector and other interest-

ed parties. The organization's main goal is enhancing regional policy coordination and road transport systems integration in order to improve intra-regional road transport efficiency and lower transport costs.

ii. The African Road Maintenance Funds Association (ARMFA) was established in 2003 and is comprised of the heads of national Road Funds in West, Central, Southern and Eastern Africa. The organization's main goals include developing an information sharing network on best road maintenance financing practices in Africa and on the functioning of Road Funds; supporting the promotion and strengthening of links between African Roads Funds; and, ensuring the medium term sustainability and harmonious development of Road Maintenance Funds.

iii. The Association of African Road Managers and Partners (AGEPAR) established in 1994 is comprised of the heads of road departments and agencies in West Africa. The organization's main goals include: promotion of the integration of road networks, harmonization of standards for construction and maintenance and performance improvement in the road sector.

From the Africa Infrastructure Country Diagnostic study undertaken in Sub-Saharan Africa, (Gwilliam et al, 2008), it was found that the RMI suite of reforms had had a discernible impact on outcomes. Countries with well-financed road funds were found to do significantly better at capturing resources for maintenance. Moreover, countries with road funds and road agencies do significantly better at converting resources into road quality. The study concluded that the advance of institutional reforms, though impressive, was incomplete in many cases – a finding that is corroborated by the SSATP as reported in its Working Paper No. 92, which concluded that progress in the institutional reforms may best be described as "a road partially travelled". Moreover, it has become increasingly apparent that lack of continued advocacy of the principles of the RMI in the Africa region has resulted in loss of institutional memory as a result of which the current generation of road sector stakeholders is largely unaware of the rationale behind the initiative.

In view of the far-reaching and often costly reforms that have taken place in the road sector of many African countries during the past two decades, it is important that an evaluation of the organizational performance of road agencies be carried out to better understand the impact of the reforms, learn lessons from these experiences and identify how agencies can or should change to improve their ability to perform. To this end, two major studies, based on somewhat different approaches to assessing road agency asset management capacity, were undertaken.

i. Progress on Commercialized Road Management in Sub-Saharan Africa. (2012). M. Pinard, SSATP Working Paper 92.

ii. Peer Review of Road Asset Management Practices in the Southern Africa Development Community (SADC) Region. (2014). I.E.S Asset management, BV, Netherlands.

Objectives

With both studies having been carried out in the same geographic area in Africa and having used two different methodologies, ASANRA and the SSATP took the opportunity to learn from the dual exercise with the objective of providing guidance for the evaluation of the performance of road agencies. Against this background, the main objective of this working paper is as follows:

i. To compare and contrast the approaches adopted in the above studies to assess roads agency performance in road asset management including aspects of complementarity and divergence.

ii. To identify how the approaches could possibly be amalgamated to enhance the evaluation of road agency capacity and related performance in terms of key benchmarks for good road asset management practice.

iii. To propose indicators that could be incorporated in an appropriate asset management evaluation framework to: (1) measure the progress being made towards commercialization of road management, and (2) monitor the performance of roads agencies in terms of the efficiency and effectiveness with which they undertake their responsibilities in the roads sub-sector.

Structure

The publication is structured as follows:

Section 1 (this section): Presents the background to the working paper, including its purpose and structure.

Section 2: Considers the need for a holistic approach to assessing road agency performance in road asset management.

Section 3: Provides an overview of the alternative approaches to assessing roads agency capacity in asset management and their ability to pinpoint those key elements that contribute to effective and efficient road asset management.

Section 4: Compares and contrasts the outcomes of the assessment of road agency capacity in road asset management produced by the alternative approaches and uses data from three countries to compare the outcomes produced by the two methods.

Section 5: Considers various performance measures and indicators that could be adopted to monitor and report upon on a continuing basis road agency performance in asset management.

Section 6: Presents the findings, conclusions and recommendations of the study including a plan of action to implement the best aspects of both approaches to assessing roads agency capacity in road asset management.

2. A Holistic Approach to Assessing Road Agency Performance

Challenges faced by Road Agencies in Africa

African governments are placing increasing pressure on road agencies to improve the efficiency of, and accountability for, the management of their road networks. In most African countries, the road network constitutes one of the largest public assets and is generally wholly government-owned. Typically, roads agencies are entrusted with maintaining, operating, improving, replacing and preserving the road asset while, at the same time, carefully managing the scarce financial and human resources needed to achieve these objectives. This must be accomplished under the close scrutiny of the public who pay for, either via general taxes or road tariffs, and are regular users of the road network, and who increasingly demand improved levels of service in terms of safety, reliability, environmental impact and comfort.

Road agencies face significant external, internal institutional and technical challenges that affect their ability to operate in a commercialized manner. In general, these challenges relate to the following:

i. Governance issues
ii. Weak legislative framework upon which RMI reforms can be based
iii. Fragmented approaches to planning of road sector programs
iv. Poorly developed commercial sector
v. Lack of vibrant and competitive domestic consultant and construction industries, which limits the extent to which non-core activities can be contracted out to the private sector
vi. Problems with retrenchment of large numbers of in-house staff

Of the above challenges, governance is arguably the most important one. Good governance, or the lack of it, can have a profound effect on the ability of road agencies to operate in a commercialized manner. Good governance in the transport sector is now widely recognized as being crucial for attaining sustainable

improvements in road asset management. In a recent study commissioned by SSATP (Christie, Smith and Conroy, 2012 in SSATP Working Paper No. 95), the following transport governance issues were identified across four pilot countries:

i. Political interference in projects and in key governing board appointments

ii. Limited or non-existent integrated transport sector policy

iii. Identification of new and strengthened institutional and regulatory arrangements, together with continued evidence of on-going blurred boundaries, unrealistic budgets, and no objective criteria for prioritization

iv. Long-term under investment and prioritization in maintenance

The above issues all reflect a poor governance environment, which is not conducive to improving the efficiency and effectiveness of road agency operations. These issues were identified in the process of developing the RMI vision more than two decades ago! They indicate clearly that poor performance in the road sector is due to far more than mere proficiency in asset management practice and, as a result, any evaluation framework should address all factors that affect the ability of a road agency to operate in an efficient and effective manner.

Factors Affecting Road Agency Performance

Capacity is a critical factor for a road agency to perform efficiently and effectively. Connolly and Lukas, 2002, identified the following components of capacity that are deemed to be critical for high performance in any agency:

i. *Mission, Vision and Strategy*: Need for vital mission and clear understanding of its identity

ii. *Governance and Leadership*: Need for a board of directors, with defined governance practices to effectively oversee the organizations' policies, programs and operations

iii. *Finance*: Need for the organization to successfully secure support from a variety of sources to ensure that its revenues are diversified, stable, and sufficient for achieving its mission and goals

iv. *Internal operations and management*: Need for efficient and effective operations and strong management support systems with financial operations responsibly managed and reflecting sound accounting principles

v. *Program Delivery and Impact*: Need to operate programs that demonstrate tangible outcomes commensurate with the resources invested

vi. *Strategic relationships*: Need to engender respect and maintain strong connections with its constituents including participation in strategic alliances and partnerships that significantly advance their goals and expand their influence

Several international studies of road transport infrastructure and financing (Heggie and Vickers, 1998; Queiroz and Kerali, 2008; Pinard, 2012) have identified factors that impact on efficiency and effectiveness of road agencies, all of which are in accordance with the RMI commercialization concept:

i. Establishing appropriate institutional structures and relationships with stakeholders

ii. Separating the client and supplier functions

iii. Separating the client and supplier organizations

iv. Privatizing the supplier organizations

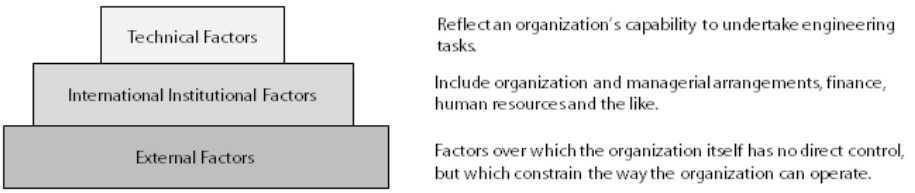
v. Establishing an executive agency or a commercialized (client) organization

vi. Ensuring user participation through oversight boards

vii. Improving management information systems

viii. Seeking additional, sustainable sources of financing

Figure 2– Hierarchy of management issues: The Brooks Pyramid



Source: Robinson, Danielson and Snaith, 1998

Attainment of the above requirements has been shown from other studies (e.g. Brooks, Robinson and O'Sullivan, 1989) to be insufficient to ensure satisfactory performance in a road agency. Instead, Robinson, Danielson and Snaith, 1998, argue that successful performance depends on three fundamental, hierarchically

interrelated factors that take the form of a pyramid as in Figure 2. What the pyramid indicates is that institutional development should be undertaken from the bottom up. Thus, for technical improvements to be successful, sufficient institutional capability must exist. Furthermore, unless the external context (e.g. governance) is supportive, sustainable improvements in the organization are unlikely to be achieved (Stankevich and Guillossou, 2008).

