NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP Report 371

State Departments of Transportation: Strategies for Change

Transportation Research Board
National Research Council

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State Departments of Transportation: Strategies for Change

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION
Washington, DC
in cooperation with
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INSTITUTE FOR TRANSPORTATION RESEARCH AND EDUCATION

Subject Areas

Planning and Administration
Energy and Environment
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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Transportation Research Board of the National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state and local governmental agencies, universities, and industry; its relationship to the National Research Council is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway and transportation departments and by committees of AASHTO. Each year, specific areas of research needs to be included in the program are proposed to the National Research Council and the Board by the American Association of State Highway and Transportation Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Research Council and the Transportation Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

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NOTICE

The project that is the subject of this report was a part of the National Cooperative Highway Research Program conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council. Such approval reflects the Governing Board's judgment that the program concerned is of national importance and appropriate with respect to both the purposes and resources of the National Research Council.

The members of the technical committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the technical committee, they are not necessarily those of the Transportation Research Board, the National Research Council, the American Association of State Highway and Transportation officials, or the Federal Highway Administration, U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical committee according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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FOREWORD

By Staff
Transportation Research Board

Research has been conducted to examine the internal and external factors forcing change in state departments of transportation and to develop strategies to respond to that change. Researchers have surveyed and personally contacted chief administrative officers and top managers of state departments of transportation and other stakeholders affected by the provision, maintenance, and operation of the transportation system. The researchers have identified factors and discussed their general impacts on state departments of transportation. This report contains overall guidance for dealing with change and will be of interest to many individuals employed or affected by state departments of transportation. Specific guidance in the form of self-assessment tools was developed for chief administrative officers and top managers responsible for highway engineering and administration, budget and finance, planning, personnel, and public transit.

State departments of transportation (DOTs) are continually evolving because of planned and unplanned reactions to internal and external influences. Recently, however, the pace of this evolutionary process has greatly accelerated, so much so that many state DOTs must rethink traditional ways of doing business. Influences contributing to this evolution include legislative, economic, and demographic changes; variations in service and use demands; rehabilitation needs versus new construction; modal integration; and elective and mandatory changes in relationships with other governmental agencies and private organizations.

Specifically, requirements in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Clean Air Act Amendments (CAAA) of 1990 have accelerated changes in state DOTs and created more challenges to their operations and functions. A few examples of initiatives in response to these acts include (1) renewed interest in transportation planning, which includes a requirement for statewide planning and the consideration of the interrelationships and trade-offs among the various modes; (2) increased public involvement in planning and decision-making processes; (3) heightened attention to air quality and other environmental considerations; (4) increased flexibility in the use of federal-aid transportation funds; and (5) better cooperation among DOTs, metropolitan planning organizations (MPOs), other state agencies, and other transportation providers—particularly transit agencies.

Moreover, ISTEA has raised the expectations and the responsibilities of state DOTs. However, in many instances, these expectations and responsibilities are not accompanied by commensurate increases in resources. In some cases, state DOT staffs have been reduced to comply with across-the-board cuts in state governments, resulting in DOTs trying to do more with less. At the same time, ISTEA also has raised the expectations and increased the responsibilities of other governmental and private organizations. Because of ISTEA's increased flexibility in the use of funds, many organizations now see the possibility for accessing these funds and sharing in decision-making responsibilities.

Under NCHRP Project 20-24(9), *State Departments of Transportation: Strategies for Change*, the National Academy of Public Administration (NAPA) was asked to provide

assistance to state DOTs for anticipating and handling change. Specifically, NAPA has (1) evaluated current and potential influences that affect the future of state DOTs, (2) described and discussed the impacts on DOTs, (3) provided guidance for DOTs to assess their ability to respond, and (4) made recommendations that will assist DOTs in meeting current and future challenges. Although the overall research results will be of interest to many employees of or other individuals associated with state DOTs, specific guidance in the form of self-assessment tools has been targeted to chief administrative officers (CAOs) and other top managers with functional responsibilities for highway engineering and administration, budget and finance, planning, personnel, and public transit. These tools are constructed as sequenced sets of questions to lead the user through key considerations for understanding the issues, synthesizing information, assessing the organization's ability to respond, identifying potentially appropriate actions, and establishing measures for judging success.

As part of the initial presentation of project results, NAPA has provided a "toolkit" directly to CAOs of the various state DOTs. This toolkit contains the same self-assessment tools and supporting materials found herein, but in a more user-friendly format for busy executives.

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ACKNOWLEDGMENTS

The research reported herein was performed under NCHRP Project 20-24(9) by the National Academy of Public Administration (NAPA) and the University of North Carolina's Institute for Transportation Research and Education (ITRE). The National Academy of Public Administration Foundation (NAPAF) was the contractor for the study. The work at ITRE was under subcontract with NAPAF.

Thomas D. Larson, a Fellow of NAPA, was the Principal Investigator. The work at ITRE, including the extensive data entry and tabulation of results of the research surveys and interviews, was supervised by Gorman Gilbert, Director of ITRE and Professor of Civil Engineering at North Carolina State University in Raleigh, NC. The others contributing to the research included Thomas Harrelson, previously Secretary of the North Carolina Department of Transportation and now under contract with ITRE; Steve A. Martin, President of Steve A. Martin, Inc., in Winston-Salem, NC, under contract with ITRE; Anna Nalevanko, Research Associate, ITRE; Frank Rush and Bruce Kluckman, Research Assistants, ITRE; Katie McDermott and Anne LaPierre, Graphics, ITRE; Ann Mladinov, Senior Research Associate, NAPA; Julie Oster, Lori Graves, Simon Broecheler, and Sarah Heatherington, Research Assistants, NAPA; Carole Neves, Project Advisor and Senior Research Associate, NAPA; and Roger Sperry, Responsible Staff Officer for the project and Director of Management Studies, NAPA.

An advisory panel convened by NAPA also worked with the research team in the second phase of the project, evaluating findings and developing strategies and options for CAOs. The following were members of the NAPA advisory panel for the project: Sharon Banks, General Manager, AC Transit, Oakland, CA; Larry Bonine, Director, Arizona Department of Transportation; Nancy Rutledge Connery, consultant, Small Point, ME; Tom Downs, President, Amtrak; Ed Emmett, President, National Industrial Transportation League; Karen Gislason Ender, consultant, Indiana, PA; Andy Fogarty, Vice President, CSX Corporation; Stephen Goldsmith, Mayor of Indianapolis, IN; David Keever, SAIC, McLean, VA; Lillian Liburdi, Director of the Port Department, Port Authority of New York and New Jersey; and Michael Meyer, Professor of Civil Engineering, Georgia Institute of Technology and Director of the Transportation Research and Education Center in Atlanta, GA.

STATE DEPARTMENTS OF TRANSPORTATION: STRATEGIES FOR CHANGE

SUMMARY

The goal of NCHRP Project 20-24(9) is to provide state departments of transportation (DOTs) with the best possible guidance on responding effectively and timely to challenges and changes. In addressing that goal, the research targeted four objectives:

- Identification of factors driving change, and their impact on state DOTs;
- Analysis and synthesis of the data;
- Development of guidance on how state DOTs can assess their own ability to respond to the many factors forcing change; and
- Identification of effective strategies and actions for state DOTs to respond to challenges and changes.

The greatest resources for determining conditions in transportation and in state DOTs are in the people who use, observe, and work on transportation and related matters. The forces that create pressures for change and their effects are as much matters of human perception and analysis as they are objective facts. Therefore, the research team conducted extensive interviews across the country to gather perceptions of the major factors driving change in transportation and their effects in the states. The research team visited 13 states for in-person interviews with the chief administrative officers (CAOs) of the DOTs, other state DOT employees, and outside "stakeholders." The team also conducted telephone interviews with CAOs in states not visited and mailed surveys to more than 900 other DOT officials and stakeholders across the country. A total of 421 interviews and surveys were completed and coded.

The survey questioned the nature and effectiveness of current DOT responses and the strengths and obstacles for DOTs in responding effectively. It also asked for suggestions on how individuals and interest groups outside a DOT could best contribute to the DOT's ability to respond to challenges and changes.

The field research generated more than 1,600 responses about factors forcing change in transportation today, and nearly as many responses about factors expected to drive change in the future. The responses fell into more than 120 specific areas, which were aggregated into 15 major categories for quantitative analysis. The three factors receiving overwhelming mention (with more than 50 percent of the respondents citing each of them) were finances, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and

the environment, followed by governmental processes, economic forces, demographics, and factors related to the internal DOT organization. Land use, congestion, public concerns in general, infrastructure, and technology received fewer mentions. Among factors expected to be driving change in transportation in the years 2010 to 2015, technology received the most frequent mention, followed by the environment, themes in ISTEA, and finances.

Responses about current factors or change did not differ significantly among the three categories of respondents. They did differ somewhat by region of the country. Finances and ISTEA were among the three most commonly mentioned factors in every region, but environmental factors dropped to seventh place in the South; governmental processes were the most frequently mentioned factor there.

Virtually all respondents could easily name up to five factors they see as driving important changes in transportation and in state DOTs. Many of the key factors contribute to the same effects, including broadening and shifting missions and functions for DOTs; adjustments in roles and relationships wih other agencies and levels of government, stakeholders, and the general public; more strategic and less bureaucratic processes for doing their jobs; more diverse skills and backgrounds in the DOT workforce; more effective applications of technology; and pressure for more effective and efficient use of funds and other resources. The respondents see that some impacts, however, differ according to the conditions in their states.

It is important to recognize that the interview responses on factors forcing change may be biased toward factors that are the most visible, well publicized, or urgent. Factors that the largest numbers of people are aware of today may not be the forces that bring the greatest changes in transportation. The greatest changes may instead come from unanticipated sources.

In analyzing the statistical results from the survey and drawing on the rich observations of individual respondents, the research team developed several general findings:

1. Each DOT has its own culture or mix of cultures that creates strengths as well as some obstacles to change.
2. Almost without exception, CAOs, other DOT employees, and stakeholders see significant changes affecting transportation, with important implications for state DOTs' missions, roles, responsibilities, and relationships. Impacts may differ by state and region—depending on their history, geography, and other conditions—but the top-ranked factors are pervasive.
3. General principles and models for achieving organizational effectiveness have been developed that have a number of fundamental elements in common. Many organizations are testing various organizational models and approaches. The report illustrates that many DOTs are applying improvement strategies and techniques, to varying purposes and effects.
4. While state DOTs are responding in many ways to the factors driving change in transportation, there is little evidence that fundamental change has penetrated very deeply in most of these organizations.
5. The greatest obstacle to state DOTs in responding effectively to change is also their greatest strength—the people who work for the organization and their professional training, experience, and devotion to their mission and organization.
6. Respondents inside and outside the DOTs report that changing people's perspectives, methods of operating, and the organizational culture takes time, effort, and strong leadership and commitment from the top officials in the organization.
7. In spite of the magnitude of changes facing DOTs, broad and dramatic organizational change processes generally do not arise in an agency without a direct and immediate

Internal Capacity / Degree of Changes Affecting DOT (Mission, Roles, Public Goals, Fiscal Pressures)	Not flexible, not learning, not developing new internal capacities	Follows major trends in the field, stays in the mainstream of new developments and learning	Innovative, constantly learning, on cutting edge of technology and management
VERY LIMITED CHANGES	Does the same things in the same way	Adopts major standards and practices as they become established in the field, to improve the way the customary functions are done	Makes continuous improvements, even dramatic improvements in efficiency and effectiveness of the customary activities (technologies, processes, and relationships)
MODERATE CHANGES	Does some new things in the same way as it did the old things	Applies techniques tested in other cases to handle new requirements	Moves into evolving functions and roles with innovative, efficient and effective strategies, processes, and techniques.
DRAMATIC CHANGES	Unable to respond; overwhelmed by the challenges	Deals with pressures like the majority of its peer organizations. Reactive; always behind the curve.	Organizes to take on new challenges. Anticipates needs. Leads in developing means for responding effectively

Figure 1. Matrix of scenarios: Degree of changes affecting a DOT and extent of DOT internal capacity to respond effectively.

stimulus—for example, a change in leadership, financial crisis, lawsuit, natural disaster, or some other dramatic event.

8. Most DOTs do not have a comprehensive or systematic process for gathering information and insights from stakeholders, employees, and the general public on goals, policies, or programs. They do not tend to work through open, participatory processes in which stakeholders and employees have important roles and voices. The interview process on which this research is based provides a model of how a CAO and state DOT could design an outreach process to keep in touch with the interests and concerns of stakeholders, including the general public, elected officials, and employees.

9. The best means for stakeholders to contribute to the ability of DOTs to respond to change, according to most interviews, is to work in partnership, sharing information and perspectives through better communications and cooperation in planning and goal-setting processes.

The matrix in Figure 1 illustrates both the range of effects or demands that changes can place on a state DOT and also the degrees of internal capacity a DOT has to respond effectively to change. Guidance to help the DOTs assess their ability to respond to change and their options for response must be flexible enough to accommodate the unique history, experiences, issues, and circumstances in states.

This report presents general principles for state DOTs to deal effectively with change, as well as options for developing strategies, actions, and measures of success to more capably respond to change. The focus of the research is active participation by CAOs, other DOT employees, and outside stakeholders in assessing challenges, identifying priori-

HOW THE PIECES FIT TOGETHER

Crosswalk Between Research Objectives, Phases of Toolkit, Key Questions for CAO, and Supporting Sections of Report

Key Research Objectives and Phases of CAO "Toolkit"	What CAOs Need to Ask	What the Report Presents
I - Understanding the Issues (Information Gathering Phase)	What is my status regarding things that I should know in order to respond to forces driving change and to manage change successfully in my DOT?	Chapter 1 - Context: Lay of the Land Chapter 2 - Survey results on factors driving change, impacts, and responses of state DOTs Chapter 3 - Self-assessment matrixes, guidance and action steps for CAOs
II - Synthesizing the Information (Synthesis Phase)	How am I synthesizing this information? Does it give me a basis for action?	Chapter 3 - Self-assessment matrixes (Chapters 1, 2, 4 and Appendixes H, I, and J are also designed to aid in seeing and synthesizing the "big picture.")
III - Ability to Respond/Methods for Assessing that Capability (Response/Assessment Phase)	What is the DOT's capability for responding to forces driving change?	Chapter 2 - Survey results Chapter 3 - Matrixes and guidance Appendix H - Principles of organizational effectiveness Appendix I - Matrixes for functional areas Appendix J - Guidance on Strategic Management
IV - Potentially Appropriate Actions and Action Selection (Action Identification/Selection Phase)	What should I do?	Chapter 3 - Matrixes and guidance Appendixes H, I, and J
V - Measures for Judging Success (Performance Monitoring Phase)	Are our strategies and actions working? Are we succeeding?	Chapter 3 - Matrixes and guidance Appendixes H, I, and J

Figure 2. General framework for CAOs in using the report.

ties, and developing strategies for the DOTs to address changes. The report does not assess the effectiveness of individual DOTs and does not attempt any ranking of state DOTs on their performance in dealing with challenge and change. The research team instead emphasizes self-assessment by the DOTs.

To achieve that goal, the report presents a "toolkit" of matrixes of questions for CAOs and other officials to complete. The toolkit also includes guidance on implementing specific strategies and action steps suggested in the material, as suited to the needs and conditions of the individual DOT and its leadership. The elements or "phases" of the matrixes are organized to reflect key objectives of the research. The five phases are 1) understanding the issues, 2) synthesizing the information, 3) assessing the ability to respond, 4) determining and selecting appropriate actions, and 5) developing measures for judging success. Figure 2 presents those five phases and a framework for CAOs using the "toolkit" and other parts of the report. The report also includes self-assessment matrixes designed to be applied by managers and employees throughout the DOT in assessing the performance of key functional areas: budget and financial services; planning; highway engineering and administration; transit and other public transportation activities (rail, air, water, etc.); and personnel and administrative services.

The subject area of this research — strategies for developing the capacity to respond most effectively to the challenges of change — will always be a "work in progress." State DOTs are truly "laboratories" for exploring what the state transportation missions, functions, roles, and relationships should be and how best to meet them. Wih the ever-increasing range and degree of challenges that DOTs face, the significant effects their actions have on public well-being, and the commitment to excellence in public service among the people of the transportation community, the questions in this research appear to be an important avenue for constructive and ongoing research, experimentation, and evaluation.

CHAPTER 1

INTRODUCTION

1.1. RESEARCH OBJECTIVES

The goal of NCHRP Project 20-24(9) can be simply stated:

To provide the state departments of transportation with the best possible guidance on responding effectively and timely to challenges and changes.

The project statement, which is included as Appendix A, identifies four objectives for the research:

- To evaluate current and potential influences that affect the future of the state DOTs
- To describe and discuss the impacts on DOTs
- To provide guidance for DOTs to assess their ability to respond
- To recommend solutions or techniques that will assist in helping DOTs meet current and future challenges.

In meeting those objectives, the project was intended to assist the leadership of state DOTs in understanding the changing forces and issues facing them, synthesizing this information, assessing their ability to respond, identifying appropriate actions to improve their responses, and developing measures for judging their success.

1.2. CONTEXT: "THE LAY OF THE LAND"

Conversations held with CAOs, other DOT employees, and stakeholders in the course of the research yielded concise, insightful comments on how "the lay of the land" affects these agencies in the mid-1990s:

> *"This is a time when every DOT is facing more change than in 40 years."*
>
> —CAO, eastern state DOT

> *"Our responsibility is to treat [the people] all as customers. We have to educate them about our needs, especially as to the importance of good transportation, what congestion costs the economy and the environment."*
>
> —CAO, western state DOT

> *"So much is leadership. . . . From World War II until 1990, they [state DOTs] could go from one [CAO] to another and it didn't matter because the mission was the same. Now the mission is changing year by year and the person at the top has to figure out where the world is going and really has to lead."*
>
> —common carrier executive, northeastern state

Beginning at the turn of the century and continuing for some 70 years, state highway departments responded to a broadly held public view of roads as a key to a mobile, accessible, and prosperous America. It was a vision rooted in a dynamic movement- and growth-oriented national culture. But beginning in the 1950s and particularly in the 1960s, and notably marked by the National Environmental Protection Act of 1969 (NEPA), other values, particularly environmental ones, gained attention and importance among the public as well as professionals working in transportation. Perhaps more than any other factor, the requirement under NEPA that each major highway project have an approved assessment of its environmental impacts drove home the reality of a new and different era to the transportation community.

Another action reflecting the national mood, and also driving change for government officials involved in transportation, was the formation in 1967 of the U.S. Department of Transportation (USDOT), an agency that brought together at the national level the programs and policies covering ground transportation and most other modes. Virtually all the states followed the same course, forming state DOTs that took on broadened functions beyond the traditional highway focus. The transition to other functions has been long, difficult, and sometimes divisive for some organizations. The process of transforming the state departments into effectively integrated transportation agencies is still going on.

