International Experiences in Restructuring Road Sector

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An evolutionary continuum on which a modern and mature road administration develops is proposed. The five phases that appear necessary in this evolution are outlined: (a) the establishment of traditional construction and maintenance organization, (b) separation of client and producer functions, (c) separation of client and producer organizations, (d) corporatization or privatization of the producer organization, and (e) corporatization of the (client) road administration. The change management process—the framework process and its constituent cores—is addressed. The framework process is the flow of activities in change management when they move from one organizational phase to another. The core activities are those that the road administration must address in the change process. Both of these are discussed in detail. It is asserted that a quick reorganization of road administrations is neither possible nor desirable. The exact path to be taken depends critically on the initial conditions from which the road administration embarks on its development path.

In a World Bank seminar a speaker called the 1970s the decade of the benefit-cost analysis, the 1980s the decade of pricing, and the 1990s the decade of the institutions. This reflects the importance of institutional economics (*1*) and the experiential recognition of the significance of institutions. Road administrations are no exception. It is not difficult to design, build, and maintain roads. It is difficult to structure, manage, and finance organizations that have the responsibility to do that.

Like any organization, a road administration cannot be changed quickly. A growing body of literature (*2–5*) suggests that there are evolutionary phases or plateaus—organization models—and a change process that are observed. This paper is about both. The phases—the organization models—in the evolution of the road administration are described, and a dynamic process—a road map—of how to go about reaching one plateau from the previous one is presented. Although it may be needless, the reader is reminded that the interpretation of observations, generalizations made, and the theoretical model for restructuring a road administration presented are provisional.

IMPORTANCE AND NEED FOR RESTRUCTURING

Improvements in technology; information use; associated gains in efficiency; and the public's desire for participation in decisions determining the quality, manner of service delivery, and prices of services received are among the most important reasons for periodic restructuring of a road administration. The interrelationships are complex but all are involved in the trend to decentralize it and to provide a greater autonomy for its management.

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Cost cutting is the most apparent benefit of restructuring a road administration. Data presented in previous studies support the case for restructuring on efficiency grounds (*2–6* and several World Bank documents).

- Decentralization in programing the outputs can increase efficiency by 10 to 15 percent,
- Optimal timing and scheduling of works reduce the total road transportation costs (user plus administration) by 5 to 30 percent,
- Efficient, decentralized data collection costs 2 to 3 percent of the maintenance budget,
- Contracting out can reduce costs by 5 to 15 percent, and
- Reworking the planning processes can shorten the planning and design cycle.

The benefit of restructuring a road administration is not simply or even primarily for obtaining cost reductions. Perhaps more important are the nonmonetary benefits coming from greater citizen, user, and worker satisfaction from responsive government and from meaningful work.

Mature road administration is one that is syntonic with private organizations in a democratic society. The paper indicates a progressive evolution, akin to the evolution of a human being from infancy to maturity, that road administrations appear to follow. Consistent with the analogy to human development, the lines between phases, to be described shortly, are lines drawn to water.

Restructuring road organizations is a complex task. It is affected by many factors, including the history of the country, its administrative culture, role of the state, and the influential persons mapping out the road administration's vision and ways for the future.

INCREMENTAL PROCESS OF CHANGE

Organizations have only a small window of opportunity for change. This small window is bounded by the authorizing environment (political, social, economic), by the vision and courage of the politicians, and by the organization's capacity for change (*7*).

Restructuring the road sector involves several ministries and numerous organizations and interest groups. All these can influence the outcome of the change process. The complex authorizing environment tends to restrict the available choices, but the road administration management can do something about its capacity for change. The process of change by its nature can increase the array of choices. Change also is incremental because the development of vision and the organization's capacity for change evolve slowly. It is important to recognize that the evolution of road organizations is overdetermined: there is no single cause for an outcome, but outcomes are determined by numerous factors linked to other development directions in society.

EVOLUTION OF ROAD ADMINISTRATIONS

The earliest manifestation of most road administrations is a relatively simple centrally managed and directed line organization responsible for road design, construction, and maintenance. From this initial condition of the organism, the direction of evolution is toward decentralization (Figure 1). A five-step sequence is identified for this evolution:

1. Establishment of a traditional construction and maintenance organization.
2. Identification of client and producer functions. The client organization is responsible for governmental functions: administration, management and planning, contracting, and associated information collection and dissemination functions related to roads. The producer organization is responsible for execution: design, construction, maintenance, and operation of the road system.
3. Separation of client and producer organizations; introduction of a road board.
4. Corporatization or privatization of the producer organization and establishment of an autonomous (client) road administration; installation of a road fund.
5. Corporatization of the (client) road administration or agency.

The first four phases of the evolution have already been taken in some countries. The fifth step may be inevitable because it is already taken in other transport infrastructure administrations: railroads, ports, and airports. This sequence may not be followed strictly and different parts of an organization can be in different phases.

