Africa Transport Technical Note

Road Management Initiative (RMI)

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Road Sector Performance Indicators for African Countries

Development practice is concerned with achieving results on the ground, towards improving economic and social welfare. Road sector development and administration are not exceptions, being increasingly subjected to scrutiny by the various stakeholders. Assessing outcomes to monitor performance in the road sector is thus at the forefront of sector reform efforts. This Technical Note, relying on ongoing research by the Organization for Economic Cooperation and Development (OECD), aims to set the development of performance indicators in an African context.

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In developed and developing countries, road systems are central not only to economic health, but also to the quality of the environment and, generally, the quality of life. Public awareness of this fact has forced road administrations to be accountable for road system performance.

Despite the efforts of many countries, there has been no transparent measurement or comparable evaluation standards for road systems performance. But in 1996 the Organization for Economic Cooperation and Development (OECD) embarked on an international effort involving thirteen countries and created a Scientific Expert Group to develop a set of Performance Indicators to address this need.

Concentrating only on issues related to road systems, they set out to create Performance Indicators that would be comprehensive — *holistic* — and would help road administrations to evaluate themselves, respond more effectively to decision-makers and constituents, and even allow some comparisons with peer countries. The complete OECD Expert Group Report, "Performance Indicators for the Road Sector" was published in 1998.

The Performance Indicators in this paper, although slightly different from those proposed by the OECD Group, were developed in consultation with area specialists with the intention of applying to African conditions and circumstances. They reflect the *Comprehensive Development Framework.*

The Starting Point: Three Critical Questions

Every road manager, even those working in seriously compromised transport systems, must ask three critical questions: Is the road administration doing the right things? Is the road administration doing things right? And, what things done by others, including international partners, affect the road system?

These questions promote a holistic approach to the development of Performance Indicators. In addition, they assume that, although the road administration handles day to day data collection, analyses and operations, government officials (elected and appointed) and the public do in fact influence the decision making processes. *They are ultimately responsible that the data collected and analyses undertaken reflect their concerns and affect the project selection and the actions performed.*

To assist road administration management directly, the three questions were translated into three areas of inquiry: What is the conceptual mental model to frame Performance Indicators for adaptation and quantification in different country contexts? What are the most important indicators to allow both assessment as well as the development of creative approaches? And, finally, a question that the Group saw as the most important of all: What is the application of Performance Indicators so as to create a learning organization?

The Performance Indicators are broad enough to capture the essential concerns of the government, administration, users and community; flexible enough for use across different country contexts, and specific enough to be measured. Table 1 presents the Performance Indicators applicable in African countries, using the above classification. Data collection to establish a baseline of initial conditions is essential at the outset.

Finally, for the Performance Indicators to be truly useful, they should be subject to criteria that they are measurable,