This brief summary cannot chronicle all the changes in state highway agencies or their successor DOTs. The critical point is that the present period of change, which is the focus of this research, did not come without precursors. Transportation and the people who make it their work have faced constant change throughout U.S. history.

While the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA) are frequently cited as causing fundamental change for transportation and state DOTs, those major pieces of federal legislation are only the most visible and latest of a long series of developments contributing to an increasingly complicated environment for transportation and state leaders and managers. Perhaps what differentiates the current circumstances from those of the 1960s and 1970s is the broad scope of the changes now affecting the state DOTs, the accelerating rate at which changes are confronting them from inside and outside the organization, and the dramatic changes in society, technology, politics, and the economy that create the overall context for DOTs. Public concerns about the environment continue and intensify. In addition, transportation is affected by the increasing global implications of economic developments, as well as changes in demo-

graphics, shifts in patterns of travel demand, and budget pressures at all levels in business and government. Many DOTs are faced with a seemingly boundless demand for more transportation capacity to handle enormously increased traffic flows, particularly from trucks and single-occupant autos. Financial pressures are particularly serious for DOTs when public expectations for more and better services are juxtaposed against an eroding tax base, increasing needs for rehabilitation and maintenance, and interest in new systems and new technologies in transportation. In the past, a state highway department relied principally on civil engineers, but now state DOTs need a different and more diverse workforce. Finally, the public gives heightened scrutiny to government operations including transportation, demanding new and often widely divergent public services.

Recognizing the pace and scope of change affecting DOTs, NCHRP initiated this project "... to ensure that DOTs will be prepared to continue to provide a fully integrated transportation system that is multimodal, safe, energy-efficient, environmentally sound, and cost-effective."

Offering specific guidance and relevant options to state DOTs and their leaders for dealing with the many "forcing factors" and their impacts—external and internal—is a daunting task. But a solid platform on which DOTs can build strategies for the future is an enriched understanding of their history and evolution, and a heightened perspective on the public's expectations for transportation and state transportation agencies.

1.2.1. Change in State DOTs and Predecessor State Highway Departments

> *"We were so good at something that is no longer the [single] motivating force, i.e., building roads. It's more difficult [now] to focus on a common goal. DOT's role is not as clear as it used to be."*
>
> —DOT official, western state

While the breadth, depth, timing, and frequency of change have differed considerably across the states, the state agencies dealing with roads and transportation have experienced almost a century of change in the social, political, economic, financial, technological, and organizational realm. Their policies and core missions have also evolved over that time. As context for this research, one might ask, "Is there a 'normal' rate of change for state DOTs?" and if so, "How do current types and levels of change compare with the norm?"

These questions about change require consideration of a long time period. The perceptions of people in state DOTs may be that they are enjoying surprising stability, or, on the other hand, extraordinary instability. CAOs, who increasingly are serving in that position for only a few years, may be judging conditions based on only a brief time in the life of their agencies. But in fact, the conditions they see may have been forming for as long as several decades. When an agency is in the middle of a cycle, programs and operations may have considerable continuity and stability. Alternatively, at some junctures, a state DOT may undergo such a dramatic shift in its internal or external context or legislated mission that it moves into a completely different cycle; during that transition, the agency is likely to experience considerable turbulence and change. (And even after a transition, a new cycle may involve continuous change and instability.) The range of experiences the agency has faced cannot be assessed fully and adequately based only on observations today or over a short period. Understanding the longer cycles and the changes they involve, especially in a time of turbulence or transition between cycles, can provide a state transportation agency the foundation for understanding and dealing with today's challenges and changes.

History suggests the following four cycles affecting the state agencies that have evolved into today's DOTs:

1. **Focus on Road Building**. Beginning in the late 1800s, a relatively radical concept developed for state and federal government: providing major capital support for road construction. It was a period of "getting the farmers out of the mud," of providing more economical and ready access to land, communities, homes, and businesses, with much more flexibility to reach dispersed locations and accommodate individual needs than existing alternatives, primarily rail and water transportation. (The need for alternative transportation was illustrated by rail tycoon William Vanderbilt, who when asked by a *Chicago Daily News* reporter if his railroad would be willing to sustain a loss if the public interest demanded it, responded, "The public be damned.")

State agencies' intense focus on road building developed at a time when horses and wagons, "streetcars" or jitneys in cities, the new inventions of automobiles and trucks, and walking and bicycles—all or most of them involving roads—were primary means of moving from home to work, school, and markets for most households. Citizens wanted roads to get them wherever they wanted to go. During this period many elements of the highway department culture grew, including certainty of public support and often a low level of involvement with individual citizens; priority emphasis on the roles of civil engineers and builders to serve the agency's road and bridge construction mission; project delivery and capital expenditure levels as principal performance indicators; dependence on dedicated funding and industry cooperation, often translated into intense lobbying to protect and increase this funding; and centralized, hierarchical organizations in government to manage and oversee these functions.

The focus and priority on road building continues to varying degrees in state DOTs. It is a mark of the difficulties in managing DOTs today that while these elements of the highway culture are successful in the state DOTs' continuing core mission—building and operating the state highway system—they may pose real limitations to the state DOTs' ability to carry out other aspects of the DOT mission.

2. **The Interstate Highway Building Era**. Beginning in 1956, the Interstate Highway Program was the forcing factor for a period of massive change. The changes were evident in many directions beyond simply growth in size and extent of the federal program: a new and high degree of common purpose between all the states; a new federal/state partnership in planning and construction; new roles in collecting and distributing large sums of federal, highway-dedicated, program-specific funds; major effects on communities from construction of highways, particularly in urban places; and a focus among state and federal officials and among major transportation stakeholders on this concerted nationwide funding and construction initiative.

In the 1990s, the focus on developing and building interstate highways has virtually ended. But it would be hard to exaggerate

the impact of this multidecade, federally generated period on state DOTs, the "owners" and builders of the Interstate highway system. Current state DOT practice in the areas of planning, financial management, highway building, and human resources was shaped during this period. During this Interstate era, many of the people who have been dominant forces in forming and leading the state DOTs in recent decades were hired and/or received their formative training; they make up the senior level of officials in many DOTs. Like the "baby boomers" in the larger society, they were more numerous, better educated, more unified in their experiences and background, and better positioned to influence their organizations; inevitably, their training and experience and the culture they created affected all the state DOTs. The Interstate period was so long that it spanned the entire careers of many leaders and employees. With such a major and relatively stable force shaping the major operations of the agencies, stability was seen as the norm, with changes measured as adjustments within that framework.

3. **The ISTEA Era**. A third period for state DOTs can be measured as formally beginning in 1991 with passage of ISTEA, though the themes of ISTEA trace back in many cases to at least the 1960s. These themes include growing public expectations for transportation services and facilities more sensitive to the conditions and interests of the local communities, through more local planning and decision making on transportation programs and projects. The effects of ISTEA and the reinforcing phenomena in society are still evolving and appear to be growing in importance in many communities.

As reflected in the development and implementation of ISTEA, many of the larger and more urban and industrial states are facing an expanding population; greater numbers of automobile drivers and two-worker households with much more dispersed work sites, daily trip patterns, and time schedules; accelerating urbanization accompanied by residential, commercial, and industrial expansion in areas outside central cities; a growing focus on the environmental effects of transportation and other activities; and increasing effects of goods movement, including overnight courier service, small parcel delivery, and just-in-time manufacturing practices that have vastly increased the volume and value of goods shipped by trucks.

In this period, businesses and citizens increasingly appear to expect the several transportation systems to serve their specific needs, and to serve them more conveniently, less obtrusively, and more economically and efficiently. Though they may have little understanding of what agencies are involved or what is required of state DOTs or other organizations to deliver the services, people want the services nevertheless. Finally, state and federal policymakers are increasingly taking advantage of the funding and influence of state transportation projects and functions to address social, environmental, and other broader objectives.

In sum, the states that are entering a new period with implementation of ISTEA are driven by diverse, highly complex public expectations with which the DOTs and their leaders need to understand and deal with. An important reality is that these agencies may well come to this period unprepared by their history for the many new demands being placed on them.

4. **State Transportation in an Evolving Global Economy**. Beyond the requirements of ISTEA and the environmental and social interests it reflects, the larger context of international economic and social changes may foretell a new period for state DOTs. Evolving global economic realities are shaping the demands for and functions of transportation. This global dimension is largely a new concept for the state transportation community, and may require new approaches, cooperation with new partners, and a different perspective on the transportation mission.

ISTEA requires a state, regional, and national focus on projects and plans for the relatively immediate term—this year and 5 years into the future. In a global economy, transportation has a strategic role for the longer term. Though the full dimensions of this role are still evolving as global trade and other developments proceed, it is clear that transportation will have to contribute increasingly to the capacity of states, businesses, and individuals to participate effectively in the wider international economy.

Summary Observations. The agencies that work in transportation have been subject to great, long-cycle forces and changes, whose impacts extend beyond a specific agency, state, or region. Though each state DOT has its own history, the nature of the early eras of road building and the Interstate program had a uniting influence on the agencies as a group. The similar challenges and expectations they faced, combined with the skills and backgrounds that state highway professionals brought to their mission over the decades, served as unifying forces. Today, the increasing flexibility and authority for state DOTs within the federal transportation programs, the wider range of responsibilities they hold, and the divergent circumstances they face point to increasing diversity and innovation in the ways states address their transportation challenges.

1.2.2. What Do People Expect from Their State DOTs in the 1990s?

"They [stakeholders] need to be engaged with us [state DOT] in helping define the future. There needs to be a heightening of awareness. This requires the public to be involved in new ways."

—CAO, mid-Atlantic state

In light of the changes that DOTs have faced over the years and the various eras they have come through, the question of what people expect of a state DOT is central to understanding the difficult, often turbulent environment that state DOTs and their CAOs face. In our democracy, people's expectations and demands are the most fundamental forces driving priorities—and also driving change. The basis for this research project is that some people, expressing their interests and concerns in various and often unclear ways, want and expect something different in transportation services and priorities. Changes in public goals and interests drive changes in government processes and decisions, and thus in the operations and choices of state DOTs.

What is the lay of the land for transportation in the 1990s? The common ground probably lies chiefly in peoples' desire for mobility as well as a high standard of living and quality of life. Any probing beyond this likely will show more differences than commonalities. In general, the population still appears to accept and support the broad public purposes of transportation—to allow movement of people and goods and access to opportunities to support broad social and economic goals, but the particular expressions of this purpose change as the economy and society change. State DOTs must change and develop new performance capacities to meet those goals. The central questions to be ad-

dressed by this research remain: How should a state DOT, facing the forces for change, respond to challenges and the diverse, often unclear, and sometimes conflicting demands from citizens and other stakeholders? What strategies will best enable state DOTs to meet that test? There are no pat answers to these pivotal questions.

1.3. RESEARCH APPROACH

The research approach was designed to be empirical and focused on the needs of a primary audience, the CAOs. The key questions—the influences on DOT, their impacts, and the most constructive responses—all involve either imposing or feeling pressures, or taking action. Therefore, the research team felt it was critical to contact observers of the situation. On these issues, CAOs can learn a great deal from perspectives and experiences of their employees and outside stakeholders, from other states, and from each other on the influences, capacities, needs, and most constructive options for their organizations. Thus, the research was designed to elicit the perspectives of CAOs, other officials of the DOTs, and stakeholders who have a substantial interest in transportation and in the performance of the state DOTs.

The first task was to identify the forces and factors that are changing the environment in which state DOTs work, which either do or may create pressures on the DOTs, their missions, responsibilities, organizational structure, staffing, and institutional arrangements and processes. In addition to these forcing factors influencing transportation and the DOTs, the research also explored the impacts of those factors; the responses DOTs are making and their effectiveness; the strengths of the DOTs as well as obstacles in responding effectively; and steps that could and should be taken to improve their strategies and capacities for change.

The research had to take into account several significant facts. Because geography, economics, traditions, and other conditions inside and outside state DOTs differ widely in nature and degree from state to state, pressures for change are not uniform across all the state DOTs. The impacts they generate are also different. The research approach, therefore, was structured to solicit data from all 50 states and to look for factors and impacts on a disaggregated basis.

1.3.1. Field Work and Outreach

To gather the broadest and most useful information to satisfy the research objectives, the research approach was based on extensive field contacts across the country. First, the project team undertook an initial outreach effort to inform state DOTs about the purposes and scope of the study. The outreach included presentations at meetings of the American Association of State Highway and Transportation Officials (AASHTO) in each region, as well as at the national AASHTO meeting in Detroit, Michigan, in October 1993.

The next step was to gather perspectives on the key research questions from the state DOTs themselves and from their stakeholders. For that purpose, the research team chose a research approach based on interviewing experts across the country.

On the basis of its experience and the results of the initial outreach, the research team developed an interview guide that was tested in a series of pilot interviews in Virginia in July 1993. After the pilot visits in Virginia, the research team refined the interview guide into a final form that provided the format and questions for all the later interviews and the mail survey (see Appendix B). Using that guide, members of the research team visited 12 states, interviewing a total of one to two dozen individuals in each state, including the CAO, other managers and employees in the state DOT, and a wide range of stakeholders, to discuss the research questions in depth.

The project team selected states for on-site interviews so that at least three states were visited in each AASHTO region. The research team consulted AASHTO, stakeholders groups, and others in making these selections.

On-site interviews were conducted in the following states:

California	Oklahoma
Colorado	Oregon
Connecticut	Pennsylvania
Florida	Texas
Mississippi	Virginia*
Missouri	Wisconsin
New Hampshire	*pilot visit

At a minimum, five DOT officials and five stakeholders were interviewed in each state, with each interview lasting approximately 45 minutes. In each state, the CAO of the DOT was interviewed, along with other senior managers, generally including the directors of finance and budget, planning, human resources and other administrative services, highway administration, and public transit and other modal responsibilities (rail, air, water, etc.). The research team also made an effort to contact a broad and diverse group of stakeholders in each state. Stakeholders contacted included trucking companies; urban and regional transit systems, railroads, ports, and airports; state agencies that work with the DOTs; local and federal officials in executive and legislative positions, including Metropolitan Planning Organizations (MPOs); transportation consultants and contractors; environmental and public interest groups with a stake in transportation issues; and representatives of firms and individuals that use transportation facilities and services. The top DOT officials in the major functional areas were identified with the help of AASHTO and the CAOs. Stakeholders were drawn from suggestions of experts in the states or national organizations, their national associations, the state DOTs, and other contacts identified by the research team.

The study team conducted 203 in-person interviews in the 12 states—13 with CAOs, 57 with other DOT officials, and 133 with stakeholders. The on-site interviews were conducted from August through November 1993.

The on-site interviews were supplemented by telephone contacts with the CAOs in the remaining states, as well as Puerto Rico and the District of Columbia. For the 37 states not visited, the CAOs were contacted and full telephone interviews were scheduled with either the principal investigator, Tom Larson, or Tommy Harrelson, both of whom have been CAOs. The protocol for the telephone interviews was the same as that for on-site visits.

Because it was impractical to conduct telephone interviews with the full range of other state DOT officials and stakeholders in all the states not visited, the research team mailed a survey to approximately 900 individuals in December 1993. The basic interview guide was used as the framework for the survey. Writ-

TABLE 1. Number of Respondents by State

State	Number of Respondents	State	Number of Respondents
Alabama	7	Montana	1
Alaska	4	Nebraska	5
Arizona	5	Nevada	5
Arkansas	1	New Hampshire *	15
California *	21	New Jersey	3
Colorado *	15	New Mexico	2
Connecticut *	20	New York	11
Delaware	5	North Carolina	8
District of Columbia	5	North Dakota	8
Florida *	20	Ohio	6
Georgia	7	Oklahoma *	13
Hawaii	7	Oregon *	12
Idaho	4	Pennsylvania *	21
Illinois	5	Puerto Rico	5
Indiana	5	Rhode Island	4
Iowa	6	South Carolina	5
Kansas	3	South Dakota	2
Kentucky	7	Tennessee	8
Louisiana	3	Texas *	23
Maine	2	Utah	5
Maryland	9	Vermont	3
Massachusetts	2	Virginia *	20
Michigan	5	Washington	3
Minnesota	8	West Virginia	5
Mississippi *	13	Wisconsin *	18
Missouri *	13	Wyoming	5
TOTAL NUMBER OF RESPONDENTS: 421			

* States visited for on-site interviews

TABLE 2. Number of Respondents by Type and Form of Interview

	CAO	Other DOT	Stakeholder	Total
In-person Interviews	13	57	133	203
Telephone Interviews	30	1	2	33
Mail Survey	3	56	126	185
TOTAL	46	114	261	421

ten responses were received from 197 of them. Returns came from all the states as well as Puerto Rico and the District of Columbia.

From all these field research efforts, 421 completed interviews or survey forms were reviewed, coded, and analyzed. Table 1 lists the number of respondents by state and territory. Table 2 shows the number of respondents in each of the three categories (CAOs, other DOT officials, and stakeholders), as well as the survey method used (in-person, telephone, or mail). Further details of the survey methodology are provided in Appendix C.

1.3.2. NCHRP and NAPA Panels

NCHRP projects are selected and guided by panels of key representatives from the issue areas and the target communities for the research. The NCHRP panel for this study met with the research team after reviewing its interim report, and offered comments on the work and suggestions for developing a useful final report. The members of the NCHRP panel for this project are shown in Appendix D.

National Academy of Public Administration (NAPA) projects also generally employ panels of experts to gain their knowledge and experience in developing the study findings and conclusions. For this study, the project team convened an advisory panel of experts on transportation as well as on broader economic and social forces, organizational development, leadership, and management strategies. Appendix E lists the members of the advisory panel, with brief biographies. The NAPA panel for the project met formally at NAPA on two occasions, and also reviewed materials and offered individual comments to the research team less formally through the course of the project.

The first meeting of the NAPA advisory panel focused on the results of the field research work, and particularly on the general implications for state DOTs and potential strategies to respond to the challenges facing them. The second meeting covered specific advice for the final product and how to make the advice most useful to the state DOTs.

1.3.3. Communication of Findings

Because a major purpose of the research is to provide information and tools for state DOTs to use, making them aware of the process and the results was a vital part of the research approach. Throughout the study, the research team continued its outreach to the state DOTs. Members of the research team introduced the study and discussed the progress of the research with CAOs and other state DOT officials at meetings of regional groups of officials and other AASHTO groups on several occasions. AASHTO scheduled a presentation by the research team at its 1994 annual meeting in Albuquerque, New Mexico, to provide a chance to share general findings, potential strategies, and recommended self-assessment tools with CAOs and other state DOT officials. Building on the design of the research outreach process, the research team made an essential contribution to state DOTs' awareness of the project and improved the likelihood that they would review the findings and apply them.