The phases identified for this presentation are plateaus in the evolutionary continuum. They are assigned characteristics that are observed and appear inevitable and beneficial to that phase. This may mean, for example, that in the second or even in the third stage, a road board can be of only limited value because the client and producer organizations are governmental units and the road administration's management can, if it so chooses, ignore the board's recommendations or manipulate it for advantage. Typically in such cases the board agrees with what the road administration proposes. Similarly, it may be counterproductive for a road administration that has not developed appropriate management systems, trained its employees, and developed a professional management culture that measures its own performance to have a road fund. A special fund is simply used to support an inefficient organization. On the other hand, a client organization and corporatized or privatized producer organizations without a road fund to provide for a stable road budget may be pointless or at least inefficient. In such cases the government is committed to providing funding to maintain the organizations, when it might be better to provide a defined source of income and charge the client administration to produce its outputs efficiently.

Phase 1: Traditional Construction and Maintenance Organization

In this phase the road administration is a relatively simple organism, but it employs thousands of people; indeed one of the roles of the organization may be to provide employment opportunities for unskilled labor. The perceived road needs are obvious—roads, employment, and technical improvements. Specialization offers limited advantages, in part because the training of the employees in all ranks and also because of the general socioeconomic environment in the country. In this stage the road administration is centralized and the Ministry of Public Works above it micromanages the budgets and project selection. Politics is the method of resource allocation and management. Professionally, the road administration concentrates on technical issues: standards and specifications, and execution of the works. Construction of new roads has a priority.

Phase 2: Identification of Client and Producer Functions

The road administration adopts a deconcentrated form of organization: project management is moved to the field. Efficiency is emphasized in service delivery and contracting. Specialization gains in importance and the client and producer roles become identified. Political pressures compel the Ministry of Public

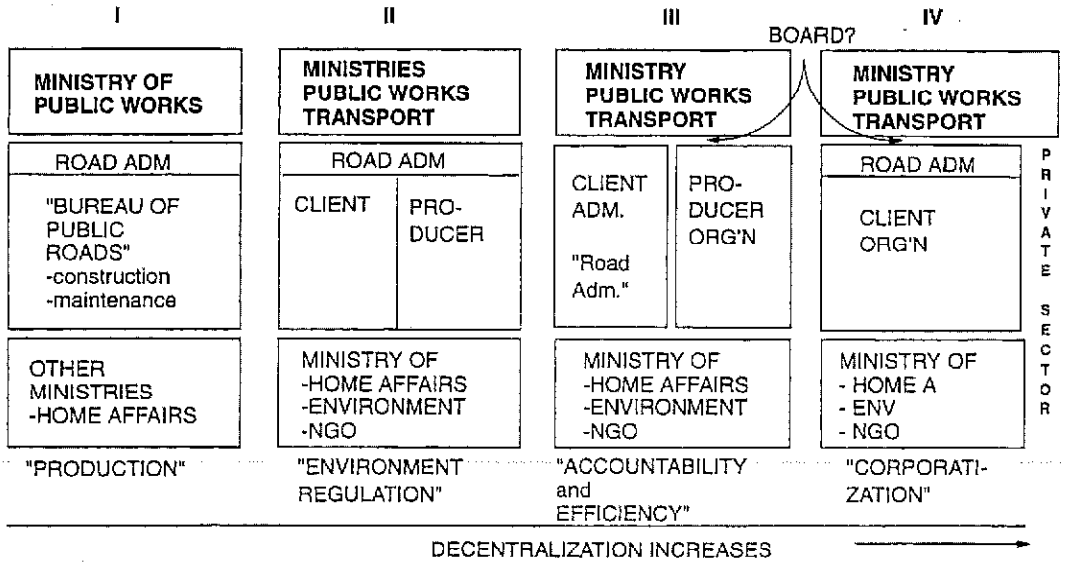

FIGURE 1 Stages in road organization evolution.

Works to have regional and subnetwork perspectives in distributing monies, but occasional ministerial project-specific micromanagement continues. The Ministry of Transport (or equivalent) emerges as a competitor to the Ministry of Public Works in the road sector policy. This is because soft aspects of road transport—axle load control and traffic safety, for example—are perceived as problems because of their social costs and because public and freight transports suffer from multiple ills. Struggle over turf is avoided if the Ministry of Transport becomes the heir of the Ministry of Public Works and assumes the policy responsibilities from the Ministry of Public Works (and from other ministries if transport matters are scattered among several ministries) whose producer units are transferred to (or become) a road administration. Later in this phase, the Ministry of Transport begins to concentrate on multimodal policy, and the road administration begins to decentralize. There is strife in transport policy and decision making between the public works and transport ministries if both still exist.