Road Asset Management

Within their broad mandate, road agencies face a complex, multi-faceted array of operational issues related to road asset management. At each turn, crucial decisions must be made, and each involves expenditure of valuable resources. For example:

i. What is the level of maintenance and rehabilitation funding required to maintain the road network in an optimal condition and what is the corresponding level of road user charges that should be levied?

ii. What will happen to road surface conditions and structural capacity if an optimum budget is not available and what will be the resulting excess user costs?

iii. What choices of maintenance and rehabilitation actions and budgets will most effectively bring pavement conditions to an optimal level?

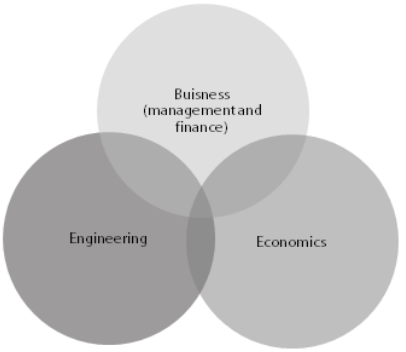
iv. In short, what should be the highway budget for various activities, where should the money be spent, and what exactly should be the road improvement action?

The technical issues posed above are difficult but important ones. They are difficult not only technically, but also because of the sophistication of the road transport system, the extent of the road network, the complexity of relationships, and the political realities which are always present in road system management and decision-making, and which all pose a major challenge for any roads agency manager to grapple with.

Because of this complexity, road agency managers are placing increased reliance on the use of an appropriate "systems engineering" approach in combination with modern day "management" techniques which, in practice, combine to produce a tool which has become almost, if not, indispensable to today's generation of road managers – a Road Asset Management System.

The term "asset management" is used differently by different practitioners. For the purpose of this paper, the definition given by the British Standards Institution for their Publicly Available Specification (PAS) (IAM, 2008) which applies to all types of infrastructure is as follows: "*systematic and coordinated activities and practices by which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organizational strategic plan*". This definition recognizes that asset management is related to delivering business goals through a combination of management, financial, economic, engineering and other related activities with the objective of providing the required level of service in the most cost-effective manner Therefore asset management can be viewed conceptually as the central overlap of the key activities shown in Figure 3.

Figure 3: Conceptual components of Asset Management



Source: Robinson 2008.

3. Assessment of Road Agency Performance in Asset Management

Introduction

As outlined in Section 2, the performance of a road agency is dependent on a wide range of factors that affect the efficiency and effectiveness of its operations. This suggests that the assessment of road agency performance should be undertaken in a holistic manner and should evaluate all the factors that are likely to affect such capacity and related performance. In this regard, the Institutional and Organizational Assessment Model (IOA Model) developed by the Institutional Development Research Centre - IDRC), provides a well-tested framework for organizational performance assessment that has been successfully applied by the IDRC in a number of developing countries (Lusthaus, et al, 1999).

In the IOA evaluation framework, the performance of an organization is viewed as a multi-dimensional balance between its effectiveness, relevance, efficiency, and financial viability. The framework also presumes that the organizational performance should be examined in relation to the organization's capacity, motivation, and external environment. In the schematic representation of the IOA framework in Figure 4, performance is defined in terms of effectiveness (mission fulfilment), efficiency, ongoing relevance (the extent to which the organization adapts to changing conditions in its environment), and financial viability. The framework implies that certain contextual forces drive performance, namely: the capacity of the organization, forces in its external environment, and the internal motivation of the organization.

Figure 4: Institutional and Organizational Assessment (IOA) Model

Source: IUCN 1999.

Against the above generic approach for evaluating the performance of an organization, the next section considers two frameworks, based on somewhat different approaches, used recently to evaluate the asset management capacity and related performance of a number of roads agencies in the SADC region. These frameworks are:

i. The CRM framework

ii. The PAS framework

The CRM Framework for Assessing Road Agency Performance in Asset Management

The CRM framework is based on the extent to which the agency has been reformed in line with the RMI concept as discussed in Section 1. The underlying premise is that such reform is a necessary pre-requisite for establishing institutional arrangements that are conducive to effective and efficient service delivery as outlined in the Sourcebook on Institutional Development for Utilities and infrastructure (Heggie and Kerali, 2000). The evaluation framework is based on a checklist for examining road agency performance and, in so doing, includes the basic elements of the four Building Blocks (BB) that cover all aspects of road service delivery normally expected of a road agency, each with a specific aim related to good practice.

Based on the broad framework for assessing road agency asset management capacity presented above, a survey questionnaire was developed to cover all the elements of the four BB associated with commercialized road agency operations. Each question asks whether a particular feature of road management in the evaluated agency corresponds to a good practice as promoted by the RMI through the four BB. Most questions offer several potential answers, which move progressively from "Unsatisfactory" through to "Excellent" in terms of prevailing practice. When a particular feature of the road sector is checked against the checklist, the answer provides two sets of information:

i. How does the road sector in this country score on this feature, measured in terms of Rating 1 (unsatisfactory practice) to Rating 5 (Excellent practice)

ii. If less than Rating 5, what progressive reforms are required to take this feature from where it is towards a higher-rated good practice.

Table 2. CRM framework for assessing road agency performance in asset management

Building Block	**BB.1 Responsibility**
Element 1	*Institutional Framework*
Aim	Separate management and financing of roads.
Good practice	Establish by Acts of Parliament a functionally autonomous *Road Agency* and *Road Fund Administration* as separate *juristic persons* responsible respectively for road management and financing, overseen by separate Boards with public/private sector participation in which the private sector is in the majority.
Element 2	*Organization*
Aim	Create a coherent organizational structure with functional separation of roles and clearly assigned responsibilities for managing different parts of the road network.
Good practice	Separate client and supplier roles; formal assignment of responsibilities amongst roads agencies; establishment of a functionally classified road inventory.
Building Block	**BB.2 Ownership**
Element 3	Oversight management
Aim	Build constituencies with a strong vested interest in sound road management.
Good practice	Involve road users in road management and decision-making to help win public support for secure and stable funding.
Building Block	**BB.3 Financing**
Element 4	*Secure and stable financing*
Aim	Secure an independent, sustainable source of road funding through incremental expansion of road user charging system.
Good practice	Establish by an Act of Parliament a dedicated Road Fund that serves as the depository of the road user charge
Element 5	*User representation on board*
Aim	Engender strong stakeholder support for putting roads on a fee-for-service basis.
Good practice	Establish a broad-based private/public board with majority private sector.
Element 6	*Road user charges*
Aim	Recognition of the "user pays" principle by putting roads on a fee-for-service basis to generate additional revenue separate from the vagaries of the government's budget
Good practice	Levy an appropriately *road user charge* to recover from road users the economic cost of road usage and to be used for eventually covering all costs of maintaining main roads and part of the costs of maintaining urban and rural roads.
Element 7	*Revenue collection*
Aim	Direct transfer of road user charge to the dedicated Road Fund account.
Good practice	Ring fence road user charges which are deposited directly into the Road Fund.
Element 8	*Revenue allocation*
Aim	Transparent allocation of funds to various road agencies.
Good practice	Develop sound criteria for allocating funds to various tiers of the road network.
Element 9	*Accounting for Road Fund*
Aim	Ensure that all funds are accounted for in a sound and transparent manner.
Good practice	Establishment of a cost accounting system.
Element 10	*Independent auditing*
Aim	Ensure that all revenues due to the Road Fund are collected and reported; that no funds are diverted for non-authorized purposes; and safe custody of funds.
Good practice	Undertake regular, independent, financial auditing of the Road Fund and make report public.
Building Block	**BB.4 Management**
Element 11	*Degree of autonomy*
Aim	Strengthen managerial accountability.
Good practice	Appointment of the CEO by the Board with an annual Contract Plan including clear objectives and performance targets.
Element 12	*Management structure and operating procedures*
Aim	Strengthen the management of roads by the adoption of sound business practices.
Good practice	Ensure that the CEO and line managers generally operate along commercial lines.
Element 13	*Human resources*
Aim	Recruit and retain capable staff by offering competitive salaries.
Good practice	Adopt terms and conditions of employment for the CEO and staff comparable to those in private sector organizations.
Element 14	*Financial management*
Aim	Develop the ability to present a clear picture of the agency's overall financial health.
Good practice	Maintain commercial accounts by the national roads agency and the operation of a cost accounting system that provides at least an income and asset statement.

Element 15	*Management information systems*
Aim	Maintain objectivity in setting priorities & evaluating appropriate technology for road works.
Good practice	Operate an appropriate management system for planning and setting priorities for investment and maintenance.
Element 16	*Procurement and tender procedures*
Aim	Contract out implementation of road works to the private sector in an efficient manner.
Good practice	Contract out most of the design, supervision and implementation of road works and the existence of well-developed procurement procedures for doing so.
Element 17	*Quality control*
Aim	Adhere to auditing procedures to ensure that the public gets value for money from road spending.
Good practice	Check regularly the quality of construction and maintenance works through independently undertaken technical audits.
Element 18	*Technical auditing*
Aim	Measure effectiveness of road agency operations to check whether it fulfils its role as effectively as possible.
Good practice	Undertake independent auditing of road works and make report public.