As a final note, it is important to emphasize that the study made no attempt to rate or rank the individual state DOTs or their practices. Instead, the focus was on identifying the nature and impacts of various factors, finding responses that appear to have been effective in various circumstances, and offering suggestions and options for strategies and actions that may be useful for DOTs to apply in the future.

CHAPTER 2

FACTORS FORCING CHANGE AND THEIR IMPACTS ON STATE DOTs: SUMMARY OF SURVEY RESULTS

The oldest state department of transportation is now more than 27 years old, formed just 10 years into the implementation of the Interstate Highway Program. During the last 2 decades, most state DOTs, often building on the earlier foundation of state highway agencies, have become well-established organizations with accustomed processes, standards, and norms of organizational and professional behavior, as well as highly visible programs and policies. Yet in the 1990s, the state DOTs have been operating under a dramatically different surface transportation law, ISTEA, comparable in its breadth with the law that created the Interstate highway program in 1956. At the same time, increasing numbers of communities, interest groups, citizens, and the media are thinking about air pollution and other environmental effects of transportation, the transportation requirements to serve new residential and business development, the pressures of changing travel patterns and traffic growth, and continuing public demands for expanded access and mobility.

What do people see as the major factors driving change in transportation — technology, congestion, public pressures, and expectations? In fact, the DOT officials and stakeholders surveyed for this research study did not emphasize those particular forces; none was mentioned by more than one-sixth of the respondents. Instead, respondents much more commonly mentioned finances, ISTEA, and environmental factors as the forces having the greatest effects in changing transportation and state DOTs today, followed by governmental and political processes, economics, demographics, and factors related to the internal DOT organization. Based on the responses, those three most commonly mentioned "forcing factors" appeared to be pervasive across all regions and states, although their impacts and importance vary.

This chapter reports the responses on key factors forcing change today and into the next century, and their expected impacts on state DOTs. In addition to the data presented in this chapter, Appendix F presents supplementary tables of survey responses.

Several points are vital to remember in considering the survey results:

1. The perspectives and the challenges in each state, and even regions within a state, are different, reflecting their different economic and social conditions, topography, past experiences, institutions, and traditions. There is no universal answer to the issues and changes facing the state DOTs or the impacts they will feel.
2. Many respondents focus on forces with the "teeth" to force response — laws, regulations, federal or state appropriations, or other actions by parties with clear authority over the DOT. The DOT has to comply with or operate within ISTEA, the Clean Air Act, and annual budgets. They are also the most visible and widely publicized.
3. In this type of research, the greatest insights often come from the observers with a unique and independent view, and it is important to pay attention to these "outliers." These comments provide valuable perspectives on long-term patterns and possibilities, as well as impacts and potentially effective DOT responses.

The individual observations can be important signals of where the next challenges for change may be arising. They also serve as reminders of the range and nature of forces state DOTs need to recognize and address. Appendix G presents many individual comments from respondents on forcing factors, impacts, and DOT responses.

2.1. CURRENT FACTORS FORCING CHANGE

This chapter focuses on the field research results on the factors seen as driving change both now and in the future in transportation and in state DOTs, and their impacts on state DOTs. The question on the key current factors driving change in transportation drew 1,612 comments from 421 respondents. Similar numbers of responses were recorded on questions about future factors, potential impacts, responses of DOTs, and their effectiveness. In each case, the major categories of factors mentioned by respondents are presented, including the frequency of mention and illustrative comments from the interviews and surveys. A summary of the results, along with qualitative information and comments on the general impacts of these forcing factors on the DOTs, follows.

Some respondents linked various factors to each other, as part of a larger picture of developments affecting the region and the environment for transportation. For example, they tied together the challenges of ISTEA, environmental, and land use factors, and suggested that those forces will work together to drive change for state DOTs. Some also suggested that the state DOTs need to approach their challenges in an integrated way, instead of approaching and addressing issues as though they were isolated and could be solved separately. The analysis takes these qualitative points into account, along with the quantitative results of the survey.

2.1.1. Nature of Current Forcing Factors and Their Impacts

The research addressed current forcing factors in two ways. First, the respondents were asked to list up to five factors that

TABLE 3. Factors Currently Driving Change (Share of Respondents)

Factor	Share of Respondents Citing Each Response by Type of Respondent			
	CAO N=46	Other DOT N=114	Stakeholder N=261	All N=421
Finances	59%	50%	56%	55%
ISTEA	61	56	54	55
Environment	52	49	50	50
Governmental Processes	35	40	39	39
Economics	37	37	37	37
Demographics	46	36	29	33
Internal DOT Organization	33	46	24	31
Land Use	17	15	18	17
Congestion	17	18	16	17
Public Concerns	22	17	15	16
Infrastructure	13	8	16	13
Technology	7	15	5	8
Amer. with Disabilities Act	0	4	2	2
Travel Behavior	4	2	1	2
Other	9	8	8	8

NOTE: Numbers shown are percentages of total respondents citing each factor, by type of respondent.

TABLE 4. Rating of Importance of Factors Currently Driving Change

Factor	Mean Rating
Constraints on state spending	1.49
ISTEA	1.53
Public resistance to state taxes	1.56
Public concern and support for environmental quality	1.57
Changes in industry and economy	1.58
Travel demand changes	1.65
Competing demands for construction vs. maintenance	1.67
Changes in demographics	1.68
Clean Air Act Amendments	1.70
Increased public scrutiny of government	1.77
Demands for integrating/connecting/coordinating modes	1.77
Increased public interest in participating in transportation decisions	1.77
"Not-in-my-backyard" (NIMBY) syndrome	1.78
Expanded roles of other government and private entities (outside the state DOT) in surface transportation	1.79
Changing skills of DOT workforce	1.79
New technology (IVHS, computers, vehicles, and systems)	1.81
Public pressure for better community and transportation planning	1.83
Uncertainty about reliability of gas tax as revenue source	1.86
Changes in lifestyles	1.88
Increased regional and interstate nature of issues	1.95
Overall cuts in state employment	2.01
New transportation systems as alternatives for highways	2.02
Inadequacy of transportation data and models	2.06
Antihighway sentiment	2.17
Privatization in transportation	2.21
Deregulation of transportation industries	2.35
Importance ratings 1 = substantial 3 = not at all	

they considered most important in driving change currently in transportation in their states. Second, the respondents were asked to rate over two dozen specific factors according to how important they are in forcing change within the DOT in their state, currently or in the near term.

The general categories of responses to the first question are shown in Table 3. Table 3 shows the percentage of respondents who mentioned the particular category or factor; Table F-1 in Appendix F shows the corresponding percentages of total individual responses on the question that deals with the particular category of factor.

In response to the open-ended question on current forcing factors, financial factors, ISTEA, and environmental considerations were each mentioned by at least half of all respondents. The largest number of responses referred to finances (14 percent of all the factors cited); nearly as many referred to ISTEA and its implementation (also 14 percent) and the environment (13 percent). In frequency of mention, those top three factors were followed by governmental processes and economics (each approximately 10 percent of all responses). Smaller percentages were registered for demographics, internal DOT organization, land use, congestion, public concerns, infrastructure, and technology.

The aggregate responses of CAOs, other DOT employees, and stakeholders did not differ significantly. Responses from different geographic regions did show some statistically significant differences. Demographics appeared among the top three most frequently cited factors in the West, virtually tied with ISTEA and environmental factors. In the southern states, governmental processes received more frequent mention than any other factors, while the environment was mentioned less often than in the other regions. When asked specifically about certain factors, respondents indicated that changes in travel patterns and volume are also important in driving change in state DOTs.

The forcing factors themselves, along with the responses that DOTs are already making, indicate a broad range of implications for the DOT organizations and the way they work. The respondents noted that the factors for change, individually and together, call for a variety of changes:

- Shifts in DOT missions and responsibilities
- New roles and relationships to other government agencies, outside stakeholders, and citizens
- Different processes and ways of conducting business
- Greater involvement and sensitivity to DOT employees
- More diverse skills and backgrounds in the DOT workforce
- More effective applications of technology
- More efficient and effective use of funds and other resources.

To ensure that the research would include perceptions on a wide range of forces for change, the study also asked respondents to consider 26 specific factors that may be driving change now or in the near term in the state DOTs. The list included factors identified in the NCHRP project statement and others suggested by the research team, AASHTO, and stakeholder contacts. Respondents were asked to rate each of those specific factors from 1 to 3 based on its importance in driving change in the DOT. The aggregate results appear in Table 4. The lower the rating in the table, the higher the importance of the factor.

The results in Table 4 agree very closely with those obtained from the open-ended question reported in Table 3. Constraints

on state spending received the highest average importance rating, followed by ISTEA, public resistance to taxes, environmental quality, and changes in industry and economy. Thus, in both approaches, finances, ISTEA, and the environment show up as important factors for change, from the perspectives of both state DOTs and stakeholders. The factors that received the lowest importance ratings were deregulation, privatization, antihighway sentiment, and inadequacy of transportation data and models.

One factor was rated high in importance on the closed-ended question yet was seldom mentioned specifically in response to the open-ended question: travel demand changes. No explanation for this discrepancy is evident, but one might speculate that respondents were not thinking about this source of pressure for change until it was explicitly brought to their attention. Perhaps it is subsumed under other responses in the open-ended question, or maybe it is so basic to the work of state DOTs that respondents did not consider it as new or different.

The responses to the open-ended question shown in Table 3 included many factors related to "supply"—providing facilities or services, from the perspective of the transportation agency or service provider. Demand factors seemed to receive less attention from respondents. For example, many respondents spoke of resources to support transportation activities or, alternatively, constraints on construction and operations (funding limits, environmental restrictions, the framework of funding programs, or other perceived procedural challenges to the state transportation program and projects). This pattern seems to reflect the historic mission and role of state DOTs of building and maintaining transportation facilities.

The following sections discuss the major categories of factors for change cited by respondents, in descending order of their frequency of mention.

2.1.1.1. Finances

More responses related to finance issues than any other category. About 55 percent of all respondents cited financial considerations as one of the top five factors. Financial factors constituted 14 percent of all the individual responses to the open-ended question on current forcing factors.

Financial factors were almost uniformly characterized as a difficult constraint on the ability to make investments and improvements in transportation. Specific responses pointed out shortfalls in federal, state, and local funds compared with needs; underfunding of ISTEA; difficulties in raising state gas taxes; increasing costs of maintenance and construction; diversion of transportation revenues such as gas taxes to the general fund to cover nontransportation purposes at the state and federal level; concerns about paying off transportation bonds and interest charges; and fears about the effects of reduced gasoline consumption and its consequences for the availability of funds for transportation. Most of the comments amounted to the same thing: inadequate funds. Some respondents noted a lack of sufficient funds for needed highway investments; others highlighted the lack of funds for transit or other modes, rather than roads and highways. For most respondents, that is what might be called "supply side" concern: that more funding will be required to support the maintenance and investment in transportation they believe the state should undertake.

Some comments on financial factors were related to perceived needs for alternative sources of financing to deal with future funding pressures. A midwest CAO stated, "There will have to be alternative mechanisms to meet the needs of citizens. The gas tax can't do it." The same perspective came from a western CAO who noted, "The financial system will need an overhaul because the gasoline tax is the past; now revenues are flat or decreasing." A southeastern CAO simply noted, "We're caught in a hard spot—escalating needs and declining revenues."

The number of responses concerning finances is impressive. Stakeholders as well as CAOs and DOT employees showed awareness of budget pressures and shortfalls in financial resources compared with demand. It is clearly an important factor with powerful and definite effects on what the state DOT and other parties in transportation and the larger community can do. In terms of impacts, respondents observed that financial pressures place a greater premium on efficiency of funds and wise selection of projects and activities. Financial pressures push the state to consider other sources of funding or mechanisms for getting transportation investments financed, including new financial partners and innovative funding instruments.

In the competition against other uses of funds, transportation needs close and effective communications with and support from the governor, legislature, other levels of government, and the citizens and voters. Finally, these forces create a need for more information on the results of past transportation expenditures and potential effects of future choices. Although key actors beyond its control affect finances, a state DOT, by its own strategies and initiatives—internal efficiency and effectiveness, information, outreach, and relationships—has considerable leverage to affect the finances available for transportation and to determine how much is achieved with them.

2.1.1.2. ISTEA

The second most commonly mentioned factor for change in transportation today was ISTEA. Almost 55 percent of all respondents (61 percent of CAOs) mentioned ISTEA or some aspect of ISTEA provisions and themes as a top factor driving change. Of 1,612 responses, those related to ISTEA made up 14 percent, with only slightly fewer mentions than financial factors.

Responses ranged from simply "ISTEA" to referrals to specific aspects of ISTEA, such as the management systems, transportation enhancements, flexibility in funding between highway and transit, planning requirements, or greater authority for MPOs. Because respondents have different perspectives, they saw the same elements as favorable or unfavorable, as opportunities or burdens. For example, for some, ISTEA means an opening to consider an entirely different set of projects or options; for others, ISTEA means only some different processes—perhaps some new hurdles—for funding the same programs and projects as before.

The interviews produced many valuable comments on the role of ISTEA in forcing change. One state DOT official said that as a result of ISTEA, "We in the DOT need to listen to groups more—environmental groups, business groups and the like." A CAO in another state commented that "ISTEA enhancements are bringing other people to the table, broadening the stakeholders." An FHWA official observed, "ISTEA has put decision

making at the local political and bureaucratic level. They can't point to 'those highway guys.' They have to make decisions."

ISTEA also forces greater attention to alternatives other than highways and to connections between various modes. One financial officer from a western DOT commented, "Increased flexibility means more players are now vying for less money." Similarly, an East Coast DOT planning director said, "ISTEA has too many requirements and not enough resources." The secretary of another DOT noted, "Expectations for ISTEA are greater than can be accomplished."

Comments varied widely about the depth and benefits of changes under ISTEA. A Chamber of Commerce official expressed skepticism about how lasting the changes will be under ISTEA, stating, "There is no guarantee that ISTEA is a permanent change." The predominant comment about ISTEA, however, was that it is changing the way DOTs do business. One stakeholder commented, "Without ISTEA, there would be very little change."

ISTEA contains not only new flexibility and funding but also program and process requirements, deadlines, and sanctions in some areas. With the tie to federal funding, and the possibilities for federal oversight and enforcement, ISTEA carries considerable force. Thus, the program and process changes in ISTEA affect every state. A key impact of ISTEA for many states may be a renewed set of goals and measures of success for transportation and the state DOTs. Regardless of whether a state develops a different set of priorities based on funding, planning, and management considerations in ISTEA, each state is operating under the ISTEA policy and program framework, which calls attention to the broad goals and public purposes of transportation (including economic health, safety, energy and fuel efficiency, environmental protection, and quality of life), and the imperative to include and respond to the broad interests of the people. The law in general and the planning and management requirements in particular require a directed, orderly consideration of overall state DOT investment plans and program operations, system needs and priorities, and the costs and benefits of various options for meeting them.

Particularly in urbanized states where air quality targets are a critical factor in transportation planning, ISTEA provisions working in combination with the Clean Air Act and related interests in planning, land use, and a wider range of modal options create pressures for DOTs to do the following:

- Alter their measures of success and sense of mission
- Open up more to perspectives of citizens, their communities, elected representatives, and interest groups
- Share information and responsibilities with MPOs and other local and regional groups and interests
- Include a different mix of skills and backgrounds in the DOT workforce, including greater expertise in planning, environmental, and economic analysis
- Increase applications of research and technologies to improve efficiency and effectiveness
- Strengthen management systems, including enhanced data collection, performance measurement, and evaluation.

The specific requirements of ISTEA are already established, but the changes attributable to ISTEA are likely to continue to increase through the 6-year life of the law. The magnitude of change will be heavily affected by the support states get from the federal government and stakeholders for the new policy direction of ISTEA, through the formulation and implementation of the next federal authorization law on surface transportation. The state DOTs have some capacity to affect the way ISTEA is carried forward, through their own choices and their input to federal officials who are developing regulations and standards, administering the funds and programs, and developing the new legislative proposals.

2.1.1.3. Environment

The third most frequently cited factor driving change was the environment. Some respondents simply referred to the environment in general. Others respondents were more specific, mentioning the Clean Air Act Amendments, local air quality targets, other environmental regulations and procedures, or public pressure to put a priority on preserving the environment. Half of all respondents mentioned the environment among the top factors forcing change in transportation, and environmental factors made up 13 percent of the individual responses.

Responses on the environment related primarily to the Clean Air Act Amendments of 1990 and air quality, although wetlands and water quality, general environmental laws and regulations, and general public concerns about the environment were also mentioned.

Many respondents exhibited strong feelings about environmental factors, not all of them consistent. One CAO in the Southeast stated, "Since 1986, there have been 80 environmental changes that have added time to highway construction projects." Another southern DOT secretary expressed fear that the environmental issue would become an increasingly serious constraint on transportation: "We can still build roads, but there will come a day when it will be difficult." An eastern CAO suggested that "some people are using the Clean Air Act Amendments to change the way we live rather than clean up the air."

"Overall, our agency is too slow to recognize the legitimacy of some of the new issues. The attitude is that these issues have been dreamed up by some radical 'wackos,' without recognizing that there's a core of very legitimate concerns," was the comment of the director of planning for a midwest DOT. Many respondents in the survey are looking to more constructive partnerships between DOTs and environmental interests. Contemplating what supporters of environmental interests could do to assist DOTs to meet future challenges, the CAO from a southwestern state remarked that it would be very helpful for environmental interest groups to share their knowledge and perspectives and program goals with the DOT and to become involved in the transportation policy and planning processes from the earliest stages, rather than only in adversarial hearings or lawsuits after project plans are developed. He noted, "Not once have I had a representative from any environmental group come sit in these chairs and ask how we can work together. The only time I see them is in public hearings where they lambaste us."

Many of the respondents from inside and outside state DOTs viewed environmental interests as an important influence that needs to be integrated into transportation policies and decisions. A top executive in a western DOT candidly commented, "With respect to environmental issues, we buried our heads in the sand at first. We are paying for our sins." Reflecting a similar note, an East Coast DOT official noted, "Transportation ran over the

environmental community." The respondents generally see a need for a different approach and direction for the future relationship of transportation and environmental interests. They emphasized cooperation and joint consideration of transportation and the environment, rather than competition or resistance.

On the subject of environmental regulation, several respondents commented that rigid and increasingly demanding targets or technical standards set down by Congress or a regulatory agency are not the answer. One stakeholder from an eastern environmental advocacy group stated, "Transportation as a whole is not going to be solved by an EPA effort. There still needs to be a trade-off between environment and economy."

Perhaps the most typical—and challenging—comment about transportation and the environment came from the CAO in an eastern state, who noted, "People want mobility and a clean environment. We have to find a way to give them both." The new emphasis of transportation and environmental planners is on integrating the goals and considerations of environmental quality and mobility, rather than past approaches based on conflict between transportation and the environment. It appears to be neither productive nor accurate for state DOTs to assume a "zero sum" game in which the more the nation meets environmental goals, the less it can meet transportation goals. Increasingly, stakeholders and DOT officials see the two as intertwined, and believe that transportation and environmental interests can and must be met at the same time.