Phase 3: Separation of Client and Producer Organizations

The need for accountability and efficiency on one hand and the needs of the environment and society on the other push for increasing policy orientation (as opposed to production orientation) of the government. Greater reliance on the market mechanism drives for the separation of the client and producer organizations. The client organization remains as the road administration, and the producer organization reports either directly to the Ministry of Transport (as in Poland) or to the central management of the road administration (as in the Scandinavian countries). The road board normally appears in this phase. The road administration decentralizes its organization. The central office manages and the regional offices reporting to it are responsible for the quality and quantity of the service delivery. The ministry delegates budgetary and other responsibilities to the (client) road administration and the road board. It defines only the mission of the administration, its broad goals—which change from time to time—and fixes the annual budget.

Phase 4: Corporatization or Privatization of Producer Organization

In this stage the producer organization is privatized and a road fund is established to provide for partial autonomy of the road administration, which continues to report to the Minister of Transport (or its equivalent) and to the Parliament (or its equivalent, e.g., a state legislature) through the minister. The ministry is likely to delegate all budgetary responsibilities to the road administration through the road board and concentrate on defining and developing the policy framework. The ministry merely exercises periodic oversight over the road administration through the board. The central office of the road administration, now responsible for policy uniformity, budget distribution, important goals, and performance audit, is small and manages effectively using modern technology and management systems. The road program is managed by the regional offices. They also carry out performance measurement, which is institutionalized.

Phase 5: Corporatization of Client Organization

In this phase the (client) road administration is corporatized and becomes the formal owner of the roads on behalf of the government (Figure 2). The road administration simulates a private corporation subject to the ministry's oversight. Its income source is the road fund paid from the road user charges.

The following principal problems seem to persist even in Phase 4, after the road administration has become the client organization and production is privatized: unclear administrative performance, unoptimal network size, budget, neglect (or surplus) of maintenance, effectiveness of management, and inattention to social effects of roads.

A remedy for some of these issues can be the corporatization of the client organization, proposed in Phase 5 as the mature culmination of the evolutionary process that is syntonic with private organizations in democratic societies. Because this is a fundamental departure from the present (client) road administration, it is elaborated in greater length.

A significant feature of the Phase 5 organization is its ownership of the road network on the government's behalf. Annual valuation of road, the assets, and payment of interest on (productive) capital would be required. Figure 2 shows schematically that the assets are the road network, buildings, materials and supplies, plans (placing plans on the asset side is used as an incentive for the management to improve the planning cycle and eliminate the desire to produce plans for inventory just in case there is a political window to implement them), and financial assets.

On the liability side, the road network has been divided into two parts: the productive (road network) capital and the lazy or nonproductive (road network) capital. The distinction between productive and lazy capital derives, in the final analysis, from functional classification of roads. The highest functional class, often termed the arterials, serves the traffic and should be paid for by the road users. These user payments are the revenue source of the road fund and reflect, in case of the arterials, user willingness to pay for the benefits. These user charges should be large enough to pay not only for the roads but also for interest on the capital used. These interest payments are all the more appropriate because in many countries the initial road capital was created by subsidies to road users. Years ago, when road investments were made, road users did not have to pay charges covering the full costs of roads.

The second level in road hierarchy, the collectors, which serve both the adjacent land uses and the road users, can normally be lumped together with the arterials. That is, the user benefits are calculable and payable, and a return on the investments in this road network can be required. However, the expected rate of return can be lower than in the case of arterials. Finally, the local roads, which provide access to land, serve a multiplicity of uses and users, and cost recovery from road user charges can only be partial. It is suggested that the capital used for this purpose could be lazy. This means that user charges might be made to cover only periodic and routine maintenance but pay no interest on the capital. Views on this—who should pay for the local roads and how much—may differ. The purpose of this concrete proposal is to invite attention to the long local road network (more than 65 percent of the total road network length) often ignored in road plans and programs.

Other items on the liability side include reserves (from profits) and loans that the administration may want to take to implement productive road projects quickly. The government can at its dis-