An example of an evaluation questionnaire pertaining to BB.2: Ownership is presented in Table 3. Once filled, the questionnaire provides the basis for holding detailed consultations with stakeholders in a particular country on that topic to identify actions needed to improve the performance of the country in road management.

Table 3. Example of CRM evaluation questionnaire

BB.2. Ownership **Key Objective:** Empower & encourage the public to play an active role in the management of roads and win their support for road contributing to a Road Fund. **Element:** Oversight management **Issue:** Supervision of the Roads Authority		Unsatisfactory	Poor	Satisfactory	Good	Excellent
Questions:	**Answer**	**No**	**Yes**			
	Rating score	**1**	**2**	**3**	**4**	**5**
Q.1	*(a) Does the RA have any kind of oversight Board? If no, go to next section.*			✓		
	(b) Does the Board include members from road users and the business community?				✓	
	(c) Are the private sector members of the Board in the majority?				✓	
	(d) Are members nominated by the organizations they represent?	✓				
Q.2	*(a) Does the Board have Terms of Reference?*			✓		
	(b) Are the Terms of Reference published in the Gazette or similar?				✓	
	(c) Are the terms of Reference written into regulations under the Roads Act?				✓	
	(d) Do the Terms of Reference include a Code of Conduct?					✓
Q.3	*(a) Is the Board chairman appointed by the Minister without consultation?* or					
	(b) Is the Board chairman appointed by the Minister after consulting the Board? or			✓		
	(c) Is the Board chairman elected by the Board?					
Q.4	*(a) Does the Board meet on an annual basis? or*					
	(b) Does the Board meet at least every six months or					
	(c) Does the Board meet at least every three months? or				✓	
	(d) Does the Board meet at least every per month?					
Q.5	*(a) Are the workings of the Board ever open to the public (shareholders)?*	✓				
	(b) Are the minutes of the Board meetings ever made available to the public?	✓				
	(c) Are selected embers of the public ever entitled to attend Board meetings?	✓				
Total score		**4**	**0**	**9**	**20**	**5**

Tick only shaded cells as applicable

Total score = T = 38 Max possible score = 54

Rating (%) = T/54 * 100 = 38/54*100 = 70.4

Measurement of road agency capacity in asset management

Following completion and analysis of the outcome of the CRM evaluation questionnaire, the capacity of a road agency to undertake efficient and effective asset management is determined by the extent to which it complies with the requirements of the BB. This approach assess road agency capacity and related performance through a set of performance indicators (see Section 5) in which the rating is expressed on a chosen graduated scale ranging from Unsatisfactory (rating 0-20) to Excellent (rating 80-100) as illustrated in Figure 5[1].

Figure 5 – Example of CRM measurement of road agency performance

		Institutional Framework	Institutional Management	Ownership	Degree of Autonomy	Management Structure and Procedures	Human Resources	Financial Resources	Management Information Systems	Procurement and Tender Procedures	Quality Control
BB		BB.1		BB.2	BB.4						
Rating %		70		40	64.3						
		80	60	40	60	50	80	80	100	60	20
E	100										
	90										
G	80										
	70										
S	60										
	50										
P	40				Overall Rating: 63% Evaluation: Good						
	30										
U	20										
	10										
Legend: U=Unsatisfactory (0-20); P=Poor (21-40); S =Satisfactory = 41-60; G=Good (61-80); E=Excellent (81-100)											

By way of example, the following broad conclusions may be drawn from Figure 5 regarding progress on commercialization of a road agency's operations in terms of the extent of implementation of the reforms embodied in the three BB. (Note: The approach is equally applicable to evaluating all four BB).

Table 4. Example of reporting on general progress on commercialization

Progress on implementation of Building Block	Rating (%)	Evaluation
BB.1	70	Good
BB.2	40	Poor
BB.4	64.3	Good
BB.1 + BB.2 + BB.4	63	Good

[1] Only three of the BB were considered in the CRM study (BB1, BB2 and BB4), a study focusing on BB3 having already been carried out by SSATP (Benmaamar, 2006).

Table 5, which may be developed from the information contained in Table 4, provides a detailed assessment of the progress made on each element of each Building Block. In so doing, those features that require particular attention can be isolated and addressed, as appropriate.

Table 5. Example of reporting on detailed progress on commercialization

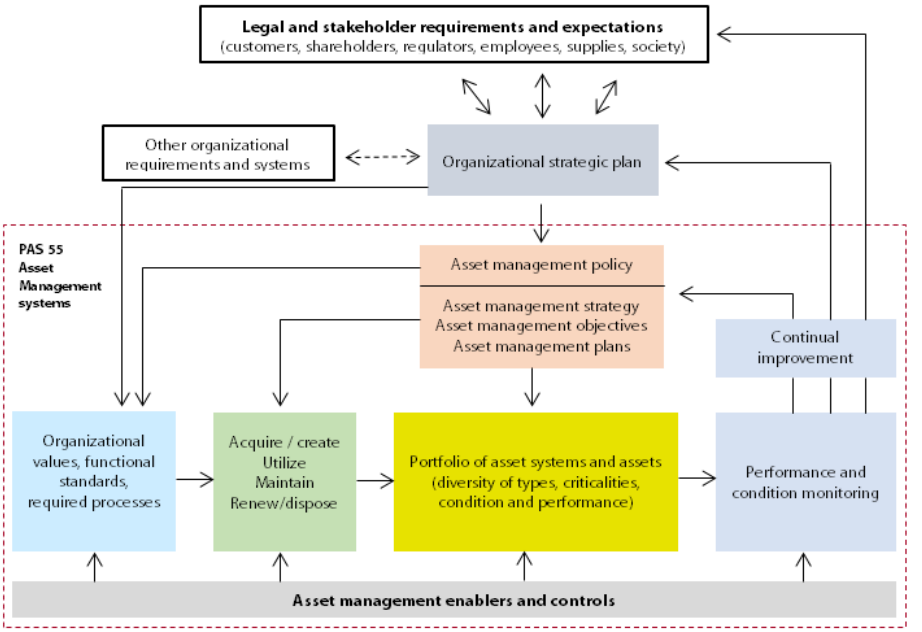
Progress on Commercialisation	Building Block	Feature
Unsatisfactory	BB.4	Quality Control
Poor	BB.2	Ownership
Satisfactory	BB.1	Institutional management Degree of autonomy Management structure and procedures Procurement procedures
Good	BB.1	Institutional framework Human resources Financial management
Excellent	BB.4	Management Information Systems

The PAS Framework for Assessing Road Agency Performance

The Publicly Available Specification (PAS) was developed by the UK Institute of Asset Management (IAM) and the British Standards Institution in 2004 in response to demands from the industry for a standard for asset management (Institute for Asset Management, 2008). In order to ensure consistency with other related management system standards, it was considered that asset management would best be standardized as a specification, with the information on implementing asset management distilled into key requirements. The criterion for including such requirements has been that, without them, the asset management system would be regarded as deficient. The Specification is applicable to any organization where physical assets are a critical factor in achieving its business.

The PAS is primarily designed to support the delivery of an organizational strategic plan in order to meet the expectations of a variety of stakeholders. Thus, the plan becomes the starting point for developing the organization's asset management policy, strategy, objectives and plans. These, in turn, direct the optimal combination of life cycle activities to be applied across the diverse portfolio of assets. Figure 6 presents an overview of the asset management system and its relationship to the organizational strategic plan and stakeholder expectations.