Environmental factors include pressures for state DOTs to do the following:

- Consider additional goals, measures of success, and responsibilities in their plans and program administration
- Expand the range of partners and relationships with environmental and resource agencies and interest groups
- Build new skills and perspectives in the DOT workforce
- Develop greater environmental information and expertise (data on performance of the transportation system and project costs and benefits for the environment; quantitative techniques for modeling the effects of various plans and projects; new control and mitigation technology, and general understanding)
- Expand public education.

In spite of the great differences in the transportation and environmental conditions in different states, legislative requirements and increasing public interest in the quality of the environment make environmental factors a large and powerful influence for change in DOTs throughout the nation. Like ISTEA, environmental laws are in place and outside the control of the state DOTs. Most of the administrative standards for implementing the laws are also developed and administered outside DOTs, in environmental agencies at the federal and state level. DOT officials can contribute to the process of developing those standards; the law explicitly requires the cooperation and concurrence of USDOT in certain EPA actions, and some state DOTs have similar roles to play at the state or regional level. In addition, by their response to environmental laws and issues, DOTs also can affect how environmental agencies and their supporters view the transportation community and how they approach future laws or regulations affecting DOTs.

2.1.1.4 Governmental Processes

The fourth most commonly cited factor for change was governmental processes. Close to 40 percent of all respondents and 10 percent of all the individual factors they cited specifically mentioned governmental or political circumstances, institutions, or processes (other than budget, ISTEA, and environmental mandates or other factors discussed above).

The responses related to governmental processes covered a variety of policy, structural, and procedural characteristics of the federal, state, and local government systems, including the governor's interest (or lack of interest) in transportation; the legislatures' involvement in transportation and the work of the DOT, as well as specific legislative decisions, the number and interests of the legislators, the nature of legislative operations, and the general structure and policies of the legislature; local government autonomy; the specific form of local government (for example, open town meetings); lack of regional or county government; general mandates and relationships with the federal government; administrative and bureaucratic constraints affecting state government in general; lawsuits; and other characteristics of the governmental and political systems in a state or states that affect how a DOT conducts business. This category of response also includes the general answer "politics." For example, one official observed, "I have mixed feelings with the legislature micromanaging. . . . Political people tend to be knee-jerking. They try to represent what constituents want and their careers are short if they don't see results immediately."

Some states themselves have particular requirements that affect all state agencies. In Oklahoma, for example, any tax increase for any purpose must be approved by a vote of the electorate. In New Hampshire, every state purchase in one of the agencies, including supplies, must go through the state's Department of Administration. In most states, local officials such as planning and zoning boards have jurisdiction over land use decisions, which puts one of the most important influences on the transportation system into the hands of extremely diverse, often part-time officials, scattered over a state, without any straightforward or necessarily consistent standards and processes in which transportation officials can participate. Many state DOTs are under the authority of a transportation (previously highway) commission that makes the key budget and program decisions, as well as in some cases, major personnel and project choices. Designed to ensure an independent body committed to transportation and insulated from the political authority of the governor and legislature, this structure has also created its own political and institutional imperatives, which are not within the DOT's control and can occasionally hurt the DOT's abilities to carry out a solid, comprehensive, effective transportation program.

In Texas, every state department including the DOT is subject to a "sunset" review every 5 years, and must report on its performance and justify its continued existence before the legislature every 5 years. That process can affect DOT officials' willingness to make controversial or unpopular decisions in the year or so before a DOT review is scheduled. On the other hand, the process is clearly a method for getting the DOT to think about and articulate what it has accomplished and the direction it would like to go, at the same time that it has an opportunity to hear legislators' and other constituents' interests and priorities for the coming 5 years. As one interest group noted, "It is probably the most effective way individuals can participate in organizational change."

The diversity of individual circumstances underlying the responses on governmental processes makes any generalization difficult. Some of the institutional factors, including the structure

of the legislature and its committees, the form of local government, and federal mandates, are far beyond the control of a state DOT. However, as with previous factors, a state DOT's own choices, its public presentations, and its methods of operating and relating to other parties in the overall governmental and political system can affect the way those parties interact with the DOT and what they look to the DOT to do.

DOTs cannot function independently of the governmental and political structure; they are governmental entities established to carry out essential public functions and respond to public needs. Often, those needs and functions are defined by elected officials or legislative bodies created to represent the public. The representative structure and various means for hearing and responding to the voice of the people are at the foundation of the U.S. governmental and political system, and essential components of "politics" in the largest sense. The workings of the political system likely will always elicit some frustrations and complaints about the difficulties and shortcomings of the process. However, a DOT must respond to public interests, although it may not find them easy or comfortable to deal with. These interests are a necessary and important part of a DOT's existence and operations, and cannot reasonably be treated as an unwanted or unwelcome burden.

2.1.1.5. Economic Factors

Economic factors were mentioned by 37 percent of all respondents and accounted for approximately 10 percent of the individual responses. This broad category covered international trade, economic competitiveness, changes in the base of the states' economies, tourism, and unemployment. Respondents in individual states highlighted the particular economic development trends and conditions they face, such as foreign commerce, international border traffic, defense conversion and loss of jobs in the state, economic instability of central cities, tourism, new industries, and shifts from an agricultural to an industrial economy. Each of these developments creates changes in demands for transportation, and different patterns of passenger and freight traffic. They have put strains on transportation funding, created demands for changes in transportation plans, and stretched DOTs' capacity to respond.

A western state stakeholder remarked that "there needs to be a better understanding of the importance of transportation to the overall economy." Another commented, "We're not leading economic development yet, still basically reacting." While a state DOT cannot control economic forces, these forces have powerful effects on the nature and magnitude of transportation facilities and services demanded in the state. Each DOT needs to be aware of economic trends and developments, anticipate future needs, and be prepared to work with businesses and economic development agencies to develop and estimate costs for various transportation options and prepare transportation plans that are integrated with economic plans.

2.1.1.6. Demographics

Thirty-three percent of all respondents mentioned demographics or population patterns as a force driving change in transportation. These answers made up 9 percent of the total individual factors mentioned. Demographics is a category that includes overall growth in the population, changes in the age and distribution of the people (urban, rural, older, younger, more isolated from each other, etc.), increasing ethnic diversity, and other societal changes that affect where people live, and therefore their demands on the transportation system.

As census figures show, Florida and California and other "Sun Belt" states have seen dramatic growth, while others are losing population. Within a state, population shifts also have been pronounced. The age profile and ethnic and racial make-up of various states and regions continues to change, with very different results in different communities: migration of families out of center cities, gentrification and migration into some central neighborhoods, immigration from other countries, movement of retirees to southern states, and movement of agricultural and rural workers northward. These factors are not within the power of a DOT to control, although many residential and industrial location decisions are based on the availability and quality of transportation services. Transportation agencies and officials must at least keep informed about current and evolving population patterns; population growth and distribution has long been a starting point for transportation planners.

2.1.1.7. Internal DOT Organization

Just over 30 percent of all respondents mentioned internal factors related to the DOT organization as key factors forcing change. These responses made up 8 percent of the total responses, and included reorganizations and downsizing; changing leadership at the DOT; difficulties in maintaining a quality workforce, particularly in engineering and technical areas; changing attitudes of the employees; total quality management and "reinventing government" strategies; increasing emphasis on staying in touch with DOT "customers" and communicating with the public; civil service overhaul; pressures for efficiency; new accounting and financial reporting systems; and the changing make-up of state DOTs, sometimes as a result of other forcing factors.

Most of the narrative comments concerned the changing perspectives and skills of DOT employees. A transit operator said, "DOT needs fresh blood to address . . . change." A port director stated that the DOT in his state "has a very good group of talented people, but they have a highways mindset. They have always promoted from within, so it's inbred." Others commented on the need for state DOTs to develop a different, more open, trusting, and empowering way of working with people inside and outside the organization. Several persons noted the high turnover of the CAO position, which creates continuous uncertainties and stress in the DOT. The change in leadership means that the process of change to accommodate other challenges becomes more difficult to achieve and sustain.

Overall, the responses suggest differing expectations and demands of the workforce and changing needs of the organization management:

- More effective internal and external communications
- Expanded efforts to increase the diversity of backgrounds and disciplines represented in the DOT workforce, and appreciation, support, and development of the potential of that diverse workforce

- Enhanced training for managers and other employees
- New human relations and management skills
- Solid strategic direction and management perspective starting at the top in DOT
- More efficient internal processes and systems
- Effective headquarters/field relations
- Strong and constructive relations between the DOT and the government officials and citizens to maximize available resources and support for DOT.

Internal reorganization, training, recruitment, hiring, and promotion are largely shaped by DOT officials, and so are the management systems and strategies they pursue. Employee attitudes, though they may seem established and immutable, also are heavily influenced by management practices and the tone and direction set inside the organization. The selection and tenure of the CAO is generally up to individuals outside the DOT, as are legislative and administrative requirements governing every state agency. While it is not possible to dictate that a governor appoint a CAO to stay for a full 8-year term, capable political and career leadership can set the atmosphere and tone within the agency and create a base of better external and internal relations and communications, trained and motivated and involved employees, sound management and information systems, and effective and informed decision making, which could have staying power beyond the term of the CAO.

2.1.1.8 Land Use

Seventeen percent of the respondents mentioned a factor related to land use, accounting for 5 percent of the individual responses. Answers concerned development patterns, urban and suburban sprawl, growth management policies, lack of land for future transportation rights-of-way, and needs for coordinated land use and transportation planning.

One western state DOT official commented, "We don't have the best land use policies, so transportation becomes a way indirectly to control land use." Recognizing this reality in California, the California Department of Transportation (Caltrans) is moving to shift transportation funds to the local level so that land use and transportation decisions can be made in conjunction with each other at the same level, by officials closest to the situation where the effects will be most directly felt and most hotly debated.

2.1.1.9. Congestion

Seventeen percent of the respondents referred to congestion as a factor forcing change, accounting for about 4 percent of the individual responses. Some mentioned specifically the heavy truck traffic, or increasing vehicle traffic in general, crowding roads and highways.

One CAO in the Southeast stated, "We're behind and staying behind . . . you can't do away with congestion. You can't build your way out of congestion." This factor is an immediate concern for the public and imposes delays and costs on drivers and businesses that rely on highway travel for their employees and goods movements. Correspondingly, they put pressure on the state DOT to reduce the congestion. However, congestion is generally a symptom rather than the problem itself. It is heavily related to other factors, including population and economic changes, constraints on new construction imposed by limited funding, environmental laws, land use considerations, and public concerns. To the extent that ongoing maintenance and accidents or other incidents are creating congestion, the DOT may have more direct control over the conditions, through incident management, maintenance practices, and design and safety features of the facilities. Traffic management and demand management techniques are also available to help shape the flow of traffic on congested facilities.

2.1.1.10 Public Concerns

Sixteen percent of the respondents (4 percent of individual responses) mentioned a general category of public concerns, including increased public scrutiny of government, distrust of government, demands for quality service, antihighway sentiments, and strong public interests in a specific transportation mode.

2.1.1.11. Infrastructure

Thirteen percent of the respondents (3 percent of individual responses) referred to conditions of the transportation infrastructure as factors driving change. Their specific comments noted unmet needs for maintenance of transportation facilities, competition between spending for new construction versus maintenance, the completion of the Interstate highway system, and deteriorating conditions of roads and highways. This factor is related to the project and program priorities in the state, funding availability, and the DOT's efficiency and effectiveness in using funds. Those elements are partly under the control of the DOT, though they are also affected by legislative appropriations and conditions placed on DOT's work by authorities in other agencies and communities.

2.1.1.12. Technology

Only 8 percent of respondents (1 percent of individual responses) referred to technology as a factor. Their responses included both general references to technology and mentions of specific technologies such as Intelligent Vehicle Highway Systems (IVHS), computerization of transportation operations (inside the DOT and by companies using transportation), telecommuting, and new vehicle technology. Effective application of transportation technology requires skills and attention inside the DOT, funding for research and testing, and effective processes for coordination with other technology providers and users. Those elements are partially within the power of the DOT, given the leadership support and staff expertise and interest.

2.1.1.13. Americans with Disabilities Act

This factor includes the 1990 federal law requiring public facilities to be accessible to persons with disabilities. The law includes specific requirements for transit vehicles, stations, and

other transportation facilities to be accessible to persons with disabilities. USDOT adopted regulations in 1991 to implement the transportation aspects of the law. Two percent of respondents (0.5 percent of individual responses) mentioned the law as a major factor driving change in transportation. New purchases of public transit vehicles are required to be accessible to persons with disabilities. The respondents highlighting this factor generally work with public transit issues or provide transit services. The law has meant additional mobility for persons with disabilities, as well as additional costs for transit providers.

2.1.1.14. Travel Behavior

Fewer than 2 percent of respondents (under 0.5 percent of individual responses) mentioned factors related to individual travel choices and travel patterns. This category includes choices made by travelers, people's reliance on automobiles, patterns of car ownership, relative costs of commuting, and increased use of public transit. Some respondents noted the complex trip patterns in two-worker households where parents combine trips for work, child care, shopping, and other errands. This "trip chaining" strongly affects traffic patterns and modal choice.

2.1.1.15. Other Responses

The remaining 8 percent of respondents (2 percent of individual responses) mentioned factors that did not fit into any other category. Those factors include the 1993 floods, safety, labor unions, competition between modes, transportation access for rural areas, the large number of demonstration projects, proposed new toll roads and the existence of a turnpike authority.

2.1.2. Differences by Type of Respondents

The results in Table 3 show slight differences among the three types of respondents. CAOs more frequently mentioned demographics than the other two groups of respondents but did not cite governmental processes as often. Other DOT personnel cited internal organizational factors more often than the other two groups did. In general, however, the three groups appear to have similar responses to the current forcing factors.

It might be hypothesized that the three groups of respondents would differ substantially in their perspectives on forcing factors. For example, the CAOs might differ from others at lower levels in DOT management, or DOT personnel might differ from the stakeholders, reflecting different perspectives of those inside DOT versus those outside DOT. To test for such differences, a chi-square test was used. When applied to the three groups, the chi-square test produced a result that was considerably short statistically significant. The responses of the two DOT groups ("CAO" and "Other DOT") were then combined and the chi-square test was repeated. This time the results were close to statistically significant, yet still not at the level to reject the hypothesis that the groups are the same in their responses to current forcing factors. On the basis of the statistical evidence, therefore, it is not possible to conclude that the three groups showed any significant differences in the forcing factors they cite as most important currently in driving change in transportation.

TABLE 5. Factors Currently Driving Change Reported by Region (Share of Respondents)

Share of Respondents Citing Each Response by Type of Respondent					
Factor	1 Northeast N=100	2 South N=104	3 Midwest N=74	4 West N=135	All N=421
Finances	62%	47%	69%	51%	55%
ISTEA	74	48	62	46	55
Environment	75	31	54	47	50
Governmental Processes	33	57	50	26	39
Economics	36	45	35	35	37
Demographics	14	38	38	46	33
Internal DOT Organization	27	31	42	29	31
Land Use	18	16	27	13	17
Congestion	20	17	8	19	17
Public Concerns	23	10	24	13	16
Infrastructure	7	16	18	14	13
Technology	8	4	15	8	8
Amer. with Disabilities Act	4	2	3	1	2
Travel Behavior	3	1	1	1	2
Other	2	7	1	17	8

NOTE: Numbers shown are percentages of total respondents in the region who mentioned each factor. See pages C-13 and C-14 for lists of the states in each region.

2.1.3. Differences by State and Region

As shown in Table 5, there were clearly differences in the responses between geographic regions in the perceived forcing factors. Finances, ISTEA, and the environment were at the top of the list of factors in terms of number of mentions everywhere except the South, where environmental factors were the seventh most often cited. The Northeast shows a greater concentration of responses for the above three factors; they account for 52 percent of all factors cited by respondents in the Northeast compared with 34 percent in the South, 39 percent in the Midwest, and 39 percent in the West. Governmental processes constituted the most commonly mentioned category in the South. Demographics received frequent mention only in the West, where it tied with ISTEA as the third most often-cited factor. Economic factors were fourth most often-mentioned in the Northeast, South, and Midwest.

Table 6 shows that geographic differences in the responses are more pronounced when the results are grouped by smaller subregions. Substantial differences are evident between subregions on almost all factors. The exceptions are financial factors (which received frequent mention in all subregions), and ISTEA (which received more than 10 percent of the mentions in all subregions except one western subregion). Some of the differences between subregions are striking. Environment was near the top in the number of mentions nearly everywhere except one subregion in the South, where it was only the eighth most often-cited factor and received only 5 percent of all mentions. Demographics were among the most frequently mentioned factors in one subregion of the South and in all parts of the West.

States differ sufficiently in geographic, historical, institutional, and political conditions so that grouping states into large regions or subregions in itself may obscure important differences between individual states. Although the research did not produce a sufficient number of responses from every state to generate

TABLE 6. Factors Currently Driving Change Reported by Sub-Region (Share of Respondents)

Share of Respondents									
Factor	AASHTO Region and Subregion (N=Total Number of Respondents in Subregion)								
	Northeast		South		Midwest		West		
	1A 46	1B 54	2A 39	2B 65	3A 27	3B 47	4A 43	4B 45	4C 47
Finances	63	61	62	38	67	70	60	51	43
ISTEA	72	76	41	52	44	72	63	33	43
Environment	87	65	21	37	41	62	56	44	43
Governmental Processes	35	33	85	40	48	51	33	27	19
Economics	33	39	49	43	52	26	19	47	38
Demographics	17	11	18	51	26	30	42	56	40
Internal DOT Organization	35	20	46	22	52	36	30	33	23
Land Use	11	24	10	20	30	26	9	9	21
Congestion	22	19	23	14	11	6	7	24	26
Public Concerns	26	20	10	9	19	28	19	9	13
Infrastructure	4	9	21	14	22	15	9	24	9
Technology	4	11	5	3	15	15	7	9	9
Amer. with Disabilities Act	4	4	3	2	4	2	2	0	0
Travel Behavior	4	2	0	2	0	2	5	0	0
Other	2	2	13	3	0	2	37	7	9

NOTE: Numbers shown are percentages of total respondents in the subregion who mentioned each factor. See pages C-13 and C-14 for lists of states in each subregion.

useful data on every state, the states visited for personal interviews each had at least one or two dozen respondents. Table 7 shows the top five responses in 11 of the states visited for in-person interviews. The table suggests the differing degrees of importance respondents give to factors in different states.

This difference is particularly true for financial considerations, which were cited by every respondent in some states but by only one-third of the respondents in other states. Environmental factors also figured differently.