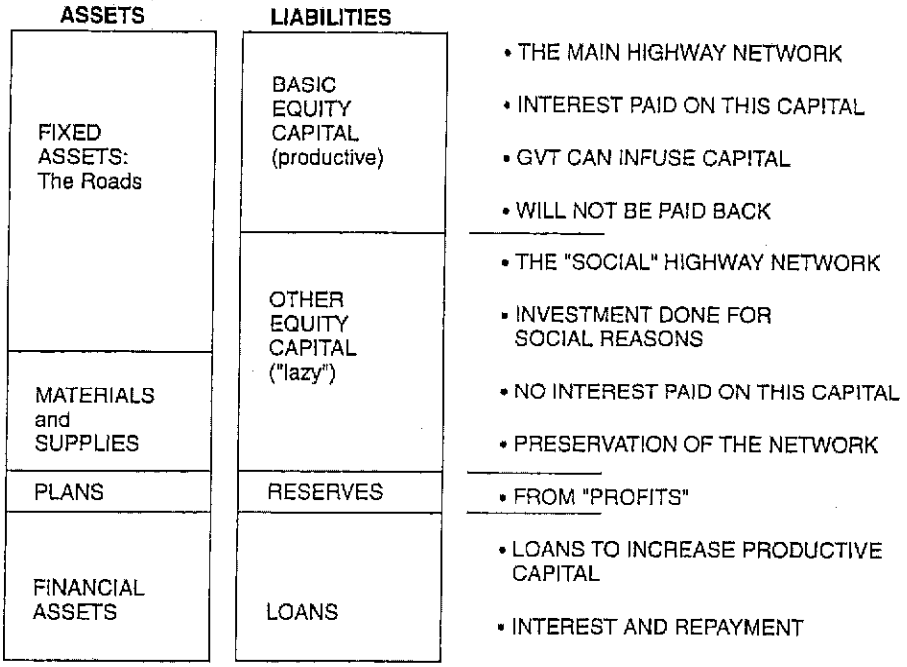

FIGURE 2 Phase 5 corporatized road administration.

cretion infuse either productive or lazy capital to achieve goals other than those directly related to road transportation. The consequences of such actions will have repercussions on road user charges because the road organization must cover its expenses from the road fund and cannot, without consideration and publicity, absorb the new capital by disinvesting on roads somewhere. Such actions would show up in the annual audits of balance sheets and income statements.

Of course, Phase 5 is not the end of evolution. It can be organized in several ways to be syntonic with the private sector in that country. Phase 5 is a general model for the public sector, to emulate the private sector, which also undergoes periodic reengineering.

Who Should Manage Capital Assets?

The most important feature of the model of Phase 5 is the requirement for the road administration to own the road network assets, to value them, and subject the operation of the road administration to annual financial and technical audit. The most provocative feature may be the inclusion of productive and lazy capitals in the same organization. With some important exceptions, the road administration is responsible for the main highway network and the other roads are the responsibility of the lower levels of government—municipalities, counties, districts—and private entities. Although the jury is still out, there are several reasons that speak in favor of such (client) road administrations that manage all publicly owned road assets, excluding the city and municipality streets:

- There exist (*4*, and in a paper by Sikow-Magny and Talvitie in this Record) economies of scale and scope in building and maintaining roads. Efficiency could be improved if one administration was responsible for managing the public road network.
- Because all the assets are valued, even assets of the lower level network, it is clear if there is a disinvestment (that is, neglect of maintenance). On the other hand, disinvestment may become an alternative, a conscious choice.
- Because the government expects interest on the capital it invests on the main roads, road design becomes a socioeconomic choice.
- Inclusion of the lower level social road network within the responsibility of the organization prevents the division of roads—and of society—into two parts: one economic the other social. The road organization will have to develop fair methods to evaluate its investment and maintenance programs and their funding, in a participatory framework.

Phase 5 requires, of course, careful preparation and appraisal. Preparatory considerations include:

- Developing a method to value the road assets,
- Developing procedures and processes to serve multiple governments,
- Developing procedures for planning in the new administrative environment,
- Identifying the precise income sources,
- Identifying what kind of government oversight is necessary, and
- Developing an approach to how the private sector will be represented.

Need for Incremental Change

Can a country successfully skip some of these stages? The answer appears to be a qualified no. The qualification has to do with the administrative and managerial capacity that exists and is available to the road sector. Proposals are often made to jump from Phase 1 to Phase 3 and skip Phase 2. However, many important often simultaneously occurring activities are accomplished in Phase 2 without

which Phase 3 cannot succeed. These include identification and learning of new roles (client, producer), reorganization of the sector (Ministry of Transport, etc.), legal and regulatory development, improvement of contracting procedures, emergence of new issues (traffic safety, public transport, engineering-economics), and development of modern management tools (road and traffic data collection, road data bank, management systems). Phase 2 often has two subphases, the first in which client and producer organizations are identified and the second, after a few years, in which the client and producer organizations are internally split. This is formalized in Phase 3 with a view to proceed to Phase 4 in a few years.

Moving from Phase 1 to Phase 3, or even 4, is sometimes viewed as a move to doing maintenance and construction by contract, or establishing a road board. As important as learning to contract or securing stable funding for roads are, the road system is more than contracting road projects to the private sector. This is not to deny that a road board, which may include influential representatives from the private sector, could not act as a catalyst for change. It can, but there is no unequivocal evidence to support that; the causality may run the other way. However, there is evidence that the road board or road fund is not sufficient for positive change. In the past, some countries that had such mechanisms spent the earmarked money but did not do it efficiently or in the right places. There is evidence that able management can accomplish significant changes without the board or road fund.