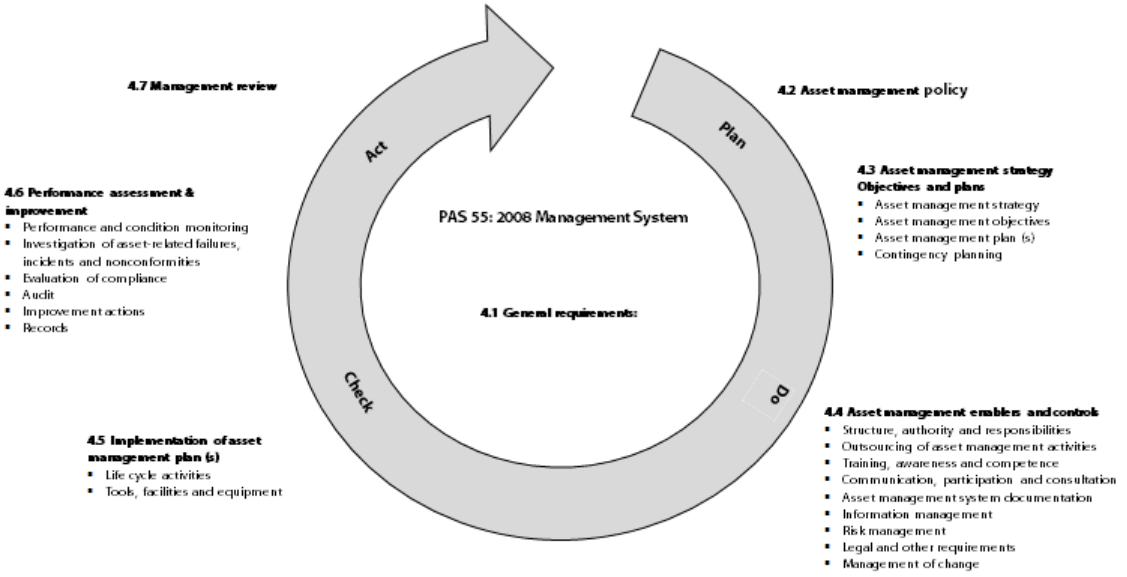
Figure 6. PAS framework for asset management



Source: IAM 2008

The PAS framework is essentially a measurement/compliance tool, which, as indicated in Figure 6, focuses on the management of physical assets and asset systems in accordance with an over-arching asset management policy. The framework measures the extent to which a road agency complies with the *PAS Specification for the Optimized Management of Physical Assets.* This specification provides key performance indicators across 28 aspects of good asset management (Figure 7). It is important to note that the requirements of PAS are prescriptive only to the extent that they define what has to be done, not how to do it. The method of achieving each requirement is for the requirements of PAS are prescriptive only to the extent that they define what has to be done, not how to do it. The method of achieving each requirement is for the organization to determine in accordance with its assessed needs.

Figure 7. PAS management system structure



Source: IAM 2008

PAS 55 recognizes that the management of physical assets is inextricably linked to the management of other asset types, such as Human Assets, Information Assets, Intangible Assets and Financial Assets. However, these assets are only considered where they have a direct impact on the optimized management of the physical assets. As is apparent from Figure 7, the main requirements within PAS call for the organization to establish an asset management system, including asset management strategy, asset management objectives and asset management plans. Other organizational requirements that could affect performance, e.g. institutional mandates and responsibilities, financial sustainability, human resources, or the external environment, e.g. stakeholders such as road users or service providers, are not addressed.

In order to assess the "level of maturity" or capacity of the road agency in relation to an aspect of road asset management, PAS 55 developed a questionnaire which covers all 28 aspects of the PAS requirements indicated in Figure 7. A typical example of the questions pertaining to asset management strategy (Item 4.3.1 in Figure 7) is presented below in terms of the requirements to be met by the organization for various maturity levels.

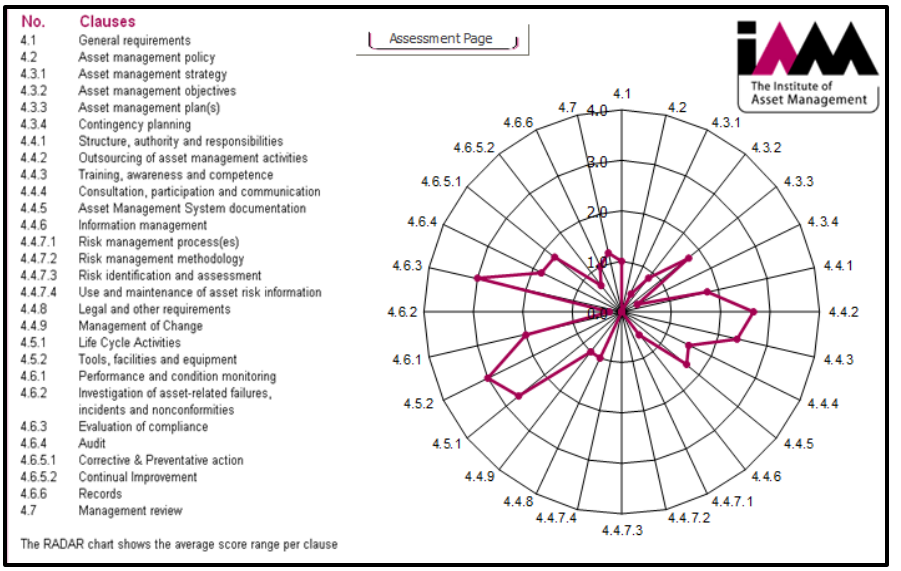
Table 6. Example of PAS evaluation questionnaire

Clause No. 4.2	Asset Management Policy	Score				
Question	To what extent does the organization's overall asset management (AM) policy align with its organizational asset management plan?	0	0.1to 1.0	1.1to2.0	2.1to3.0	3.1to 4.0
Why	The organization needs to document, authorize and communicate its AM policy. A key requisite of any robust policy is that the organization's top management must be seen to endorse and fully support it. Also vital to the effective implementation of the policy is to tell the appointed people of its content and their obligations under it. Where an organization outsources some of its asset-related activities, then these people and their organizations must equally be made aware of the policy's content. Also, there may be other stakeholders and shareholders who should be made aware of it.					
Maturity level 0	The organization has no AM policy.	✓				
Maturity level 1	The organization has an AM policy but it has not been authorized by top management or it is not influencing the management of assets.		✓			
Maturity level 2	The organization has an AM policy which has been authorized by top management, but it has had limited circulation. It may be in use to influence development of strategy and planning but its effect is limited.			✓		
Maturity level 3	The AM policy is authorized by top management, is widely and effectively available to all relevant employees and stakeholders and used to make these persons aware of their asset related obligations.				✓	
Maturity level 4	The organizations processes surpass the standard required to comply with PAS 55 requirements.					✓

Legend: 0 = Unsatisfactory; 0.1- 1.0 = Poor; 1.1- 2.0 = Satisfactory; 2.1- 3.0 = Good; 3.1- 4.0 = Excellent

Following completion and analysis of the outcome of the PAS evaluation questionnaire, a road agency's asset management capacity can then be measured in a quantitative manner as illustrated in Figure 8.

Figure 8. Example of PAS measurement of road agency performance in asset management



By way of example, the following broad conclusions may be drawn from Figure 8 regarding the level of Asset Management (AM) maturity of the roads agency.

Table 7 – Assessment of PAS asset management maturity

Clause No.	2008 Clause	AM Rating	AM Evaluation
4.1	General requirements	1.0	Poor
4.2	AM policy	0	Unsatisfactory
4.3	AM strategy, objectives & plans	0.9	Poor
4.4	AM enablers and controls	1.2	Satisfactory
4.5	Implementation of AM plans	2.7	Good
4.6	Performance assessment & improvement	1.4	Satisfactory
4.7	Management review	1.2	Satisfactory

Overall, in this example, the shape of the radar graph indicates a relatively immature organization as regards to asset management as defined by PAS.

Comparison of CRM and PAS Approaches for Assessing Road Agency Performance in Asset Management

Similarities and differences in approach of the CRM and PAS frameworks for assessing road agency performance in asset management are summarized in Table 8.

Table 8–Comparison of CRM and PAS approaches for assessing road agency performance

Similarities	
▪ Use of objective, measurable criteria in various aspects of road asset management. ▪ Use of a far-ranging questionnaire to ascertain the extent of compliance of the agency with a benchmark, the asset management-related standard. ▪ Can evaluate, and quantitatively rate, the capacity of the agency to undertake road asset management in accordance with the benchmark criteria considered. ▪ Are not linked to any road indicators that can be used to assess the level of road agency capacity, monitor results and act on the findings.	
Differences	
CRM framework	**PAS framework**
▪ Developed on the basis of extensive and wide-ranging consultations with stakeholders in the SADC region.	▪ Developed by an international organization (IAM) for international stakeholders
▪ Applies specifically to environments in which the road agency is perceived to be in need of structural reform in line with the RMI commercialization concept including attainment of the requirements of the related 4 BB.	▪ Applies implicitly to environments in which the organization is not perceived as being in need of structural reform as a necessary pre-requisite for achieving proficiency in road asset management. ▪ Applies specifically to the management of physical assets and only considers other asset types, such as human, financial and information assets, where they have a direct impact on optimized management of the physical assets.
▪ Specifically addresses a large number of road sector-specific factors (external, internal institutional and technical) that are perceived in the Africa region as directly influencing road agency performance in road asset management.	▪ Applies to any organization dealing with asset management, not specifically in the road sector, and thus does not specifically address a number of roads sector-specific attributes that, from historical experience, are perceived in the SADC region as being desirable, if not necessary, for achieving lasting improvements in road asset management proficiency. ▪ Addresses a few key issues that are not addressed in the CRM framework, and are now perceived as a necessary aspect of proficient road asset management, including risk management processes, methodology and assessment; contingency planning.
▪ Produces outputs that pin point gaps in asset management capacity and indicates how to close these gaps in terms of the agency's attainment of the requirements of the four BB. These outputs can be aggregated to allow an overall rating of the agency to be obtained.	▪ Produces outputs that define what has to be done, but not how to do it. The method of achieving each requirement is for the organization to determine in accordance with its assessed needs. These outputs can be aggregated to allow an overall agency rating to be obtained.