TABLE 1: PROPOSED PERFORMANCE INDICATORS FOR AFRICAN ROADS

PERSPECTIVE DIMENSION	GOVERNMENT (Ministry)	ROAD ADMINISTRATION	ROAD USER	COMMENTS (number refers to the indicator)
ACCESSIBILITY MOBILITY	**1. Average road user cost (car, truck, trailer truck)**		**2. Road network**	1. Three parts: producer price, tax, and tariff for road administration 2. Km/sq km of arable land or population by region; separately for functionally classified (FC) and community roads.
SAFETY	**3. Accident risk: fatality and injury accidents/veh-km**		**4. Unprotected road user risk**	3. No. of fatalities and injuries 4. Nonmotorized fatalities and injuries
ENVIRONMENT		**5. Environmental Policy or Program**		5. Yes or No; elaboration required (e.g. phasing in of non-leaded fuel; treatment of polluting vehicles; etc.)
EQUITY COMMUNITY		**6. Percentage of population within 10 km from a classified road**	**7. Processes in place for customer/road user feedback**	6. Or within 2hrs walking time. 7. Yes or No; a method to obtain information of social benefits and costs.
PROGRAM DEVELOPMENT	**8. Rolling multi-year program for construction, maintenance, and operations** **9. Percent completion of the annual work program**	**10. Data bank for FC roads** **11. PMS system for distribution of funds by region, functional class, and for prioritizing road rehabilitation and maintenance actions**		8. Yes or No; elaboration required 9. By program (const. maint. oper.) 10. Yes or No; elaboration required on data collection methods and updating. 11. Yes or No; elaboration of principles.
PROGRAM DELIVERY		**12. Forecast values of road costs vs. the actual costs** **13. Percent of work done by direct labor and parastatals**	**14. Percent of gravel roads formed twice or more times a year**	12. By FC and program (construction, maintenance, operations). 13. A measure of competition.
PROGRAM PERFORMANCE	**15. Value of assets**	**16. Paved road roughness (IRI)** **17. Bearing capacity/deflection** **18. Thickness of gravel surface** **19. Defective bridge deck area**	**20. No. of road closings and road closing days**	15-17. By FC 18. Gravel roads only 20. Percent links and percent time closed by FC
INITIAL CONDITIONS	**Possible descriptors are: (1) population (urban/rural); (2) GDP; (3) vehicle fleet by type; (4) fleet without emission control; (5) current road administration budget by program; (6) veh and ton km of travel and traffic volumes by FC (weighted by link length); (7) modal split for passenger and freight (all road modes); (8) congestion: weighted road-km with Volume/Capacity>1 by FC.**			

The Performance Indicators

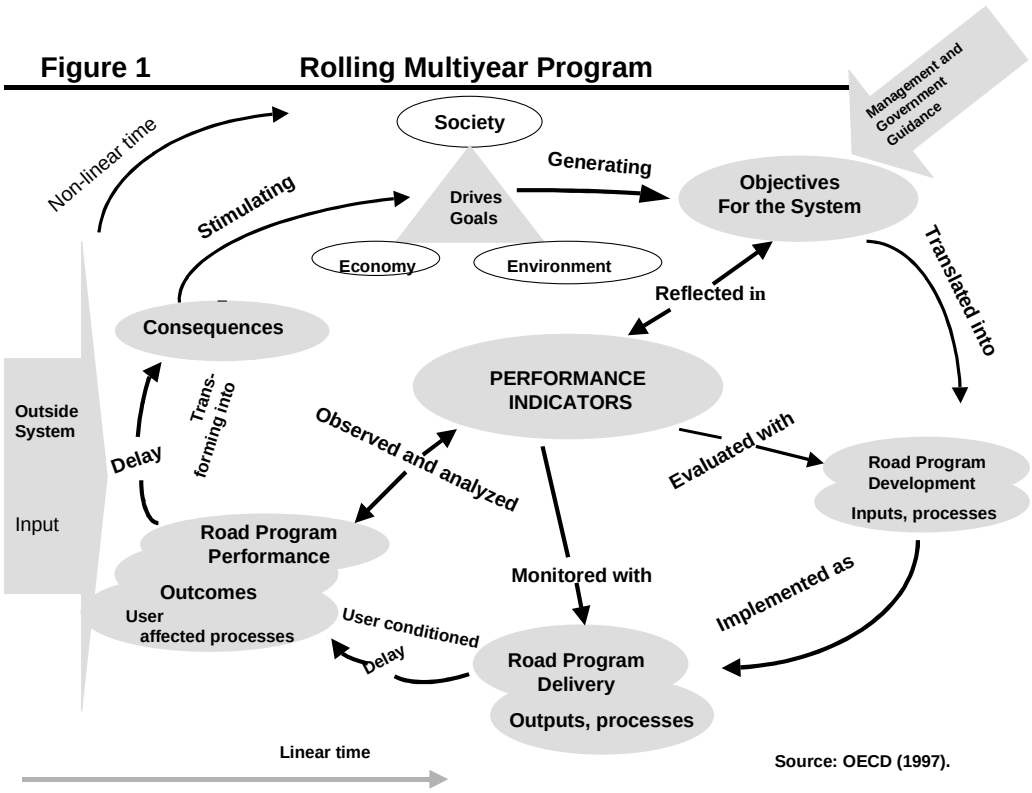
The array of possible Performance Indicators is vast, and therefore they must be classified. The classification recognizes the fundamental roles of transport and reflects them by seven groups of objectives — namely, mobility, accessibility, safety, environment, equity, community, and economic development. The management of the dynamic, goal-seeking transport system entails three major activities — program development, service delivery, and system operation. These dimensions of performance are seen from three perspectives: government (including stakeholders), the road administration itself, and the user/community.