Finally, it is noted that the evolution described is a hypothesis. It is pieced together from successes and failures. It must be revised when more empirical evidence is gathered and greater skills acquired in managing institutional change. Evidence to date of evolutionary rather than revolutionary change should act as caution signal: too rapid an advance to an autonomous road agency, often forced by external agents, may not yield the benefits desired and be counterproductive in the end. A great deal of experiential learning must take place by the professionals in the institution to manage a modern road administration. And, as suggested earlier, road administrations do not evolve in a vacuum but with the governance in the country.

CHANGE PROCESSES

The evolution of road administrations was described as having discrete phases, plateaus. The process of moving from one phase to the next will also be described as having stages. However, it is a digestive system in which stages are less clearly demarcated than in the evolution of the organization described in the previous section. The process of restructuring is theorized to involve a framework change process within which the definition and implementation of the road administration's core activities take place.

In this section a first approximation is developed for both the framework process and the definition of the road administration's core activities. A four-stage framework change process is articulated: contract for change, object-oriented studies, agency-oriented studies, and institutionalization.

In the change management literature three- and four-stage processes are proposed. Larson (*3*) suggests a three-stage process: direction setting, broad-based problem solving, and institutionalization. Van Zuylen (*8*) also uses a three-stage process called Infralab: the voice of the user, the agora, and action. This process is compared with the four-stage program planning model process studied by Van der Ven (*9,10*). Van Zuylen concludes that the Van der Ven framework process—problem exploration, knowledge exploration, program design, and program implementation—is similar. The difference is that Infralab does not have an explicit knowledge exploration phase hidden in the Agora phase where also the program design is made. "Infralab may start too early with solutions, while still knowledge has to be collected and a further analysis to be made" (*8*). Talvitie (*11*) proposes the four-stage process. The main difference of this proposal from the others is that changes are implemented in every stage, whenever the administration is ready for them, although it is true that the most far-reaching decisions are taken toward the end of the cycle when the perceived benefits from changes have broken down the resistances to change. Another reason for significant decisions taking place in the last phase of the cycle is, of course, the understanding acquired and the support that should have been developed. Nonetheless, the principle of implementing incrementally and starting to make changes early, while other studies are still ongoing, is a good one because in that way a need can be met or frustrations lessened.

The core activities are embedded in each stage and are the means for the road administration to accomplish its mission. The mission of a road administration is different in each organizational phase described earlier. The content of the core activities will also differ, though their definitions may remain the same. Definition of the core activities is a substantial task. Provisionally, the following are defined to be the core activities that will be described in more detail later.

- Define the role of the organization (Stage 1),
- Develop policy framework (Stage 2),
- Ensure stable funding (Stage 2),
- Improve management structure (Stage 3),
- Strengthen management processes and procedures (Stage 3),
- Expand human resources (Stage 4), and
- Evaluate continuously all core processes (Stage 4).

Stage 1: Contract for Change (0 to 12 Months)

Written and spoken vision and mission statements of the road administration are necessary. They can be either imposed from the outside or developed from within. The latter is preferable because the mission must be internalized for it to have the desired effect (Figure 3).

Contract for change also means commitment for change. For this reason the participation of all affected interests is desirable. Normally there also are unwilling interests. The motivation for opposition must be understood; besides, useful things can be learned by joining the opposition. This is one of the purposes of this stage that Van der Ven (*9*) called problem exploration. Development or initiation of enabling legislation to accomplish the vision as envisaged in the mission statement should also be started in this stage.

Stage 2: Object-Oriented Studies (0 to 24 Months)

These studies focus not on change but on topics or issues important to the management, to the politicians who are the driving force behind restructuring, or to those opposing the changes. The studies are called object-oriented studies because they are directed outward. This object orientation is done on purpose to give the management an opportunity to enlist the cooperation of key personnel and under-