4. Outcomes of Alternative Approaches for Assessing Road Agency Performance in Asset Management

Introduction

This chapter compares the alternative approaches that were both used for assessing road agency capacity in asset management, as described in Section 3, in a number of countries in the southern African region as follows:

i. *The CRM framework*: The assessment was undertaken by a consultant who discussed and rated each of the questions contained in each of the four BB, as illustrated in Table 2, based on detailed discussions with a cross-section of senior staff of the road agencies. The countries surveyed are shown below whilst the outcome of the assessment is contained in SSATP Working paper No. 92 (Pinard, 2012).

- Botswana
- Cameroon
- Ethiopia
- Ghana
- Namibia
- South Africa
- Tanzania

ii. *The PAS framework*: The assessment was undertaken initially on a self-assessment basis by road agency staff after undergoing training in the PAS 55 assessment methodology. The outcome of the assessment was then verified by an independent review panel and adjusted, where appropriate, through joint panel interviews in each country. The countries surveyed are shown below whilst the outcome of the assessment is presented in a report entitled: Peer Review Benchmarking: Steps to the Future. I.E.S Management BV (January, 2014).

- Botswana
- Lesotho
- Malawi
- Mozambique
- Namibia
- South Africa
- Tanzania
- Zambia
- Zimbabwe

Outcomes from Application of CRM and PAS Frameworks

The outcomes of the application of the CRM and PAS frameworks used to evaluate road agency capacity in road asset management are compared at two levels:

- First at the level of the general findings of each evaluation of all the countries surveyed.
- Second at the level of the detailed findings of the evaluation for three of the countries surveyed (South Africa, Tanzania and Botswana).

General findings and recommendations emanating from application of the CRM framework

The general findings derived from the application of the CRM framework are summarized as follows:

- Progress on commercialization of road management practices varies considerably from just satisfactory to excellent.
- There is generally lack of genuine autonomy of Roads Authorities from parent ministries.
- Roads Boards are still predominantly public sector dominated and road user interests are not adequately articulated.
- Good governance mechanisms in many Roads Boards operations are generally inadequate.
- Board members are often not abreast of the fundamentals of commercialized road management and financing.
- Many road agencies fulfil aspects of the "supplier" function and undertake varying amounts of non-core activities.
- Lack of Procedures Agreements between some Road Authorities and Road Funds adversely affect the implementation of Road Network Management Plans.
- Performance measurement is not carried out in most road agencies.
- There is significant over-staffing in traditional Government roads institutions in terms of the number of staff responsible for managing 100 km of roads compared to more commercially oriented agencies.

- Salaries are still not market based in most road agencies, which often find it difficult to attract and retain competent staff.
- Most road agencies are unable to operate their Road Asset Management Systems to produce reliable outputs in terms of optimal network strategies and programs.
- Some Road Authorities tend to consider maintenance and rehabilitation/upgrading as separate interventions.
- Road Fund allocations to Road Authorities are inadequate for the maintenance needs of the networks with an over-reliance on the fuel levy compared to other road user charges.
- Road funds are not always used for road maintenance.
- Procurement and tendering processes are very time consuming and inefficient in Government road institutions and a lot less so in commercially oriented agencies.
- The capacity of local consultants and contractors is still limited in a number of countries.
- Technical auditing of maintenance projects is generally carried out but the process is sometimes more superficial than rigorous. Auditing of development projects is seldom carried out.

The positive impacts of the reforms so far, despite the challenges faced, indicate that the pursuit of the reforms promoted under the RMI is justified and beneficial. However, from the application of the CRM framework it can be concluded that for more agencies to realize the full benefits of commercialization, the following issues must be addressed in what may be termed "second generation roads agencies":

- More institutional autonomy should be given to Roads Authorities for accountability and improved efficiency through the amendment of existing Road Acts, where necessary;
- Road Boards should be constituted with majority private sector representation and should introduce appropriate mechanisms for promoting good Board governance; including adherence to a code of ethics, and:
- Board members should be adequately remunerated, should be required to be abreast of commercialized road management practices and to adhere to a code of ethics.

- Road Authorities should focus only on their "client" functions and should outsource all non-core functions.
- Inter-agency (Road Authority/Road Fund) Procedures Agreements should guide the implementation of Road network management Plans and programs.
- All Road Authorities should move to an integrated network management approach for managing their road networks, making good use of road asset management systems.
- Performance measurement of all Road Authorities should be undertaken on the basis of appropriately chosen performance indicators.
- Where necessary, Road Authorities should contract appropriately experienced local consultants to take responsibility for the data collection, operation and management of Road Asset Management Systems.
- The revenue collection base for Road funds should be widened and mechanisms should be put in place for automatic adjustment of road user charges in relation to road demand.
- Road Authorities should undertake technical auditing of both maintenance and new construction/rehabilitation/upgrading projects at all stages of the project cycle.
- Further, locally driven institutional reform is required in many road agencies in order to improve the efficiency and effectiveness of their road management operations based on implementation of the four Building Blocks with particular emphasis on the first – Creating Ownership – taking due account of the examples of good practice that have emerged from this study.

General findings and recommendations emanating from application of PAS framework

The general findings derived from the application of the PAS framework are summarized as follows:

- There is a general drive towards road asset management.
- Member States have different perception about road asset management.
- Risk related aspects of asset management ("thinking the unthinkable") are underdeveloped.

- There are funding gaps leading to vicious circle (no funds → no maintenance → degradation of the roads quality and value → need for more funds, etc.).
- Maintenance is not politically attractive, leading to short term decisions instead of Life Cycle Costs.
- There are generally fuzzy responsibilities between asset owner, asset manager and service provider.
- Standard of performance measurement is moving from PAS 55 to ISO 55000.

The general recommendations derived from the application of the PAS framework are summarized as follows:

- The Member states' top road agency management should demonstrate commitment with respect to asset management by:
    - Ensuring that an asset management policy that is aligned to ISO 55000 and compatible organizational objectives is established.
    - Ensuring that the asset management system requirements are integrated into the organization's business processes.
    - Ensuring that the resources (financial, software, people, equipment, training) for the asset management system are available.
    - Promoting cross cutting collaboration within the organization.
- The Member states' top road agency management should ensure that asset management related risks are considered in the organization's management approach including contingency planning.
- The Member states should perform self-assessment on annual basis and submit to ASANRA Secretariat by end of November each year.
- Another asset management peer review process should be performed in 2017 to review progress made.
- Road Fund Agency representatives should be permanent members of the Road Network Management and Financing Committee of ASANRA.
- The impact of super single tires on regional road networks should be investigated and appropriate policies recommended.

Comparison of outcome of assessments based on application of CRM and PAS frameworks

A detailed comparison of the outcome of the assessment of road asset management capacity based on the application of the CRM and PAS frameworks for South Africa, Tanzania and Botswana is presented in Annexes A, B and C and is summarized in Table 9.

Table 9–Comparison of outcome of selected country assessments by CRM & PAS frameworks

Country	Overall rating									
	CRM					PAS				
	U	P	S	G	E	U	P	S	G	E
South Africa					■				■	
Tanzania				■				■		
Botswana			■				■			
Framework rating	Legend: U=Unsatisfactory (0-20); P=Poor (21-40); S =Satisfactory (41-60); G=Good (61-80); E=Excellent (81-100)					Legend: 0 = Unsatisfactory, 0.1-1.0 = Poor; 1.1-2.0 = Satisfactory; 2.1-3.0 = Good; 3.1–4.0=Excellent				

As is apparent from Table 9, both frameworks rate the three countries in a relatively, but not absolutely, similar manner. This difference in absolute terms is due to the dissimilar scales used in the frameworks in that the PAS framework includes a scale (Maturity Level Excellent: rating 3.1–4) surpassing the standard required to comply fully with the PAS 55 requirements considered to be achieved at the level Good of maturity (rating 2.1-3). Thus, if the scales of CRM and PAS were to be "standardized" by assuming that attainment of the PAS Maturity Level Good, which complies largely with all of the requirements of PAS 55, is rated as excellent, then this rating would be similar to the CRM scale of Excellent (rating of 81-100) which complies largely with all the requirements of the 4 BB of the RMI. Thus, with such standardization, both frameworks would produce the same results.

Although both the CRM and PAS frameworks provide very similar results in terms of the overall rating of road agency capacity in road asset management, the underlying implications of such an outcome are very different. This is due to the fact that the CRM framework addresses a much more extensive set of parameters that are likely to affect road agency asset management capacity than is the case with the PAS framework. While the PAS rating is determined by a set of PAS-specific parameters, these parameters are influenced by additional parameters which are not included nor rated by the PAS approach but are taken into account in the CRM approach. For example, the PAS framework rates the South African road agency as

"Good". The reason for this rating is more than likely not only because the agency is compliant with the PAS requirements but, also, because it is, more broadly, also RMI compliant in terms of meeting generally the requirements of the four BB and as a result is rated Excellent by the CRM framework.