Since respondents' listing of factors driving change is based on perceptions rather than on objectivity, the responses in different regions may partly reflect differing degrees of attention to change factors. What people hear from their colleagues and neighbors, interest groups, government bodies, public officials, the media, and the public can have important effects on their perceptions. Thus, the different responses reflect a combination of actual differences between regions and differences in what has attracted people's attention in those states or regions.

2.2. FUTURE FORCING FACTORS

To understand the changes to which state DOTs need to respond, it is necessary to understand not only the current factors forcing changes but also the future factors likely to force change. As one California stakeholder noted, citing Marshall McLuhan, "We always plunge into the future by looking in the rear view mirror. Imagine what would happen if we raised our eyes and looked through the windshield."

Each respondent was asked to list those factors that would be most important in driving change in transportation in the first decade of the next century. The wording of the question otherwise followed the wording of the open-ended question regarding current forcing factors. The responses to this question were coded using the same categories shown in Table 3 except that one new category was added — fuel/energy — that received prominent mention as a future factor but did not appear in the responses about current forcing factors. The most frequently mentioned future factors were technology, ISTEA, environment, finances, and demographics (in descending order of frequency of mention). The results are shown in Table 8.

As with the current forcing factors, the study team used a chi-square test to assess whether the differences between the three categories of respondents were significant. When the test was applied to the three groups, the results were not statistically significant, indicating that the responses of the three groups were not significantly different from each other. When the two groups of respondents from the state DOTs — CAOs and other DOT employees — were combined and compared in the aggregate with all stakeholders, the results of the chi-square test were significant. It appears, therefore, that respondents from the state DOTs differed from stakeholders in the factors they expect to drive future change.

Nearly equal numbers of stakeholders mentioned each of the four top factors — technology, ISTEA, environment, and finances. In comparison with stakeholders, a considerably higher share of DOT employees — 51 percent of all the CAOs and other DOT respondents combined — mentioned factors associated with ISTEA (including intermodal approaches, flexibility for funding across modes, greater decision-making roles for states and also for local regions through their MPOs, expanded focus on planning, a broader range of missions and purposes, and emphasis on management systems). In fact, compared with the proportion of stakeholders citing each factor, a larger share of the DOT respondents mentioned all the major factors as future driving forces, including technology, environment, ISTEA, and finances, as well as demographics, economics, and internal DOT organizational factors. On the other hand, a smaller share of the respondents from state DOTs mentioned fuel/energy, governmental processes, public concerns, and infrastructure.

Among all categories of respondents, technology was much more frequently mentioned as a force for change in the future than in the present. While many respondents noted that technology should be a greater factor today, far more predicted that technology will be shaping changes in transportation and in state DOTs in the early years of the 21st century. The technologies mentioned as likely to drive change in the future included information systems for storing and using data; computer-aided design and planning; advanced materials, construction and maintenance techniques; safety and incident management tools; IVHS; new designs and fuel sources for personal automobiles; and alternative modes of transportation. In the perspective of one respondent from FHWA, "We shall have to put a greater emphasis on technology such as IVHS." A CAO in the Midwest remarked, "The impacts of electronic highways have been underestimated so far." A CAO from a Plains state summed up the challenge for the future: "We need to advance technically in transportation — all modes."

Although ISTEA itself runs for only 6 years, the legislation and the policy and program changes it embodies were viewed by respondents as an important factor driving change for the longer term. Commenting about implementing the requirements of ISTEA in the long term, one CAO in a midwestern state said, "We will need to be truly intermodal and plan for it." Many comments about ISTEA as a future factor came from stakeholders. One stakeholder observed, "DOT will have to redefine its

TABLE 7. Top 5 Factors Currently Driving Change in States Visited for On-Site Interviews (Open-ended Question)

CALIFORNIA (21 respondents)			
1. Environment	57%		
2. Economic factors	48		
3. ISTEA			43
4. Finances		38	
5. Demographics		29	
COLORADO (15 respondents)			
1. ISTEA			67%
2. Environment	47		
3. Internal DOT		33	
3. Finances		33	
3. Economic factors	33		
3. Demographics		33	
CONNECTICUT (20 respondents)			
1. Environment	85%		
2. ISTEA			70
3. Finances		65	
4. Internal DOT		45	
5. Economic factors	35		
FLORIDA (20 respondents)			
1. Demographics		75%	
2. ISTEA			65
3. Finances		50	
3. Environment	50		
5. Governmental processes		45	
5. Land use		45	
MISSOURI (13 respondents)			
1. Finances		77%	
2. Governmental processes		69	
3. Internal DOT		54	
3. Environment	54		
5. ISTEA			46
NEW HAMPSHIRE (15 respondents)			
1. Environment	93%		
2. ISTEA			87
3. Financial factors	53		
4. Internal DOT		33	
4. Demographics		33	

TABLE 7. Top 5 Factors Currently Driving Change in States Visited for On-Site Interviews (*Continued*)

OKLAHOMA	(13 respondents)			
1. Finances	100%			
2. Governmental processes		77		
3. ISTEA			62	
4. Environment	54			
5. Demographics		46		
OREGON	(12 respondents)			
1. Demographics		75%		
2. ISTEA			67	
3. Finances		42		
4. Public concerns		33		
5. Land use		33		
PENNSYLVANIA	(21 respondents)			
1. ISTEA			95%	
2. Environment	71			
3. Finances		38		
4. Public concerns		33		
4. Governmental processes		33		
TEXAS *	(23 respondents)			
1. ISTEA			57%	
1. Environment	57			
3. Internal DOT		39		
3. Finances		39		
5. Demographics		30		

* A set of other factors including NAFTA and international trade were mentioned by 39% of the respondents.

WISCONSIN	(18 respondents)			
1. ISTEA			94%	
2. Environment	78			
3. Governmental processes		61		
4. Public concerns		44		
4. Financial factors	44			

NOTE: Numbers shown are percentages of respondents from the individual state for each factor. Factors are shown as tied in ranking if they were mentioned by the same percentage of respondents. (Of the 13 states visited for the study, 11 are represented in the table.)

TABLE 8. Factors Likely to Drive Change in Future (Share of Respondents)

Factor	Share of Respondents by Type of Respondent			
	CAO N=46	Other DOT N=114	Stakeholder N=261	All N=421
Technology	48%	50%	44%	46%
ISTEA	63	46	41	44
Environment	46	46	43	44
Finances	46	44	40	42
Demographics	39	31	24	28
Economics	24	25	17	20
Fuel/Energy	9	19	21	19
Governmental Processes	20	15	21	19
Congestion	17	16	18	17
Land Use	11	17	16	16
Internal DOT Organization	15	23	10	14
Public Concerns	11	12	15	14
Infrastructure	11	7	13	11
Travel Behavior	4	4	8	7
Other	28	22	24	24

NOTE: Numbers shown are percentages of total respondents in each column. Numbers do not add to 100 percent because respondents were asked to list multiple factors.

TABLE 9. Rankings of Factors Driving Change By Frequency of Mention Current v. Future

Current	Future
1. Finances	1. Technology
1. ISTEA	2. ISTEA
3. Environment	2. Environment
4. Governmental Processes	4. Finances
5. Economics	5. Demographics
6. Demographics	6. Economics
7. Internal DOT Organization	7. Fuel/Energy
8. Land Use	7. Governmental Processes
8. Congestion	9. Congestion
10. Public Concerns	10. Land Use
11. Infrastructure	11. Internal DOT Organization
12. Technology	11. Public Concerns
13. Americans with Disabilities Act	13. Infrastructure
13. Travel Behavior	14. Travel Behavior

NOTE: Factors are listed and ranked in descending order of the frequency of their mention by respondents in the open-ended questions about current or future factors driving change. Two factors are shown as tied in ranking if the factors were mentioned by the same percentage of respondents.

mission to moving people and goods, not vehicles." Another stakeholder predicted, "DOT will learn what balanced transportation is."

Considerations of future changes produced many compelling comments from the respondents. A CAO from a rapidly growing state predicted, "There won't be many more roads, and the interstates won't get bigger." Thinking along the same lines, a CAO in the East agreed: "We will have to work smarter and recognize that we will have to live with highways we've already built." An MPO representative from the Southeast forecast that new approaches to planning and pricing transportation would affect public attitudes and choices: "Once we do congestion costing so that people see the real costs, they will be willing to try alternative modes." Others observed that the state DOTs will have to become more oriented to serving their "customers." For example, the CAO of a midwestern state predicted, "The DOT will have to be more connected with public perceptions."

While internal DOT organizational factors were seldom mentioned as driving change in DOTs in the early 21st century, several respondents had telling comments about the importance of internal issues for the future. A DOT official in an eastern state asked, "Are we going to have the right types of people?" Another had a response to the same concern, affirmatively stating "We won't have the right people in 10 years." An FHWA official predicted, "Highway departments will have to be more professionally diverse, not just civil engineers."

Respondents' answers about current and future forcing factors present some noticeable similarities and some striking differences. Table 9 lists the major categories of current and future factors, in descending order of the frequency of mention, to show their differences.

Finances, ISTEA, and the environment are important in both current and future factors. Each of those three factors was mentioned by more than 40 percent of all respondents in all categories. The responses suggest that many observers picture the top current factors — finances, ISTEA, and the environment — as being long term. The general categories of public travel behavior, infrastructure, and congestion were not frequently cited in the open-ended questions about factors driving change in either the present or the future. Two commonly mentioned current factors, governmental processes and internal DOT organization, were among the least often-cited factors for the future.

Responses to this kind of question typically indicate what people see occurring around them and what has already taken place. The factors that most people are aware of today may not ultimately be the forces that bring the greatest changes. Questions about sources of pressure for change are doubly challenging because respondents may have difficulty perceiving what is unfamiliar and unexpected and also may tend to resist acknowledging forces that would require sweeping or radical change.

Some of the unique observations in this study relate to dramatically different visions of transportation responsibilities in the future; effects of an aging population or alternate living patterns; changing public interests and priorities; cost and other economic imperatives that may affect transportation choices; breakthroughs in electronics and information technology that alter the basic parameters of transportation systems, vehicles, and people's options; and blurred or restructured roles and relationships between state, federal, local, and private parties in transportation. Some observers suggested that federal transportation programs that have worked through state DOTs may no longer be effective, desirable, or necessary; a few speculated that the future may not even include state DOTs as separate entities or with the mission and functions that they now are assigned. Given the magnitude of changes that transportation is already seeing, no state DOT can rule out the possibility of dramatically different and unexpected developments, even changes that would radically alter the roles and challenges for people who work in and work with state DOTs.

2.3. IMPACTS OF FORCING FACTORS

Individually and together, the forcing factors affect state DOTs in every area of their programs and every aspect of their

operations. Taken in combination, the influences of ISTEA, the Clean Air Act, financial constraints, the changing economy and demographics, the challenges of technology, public expectations, and the complex political environment have far-reaching impacts on state DOTs—their missions and goals; their roles and relationship to the public, the transportation industry, interest groups, and other partners; technologies and approaches to operations; skills required of the DOT workforce; and the processes they follow in carrying out their work. The added demands on the transportation system and transportation organizations, along with limited funding, mean increasing pressures to make sound choices and get the most productive use from the resources available.

These influences point to a need for different perspectives and processes in state DOTs, almost regardless of the specific conditions or magnitude of changes they see in their programs. Limited funds combined with increasing public scrutiny mean that state DOTs need to have better data on the results of transportation projects and prospective choices. The pressures also place an increasing premium on efficient use of funds, careful selection of activities, and quality performance by public services and public investments.

The state DOTs are being called upon to open up their planning and decision making to broader parties including other agencies and levels of government, citizens, and interests. The challenges also suggest closer cooperation with governors and legislators, more effective outreach and public education, new financial partners, and different mechanisms for design, construction, financing, and management of their operations. For state DOTs to be able to manage their operations well, they will have to strengthen their information systems, data bases, and approaches to communications.

Demands from the public as well as from the DOT workforce create additional impacts on state DOTs. From employees, legislatures, governors, and citizens, state DOTs are feeling pressure for greater flexibility, more efficient internal processes and systems, renewed human relations and management skills, clear well-articulated vision, and direction from the top. It is difficult to imagine any time in the history of state transportation organizations when there has been a greater need for leadership, continuous learning and adjustment, shared understanding and commitment to the changing mission, effective headquarters/field relations, and solid links to the rest of state as well as to federal, regional, and local government, the transportation community, and the public.

2.4. DOTs' RESPONSES TO FORCING FACTORS

Over the years, DOTs have launched many initiatives to refine and improve their performance, structure, and procedures. The interview guide for the study asked respondents to identify the actions that their state's DOT has taken to address the current forces driving factors. Some actions address only one factor specifically; others address two or more forcing factors at the same time. For each of the top four forcing factors, Table 10 shows the actions most commonly mentioned as being taken by state DOTs, along with assessments of their effectiveness. The respondents were also asked to rate the level of effort that their state DOT is making in implementing specific management and organizational actions. Those results are shown in Table 11.

TABLE 10. State DOTs' Responses to Factors Currently Driving Change

Factor	DOT Response to Factor	Number of Survey Responses	Effectiveness of DOT Response
ISTEA	1. Forming new partnerships	30	1.3
	2. Emphasizing intermodalism	26	1.2
Environment	1. Addressing environmental concerns	31	1.7
	2. Forming partnerships	20	1.6
Finances	1. Pursuing new funding	29	1.6
	2. Exploring new organizational strategies	16	1.8
Internal DOT Organization	1. Reorganizing	18	1.3
	2. Exploring new organizational strategies	16	1.1

NOTE: Rating of 1 = "very effective" and rating of 3 = "not at all effective."

TABLE 11. Level of Effort toward Organizational and Management Changes in State DOTs

Action	Level of Effort
Adopting new management philosophies and techniques, such as continuous quality improvement and employee empowerment	1.59
Bringing in new parties and taking new approaches to transportation enhancements under ISTEA	1.62
Adopting and encouraging new technologies, e.g., GIS and IVHS	1.63
Improving communications and information flow between DOT and stakeholders and authority	1.66
Forging new arrangements with other agencies, including proactive involvement with environmental agencies in review and permitting	1.71
Paying new attention to the people being served and other "customers" of the state DOT	1.73
Providing new training for DOT employees	1.77
Taking more active Dot leadership in region-wide, broad-based planning	1.79
Implementing new contracting procedures and practices, e.g., partnering, private sector alternatives, and design-build or design-build warranty	1.81
Seeking to hire, develop, and retain a diverse workforce and creating an organizational culture open to people with different backgrounds and skills	1.82
Changing administrative procedures to give employees greater flexibility and authority	1.90
Formulating new approaches to safety	1.90
Moving from centralized to decentralized decision making	1.94
Moving toward a "flatter" DOT organization, i.e fewer layers of management	1.97
Changing state legislation to allow more flexible approaches to transportation systems and funding	2.16

NOTE: Rating of 1 = "major effort" and rating of 3 = "not at all."

2.4.1. Nature of DOTs' Current Responses to Change

The results shown in Tables 10 and 11, along with the more detailed comments received from respondents, produce a set of broad categories of actions that DOTs are taking in response to the forcing factors. Each category of response is presented below with examples as well as comments about the responses. The categories are presented in order of the frequency of their mention by the respondents in the aggregate, though the answers do

RESTRUCTURING AS A FUNCTIONAL ORGANIZATION
Iowa

Under Director Darrel Rensink, the Iowa Department of Transportation has been transformed from a modal to a functionally organized agency. Carried out as a response to budget concerns and drives for efficiency -- as well as a real desire to be able to provide higher quality service to their "customers" -- Iowa DOT's new structure consists of a deputy director and eight divisions: Planning and Programming, Project Development, Maintenance, Engineering, Operations and Finance, Motor Vehicle, Field Services, and Director's Staff. The six DOT Transportation Centers (formerly known as highway division districts) will continue to operate from the previous locations, but in a new, broader, multi-program and multimodal framework.

not reflect an assessment of the importance of each factor in contributing to change.

2.4.1.1. Organizational Changes

One frequent response to change is to change the organization. The research results show that many respondents see state DOTs reacting to forcing factors through changes in the structure and internal operating processes. Organizational changes in state DOTs seem to follow several variations, including creating a more decentralized organization (or in some cases a more centralized organization); a functionally based rather than a modally based organization structure; or a flatter or more streamlined organization structure. Organizational responses also include actions designed to reduce the size of the organization and to make the organization function more efficiently.

Numerous states reported that they have effected major revisions in their organizational structures. For example, DOTs in Virginia, Oklahoma, and Oregon have reorganized to produce flatter organization structures. Virginia DOT (VDOT) has had two reorganizations in 3 years. Oklahoma DOT (ODOT) has reorganized to remove two layers of management and produce a flatter organization. In all three states, these organizational changes are generally credited with having a positive effect on the state DOT's ability to respond to change. An ODOT official commented, "ODOT is more susceptible to change at the top now; it responds more readily."

VDOT has moved several functions into field offices in five regions and is evaluating this change with the intention of expanding the concept statewide. It has established a special urban district office in Northern Virginia to handle all design and construction decisions for that urban area. Florida DOT has designated district secretaries to work with communities, local officials, and business interests on program and project questions in the field, involving not only highways but also transit and other modes.

Some states have made major cuts in the size of the DOT. VDOT has recently decreased its workforce by 974 positions through early retirement. ODOT has reduced its workforce by close to one-third, while Texas DOT (TXDOT) carried out a major early retirement program last year that induced a substantial number of the top-level career managers and experienced employees in the agency to leave their positions. A senior TXDOT official observed, "The retirement of older management will change the face of the department forever."

Several states are making an effort to change the culture of their DOT through change in the skills, experience, and attitudes of DOT leaders. ODOT's present director is not an engineer, a first for the department. A senior executive in ODOT observed, "DOT is shifting from a bastion of engineers." A stakeholder in Oklahoma complimented the new director as "a breath of fresh air." TXDOT replaced retiring senior managers with a more culturally and professionally diverse group of leaders. On the other hand, in Oregon, Pennsylvania, Florida, Connecticut, and Virginia, among others, respondents commented positively on the long experience and professional qualifications of their DOT leaders.

Although many respondents in state DOTs complained about bureaucratic constraints in areas such as personnel and purchasing, only ODOT reported taking actions to persuade the legislature to change such procedures.

2.4.1.2. Leadership and General Approach to Challenges

Many of the comments received during this study reflected an awareness of the need for DOTs to change how they think about their roles and how they perceive themselves as organizations. This category of responses related primarily to philosophy and attitude and thus was treated as distinct from a related category, forging new relationships with constituencies, which is discussed in the next section.