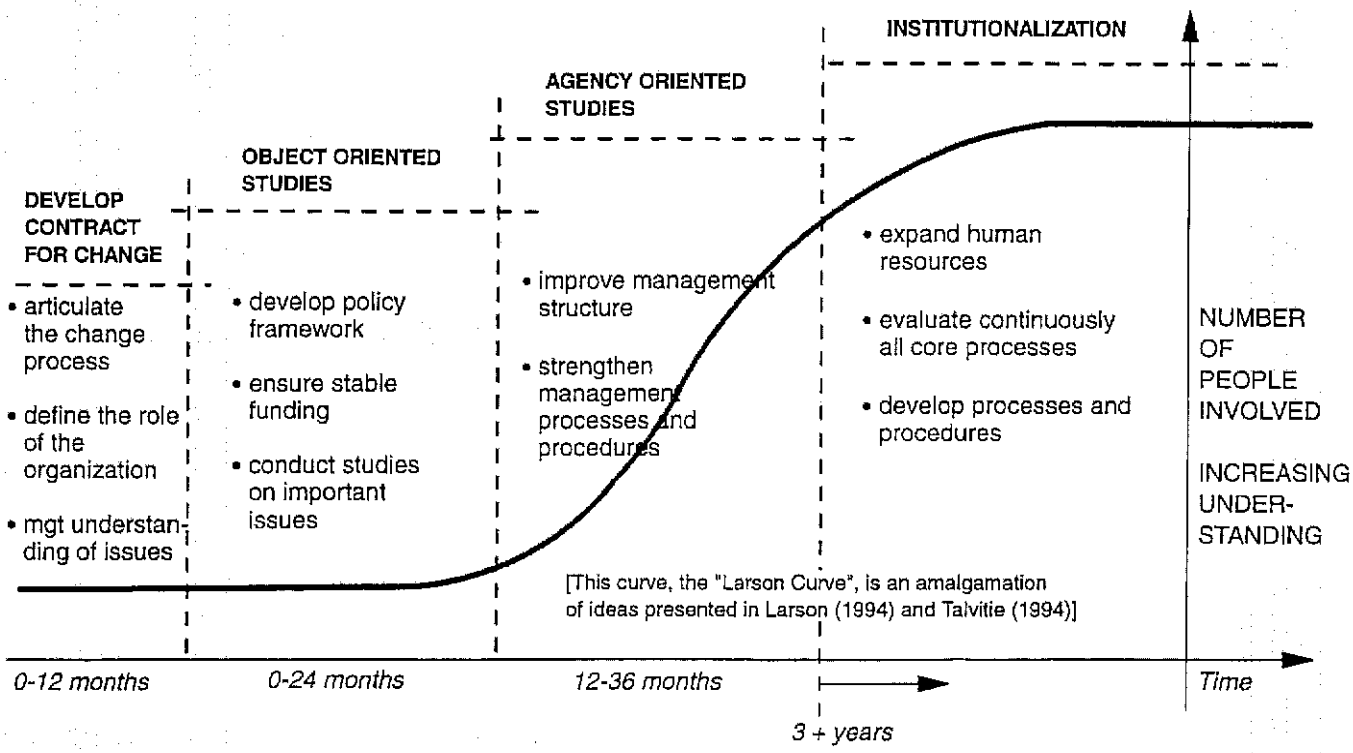

FIGURE 3 Change process.

stand the motivation of the opposition. At this stage the outcome of the studies (e.g., privatization) is not important. If the outcome is reached in the beginning on ideological grounds, then the real problems and real solutions may go (and normally do go) unperceived. Another feature of object-oriented studies is their disjointedness. Studies focus on narrow well-defined issues. In addition to their technical content, the objective of the studies is to define the links with other issues.

Object-oriented studies must be discussed and evaluated openly in policy workshops and disseminated by word-of-mouth and in writing to the middle management not involved in the studies. Grass roots are informed by newsletters and open forum meetings. Often this phase takes longer than 12 months. It would be useful to have a competent facilitator, a management consultant for example, available on a continuous basis during this phase.

Stage 3: Agency-Oriented Studies (12 to 36 Months)

Agency-oriented studies aim at broad-based problem solving that is based on the object-oriented studies, the workshops and meetings, and the emotional investment being made to the change process. In this stage, work begins on a number of important elements of changing the road administration: change of the policy framework; first steps toward reorganizing the management structure, reevaluation of decentralization-centralization issues, possible revamping of planning procedures and processes, systematization of data collection, development of road management systems, management training, development of community participation procedures, and so forth.

Several workshops are held in this stage over the 12 to 36 month period normally required to digest the proposed changes. Some changes are carried out. A good facilitator may be needed to keep the process of change on track. Broad-based problem solving gradually becomes more sophisticated or detailed and begins to address more complex questions. All levels of the administration must be involved.

Stage 4: Institutionalization

Implementation is a continuous process. By this stage, the administration has matured and is in a position to study issues objectively and subjectively and recommend and make changes whenever they are desirable or necessary. A mature road administration continually seeks to improve its performance by means of multifaceted training. Changes are implemented gradually. In some respects the institutionalization process starts a new cycle of the change process. There will be no final solution because there always will be problems and new solutions.

DEFINITION AND CONTENT OF CORE ACTIVITIES

Core Activities: Agreeing About Contract for Change (Stage 1)

The role of the organization is defined. The mission statement is developed and strategic directions articulated. Private and public roles are defined, and management understanding of the issues evolves.

The road administration must have good vision and mission statements. The former makes an emotional communication about the broad aims of the road administration. The latter is an operative

guideline stating concisely the purpose of the organization and includes the following:

- A general statement about the importance of roads,
- A specific statement about what the current problems with the road system are,
- A statement that the road administration is the correct entity to address these problems, and
- A statement of strategic direction and a description of how the road administration is addressing problems.