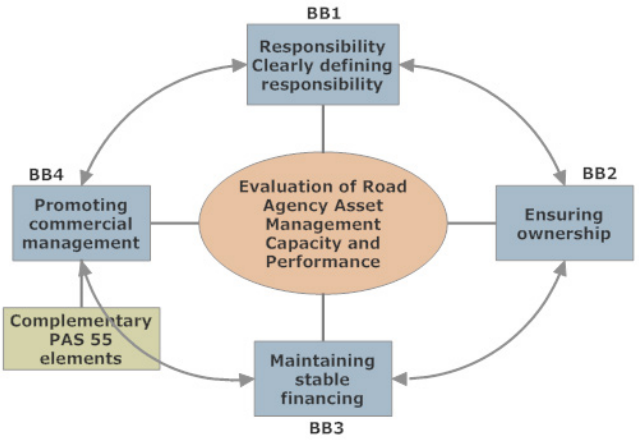
In summary, the CRM framework evaluates all the key elements contained in the four RMI BB which, collectively, have been shown to influence the overall efficiency and effectiveness of a road agency's performance. In contrast, the PAS framework focuses primarily on the asset management system aspects (BB4) within an agency which, unless complemented by other factors affecting road agency performance, is unlikely to provide a comprehensive assessment of road agency asset management capacity. In other words, the application of the PAS framework is a necessary, but not sufficient requirement, for fully assessing road agency asset management capacity.

Scope for Improvement of CRM Framework

From the outputs of previous diagnostic studies on road agency performance, it is apparent that without achievements of the four BB, lasting improvements in road asset management are unlikely. Thus, an "ideal" framework for assessing road agency capacity and performance should evaluate at least those factors included in the four BB. That being a necessity, the CRM framework would seem logically to provide a sound basis for refinement by incorporating the various elements of the PAS framework that focus more specifically, than does the CRM framework, on the asset management system aspects of a road agency's operations. To this end, the conceptual framework in Figure 9 is proposed.

The proposed amalgamated framework would also capture the organizational capacity, external environment and organizational motivation components that affect road agency performance, as presented in the IOA framework in Figure 4. Nonetheless, it is recommended that this proposed new framework is closely reviewed by all stakeholders, including ASANRA, ARMFA and road agencies in SSA countries before it is finalized.

Figure 9. Improvement of CRM evaluation framework (BB4) using complementary PAS elements



Need for Performance Indicators

The absence of an adequate framework of performance indicators (PIs) to measure and report upon on a continuing basis road agency performance in asset management is a drawback, which can have adverse consequences in terms of:

- Uncertainty as to what progress is being made in achieving the reforms that have generally been accepted as a minimum requirement to facilitate commercialization of the road sub-sector
- Inability of road agencies administrations to gauge the efficiency and effectiveness of their operations
- Tendency for policies and interventions to be made in a vacuum and to be re-active rather than pro-active

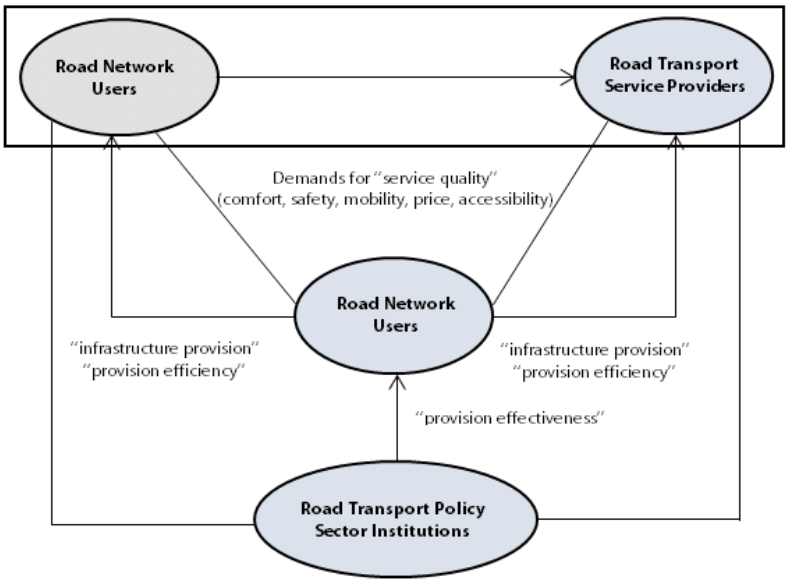
In view of the above, there is a need to enhance the proposed amalgamated CRM-PAS framework indicated in Figure 9 by linking the outputs to appropriate PIs, as discussed in the next section.

5. Performance Measures and Indicators

Introduction

One way of measuring the progress being made by SSA countries towards the achievement of the more autonomous, accountable and business-like agencies envisaged by the RMI is through the use of appropriate Performance Indicators (PIs). As illustrated in Figure 10, the use of PIs has multiple dimensions and PIs can be used by stakeholders, such as governments, service providers and road users, to measure the efficiency and effectiveness of the agency's operations against targets or a baseline position, as a basis for taking adjusting action.

Figure 10. Users of road sector performance indicators



Source: Humplick and Paterson 1994.

With the use of PIs, monitoring and evaluation becomes more objective and is no longer rooted in personal judgment and narrative descriptions. Moreover, its use would enable road agencies to assess their performance and also enable peer comparison between agencies in other countries – thereby providing a strong motivation for improvement. Such self-assessment also has the advantage of enabling a fair and open assessment by removing the tendency of agencies to over- or underrate themselves when being compared with similar agencies (Mihai et al, 2000).

Existing Performance Indicators

RMF Matrix

The RMF Matrix of transport sector performance indicators has been developed as part of the SSATP/ARMFA Partnership program. This matrix consists of a number of performance indicators as shown in Table 10.

Table 10. RMF matrix of performance indicators

Area of Measurement	Performance Indicator
Road agency institutional and operational framework	▪ Whether established or not ▪ Whether a board exists ▪ Whether the board has a private sector majority ▪ Whether a road management system is used ▪ % value of maintenance work contracted out
Road network condition	▪ % of primary roads in good or bad condition

SSATP Transport Indicators

SSATP also developed two sets of key transport sector performance indicators for Africa (SSATP, 2004) as follows:

i. **High level indicators.** These have been developed for four focus areas, one of which is *Road Network Management*, in terms of:

   - Road condition: Percentage of the road network in good and fair condition.
   - Network standard appropriateness: Percentage of road carrying traffic less than the economic threshold of their type (50 vpd for a gravel road and 250 vpd for a paved road).

ii. **Secondary indicators.** These have been developed for six sectors, including Transport Sector Management Sustainability and Road Transport in terms of the following relevant indicators.

Transport Sector Management Sustainability

a. Costs – 6 No. indicators

b. Financial autonomy – 9 No. indicators

c. Institutional Development/Governance – 2 No. indicators

d. Transport sector impact – 2 No. indicators

Road Transport

a. Road network – 3 No. Indicators

b. Road Usage – 4 No. Indicators

c. Road Sub-Sector Management – 1 No. indicator

d. Road Safety – 1 No. Indicator

More recently, transport governance indicators have also been developed by SSATP in order to demonstrate the quality of governance in a particular country, sector or sub-sector (Christie, Smith and Conroy, 2012 – SSATP Working Paper No. 95). The scoring framework adopted in SSATP Working Paper No. 95 allows the indicators to be base-lined and then targets to be set as the basis for action. The scoring system is founded on a simple four-level RAG (red–red/amber–amber/green–green) rating approach, allowing assessment of performance along a continuum. An example of the RAG ratings is presented in Table 11.

Table 11. Example of RAG rating system for a particular indicator

Indicator	Red	Red/Amber	Amber/Green	Green
Budget allocations based on reliable financial forecasts and aligned to priorities based on objective criteria.	More than 50% difference between sector financial ceilings and actual budget allocation (by amount).	Less than 50% difference between sector financial ceilings and actual budget allocation.	Less than 20% difference between sector financial ceilings and actual budget allocation.	Sector financial ceilings and budget allocations are consistent (less than 10% difference).

Both the RMF and SSATP indicators and the evaluation framework of the latter offer valuable inputs to the development of a measurement framework and related indicators for measuring and reporting progress in the efficiency and effectiveness of road agency performance as discussed in the next section.

Proposed Performance Indicators

When compared with the more comprehensive set of performance indicators for assessing the efficiency and effectiveness of road administrations that are available (Humplick and Paterson, 1994), it is apparent that the RMF matrix and the SSATP Transport Governance Indicators should be expanded, where necessary, to ensure that the following areas of measurement are all linked to appropriate indicators:

i. **Performance Indicator 1.** *Commercialization of road management*

Measures the extent to which the road agency has progressed with the reforms required to commercialize the management of roads.

Indicators

Indicate the extent to which progress has been made with regard to the various policy, legislative, institutional, regulatory and administrative changes required to commercialize the management of roads.

ii. **Performance Indicator 2.** *Institutional effectiveness*

Measures the performance of the agency in terms of meeting institutional goals.