One key aspect of this type of response is leadership. Throughout the interviews, the respondents frequently referred to leadership as an essential ingredient in a DOT's ability to change in response to forcing factors. As noted in the previous section, respondents in Oklahoma and Texas both cited concerted efforts to bring nonengineers into the state DOT management. And in a number of states, CAOs were complimented as being extremely important in enabling the DOT to cope with changing conditions. Clearly, the quality of CAO leadership is seen as a significant factor in a DOT's ability to respond to factors forcing change, to guide and carry the DOT through the process of change. Several respondents commented on the long tenure of the leadership team in the state DOT as an advantage in carrying forward change over the time generally needed to redirect or transform such a large organization.

Another response to factors driving change is the adoption of new management philosophies and employee empowerment programs. One official of Missouri DOT stated very positively

DOWNSIZING AND FUNDING REDUCTIONS
Oklahoma

As a result of an almost nationwide trend toward downsizing government, the Oklahoma Department of Transportation (ODOT) has used attrition to go from 3,400 employees to 2,800 employees. The $18 million "saved" was then dedicated to construction. To keep up with transportation infrastructure needs and to expand the system for economic development, ODOT is working closely with the Oklahoma Turnpike Authority whose 600 miles of interstate-quality roads are completely financed by cross-pledged user fees (tolls). A proposed $1.6 billion turnpike package failed in 1994, along with a smaller $500 million reconstruction and extension package. The latter proposal is being reworked for a new submittal. Since taxes cannot be raised in Oklahoma without a vote of its citizens, the state's toll highway system -- begun in the early 1950s and now both mature and profitable -- is seen as the most effective method for major roadway growth in the state. Even though every turnpike ever built in Oklahoma initially relied for financial support on the older profitable toll roads, the idea of raising present tolls on existing roads to support new ones elsewhere has proven to be a very volatile issue.

DECENTRALIZATION AND CHANGING ROLES
Virginia

The Virginia Department of Transportation (VDOT), with a central office in Richmond and nine district offices, historically has had a centralized operation, but this is changing. Due to rapid growth in the "urban crescent" of the state, pressures have mounted for more attention to urban and metropolitan issues. As a result of this increasing urban development and a strong desire to bring decisionmaking closer to the people, VDOT has established an urban district office in the heavily populated Northern Virginia region, and has delegated considerable authority to this office. It has also added a planning capability to its urban area district offices.

In addition, business managers have recently been added to the staffs of all nine districts, and increased authority has been delegated to the districts in such areas as procurement and personnel administration. A major employee involvement program has been initiated agencywide.

As a further step to address metro issues, Virginia has established a separate Department of Rail and Public Transportation, separate from VDOT but also reporting to the state's Secretary of Transportation. These functions previously were handled by a division within VDOT.

that TQM "will have more of an impact in the future than anything," largely because of its focus on serving the members of the public who are the primary "customers." The DOTs in Missouri, New Hampshire, Connecticut, and Virginia have all undertaken programs to empower employees and improve their commitment to their "customers." New Hampshire DOT conducted an agency-wide survey of its employees; the CAO personally read each survey response and subsequently launched an employee-guided process for addressing the concerns and suggestions raised in the survey. Respondents expressed mixed views on the depth of philosophical and attitudinal changes underway in DOTs. Some, many of them DOT officials, noted far-reaching changes. An executive in an East Coast DOT commented, "DOT has quickly grasped what changes need to be made in our organization." Most respondents were more restrained in their assessments. One eastern state DOT official stated, "We are just beginning to change some thinking." The New Hampshire DOT advised that such a process takes many years and requires the sustained commitment of top management.

2.4.1.3. Multimodal Focus

Many respondents cited a more multimodal perspective in the state DOT as a response to the forcing factors. To some, multimodalism is a philosophical change; to most, it includes new funding and organizational priorities. One response to the pressure to be more effectively multimodal involves enhancing the role of public transit. Virginia has responded by separating the rail and public transit division from VDOT to create a separate, stand-alone department. North Carolina took a different approach, consolidating deputy secretary positions in the DOT and designating one of these to be responsible for transit, rail, and ferries. The former director of public transportation was promoted into this new position. Several other states report they

DOWNSIZING AND DECENTRALIZATION
Florida

Florida is an example of a DOT where extensive downsizing, decentralization, and privatization are being used to avert the staffing increases that could otherwise be needed to accommodate significantly expanded demands. Using design and engineering consultants has reduced the need for in-house resources in production and operations. The state is also expanding efforts to expand contract maintenance and privatize toll collection. Through those initiatives, the DOT is achieving a lower overall staffing level than five years ago. Decentralization has allowed for downsizing central offices while improving the efficiency and responsiveness of operations in the field.

Beginning in the late 1980s, the DOT shifted operational authority to offices in the districts, including major metropolitan areas, where employees work with local officials, MPOs, business and citizen interests on urban and regional transportation programs and projects. Positions that were once called "district engineers" are now designated "district secretaries," with responsibilities that cut across modes and functions. The district secretaries are generally career employees of the state DOT; they are not necessarily engineers. A female planner is District Secretary for District 5 in the rapidly growing area around Orlando, where coordinating plans and activities with community initiatives, economic development, and public concerns is critical.

REENGINEERING GOVERNMENT: PROJECT SLIM
Arizona

As part of the Statewide Long-Term Improved Management project (Project SLIM), the Arizona Department of Transportation (AZDOT) is "reengineering" -- reviewing its operations and implementing changes in programs and processes to improve quality and efficiency. Based on a recommendation from the state Office of Excellence, the Highways Division is implementing a reorganization effort in the engineering districts, expanding from 4 to 11 districts in order to respond to "customers" at a point closer to the community. The reorganization effort also calls for establishing project management as a new philosophy driving the way the division does business.

Throughout the DOT, managers have identified sponsors and teams in the organization to implement improvement processes. They have held stakeholder meetings. Every recommendation is backed by a "living" plan and every sponsor has to report regularly on progress. AZDOT is nearing completion of its implementation plan for the Motor Vehicle Division. SLIM recommendations have resulted in reducing the time to deliver a driver's license from 21 days to 5 days, with an eventual goal of instant issue licenses. The division is combining the offices responsible for drivers' license renewal and title and registration activities. Annualized savings are estimated at $4.6 million to date. While the recommendations mean a reduction of 200 full-time positions in the division, an important feature of the implementation plan was a redeployment program so personnel knew they would have meaningful jobs after the change.

have increased the importance of their transit offices in the DOT. The other primary response to the emphasis on multimodalism has been to increase consideration of other modes in policy and planning.

2.4.1.4. New Technology

The field research elicited relatively few comments about new technology as a response by DOTs to challenge and change. Some mentioned improved planning models for demand projection and air quality impacts; others mentioned technologies such as IVHS as forces that in themselves are driving change. New technologies are incorporated in several states' quality management and continuous improvement processes that target maintenance and construction, including new pavement materials, new construction machinery and processes, and information technology. In the course of "reengineering" practices or reviewing the effectiveness and efficiency of their operations, some of the states are also refining the focus of their research activities to produce technologies with more direct applications in their day-to-day work. IVHS is receiving increasing transportation re-

RESTRUCTURING AND DIVERSITY
Texas

In the last two years, the Lone Star State has seen some of the most sweeping changes in the recent history of state DOTs. A total of 1,700 TXDOT employees have left the agency, out of a total workforce of somewhat over 15,000. Enhanced incentives made retirement an attractive option for hundreds of senior DOT managers. The new state transportation commission also moved to create a culturally, professionally, racially and gender-diverse management team. Bill Burnett, Executive Director of the DOT since September 1993, views the experience as positive for the organization overall: "This gives us the opportunity to make changes we have discussed for years. It is always difficult to lose so much continuity and institutional memory, but it forced us to be innovative and creative in ways we'd never before considered."

TOTAL QUALITY MANAGEMENT
Missouri

Heavy use of focus groups of "customers" and employees of the Missouri Highway and Transportation Department (MHTD) is helping Missouri respond to current and future challenges. All MHTD managers have been trained in Total Quality Management (TQM) and now all 6000 employees are getting involved. MHTD has 350 volunteers who now train others in TQM. Said one official, "Surveys have been great! Employees like it. But it will depend on top management to 'walk the talk' to make it effective." According to former MHTD Chief Engineer Wayne Muri, the process better work: "DOTs will have to be more connected with public perceptions. The reality of politics is that state and federal legislators will be running for their political lives. Public agencies will have to be responsive to the public, in terms of where they want to go quickly and safely. I'm convinced that TQM will have more of an impact on the future than anything else. I believe that DOTs that do it will do well. Those that don't will be in trouble. It's a matter of survival in the business world. Customers get used to it in the private sector and come to expect it in the public sector."

EMPLOYEE INVOLVEMENT
New Hampshire

New to the department and interested in assessing where the organization was starting as he charted a course for the future, New Hampshire DOT Commissioner Chuck O'Leary asked his employees what they thought about their department. They had lots to say -- more than 500 detailed letters -- and most of their comments were not complimentary! Commissioner O'Leary read all the letters and in spring 1993 he wrote his own letter back to all employees. He said, "Here is what you told me! Morale is terrible, communications are poor, promotions are based on who you know, and pay is too low. These are the key points made by the more than 1300 of you who responded to our survey. There is a widespread belief that no one is talking to anyone. Communication is weak from the top of the organization and almost nonexistent between bureaus. . . . I want you to know that I read <u>every</u> response submitted. A number of you said 'good luck' and 'thanks for doing it.' Some people expressed the opinion that nothing will change. Most people had constructive suggestions, as well as complaints. The bottom line is all of your responses showed me that you care about this organization and you want things to improve. I assure you, they will." O'Leary started a comprehensive Transportation Employees Support Team (TEST) process bringing together employees from around the department to tackle key issues in the organization. They began with vision; they assessed internal concerns and external forces. The CAO and employees are working in partnership and they are hard at work on a challenging "must do" list.

PERFORMANCE-BASED MANAGEMENT
Oregon

Oregon DOT Executive Director Don Forbes says, "What gets measured gets done!" In line with the statewide "Oregon Benchmarks" program, Oregon DOT has established and publicly announced goals, and has instituted demanding performance monitoring systems to track progress -- and there is already significant progress to report. As part of identifying and meeting public goals, Oregon has developed strong relationships with MPOs, environmental organizations, and transit agencies. Led by its Commission Chairman and the executive director, the DOT developed the Oregon Transportation Plan (OTP) in 1992, with strong input from its stakeholders and partners. That effort led to a legislative budget initiative to provide funding for a truly intermodal transportation plan. The proposal has not yet been adopted; in a tight budget climate, the legislature focused on educational issues. But both the Oregon DOT and its allies are convinced that the transportation plan will be approved by the state General Assembly.

According to a business leader in Oregon, "DOT is doing something about bringing all those [stakeholders] together in dialogue and realizing what is at stake. They did a good job with OTP, but the people and the legislature were distracted with budget problems. [Transportation Commission] Chairman Mike Hollern was outstanding. They need some more people who can talk non-technical language when they go to the public and to interest groups. You can't sound like a bureaucrat when you're talking dreams. The message won't get through."

TOTAL QUALITY IN PAVEMENT
Colorado

In the demanding environment of Colorado, the DOT has a major challenge to maintain black-top pavement on state roads and highways. Then-deputy DOT director Dwight Bower (now CAO in Idaho) participated in the European Asphalt Study Tour with a team of U.S. transportation officials and brought back concepts of pavement design and maintenance that have now been adopted in Colorado. CDOT has worked closely with the Strategic Highway Research Program (SHRP) and FHWA to introduce new technology and field applications for improving black-top pavement performance in the state. By all the state's measures, the experience is working and pavement and overall highway performance is being substantially improved.

search funds, partly through the specific provisions in ISTEA; as IVHS technology is developed and put into operation, it will have further impacts on the way that transportation systems function, the way a state DOT sees its mission, and its relationships both to users of transportation and to private consultants and suppliers that design, install, and/or operate the systems.

2.4.1.5. Relationships and Procedures

The DOTs reported several initiatives designed to alter their relationships with other agencies, elected officials, citizens, and interests that together shape the environment in which the DOTs work. In Virginia, the secretary of transportation and the secretary of the environment signed an agreement to work together to expedite the environmental permitting process for highway-related projects. In Wisconsin, as in several other states, an extensive public outreach process is underway to inform the public about transportation issues. Wisconsin also has a "public intervenor" who has sued the DOT (WisDOT) to change its program development process. WisDOT, recognizing its role in shaping land use, formed a task force to investigate its role in land use policy. In other states, respondents reported that the DOT is altering its relationships with MPOs in response to the requirements of ISTEA.

2.4.2. Effectiveness of DOT Responses

The mean ratings of effectiveness, shown in the last column of Table 10, are based on respondents' ratings on a scale from 1 to 3, with 1 indicating that the action is highly effective and 3 that it is not at all effective. Most actions received an effectiveness rating of between 1 and 2, meaning that on average they were considered moderately to very effective.

The results of respondents' assessments of the level of effort DOTs are devoting to various specific management efforts and organizational change processes are shown in Table 11. Respondents rated effort on a three-point scale, with 1 as "significant" and 3 as "not at all." Most of those ratings were slightly better than "moderate." (It should be noted that most of the respondents

CREATING PARTNERSHIPS
California

With the myriad problems facing California, from rebuilding infrastructure damaged by earthquake, fire, erosion, and urban unrest, to air quality, to a lagging economy and rapidly changing demographics, the partnership of the state transportation department with local interests offers hope in turning California's future back to gold. The combination of a decentralized DOT structure and empowered local governments -- the "self-help counties who control their own considerable transportation funds -- creates a powerful force for decisionmaking at the local level in California. The response of the Los Angeles transit system during the rebuilding of the LA freeways and Caltrans' much-heralded rapid reconstruction of the earthquake-damaged roads and bridges have doubtlessly increased the reputation of both of those organizations. They have also shown the necessity of working together and minimizing bureaucratic delay in providing for the mobility needs of the new symbol of American megalopolis.

In the San Francisco Bay area, a partnership has been formed to link Caltrans with more than 30 other transportation and environmental agencies, with the MPO (the Metropolitan Transportation Commission) serving as the "glue." This partnership is committed to delivering better transportation in the face of economic, social, environmental, and political challenges in one of the nation's most demanding areas.

PUBLIC PARTICIPATION AND OUTREACH
Wisconsin

Wisconsin has a unique public official -- the "Public Intervenor" -- to take a stand for the interests of the public on the actions of other state entities. The Public Intervenor challenged Wisconsin DOT's trunk highway construction program on the grounds that the environmental evaluation for the program was not adequate. The DOT settled the resulting court suit by developing "TRANSLINK 21," a multimodal planning process with broad involvement of the public and improved communications, including aggressive, professional, high quality public outreach by the DOT. Wisconsin is proving that an informed public can become a partner in forging the future. The governor and WisDOT CAO Chuck Thompson agree that transportation -- particularly working in alignment with the state's citizens and businesses -- is a major factor in building and preserving the solid, healthy state economy.

who answered the question on the level of effort behind internal changes were employees of the state DOT.)

Respondents were candid in their assessments of the considerable need for change in transportation and in state DOTs, but most were generous in their comments about the DOTs' efforts to date in responding to their challenges. They were even more positive about prospects for future changes and improvements in DOTs. Although respondents often noted shortcomings in DOTs' responses, only a few were sharply critical, skeptical of the chances for DOTs to change, or hostile to the DOTs. Most respondents instead gave their state DOTs the benefit of the doubt; they cited numerous initiatives by the state DOTs and assigned moderate to high ratings on the effectiveness of their efforts to respond to change.

Often the survey results revealed very different perspectives on the changes going on in the DOTs by the persons inside the DOT compared with outside stakeholders. In one state, for example, the DOT officials reported having undergone a major reduction in force, while stakeholders interviewed in that state indicated that the DOT had not undertaken any major efforts to reduce costs. In other cases, DOT officials indicated they were taking new approaches to programs and policies, typically in directions that stakeholders were also encouraging, but stakeholders did not have the same perception of the direction or the effort of the DOT. That was particularly the case with respect to DOT processes for working with MPOs, undertaking intermodal planning and environmental enhancements, or opening up new processes for citizens and community groups to make their interests and priorities heard.

This evidence suggests that the DOTs are not doing as much as the stakeholders are expecting and/or that the DOTs are not successfully communicating to stakeholders and the general public the changes they are undertaking. Instead, the DOT may be judged by its past actions and historic positions. Observers may not hear the DOT's words or see its actions in the same way as they are taken inside the DOT. Or DOT officials may not be saying, or do not get a chance to express, the same things to the media and the public as they expressed in interviews. In any case, a more effective public relations and public communications program appears to be in order for state DOTs who are facing

TABLE 12. Strengths and Obstacles for State DOTs in Responding to Forces Driving Change

Strengths	Number of Survey Responses
Professional, skilled staff	77
Strong leadership; vision	60
Openness to new ideas	22
Credibility	12
Obstacles	**Number of Survey Responses**
Resistance to change	50
Funding	42
Politics	21
Bureaucratic inertia	20

such a discrepancy in internal and external impressions of what they are doing and thinking.

2.5. ANALYSIS OF PATTERNS OF CHANGE IN DOTs

The interview responses suggest a number of characteristics that affect organizations' capacities to respond effectively to change. Some attributes of state DOTs create strengths and/or obstacles for the departments in responding, while certain internal or external events and pressures can create a strong impetus or "trigger" for an organization to change. The historical evolution and experiences of state DOTs also have an important effect on how they are developing increasing capacity to respond effectively to current and future challenges.

2.5.1. Strengths and Obstacles for DOTs in Responding Effectively to Forces Driving Change

An important element in understanding how DOTs do or could respond to factors forcing change is to understand the characteristics that aid or impede a DOT in meeting these challenges. To develop this understanding, the study included two open-ended questions, one related to the strengths of the DOT and one asking for obstacles to the DOT in responding to factors driving change. The most commonly cited strengths and obstacles are shown in Table 12.

The strengths cited most frequently related to the people, including both the career staff and the leadership. Many commented on the high level of professionalism among the DOT employees. One CAO stated, "[Our greatest strength is] the quality of our people. They have a commitment to creativity and innovation. They are a learning organization. We don't park our brains at the door." Leadership is also commonly mentioned as an important strength of the state DOTs. Stakeholders in a number of states offered positive statements about the quality of leadership in the DOT. Table 12 also shows as a strength "openness to new ideas," which is related to the attributes of the staff and leadership but is not clearly limited to one or the other. Therefore, it is listed and counted as a separate category.

One obstacle to change cited frequently by respondents was funding. "Limited funds are making it very difficult to change," stated a Colorado DOT official. Politics was also cited as an important obstacle to the state DOTs in responding effectively to challenges.

The largest number of respondents observed that the difficulties state DOTs find in responding to factors forcing change may be in precisely the same areas that are also their strengths. Respondents report that the DOTs' greatest strength in responding to challenges is their people—their training and education, commitment to mission, professionalism, and loyalty to the organization. But when the challenge is to change, those same sources of strength can also be obstacles. Three of the top four weaknesses cited related to the backgrounds and attitudes of DOT personnel, even as the most often-cited strengths of the DOTs also pertained to the backgrounds and attitudes of the workforce.