Both the vision and mission statements should be discussed with a broad audience while being developed. Legislative framework and legal supports, which are consistent with the mission statement, are necessary so that the road administration can accomplish its mission.

The role of the public and private sectors should be addressed in the beginning when the strategic directions of the road administration are defined. This may have far-reaching consequences if there is a large direct labor force. It is thought currently that the client function is proper for the road administration while the private sector assumes the producer function, normally under a competitive regime. For numerous reasons many road administrations want to retain a small direct labor force.

Core Processes: Undertaking Object-Oriented Studies (Stage 2)

To develop policy framework it is necessary to

- Establish functional classification of roads,
- Articulate organizational options for the road administration,
- Describe output dimensions of the road administration and associated management systems, and
- Articulate meaning and road administration policy for equity.

To ensure stable funding it is necessary to

- Establish fair road user charges to cover the economic and social costs of roads and
- Designate funding sources, including private financing of roads.

In broad terms, the development of the policy framework and funding are likely to emerge as the important issues that may need to continued in Stage 3 and be implemented gradually.

Policy Framework

The policy framework includes authorizing the political and administrative environment, the building blocks of the organization, and assignment of responsibilities and rights to different entities in the sector. In most countries these include the ministries (of Transportation and Public Works, which are combined into one ministry in many countries, and the Ministry of the Interior or Home Affairs), the road administration, regional organizations, and nongovernmental organizations. Often the maneuvering room of the road administration must be enlarged. For example, functional classification of roads can be used to enlist the cooperation of the authorizing environment. The process of functional classification can be used to bring the owners of the roads and the interest groups together to draw up and agree about the network and the role of the links in that network. This can lead to administrative reclassification of certain links with consequent effects on funding and other things. There are other means useful for increasing the window of opportunity for change and in developing the policy framework. The means used are context specific and require good timing.

Functional Classification Functional and administrative classification of roads is fundamental to road management in urban and interurban areas. Functional classification can be used for assigning jurisdictional responsibility, system planning, distribution of funds, evaluation of road space needs, access management, design standards, and data collection, to name a few important activities in a road administration. The process of functional classification is important so that the road network is of the correct size and fairly serves the entire country (*12*).

Organization Two basic organization types exist: centralized and decentralized. The former normally has a functional line organization in which the regional units report administratively to the local director but functionally to the line director in the central administration. Experience with decentralized organizations is limited. Although they can be organized functionally, most existing decentralized road administrations are general purpose organizations responsible for all aspects of road management. A decentralized road administration model is discussed elsewhere (*5,11*).

Regardless of a country's administrative arrangement, a hierarchical decision making structure always appears to exist (*13*). At the highest level the decision makers are faced with the problem of allocating resources annually and for a program period, between program areas, and between (functionally classified) subnetworks. At the second level, a project-specific multiyear plan is formulated. Finally, each individual project is engineered for implementation in the third level. These three levels are a way to simplify the complex decision problem and permit development of management systems that serve decision makers and support the kinds of decisions that are taken at each level.

Management Systems The organization structure and its management style affect management systems and their structure. This was an important finding in designing pavement management systems (*14*). Another important matter is that the outputs of the road administration need to be well defined because they determine how the management systems are structured.

A clear distinction must be made between the information needs of the management and those of the engineering staff. The hierarchical structure serves the central management needs by having the program areas correspond to the policy and resource allocation practices and to the time horizon of decisions: development for long range, rehabilitation for intermediate range, and routine maintenance for the short range.

Equity Road administrations are perceived by the political leaders and the public as embedded in a larger social, economic, and envi-

ronmental context (*3*). Social and economic equity—so that the provision of roads does not favor one social group or geographic area at the expense of others—is an important policy objective. Allocation of funds, public participation, and information must explicitly take account of equity objectives that have widespread support.

Stable Funding

There is substantial literature on appropriate road user charges. Less is written about the importance of stable, low-collection-cost funding to road organizations. Without going into detail, possibilities for establishing a road fund should be explored if appropriate changes are also undertaken to achieve managerial accountability and organizational efficiency. The road user charges, constituting the income to a road fund, should cover the economic (including the environment) costs of roads. Local roads, especially if the road administration is responsible for them, need other supplementary sources of funding besides the direct user charge revenue from the road fund. These income sources must be created locally.