Indicators

Indicate the effectiveness of long-term network preservation strategies including resource lag, research and training.

iii. **Performance Indicator 3.** *Sectoral effectiveness*

Measures how closely the condition and operation of the network match the optimal state.

Indicators

Indicate technical and functional qualities as evidenced by the physical condition of the network and quality of service provided to road users.

iv. **Performance Indicator 4.** *Provision efficiency*

Measures the productivity and efficiency of the agency in providing the inputs into the road system.

Indicators

Indicate how much resource was required to produce a unit of output in terms of such aspects as maintenance expenditure and staff productivity.

v. **Performance Indicator 5:** *Infrastructure provision*

Tracks the amount of the largely public asset, the size of the demand and the adequacy of the road system for the demand environment

Indicators

Provide information on demography and macro-economy, road network size and asset value, road network availability and utilization.

The proposed framework for monitoring and evaluating the performance of road agencies is presented in Table 11 and includes the five measures described above and about 30 related PIs including relevant ones that have been retained from both the RMF matrix, the SSATP Transport Governance Indicators and the PAS evaluation framework. However, in order to harmonize these approaches, it will be necessary to adopt a similar rating scale. For ease of conformance, it is proposed to adopt the four level RAG system embedded in the SSATP Working Paper 95, as described above. Accordingly, it will be necessary to amend the CRM framework from a five level scale to a four level scale. This will make it possible to produce indicators that will be the outcome of a quantitative evaluation procedure and will fall into any one of the four rating scales. On this basis performance can be monitored both within and amongst road agencies.

As indicated in Table 12, Performance Indicator 1 – Progress with Commercialization, provides the means of tracking progress made by a road agency in the commercialization of road management practices. The rating system illustrated in Table 11 and embedded in Table 12, also allows the agency to gauge what reforms are required to take a particular feature of its performance from where it is towards where it should be. Performance Measures 2, 3 and 4 provide the means of tracking progress in the efficiency and effectiveness of infrastructure provision. The outcome of the performance evaluation process can be presented in the form of a histogram (e.g. Figure 5) or a radar diagram (Figure 8).

Data requirements

Much of the data required to generate the PIs listed in Table 12 would be readily available either from national statistics (e.g. those pertaining to demography and

macro-economy) or from the regular monitoring procedures normally undertaken by most road administrations and held in the database of a road or pavement management system. Some of the PIs are contained in the current RMF matrix (road condition) while a few are generated by external organizations (e.g. vehicle fleet size and motorization).

Table 12. Framework of performance measures and indicators

Performance Indicator 1. Measure of Progress with Commercialized Road Management Practices			
Indicator			
Building Block 1. Responsibility : Institutional Framework *Indicates whether an RA has been established by an Act of Parliament as an institutionally separate, arms-length and functionally autonomous body to be responsible for service delivery and to be overseen by a separate Board.*			
Red	**Red / Amber**	**Amber / Green**	**Green**
Autonomous/semi-autonomous RA not established	Autonomous/semi-autonomous RA established through an Act of Parliament but no separate management and funding of roads.	Roads Act provides for separate management and funding of roads but no independent Board to oversee RA operations.	Roads Act provides for independent Board to oversee RA operations
Similar approach for all elements of all Building Blocks as indicated in Table 2.			

Performance Indicator 2. Measure of Institutional Performance Effectiveness			
Indicator : Resource Lag			
Backlog maintenance by road category (% budget)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A%	B%	C%	D%
Indicator : Research and Training			
Expenditure on research & training (% of total road expenditure)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A%	B%	C%	D%

Performance Indicator 3. Measure of Sectoral Effectiveness							
Indicator : Preservation Effectiveness							
i. Pavement condition (% lane-km in Good/Fair/Poor condition. *ii. Structures condition (% units In Good/Fair/Poor condition.*							
Red		**Red / Amber**		**Amber / Green**		**Green**	
Primary	A% lane - km	Primary	B% lane - km	Primary	C% lane - km	Primary	D% lane - km
Secondary	A% lane -km	Secondary	B% lane - km	Secondary	C% lane - km	Secondary	D% lane - km
Tertiary	A% lane -km	Tertiary	B% lane - km	Tertiary	C% lane - km	Tertiary	D% lane - km
Similar approach for all elements of all Building Blocks as indicated in Table 2.							
Indicator Axel load Control							
Degree of control over overloading							
Red		**Red / Amber**		**Amber / Green**		**Green**	
A%		B%		C%		D%	
Indicator : Road Safety							
Fatalities (no./Million VKT)							
Red		**Red / Amber**		**Amber / Green**		**Green**	
A		B		C		D	

Performance Indicator 4. Measure of Provision Efficiency			
Indicator : Output Efficiency			
Average maintenance cost/VKT			
Red	**Red / Amber**	**Amber / Green**	**Green**
A $/VKT	B $/VKT	C $/VKT	D $/VKT
Total expenditure/total agency staff ($/employee)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A $/employee	B $/employee	C $/employee	D $/employee
Number maintenance contracts let/annum (km)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A km	B km	C km	D km
Average time to procure contracts (days)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A days	B days	C days	D days
Indicator : Provision mode			
Private supply participation: Contract expenditure/Total expenditure (%)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A%	B%	C%	D%
Contract expenditure/Agency force a/c expenditure (%)			
Red	**Red / Amber**	**Amber / Green**	**Green**
A%	B%	C%	D%

Performance Indicator 5: Measure of Infrastructure Provision		
Indicator	**Units**	**Comments**
Demography & macro-economy		
Gross Domestic Product	US $M	Significant travel demand determinant.
Fiscal cost (roads)	%	Total road expenditure as % GDP.
Road network size		
Road length	km	By functional class/type. Descriptor of the road system.
Bridges	m	By functional class and type.
Tunnels	m	By functional class and type.
Road asset value		
Asset value	$M	Current value by component. Allows asset value to be tracked.
Road network availability		
Road density	km/1000 inhabitants	Provides an indicator of accessibility to population.
Road coverage	km/100 km^2	Provides an indicator of accessibility to land.
Road users	Km/100	
Vehicle fleet size	Million veh.	By category. Is an important travel demand factor.
Motorisation	Veh /1000 inhabitants	

Harmonization of Performance Indicators

In order to ensure that the PIs proposed in Table 12 are used in a consistent manner in all SSA countries, it is important that they are defined and specified in a unique manner and that the supporting data for calculating them is collected in a harmonized manner. In particular, to focus on performance evaluation, many indicators proposed for the measure of infrastructure provision should be trans-

formed to fit within the format of the RAG framework where actual performance is measured against targets. This will require the preparation of a specification for each PI as illustrated in Table 13.

Table 13 – Illustrative example of a PI specification

Performance Measure	Infrastructure provision
Indicator Code	*RD.P*
Indicator Name	*Road density*
Purpose	*Measure of accessibility*
Desired Goal	*Improved national accessibility*
Indicator Description	*Kilometer length of total road network per 1,000 people. The total road length includes (a) motorways/freeways, (b) highways, main or national roads, (c) secondary or regional roads, (d) urban roads, (e) rural roads (all classified or gazetted roads).*
Indicator Definition	RD.P = L/(P/1000)
Illustrative Case	*In 2007, the total road length of country C was 8,700 km and its total population was 1.7 million people.*
Illustrative calculation	L = 8,700 P = 1,700,000 RD = 8,700/(1,700,000/1,000) = 5.1

The approach outlined above should be undertaken for each indicator. However, it is outside the scope of this study to define all the indicators to this level of detail as the final selection of indicators and buy-in from stakeholders should be part of an implementation strategy aimed at engendering ownership of the performance monitoring and evaluation framework outlined in this section.

Integrating Performance Measures and Indicators into a Road Agency

The following actions would be required to ensure successful integration of the PIs into the road agency management processes. These include (TRB, 2006):

- Engage all stakeholders to achieve buy-in and commitment to use the measures
- Integrate the performance measures into existing processes and decision-making forums
- Agree on clear ownership and responsibility for each measure and associated data and tools
- Identify needs for additional data collection, data management, and analytic tools to support the selected measures and indicators
- Design communication tools with formats appropriate to rget audiences

- Document measure definitions and procedures
- Estimate the cost of operating and maintaining the measurement framework and ensure that there is a matching budget.

6. Findings, Conclusions and Recommendations

The following is a summary of the conclusions and recommendations arising from the review of the CRM and PAS frameworks for assessing road agency capacity and performance in road asset management.