understandable, timely, relevant, reflective of geographic scale, useful to management, and useful as a multiple indicator of goals, a measure of achievement, and a diagnostic tool.

The Mental Model

A Mental Model is a prerequisite for developing Performance Indicators. As developed in the OECD Report, a generic Mental Model for Road Systems unbundles the many interrelated variables that help a road administration's performance. This sets the stage for the Performance Indicators that can apply to all road systems, including those in Africa. The model presents a self-adapting transport system in which evolving

Figure 1 Rolling Multiyear Program



Source: OECD (1997).

goals and objectives reflect human values and needs. These are expressed and made tangible in the results based management format as desired outcomes and consequences, achieved through inputs (e.g., materials, money), processes (e.g., maintenance work, data collection), and outputs (e.g., passable roads, bridges). These, and unexpected outcomes, are evaluated using data collected by the road administration and feedback from the road users and community.

The model's central idea is to move the focus of planning from alleviating current symptoms to creating future results through processes. Evaluation results are defined in the quality and quantity of the outputs (e.g., condition of the road system) and in user satisfaction with outcomes. As a management-by-results model, it provides a concrete framework for self-evaluation.

The model illustrates how the road administration carries out activities using resources allocated to it. Products and services — outputs and concomitant outputs — are judged in relation to predetermined standards and criteria. Outcomes, derivatives of products, and services through user interface are judged by the objectives that the road users and the community desire.

Those judging outcomes include: *government* (including "stakeholders" — the regulators and investors, the suppliers of goods and services, developers — who voice their concerns through the government), *road administration* (the professional transport organization traditionally responsible for "system performance"), and *user/customer* (the users and operators of transport services, and the community).

Operationalizing the Model: A Rolling Multi-year Plan

The Mental Model for utilizing Performance Indicators is operationalized in a road program cycle or Rolling Multi-year Plan (Figure 1). The road administration management employs several means to develop this road program — namely, learning, information gathering, development of new options, public participation, evaluation, interaction with the market, and allocating resources to these activities. The cycle is a continuous feedback process, in which bottom-up technical practices combine with top-down management and most importantly, input from government and the public.

The Rolling Multi-year Plan in Figure 1 has Performance Indicators as the observing eye at the center. It originates from individual and societal drives and goals. These generate objectives that, augmented by policy guidance from the government and the appropriate political entities and the civil society, are *reflected in performance indicators* for the road system. The objectives are translated, again with policy guidance, into an (annual) road program whose key inputs and processes are *evaluated with performance indicators.* The delivery of the road program outputs and processes are *monitored with the assistance of performance indicators.* Finally, the outcomes of the road program, the program performance, are *analyzed with the help of performance indicators.* These outcomes co-evolve with influences from outside the road transport system and are observed with unspecified time lags and lead to complex societal consequences. These consequences in turn stimulate new goals and start a new cycle.

Using Performance Indicators Effectively

The use of Performance Indicators has multiple dimensions, going well beyond evaluating the degree to which goals and objectives have been achieved or attempting to identify variables associated with achieving goals and objectives. The effective use of Performance Indicators helps road administrations to:

- periodically evaluate road system goals and objectives;
- develop alternative courses of action or means to achieve desired goals or avoid unintended ones;
- evaluate the degree of achievement of goals and objectives;

- assess the efficiency and effectiveness of alternatives and of the road administration;
- guide program and project management; and development or re-evaluate goals.