One MPO official commented, "They [DOT] have a problem bringing in people who are not PEs [professional engineers]. Their engineering mentality can be a limiting factor in responding to the changes. Engineering expertise is a strength and a weakness." Other major obstacles relate to bureaucracy and an overall resistance to change in the state DOT. A state transportation commissioner from a western state observed, "The bureaucracy tends to hunker down. Managers at lower levels are not used to making decisions. In any organization, you have people who don't want change." A stakeholder in another western state said, "DOT is fighting change while the senior management is forcing change. Within the DOT at the division level and below, 7 of 10 people say that we don't need changes."

It seems clear, therefore, that whether a DOT can quickly and successfully respond to changes depends heavily on how well the organization is able to draw on the capacity and commitment of the people and also adapt their skills and practices to meet future needs. Respondents in and out of the DOTs report that changes in people's perspectives, methods of operating, and organizational culture take time, leadership, and reinforcement.

When asked how stakeholders might best help a state DOT in responding to current and future challenges, respondents inside and outside the DOT almost invariably suggested that stakeholders should be communicating more effectively and cooperating more closely with the state DOT. In particular, they urged more sharing of information, interests, and goals, as part of a more open and broadly participatory planning and decision-making process. They emphasized constructive cooperation rather than adversarial relationships. Outside stakeholders were almost universally interested in participating with the state DOT in shaping the transportation plans, systems, and policies for the future.

2.5.2. Depths of Change in State DOTs

The aggregate data and the comments of respondents show important factors are affecting virtually every aspect of DOT operations and programs. From the interviews and other research, it is clear that state DOTs are making many changes to respond to the challenges they see. Many DOTs reported reorganizing, sometimes more than once in the past 5 years. They also reported other efforts to reshape their operations to adapt to their new demands, including decentralizing important authority and functions, downsizing, and moving individuals with a broader range of backgrounds and skills into top positions. And many DOTs indicated that they were forging new relation-

ECONOMIC DEVELOPMENT
Mississippi and Texas

Economic development patterns are changing nationwide. The state DOTs are increasingly being called upon to respond -- often after the fact -- to rapid economic growth. In Texas, even before NAFTA, international trade was on the minds of DOT leaders, who shifted budget priorities to provide greater support in border areas, established a bilingual district office near the border in Laredo, and improved cross-border coordination with their counterpart transportation officials in Mexico. Expanded trade and transportation efforts at the border are complicated by opposition from environmental groups. A pro-NAFTA business leader in Laredo commented that environmental advocates "have been opposing NAFTA and opposing transportation improvements at the border. They didn't show any interest in border problems until NAFTA came up." The DOT continues to anticipate growth in international traffic across the border and across the state, and mapping options for accommodating it.

Across the state line in Mississippi, another development is driving economic activity and traffic growth -- riverboat casinos. The state, faced with inadequate funds for transportation, is using casino revenues to help pay for improvements on congested rural roads adjoining the new casino operations on the Mississippi River. According to MSDOT Executive Director Robert Robinson, "We're trying to respond to the gaming industry. It happened almost overnight. We have had to modify long-term plans, which is helping, but we need to do more. The Gulf Coast is a major problem with no quick fix." As both a spur and a necessary support for trade and business, transportation systems are a primary element in the state infrastructure that affects economic growth opportunities for the future.

ships with a wider spectrum of groups and interests, from other government agencies to community, business, and environmental groups. A few DOTs reported they were attempting to obtain new sources of funding for transportation; some were pursuing new legislation to cover their programs or changes in procedural requirements to allow streamlined administrative functions.

These actions are generally recent. Most of the state DOTs' initiatives along these lines appear to be preliminary and still seem to be viewed as tentative. It is not clear that the DOT reorganizations, for example, are producing organizations and ways of doing business that differ very much from the typical DOTs of the 1980s—modally organized, relatively hierarchical, focused on the same practices, programs, policies, and procedures they have built and become familiar with in the past. Several states offer exceptions; for example, Iowa and Oregon DOTs are organized along functional rather than modal lines. Virginia offers another exception; its transit division has become a separate department. Otherwise, DOTs' reorganizations are largely geared toward making the DOTs more efficient and reducing the size of the workforce.

This conclusion also extends to attempts to refocus the general management style or culture of the DOTs or to give them new direction. Only a few DOTs reported regularly updated strategic plans, ongoing strategic planning processes, or TQM or a similar approach to ensure that the organization and its employees are capable of meeting changing demands and challenges. The state DOTs show widespread awareness that they must become more oriented to serving the public, interacting and sharing perspectives and responsibilities with a wider range of organizations, and being more open to diverse people, interests, and views. A number of states have launched techniques to effect fundamental changes like these, although they generally have not been underway long enough to produce readily visible or dramatic long-term results.

In response to the question about whether the DOT in their state has a regular process for determining key public concerns and factors driving change, most of the people outside the DOT answered "no." They did not believe that the state DOT had a systematic or routine process to hear their perspectives or those of other stakeholders or the public in general. They often were aware that the DOT held formal hearings on specific project proposals or broader transportation plans, but they did not see hearings as having the same intention or effect as a regular, comprehensive process for listening and exchanging views, data, and priorities for state transportation goals and choices.

2.5.3. Stimulus for Change

The interviews raised an intriguing issue: What precipitates a major process of change within a DOT? While this question was not explicitly asked in the surveys, the issue came up frequently during the in-person interviews and, to a lesser extent, during the telephone interviews with CAOs. Thus, the study team was able to gather useful observations on the factors that actually lead a DOT to make internal changes.

These specific triggering factors should be distinguished from the large categories of forcing factors discussed in Chapter 2. All states must adapt to ISTEA requirements; most, if not all, states face financial pressures and also environmental issues. While these large forces in the overall environment for state DOTs are mentioned frequently as driving change in DOTs, both today and in the coming decades, they have not necessarily triggered major changes in the organizations; they generally do not seem to have precipitated significant and sweeping changes in the DOTs on their own, without an additional stimulus.

Precipitating factors tend to be events—a new official at the top, legislation, court action, or even a bridge failure—that

NEW DEMANDS AND NEW SOURCES OF SKILL
Connecticut

A bridge failure on the Mianus River bridge on I-95 jolted the Connecticut legislature and governor to provide new financial resources to transportation. The incident also heightened public attention to the DOT and sharpened their focus on their mission. Since becoming the chief administrative officer in 1991, Commissioner Emil Frankel has focused on the range of skills and perspectives needed to manage the DOT for the 1990s, and made a concerted effort to achieve a more diverse DOT workforce to meet the widening demands of that multi-faceted, multimodal state. Connecticut has long been known for a dedicated, highly professional DOT. Building on the DOT's reputation and commitment to fine leadership, Commissioner Frankel added a new dimension by creating a more diverse management team, drawing other appointed officials of the department from a range of experiences and geographic areas. The result has been an agency open and committed to change.

CONTINUOUS QUALITY IMPROVEMENT
Pennsylvania

In Pennsylvania, PennDOT has been on its "service quality" journey for more than a decade. The agency has successfully integrated a number of strategic planning/management efforts, performance measurement, employee involvement, and other management initiatives into its day-to-day operations and vision for the future. But for PennDOT Secretary Howard Yerusalim, who has been there from the beginning of the process, the most important focus of this effort has been continuous improvement. Most recently, PennDOT has incorporated a strong customer service and customer satisfaction focus in its improvement strategies. This move for continuous improvement -- vital for PennDOT and all public service organizations -- strengthens customer involvement and feedback and guides and monitors service delivery as perceived by the customer. Through surveys, customer satisfaction measurement models, training, and communications, PennDOT continues to build customer service principles into its daily responsibilities and into its strategic direction. Many dedicated organizations develop and launch new management methods and processes, with differing motivations. Only a few, like PennDOT, stay the course and have continuing added value for the people they serve.

stimulate DOTs to seek new strategies, organizational structure, relationships, or ways of doing business. Even though crisis tends to be the strongest impetus for real change, some leaders seem capable of anticipating changes and pressures and reorienting their organizations to meet them, thus themselves becoming the stimulus for concerted reassessment and improvement in the organization, its processes, relationships to its stakeholders, and mission and responsibilities.

2.5.4. Change Scenarios for State DOTs

In the face of the high degree of change in the forces influencing DOTs, it is likely that the kind of rethinking, "reengineering," and restructuring recently seen in business and industry and in some public agencies will be felt by an increasing number of DOTs. In this scenario, the changes evident so far represent only the beginning of what might be labeled a "sea change" for DOTs. If California is once again the forerunner for the rest of the nation, then the experience of Caltrans may foretell dramatic changes for other DOTs — for example, heightened focus on environment and air quality; increasingly diversified demands for transportation, alternative fuel vehicles and alternative financing methods; transportation management and control strategies; new technologies; multimodal planning; increasing local authority over transportation decisions; and funding. If that is the case, then some DOTs will take on radically different functions and core missions; some are likely to move to different organizational structures. Some will enter into different partnerships, for example, shifting authority to local or regional bodies, privatizing design and operational functions, or merging with environmental, economic, and land use planning agencies.

On the other hand, some observers see no such "sea change" in the offing. From their perspective, the basic state transportation programs are still in place, the traditional DOT missions of maintaining the state road and highway network continue to be core functions, and the policies and interests of most legislators and other key parties in the "authorizing environment" for state DOTs remain generally the same. In many states, the nature of the transportation system, public travel patterns and choices of mode, legislative mandates, and public goals have not changed dramatically; the DOT is broadly supported in its current roles. In some states, maintaining funding levels for transportation may not be a problem. Important differences between public- and private-sector functions may insulate DOTs from change and require them to continue to operate differently from businesses. Where that is the case, a CAO might conclude that incremental rather than radical change is in order at the DOT. In that scenario, labeled "evolutionary," the pace and extent of change will be modest, and transportation will likely continue to look much the same.

While these two scenarios—"sea change" and "evolutionary change"—illustrate the span of possible changes affecting DOTs, they do not address the question of DOTs' capacities and strategies for responding to the changes they do face.

The matrix in Figure 1 (see Summary) shows a range of possible levels of pressures or forces for change, arrayed against the possible degrees of organizational capacity to respond. The matrix takes into account that some state DOTs face strong forces for change, others face moderate pressure, and still others face very little pressure. It also reflects the fact that DOTs can respond in varying degrees to whatever pressures they face. Some states have taken bold actions, such as the restructuring and personnel changes in Texas DOT, downsizing in Oklahoma, and reorganization in Iowa and Oregon. Others have taken modest steps to change, and still others are adjusting to meet requirements, but are primarily operating as they have, and/or have only begun to contemplate making any conscious changes in their operations.

As the matrix illustrates, whatever the type or magnitude of changes a DOT faces, the organization can display varying degrees of capacity to respond. The DOT may be inflexible and not learning or adapting; it may be reacting to developments using the methods it has traditionally used and adopting practices proven effective by its peers; or it may be anticipating needs and opportunities, learning and applying technological, management, and process innovations on the "cutting edge" of change. Even in a state where the DOT is not seeing dramatic external changes, the DOT can exhibit effective leadership, internal management, and external relations, and demonstrate the capacity to understand and respond to whatever challenges arise and prepare for forces that may drive change in the future.

The matrix reflects the reality that there is not a single, uniform path for all DOTs. Some states face critical air quality problems and are required to make dramatic changes in policies and programs to fulfill the requirements of the Clean Air Act Amendments. They may be successfully leading the way toward technologies, processes, and practices to meet the challenges, or they may be overwhelmed. Their situation is different from that of many other DOTs, but every one of those organizations can still exhibit the same range of capacities to respond to their challenges. For example, a state may not be facing congestion, funding shortfalls, or demands for a fundamental change in mission. Some states, such as North Carolina, have substantial sources of dedicated state funding for transportation projects and considerable support for continuing their current programs without major change. Still, their response can be a conservative approach—one that does not open up to new partners and interests and does not take in new opportunities, information, and ways of working. Or they can take a dynamic, activist approach—assessing and preparing for conditions and needs, opening up processes for employees and other agencies and stakeholders to work together, building in changing social and economic goals and interests, setting a direction and vision, strengthening the skills of their workforces, improving their organizations and the effectiveness and efficiency of the services they provide, and developing plans and decision-making processes built on enhanced participation, knowledge, and understanding. All that can go on even when the substantive nature of the transportation demands has not changed.

Not all states fit in the same cell or will move from cell to cell of the matrix, and those that do will not necessarily follow the same path. The different circumstances and needs of the state DOTs have shaped the research approach for this study and also the approach to summarizing and presenting the findings. The states themselves need to recognize their own unique conditions and challenges and find the strategies and actions that will best enable them to respond effectively. The research suggests that, no matter what the particular circumstances, piecemeal reactions to pressures are not likely to be effective from a long-term perspective in addressing the issues and challenges facing DOTs.

The next chapter presents a flexible self-assessment "toolkit" to allow CAOs and others in the state DOTs to address in greater depth the conditions and the changes they face and assess the strategies and actions that may be most effective in responding to pressures and opportunities for change.

"If DOTs don't change, they will be dinosaurs."
—CAO, eastern state DOT

"The greatest strength of our DOT is the fact that we've decided we're going to lead and we're going to guide our own destiny before someone else forces us to change."
—CAO, western state DOT

CHAPTER 3

SELF-ASSESSMENT TOOLKIT AND GUIDANCE ON ACTION STEPS FOR CHIEF ADMINISTRATIVE OFFICERS

"The state [DOT] will have to be more connected to public perception. State and federal legislators will be running for their lives. Public agencies will have to be responsive to the public, in terms of [getting them] where they want to go quickly and safely. [Responsiveness] is a matter of survival in the business world. The customer gets used to it in the private sector and comes to expect it in the public sector."

—CAO, midwestern state DOT

As the field research for this study, documented in Chapter 2, shows clearly, the state DOTs and their leaders are aware of many internal and external influences that are driving change. The organizations are responding in a number of different ways, depending on the forces they are feeling and their particular situation and capabilities. But what can they do to respond more effectively?

A principal objective of NCHRP Project 20-24(9) is to "identify and discuss options by which state DOTs can make required changes . . . based on an assessment of capabilities." This chapter presents a series of matrixes principally designed for CAOs to use in making their own self-assessment. The matrixes present questions for CAOs and others working with them to consider, along with options and guidance on potential strategies and action steps to pursue.

Clearly, assessing the capabilities of all the state DOTs and offering guidance for such a diverse group of organizations and circumstances is difficult and complex. First, each of the 50 state DOTs has a unique history, a unique path to its current position, and unique resources. Therefore, each state requires different responses, both in substance and process and timing, based on its own conditions and circumstances. In spite of the differences, the extensive interviews for this research made clear this major point: the state DOTs face the same pervasive set of factors in their external environment, as well as many internal challenges and pressures for the institutions, their leaders, and their workforces.

Some details of change in the states and the state DOTs, impacts, current responses, and potential strategies have been presented in the previous chapters. From this general context, each state DOT and its CAO must, through self-assessment, decide on the best strategy for responding to the particular factors driving change in their situation. That is at the heart of the research findings, from the extensive field interviews conducted and the literature and experience brought together for this research. Guidance and options can be developed; they can be presented so as to facilitate understanding and application. But the right strategies and actions for a state DOT are highly particular to the state, the organization, its leaders, and its individual circumstances. Only those "on the scene" in the state can chart an appropriate course for responding to change. However, a variety of tools can be useful in guiding a CAO. This chapter and the supporting material in the appendixes represent a basic "toolkit" for CAOs.

Figure 2 (see Summary) shows the fundamental framework for CAOs in understanding and using the material in the report. The figure lists the five phases of the self-assessment "toolkit," indicates several basic questions CAOs should be thinking about in each phase, and cites the parts of the report that contain material useful as background or guidance in the various areas.

3.1. SELF-ASSESSMENT MATRIXES FOR CAOS

The five phases of self-assessment are the following:

I. Understanding the Issues (Information-Gathering Phase)
II. Synthesizing the Information (Synthesis Phase)
III. Assessing the Ability to Respond (Assessment/Response Phase)
IV. Determining and Selecting Appropriate Actions (Action Identification/Selection Phase)
V. Developing Measures for Judging Success (Performance-Monitoring Phase)

The following sections present a series of self-assessment "matrixes" of questions building on that framework (see Figures 3 and 4). The matrix for each phase suggests issues and options for CAOs to consider in that area. For each question, the matrixes offer four levels of responses for the CAO in making a self-assessment, which may point to the need for further strategies and actions. The self-assessment must be shaped by the nature of the agency and the experiences and choices of the CAO. The end of this chapter presents practical guidance and options for CAOs in identifying appropriate strategies and action steps and in measuring success, focused on Phases IV and V of the matrixes.

The matrixes are intended for consideration by the CAO first, and then for discussion with others, including the DOT top management team or other employees and stakeholders the CAO identifies as offering valuable insights and feedback. Answers to the questions will not be found in documents. Rather, they will come from the accumulated experience and discussions of the CAO and others in the DOT, and from sharing perspectives with peers managing other state DOTs. The responses will typically be quite specific to the circumstances in a particular state.

To carry forward the self-assessment process, Appendix I presents matrixes of questions related to five functional areas within the DOT: budget and financial services; planning; highway engineering and administration; transit and other public transportation activities; and personnel and administrative services. These functional area matrixes are designed for a CAO to distribute more broadly to managers and employees in the DOT. While some important divisions of the DOT may not be covered specifically by one of the five matrixes, many of the questions are generic or can be readily modified to fit the issues facing other functional areas. Therefore, the CAO should be able to use them to guide internal assessments throughout the DOT, so each area can participate in identifying needs and opportunities within and across the functional areas in the organization.

As noted by a stakeholder during the interviews, "So much is leadership." Clearly, initiatives for organizational improvement and change should reach across the entire DOT, including all the managers and other employees in the process. The CAO, however, must be leading the effort.

As context for the self-assessment, several comments on the leadership realities of contemporary state DOTs merit reemphasis here. First, the length of a CAO's term is often short. Most significant leadership initiatives or change processes in organizations of any size require several years to be implemented and to take hold. Nevertheless, CAOs must take charge and initiate action, wherever they may be in their term and however long their term may be. They must work toward making a lasting, positive impact and leaving behind a stronger organization. Second, but of primary importance, the CAO must build a strong, unified team of career managers and leaders, and must share with this team the full dimensions of agency management and direction. No CAO can manage all the projects, develop all the policies, oversee all the funds, administer all the regulations, or issue all the licenses.

As the project statement for this study suggests, "DOTs will have to respond to the various challenges principally by redeploying available resources (e.g., personnel, inventories, and funds), applying new technologies, and implementing innovative management techniques." To make those decisions, the CAO must know well enough the key priorities and goals that the public wants transportation in the state to serve, the roles and functions that are demanded of the DOT, its capacities and available resources, and the range of technologies and techniques that can be applied to better meet challenges. The matrixes of questions offer guidance in the essential considerations for a CAO in making the necessary assessments and judgments.