Other Studies

One of the purposes of the object-oriented studies is to inform the management and other affected interests on issues important to the development of a road administration. Studies on the policy framework and funding options have been singled out as being central. This is not, however, enough. Many other issues need exploration and investigation. The following are questions that have proven to be useful when deciding about policy framework and funding:

- What is the output of the road administration?
- What is the effect of management on this output?
- Are there economies of scale or scope in road administration operations?
- How many projects should be under construction yearly?
- What type of organization would be the most appropriate for service delivery?
- What does decentralization and delegation of decision making mean?
- Can maintenance equipment and garages be privatized or sold?
- What road management systems are needed?
- What are the financing options for the road program?
- What would be the best road user charge pattern?
- How should quality assurance of road works be accomplished?
- How will the performance of the road organization be measured and audited?

This is by no means an exhaustive list. These studies will expand and deepen management's awareness and knowledge about the issues, and an understanding will emerge about what the critical problems are. This will sharpen the formulation of policies and practices.

Define Core Processes: Agency-Oriented Studies (Stage 3)

To improve management structure, restructure the organization, clarify and decentralize accountability and responsibility, and improve decision-support systems, including data.

Strengthen management processes and procedures by

- Covering all activities of the administration;
- Designing management systems to support the decision making levels;
- Defining outputs: service, road condition, access, safety, environment, and information; and
- Monitoring performance and goal attainment.

In the third stage the emphasis shifts from studying the road administration objectively to focusing on it subjectively. Implementation of results from the previous stages, specifically tailored to serving the mission and to meeting the needs of the road administration, is begun. The process of implementing the changes is of utmost importance. The focus in this stage is on improved management—both structure and processes. These include laying out and beginning the implementation of the organizational changes, clarification of responsibility and accountability, and application of the improved decision-support systems, including data collection and performance evaluation and monitoring. Improved management also means application of training in practice.

Implementation of organizational changes may be the most difficult because of its political dimension. Not enough documented experience exists about how organizational changes are implemented without turbulence; most likely, a gradual purposeful change is the preferred way.

Stage 3 is thus broad-based problem solving and gradual implementation of change that

- Builds on the object-oriented studies and workshops;
- Is based on understanding of the causes of problems;
- Looks at the entire road administration and its functioning;
- Takes steps to restructure the organization;
- Revamps planning procedures and processes, if necessary;
- Takes into use comprehensive road management systems;
- Changes the policy framework when necessary; and
- Involves increasing numbers of people.

Define Core Processes: Institutionalization (Stage 4)

To expand human resources, organize continuous employee training, strengthen accountability and incentives, and adjust manpower to outputs. Evaluate continuously all core processes.

Personnel training is the key to a dynamic and efficient organization. Good organizations preserve their institutional memory. Beneficial improvements must be institutionalized by involving the entire personnel. This requires training of employees to know the mission and the problems; to understand how the road administration addresses these problems; to become capable in using new technology, new management systems, new methods in public participation and performance measurement; and to feed back critical experiences from practice to methods. New skills are also needed because skills normally found in road administrations may not span all the areas needed in the new institution.

All core activities need to be evaluated periodically to ensure a renewal culture in the road administration that endures only if it is grounded on knowledge and understanding of the causes and motivations on which chosen actions are based. Another feature of maturity, then, is the ability of the road administration to make changes using the four-stage process just described as the need for changes is perceived.

CONCLUSIONS

This paper is an attempt to provide a theoretical framework for change management and process in restructuring a road administration. By observing current trends, the paper proposes an evolutionary continuum on which a modern and mature road administration develops. The paper outlines the incremental phases that appear necessary and proposes that a quick reorganization of road administrations is neither possible nor desirable.

An incremental manner is also suggested for the change process, for the moving from one phase or one organization model to the next. The exact path to be taken depends much on the initial conditions of the development path on which the road administration embarks. The procedure outlined is based on the premise that changes should be grounded in a thorough understanding of the issues involved. These issues can derive from the past, be occasioned by here-and-now events, be posed by anticipated events, or be a combination of all three.

The theoretical framework proposed is provisional. It has similarities with frameworks proposed by others for road administrations or in other fields. What distinguishes the present proposal is its multidimensional quality: phases of development and the process of moving from one phase to the next. Although little has been said about the qualifications of the professionals facilitating the change, there can be no doubt that much of its success depends on the abilities of the professionals involved in the change management.

Finally, a word must be said about the research method used in this paper. Some reviewers were critical because there was no explicit research method. This, of course, is not true. The research method used is the oldest one known: observation. This method has many advantages over such methods as analysis of questionnaire data. Observation does not disrupt the process, bring possibly irrelevant issues into it, or ignore relevant ones; and it allows one to learn from failures and successes. In addition, observation allows free use of results from other research or other extraneous information. For example, the interest of the author in institutional development processes arose from a quantitative research into productivity in a road administration. This research provided several insights into how a road administration may work in a particular situation. However, the results and limitations of that research became fully intelligible only after unfocused discussions with the professionals whose work was the object of the productivity research. Of course, observation has its drawbacks but they are not any greater than those in other forms of scientific work.

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