There is an implicit sixth use: to assist road administrations to be learning organizations.

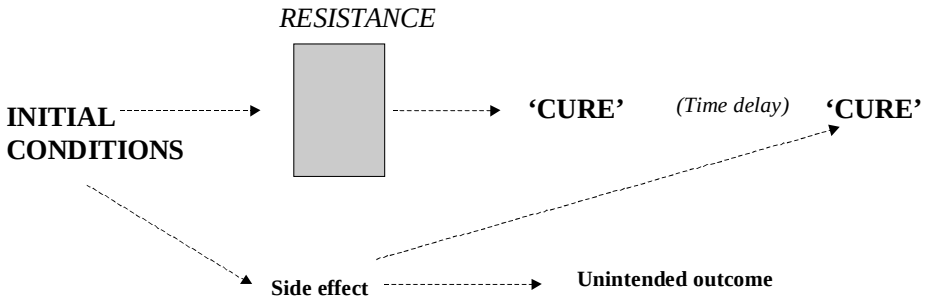


Figure 2 Linear Model of Institutional Resistance

The Learning Organization

Performance assessment depends on values that are largely immeasurable. While there is a long tradition among transportation professionals of using mathematical models to both assess performance and chart change, it is often symbolic communication and actions that portray the situation. These communications lay a common ground for understanding circumstances and possibilities — and desirability – – of change. Acknowledging and encouraging this kind of communication and assessment is a productive use of Performance Indicators. Road administrations can do this by becoming a 'learning organization — organizations in which reflection and inquiry are encouraged and in which the emotional resistances to the question *why?* are dealt with. Often the question, *why do we do this?*, *why do we do this, this way?*, *why not try a new idea?*", and so forth create an array of negative feelings. These emotional resistances often bring unintended side effects and negative outcomes in transport planning. Dealing with them allows staff and management to cope better with future problems and function more maturely. In addition, the resistances often prevent an organization from trying new approaches for developing, recommending, and implementing new plans or policies that may require a departure from extant practice.

Conclusions

The overall conclusion is that Performance Indicators selected after reflection and consultation do provide a broad-based portrait of the road sector from different perspectives. More specific conclusions are:

- The views of road users should be solicited and incorporated into the activities the road administrations — even more extensively than currently done.
- Road administration professionals want their professional knowledge to be shared with the public, and this desire for the public to know is clearly reflected in the road program cycle Performance Indicators.
- Last and perhaps most important, Performance Indicators can and should encourage an institution to learn. The OECD Report notes that no indicator tells one story, and that the interpretation of Performance Indicators is an opportunity for investigation, learning, creativity, and problem solving.

Refinement of Performance Indicators for application in African Transport Systems

Currently, an International Field Test is underway to test the OECD Performance Indicators. Measurement of those indicators not yet precisely defined will be refined in the Field Test. To be useful, the measurement of Performance Indicators should be adapted and made flexible for application in individual county contexts. It will therefore be desirable for African countries to create their own field test of Performance Indicators (Table 1) for refining indicators for their specific use. A multi-day conference among African countries to determine technologies and techniques to measure appropriate Performance Indicators, comparable within their own country subgroups, would be beneficial and productive.

Road Management Initiative

The RMI was launched in 1988 by the United Nations Economic Commission for Africa (UNECA) and the World Bank, under the auspices of the Sub-Saharan Africa Transport Policy Program (SSATP). The countries taking part in the RMI are Cameroon, Kenya, Madagascar, Rwanda, Tanzania, Uganda, Zambia, and Zimbabwe. Others receiving assistance from the program include Angola, Benin, Cape Verde, Djibouti, Ethiopia, Ghana, Guinea, Lesotho, Malawi, Mozambique, and Togo. RMI is administered by the World Bank's Africa Region, and is co-financed with the governments of Denmark, France, Germany, Japan, the Netherlands, Sweden, Switzerland, and the European Union, France, and Norway provide senior staff members to work on the Program.