Main Findings and Conclusions

Comparison of CRM and PAS approaches for assessing road agency asset management capacity

i. The PAS and CRM frameworks for assessing road agency capacity in asset management have been developed in quite different ways, against quite different environmental and cultural backgrounds and are quite differently focused.

ii. The CRM framework is the product of the RMI concept of commercialization of road management, which was initiated in response to chronic shortcomings in the ability of road agencies to manage their road network in an efficient and effective manner. The framework addresses key aspects of road asset management that are perceived as being of critical importance for achieving proficiency in road asset management. The framework considers that reforms in the road sector, in line with the commercialization concept, are a necessary pre-requisite for achieving sustainable improvements in road asset management. Moreover, follow-up studies have shown that compliance with the requirements of the commercialization concept have generally resulted in improved conditions on the ground.

iii. The PAS framework is an internationally recognized benchmark for road asset management developed by the UK Institute of Asset Management and the British Standard Institute in response to demand from the industry in Europe for a standard for asset management. This standard is based on compliance with an international specification for the optimized management of physical assets and the main focus is on management of physical assets largely through the use of an asset management system including a supporting asset management strategy and related asset man-

agement objectives and plans. Its application, so far, has been in relatively mature and developed road agencies in developed countries.

iv. In view of its relatively narrow focus, the PAS framework provides a necessary but limited basis for undertaking an overall evaluation of a road agency's capacity and related performance in asset management. Indeed, many of the problems with road asset management are caused by fundamental institutional and organizational weaknesses which are often interrelated. Thus, a good road asset management system will make little difference to the quality of roads in a country if the level of funding is erratic or the quality of staff inadequate.

Comparison of findings emanating from application of the CRM and PAS frameworks for assessing road agency capacity in road asset management

i. The CRM framework has probed in some detail the factors associated with the achievement of the RMI commercialization concept as included in its four inter-related Building Blocks (BB). Thus, it has pin-pointed fairly specifically the extent of an agency's non-compliance with, for example, those elements of organizational structure, planning, management and financing of roads that critically affect the ability of the agency to fulfil its mandate in an efficient and effective manner.

ii. As a result of the approach embedded in the CRM framework, it has been possible to not only indicate areas of weakness but, also, how to address them in terms of the required improvements/reforms in line with the four BB.

iii. The PAS framework has probed quite extensively those elements of road agency operations related to the establishment and operation of a road asset management system, including asset management strategy, asset management objectives and asset management plans. Ironically, one of the findings of the CRM study was that "Most road agencies are unable to operate their Road Asset Management Systems to produce reliable outputs in terms of optimal network strategies and programs".

iv. As a result of the approach embedded in the PAS framework, it has been possible to pinpoint what needs to be done to achieve the PAS specification for road asset management, but not how to go about achieving this, which must be determined by the agency in accordance with its assessed needs. For example, maintenance funding gaps have been identified as a major challenge faced by road agencies but the root cause of the problem

in most countries – insufficient, erratic, unsustainable funding – and the manner of addressing the challenge, as detailed in the RMI commercialization concept, and the need to attain the elements of BB3: Providing Stable Financing, have not been identified as key issues.

v. In summary it can be concluded that the CRM framework provides a broader approach to determining road agency capacity in road asset management. The framework addresses not just the asset management system aspects, but also other related aspects associated with the institutional arrangements, planning, management and financing aspects of roads, all of which critically affect road agency asset management capacity. In contrast, the PAS framework is more narrowly focused on the road asset management system aspects and much less so on other factors that affect road agency asset management capacity.

Comparison of outcome of assessments based on application of CRM and PAS frameworks

Both the CRM and PAS frameworks provide very similar results in terms of the overall rating of road agency capacity in road asset management. However, the underlying implications of such an outcome are very different in that the CRM framework addresses a much more extensive set of parameters that are likely to affect road agency asset management capacity than is the case with the PAS framework.

Scope for improvement of CRM framework

The CRM and PAS frameworks offer complementarity in the assessment of road agency capacity in road asset management in that CRM as broader framework can be refined by incorporating the more specifically focused asset management system aspects of the PAS framework.

Performance indicators

i. Both the CRM and PAS evaluation outcomes are quantitatively based and can be used as performance indicators that measure progress in commercialized road management.

ii. The RMF and SSATP indicators proposed in Working Paper No. 95: Transport Governance Indicators for Sub-Saharan Africa, together with the CRM and PAS indicators, offer valuable inputs to the development of a measurement framework and related indicators for measuring and re-

porting progress in the efficiency and effectiveness of a road agency. However, they need to be supplemented with other indicators to cover other aspects of road agency performance including institutional effectiveness, sectoral effectiveness and provision efficiency. Moreover, the indicators will need to be defined and specified in a unique manner and the supporting data for calculating them will need to be harmonized to ensure consistency in their use.

Main recommendations

The following key recommendations emerge from this study.

i. The CRM and PAS evaluation frameworks should be amalgamated so as to produce a consolidated framework for evaluating road agency capacity. Such a framework would incorporate the strengths of the individual frameworks, including all four BB embedded in the commercialization concept. In so doing, the various elements of both frameworks should first be reviewed by key stakeholders, including ASANRA, AGEPAR and ARMFA, to engender full buy-in and ownership of the new framework.

ii. The RMF and relevant SSATP indicators proposed in Working Paper No. 95: *Transport Governance Indicators for Sub-Saharan* Africa, together with the CRM and PAS indicators should be expanded in a harmonized manner to ensure that the following performance measures are all catered for.

   a. Performance Indicator 1: Measures Progress with commercialization

   b. Performance Indicator 2: Measures Institutional effectiveness

   c. Performance Indicator 3: Measures Sectoral effectiveness

   d. Performance Indicator 4: Measures Provision efficiency

   e. Performance Indicator 5: Measures Infrastructure provision

Annexes

Annex A. Outcome of assessment of road asset management capacity in South Africa based on CRM and PAS evaluation frameworks

Table A. Outcome of assessment of road asset management capacity in South Africa based on CRM and PAS frameworks

Outcome from Application of CRM Framework						
		U	P	S	G	E
BB1	Institutional framework					
	Organization					
BB2	Oversight management					
BB3	Secure and stable financing					
	User pays principle					
BB4	Degree of autonomy					
	Management structure & op procedures					
	Human resources					
	Financial management					
	Management information systems					
	Procurement and tender procedures					
	Quality control					
	Overall rating					94.8
Legend: U=Unsatisfactory (0-20); P=Poor (21-40); S =Satisfactory (41-60); G=Good (61-80); E=Excellent (81-100)						

Outcome From Application of PAS Framework						
		U	P	S	G	E
BB1	General requirements					
	Asset management policy					
BB2	Asset management strategy, objectives and plans					
BB3	Asset management enablers and controls					
	Implementation of asset management plans					
BB4	Performance assessment and review					
	Management review					
	Overall rating				2.7	
Legend: 0 = Unsatisfactory, 0.1 - 1.0 = Poor; 1.1 - 2.0 = Satisfactory; 2.1 - 3.0 = Good; 3.1 – 4.0=Excellent						

Annex B. Outcome of assessment of road asset management capacity in Tanzania based on CRM and PAS evaluation frameworks

Table B. Outcome of assessment of road asset management capacity in Tanzania based on CRM and PAS frameworks

Outcome from Application of CRM Framework						
		U	P	S	G	E
BB1	Institutional framework					
	Organization					
BB2	Oversight management					
BB3	Secure and stable financing					
	User pays principle					
BB4	Degree of autonomy					
	Management structure & op procedures					
	Human resources					
	Financial management					
	Management information systems					
	Procurement and tender procedures					
	Quality control					
	Overall rating			71.4		
Legend: U=Unsatisfactory (0-20); P=Poor (21-40); S =Satisfactory (41-60); G=Good (61-80); E=Excellent (81-100)						

Outcome from Application of PAS Framework						
		U	P	S	G	E
BB1	General requirements					
	Asset management policy					
BB2	Asset management strategy, objectives and plans					
BB3	Asset management enablers and controls					
	Implementation of asset management plans					
BB4	Performance assessment and review					
	Management review					
	Overall rating			1.2		
Legend: 0 = Unsatisfactory, 0.1 - 1.0 = Poor; 1.1 - 2.0 = Satisfactory; 2.1 - 3.0 = Good; 3.1 – 4.0=Excellent						

Annex C. Outcome of assessment of road asset management capacity in Botswana based on CRM and PAS evaluation frameworks

Table C. Outcome of assessment of road asset management capacity in Botswana based on CRM and PAS frameworks

Outcome from Application of CRM Framework						
		U	P	S	G	E
BB1	Institutional framework					
	Organization					
BB2	Oversight management					
BB3	Secure and stable financing					
	User pays principle					
BB4	Degree of autonomy					
	Management structure & op procedures					
	Human resources					
	Financial management					
	Management information systems					
	Procurement and tender procedures					
	Quality control					
	Overall rating			45.1		
Legend: U=Unsatisfactory (0-20); P=Poor (21-40); S =Satisfactory (41-60); G=Good (61-80); E=Excellent (81-100)						

Outcome from Application of PAS Framework						
		U	P	S	G	E
BB1	General requirements					
	Asset management policy					
BB2	Asset management strategy, objectives and plans					
BB3	Asset management enablers and controls					
	Implementation of asset management plans					
BB4	Performance assessment and review					
	Performance review					
	Overall rating		0.7			
Legend: 0 = Unsatisfactory, 0.1 - 1.0 = Poor; 1.1 - 2.0 = Satisfactory; 2.1 - 3.0 = Good; 3.1 – 4.0=Excellent						

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