Finally, the appropriate CAO role will vary widely from state to state. In some cases, a CAO must learn to move in sync with an organization that is already moving rapidly forward. Some bending and sharpening of the focus may be necessary, but no radical breaks or dramatic turnarounds. In other cases, the challenge will be to introduce new perspectives and approaches to an organization that is not moving forward the way it needs to; some organizations may not have moved for some time. And, of course, there are infinite variations on the possible scenarios.

Following are several general suggestions for applying the matrixes.

3.2. GUIDANCE ON ACTION STEPS FOR CAOs

This section provides background and more detailed discussion of strategies and actions raised in the self-assessment matrixes for CAOs, focusing on the questions in Phases IV and V related to identifying appropriate actions and measures for judging success.

Phase IV: Determining and Selecting Appropriate Actions
Should/Could I Launch ...

1. Enhanced internal and external communications

In the states contacted during this research, neither the DOT employees nor the stakeholders felt they were adequately informed. What does that mean? It means that employees, outside interests, and members of the public do not know what the DOT is trying to accomplish, and don't know its priorities, overall policy, and program objectives. They only know the limited activity in which they are directly involved or what they see around the state.

If that kind of information does not come from the DOT and its leaders, then someone else will interpret the DOT's actions, goals, intentions, and principles. In the absence of information, the public, media, and employees will fill the void in their own way from the partial data they have; most of them will reach different conclusions than if the DOT were communicating more and better information to them. That can not only be damaging to the image of the DOT, but can also undercut its ability to function effectively, or to undertake specific actions even when such actions meet people's overall goals and interests. Considerable progress has been made in many state DOTs in improving internal and external communications. Most CAOs recognize the importance of effective communications to the understanding, capacity, and morale of employees, to the quality of the organization's performance, and also to the quality of external relations.

Still more can be done by building on the experiences of all the states, shared through AASHTO and other cooperative programs, and by bringing professional expertise to communications problems. Many professional communicators and consultants are available to advise or assist in this function. Many public-sector organizations can justify contracting or hiring experienced professionals in an area where the benefits are so clear and the costs of failure are so great.

Communications cannot be handled by only one person. An organization that communicates effectively has good communications throughout the workforce, across multiple levels and programs and functional areas, and out to stakeholders and the general public. Specific actions can include the following:

a. Training. For leadership and for all employees, formal communications training can be useful, both for internal communications to other employees and to outside observers and the public. Many seminars or classes are available or can be designed specifically for an organization, covering the meaning and role of good communications, as well as techniques and tools. The subject of internal and external communications can be built into supervisory and management training, and also is a logical part of training in TQM, diversity workshops, strategic planning and other internal processes. The DOT can often find a communications professional outside the organization who is adept at training employees and managers; many DOTs may have able communicators and trainers on the staff who can

Suggestions for CAOs in Using the Self-Assessment "Tool Kit"

1. Read or skim chapters 1 and 2 for background and important information on context. You may want to have your staff review and synthesize the material for you.
2. Review Figure 2. This presents the general framework for using the self-assessment "tool kit" and for understanding how the various elements fit into the rest of the report. It also suggests some basic questions for CAOs to consider in using the tool kit.
3. Quickly run through the five phases of the matrixes in Figure 4, considering the questions carefully to determine how they apply in your state DOT. Feel free to adjust the order or develop modified wording – as well as additional questions – to fit your specific situation.
4. Go back through the matrixes individually and complete the questions, checking the boxes that represent the response you find most appropriate to your circumstances.
5. Review the more detailed material at the end of this chapter to provide more explanation and illustrations of potential action steps keyed to Phases IV and V of the matrixes. These are intended to help build a foundation for action.
6. Based on your responses to the matrixes taken together, draft a list of action steps you should take, using the Action Implementation Plan at the end of the matrixes, sketching target actions, assignments, dates, and measures of success.
7. When you have completed the self-assessment, choose 5-10 individuals whose opinions you value -- perhaps your leadership team – and ask them to do the same assessment of the state DOT, from the perspective of the CAO.
8. Share the assessments of this team in a way that fits your organization and the individuals involved. (This is an important and sensitive step. The exchange is not likely to be successful unless you have developed some degree of teamwork with the group. If this is not yet developed, sharing the personal and perhaps critical assessments may be difficult; on the other hand, the process could also be used as a team-building device.)
9. After you and your team have carefully considered the questions and shared perspectives,the questions and maybe even some preliminary responses and action steps should be shared more widely. This can be a vehicle for developing a new sense of direction, strategies, and action plans for the agency.
10. Distribute the other matrixes in Appendix I covering five major functional areas of DOTs to managers responsible for those functions or groups of functions. Responsibilities in your DOT may not match precisely the titles of the matrixes, but you can identify officials and units that cover the general subject areas in the matrixes. Encourage managers and staff throughout the DOT to complete the matrixes and share results broadly with each other and with you.
11. Consolidate all the assessments and work with your management team to develop a comprehensive Action Implementation Plan for the DOT, building in continuing participation and feedback from key managers and staff.

Figure 3. Suggetions for CAOs in using the self-assessment "Toolkit."

provide in-house training to their fellow employees. Training can be extended effectively and at lower cost by using a cascade approach, i.e., training persons who in turn become trainers, until all employees have been covered.

b. In-person communications. Formal speeches and frequent occasions for visits, as well as less formal personal statements and discussions, should be part of a communications strategy. DOT leadership should create occasions for communicating in person priorities, plans, and actions, and should set the tone and pattern for others in the organization to do the same. For example, CAOs can hold periodic one-on-one discussions with senior members of the career staff, small get-togethers with a cross-section of employees, and larger group meetings to share

CHIEF ADMINISTRATIVE OFFICER
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the CAO Do I know the...	I have... Comprehensive information and systematic processes to keep me up to date	Good information, but information-gathering processes are ad hoc and spotty	Some information but far from systematic/complete data or processes for gathering it	Very limited information and limited processes for gathering it
1. Needs, interests, aspirations, and values of our citizens, businesses, and interest groups for transportation?	❑	❑	❑	❑
2. Ideas, needs, aspirations, and values of our DOT employees at all levels?	❑	❑	❑	❑
3. Interests, priorities, imperatives, and potential support for DOT from our governor, legislators, congressional delegation, key state leaders, community leaders and other opinion shapers?	❑	❑	❑	❑
4. Condition and performance level of our state transportation infrastructure (highway, rail, and other facilities and systems)?	❑	❑	❑	❑
5. Condition of our state transportation finances (revenues and expenditures) and major sources and uses of funds?	❑	❑	❑	❑
6. Efficiency and effectiveness of each of our major programs and operating processes (such as contracting and procurement) and effectiveness of our quality assurance in each case?	❑	❑	❑	❑
7. Actions and results of managing change among my peers in this state and in others?	❑	❑	❑	❑

Figure 4. Chief administrative officer guidance/option development matrixes.

perspectives informally. Visits to field locations should also include visits to nearby employee work sites, to see their work and their working conditions, listen to employees' questions and inquire about their interests, and communicate key department activities. Similar visits should also be scheduled for the CAO in headquarters; even though headquarters employees generally recognize the CAO, many of them do not have opportunities to hear directly from the CAO or communicate to the CAO in any organized way.

c. Printed and electronic communications. Many state DOTs are trying publications and electronic means for both internal and external communications, with increasing effectiveness. Among the possible options are regular employee newsletters and bulletins; periodic publications, fact books, or informational brochures (for example, to cover planned projects, major construction detours, progress on public goals); columns in the major newspapers covering DOT activities and objectives; internal electronic mail; Internet or other public access bulletin boards; video features or news for employees; radio presentations or call-in programs with top officials; regular interviews or discussions on community access cable television channels; and consumer "800" or other call lines. New technologies have made production processes much more accessible and also have brought down the costs so the overall expense is often well within range in light of the benefits.

2. Comprehensive outreach to gather information and feedback (internal and external)—an "environmental scan"

The top three factors identified in this research as forcing change—finances, ISTEA, and environmental factors—are all very much reflections of current public priorities. In fact, some argue that a central feature of ISTEA is the emphasis placed on open public processes in the DOT and its surface transportation activities. There should be no misunderstanding: The public **will** be involved. Historically, it has generally been common in the state DOTs' organizational "culture" to believe that transportation professionals "know best" in state transportation matters. This position is no longer appropriate or possible. For the DOT to deliver a quality transportation program that meets public needs and interests will depend on the quality of the public outreach. The agency must understand the public and also understand objective conditions and options for addressing them. A central theme from the field visits and this report is that DOTs need to be up to date on what is happening in transportation, and what the public is doing and thinking. That requires bringing together significant amounts of information, from sources inside and outside the DOT—qualitative knowledge of the goals and interests of the public; up-to-date information on developments in the state transportation system and in the larger environment for transportation, including environmental, natural resources, and human services areas; in the transportation field in general; and inside the department and the government. The DOT must

CHIEF ADMINISTRATIVE OFFICER
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION
(Synthesis Phase)

Key Questions for the CAO *Am I integrating the information to develop a sense of . . .*	I have . . .			
	A solid, comprehensive synthesis	A fair/good synthesis	A very limited understanding	Insufficient information to make a synthesis
1. Overall transportation priorities, public and political expectations for the state?	❑	❑	❑	❑
2. Factors driving change and political, agency, and community "climate" for change (including forces resisting change)?	❑	❑	❑	❑
3. Key "businesses" the DOT is in (highway administration, public transportation, driver and vehicle registration and licensing, etc.) and the unique needs, internal and external strengths, weaknesses, threats, and opportunities for each?	❑	❑	❑	❑
4. Human resource needs and potential within our DOT?	❑	❑	❑	❑
5. Needs for other resources (fiscal, technical, political, internal systems, etc.) to support priorities?	❑	❑	❑	❑
6. Where our department falls short when compared to best practices around the 50 states?	❑	❑	❑	❑

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

CHIEF ADMINISTRATIVE OFFICER
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND—METHODS FOR ASSESSING THAT ABILITY
(Response Assessment Phase)

Key Questions for the CAO	I . . .			
	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. My tenure, experience, political/general employment status, leadership style, and abilities enable me to lead a major effort at the DOT to respond to factors driving changes in my state.	❑	❑	❑	❑
2. I am willing to seek a professional assessment of my leadership and change management capacity, and afford myself appropriate training should that be desirable and feasible.	❑	❑	❑	❑
3. I have, or I can build, an inside "team" to support the improvement efforts.	❑	❑	❑	❑
4. There is external political, professional, and public support for changes designed to improve DOT performance (or can these be developed).	❑	❑	❑	❑
5. I will be able to leave this organization with the resources and learning skills necessary to respond effectively to future challenges and changes.	❑	❑	❑	❑

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

CHIEF ADMINISTRATIVE OFFICER
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the CAO (Answers may be shaped and directed by responses in Phases I-III) *Should/Could I launch . . .*	*This action is . . .* Appropriate, and we are doing it effectively	Appropriate, and we are doing it, but with limited progress	Appropriate, but we have not acted on it	Inappropriate because of specific factors at DOT
1. Enhanced internal and external communications?	❑	❑	❑	❑
2. Comprehensive outreach to gather information and feedback (internal and external)—an "environmental scan"?	❑	❑	❑	❑
3. Improved internal systems/processes for assessing condition and performance in individual "business" areas (pavement/bridge conditions, transit service, permits, registrations, and licenses, etc.)?	❑	❑	❑	❑
4. Near-term assessments of performance in selected key areas (i.e., fiscal, project delivery, procurement, grants management, training, audit procedures, legislative relations, planning and management systems [per ISTEA requirements], technology application, safety programs)?	❑	❑	❑	❑
5. Re-focused/directed human resource management initiative to develop and manage an appropriately diverse workforce (gender, ethnic, race, professional skills)?	❑	❑	❑	❑
6. Strategic planning initiative with broad/deep internal and external public participation to: • prepare mission and vision statements • develop a statement of agency values • develop agency goals • establish measurable objectives, timetables, and specific assignments • link policies and actions to the strategic plan	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑
7. Reorganization, reallocation, or redirection of human and financial resources to serve strategic missions and priorities more effectively and efficiently?	❑	❑	❑	❑

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

have continually updated data on transportation conditions and performance of various parts of the systems and operations; projections of trends for the future; and more subjective, qualitative information on people's perspectives on their needs and problems.

It is unlikely that any one source would be able to supply all that information; beyond that, these questions are at least partly subjective, and the DOT needs to obtain the perceptions of a wide variety of stakeholders to understand the issues. Thus, an effort at public outreach is probably the best means for gathering the essential information. In addition, the DOT can benefit from establishing channels for ongoing communications and the goodwill that a broad, open, credible outreach process can generate.

Some state DOTs already have undertaken extensive outreach activity. *NCHRP Report 364*, "Public Outreach Handbook for Departments of Transportation," Chapter 3, provides ideas and examples of processes for accomplishing this increasingly important function for state DOTs. Sharing information on processes and program activities with other DOTs also can help each organization avoid plowing the same ground. In addition, AASHTO and the USDOT and its operating administrations have experience that may be useful to a state DOT in developing an outreach effort and also in defining and compiling the desired data.

Outreach mechanisms can include statewide invitations for information and other input in official register notices, newspapers, or electronic media; scheduled listening sessions, hearings, and visits around the state; focus groups and surveys; and targeted research and data gathering in key communities and parts of the state. As a public agency whose work affects the entire population, the state DOT should be open to all the people, including historic partners and allies, adversaries, and people who have not been directly involved with the DOTs. Specialized outreach efforts to get to key users or suppliers of the DOT may also be advisable. Professional assistance from other government agencies with experience, or from nonprofit associations or private consultants, can often be useful in organizing outreach.

One relatively simple and practical model for building an understanding of issues and an initial outreach process is for a CAO to identify key individuals who could provide perspective, advice, and support. Following the pattern of the interviews for this research, a CAO could contact outside experts—by telephone, in person, or through written correspondence—and structure an informal exchange of views on overall direction for

CHIEF ADMINISTRATIVE OFFICER *Guidance/Option Development Matrix* **PHASE IV: POTENTIALLY APPROPRIATE ACTIONS** **(Action Identification/Assessment Phase)**		
Key Questions for the CAO **(Answers may be shaped and directed by responses in Phases I-III)**	**Yes**	**No**
8. (*NCHRP Report 331 contains a self-evaluation matrix in Appendix B, which includes a Strategic Management Checklist for CAOs. This is reproduced below for convenient use.*) (a) Is the CAO actively and visibly involved with the major planning and control activities of the organization? • developing goals and objectives • developing organization-wide priorities • deciding organization-wide strategies • setting primary policies • reviewing program plans • reviewing budgets • monitoring program operations • reviewing the performance of senior managers • providing an organizational structure conducive to strategy development	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
(b) Does the CAO seek the advice of senior managers on critical decisions?	☐	☐
(c) Does the CAO meet regularly (i.e., at least once a month) with senior managers, individually and collectively, to assess their performance and their units' in relation to established plans?	☐	☐
(d) Does the CAO willingly make the "tough calls" in a timely manner? • deciding among competing priorities • acting on poor manager performance • adjusting the organization when necessary • adjusting plans on the basis of new information	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

CHIEF ADMINISTRATIVE OFFICER *Guidance/Option Development Matrix* **PHASE V: MEASURES FOR JUDGING SUCCESS** **(Performance Monitoring Phase)**				
Key Questions for the CAO ***Do I have . . .***	***There are . . .***			
	Comprehensive and successful programs	**Fair to good programs, but with some gaps**	**Limited efforts, and significant room for improvement**	**Poor to no efforts in this area**
1. Indicators or "benchmarks" of success/progress for each major program, functional area, division, unit?	☐	☐	☐	☐
2. Systems and people to monitor the accuracy and credibility of performance measures and progress reports, and to give me regular, timely, "unvarnished" input?	☐	☐	☐	☐
3. Specific information and measures that are monitored and applied to drive the deployment of key resources (funds, people, and technology)?	☐	☐	☐	☐
4. Effective instruments and outlets to the public and key political and other leaders for communicating DOT's progress?	☐	☐	☐	☐
5. Performance appraisals for key staff that focus on strengthening capacities and achieving mission and goals?	☐	☐	☐	☐

Note specific areas for improvement and plans for action on the Action Implementation Plan form.

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

Action Implementation Plan for CAOs

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Figure 4. Chief administrative officer guidance/option development matrixes (Continued).

transportation and the DOT, priorities and needs, current performance of key elements of the system and DOT services, and opportunities for future roles and partnerships. As a CAO takes office, or as a new legislative term, budget year, or planning cycle begins, this kind of outreach can provide an extremely valuable source of information, interest, and potential support. Immediate but brief contacts or visits with many individuals or groups are often an effective first effort for the CAO. It often proves useful for the CAO to maintain regular conversations or other systematic contacts with the same range of individuals as the months and years go by, to get a "reality check" and feedback on how the DOT is doing.

To obtain the most productive input for the longer term, it may be worthwhile for a DOT to target its most intense outreach efforts on those individuals, groups, and avenues of outreach that have the greatest potential of providing the types of data and range of insights the DOT needs and wants to maintain. DOTs should particularly keep up outreach to strong and vocal public interest and special interest groups that participate most frequently in transportation issues and debates, encouraging them to keep up the exchange of information and perspectives. State DOTs must also maintain regular contact with local, regional, and national officials, including members of the state congressional delegation and the state legislature (notably members of the committees with jurisdiction and interest in transportation).

3. Improved internal systems/processes for assessing condition and performance in individual "business" areas (pavement/bridge conditions, transit service, permits, registrations, and licenses, etc.)

Greater responsiveness from all government is a growing public expectation. The complexity of the contemporary state DOT mission makes performance an imperative and extremely difficult challenge. Measures for the performance of roads, air quality programs, vehicle registration processes, transportation safety activities, or the overall transportation system are different in almost every regard.

In general, responding to and accomplishing public goals requires "benchmarking"; in other words, checking performance against norms elsewhere to gain an understanding of what level of performance is expected or is possible. Usually the most useful benchmarking involve comparisons with equivalent, parallel, or competing situations within an agency, and across agencies in the state or across states, as well as with private sector and international examples of responding to comparable challenges.

To do effective benchmarking and to keep track of progress most readily, measurements should be in quantitative terms,

involving indicators that are meaningful and credible to both employees and members of the public affected by the particular service. Measurement systems must rely on data that is acceptably accurate and reliable and can be collected without undue difficulty. Fortunately, the technology is now available to meet this need. For example, the public "feels" the condition of pavements and what it sees and feels can now be measured efficiently. If this measurement is continued, the public can be made aware of improved service and the agency employees can feel pride in their improved performance.

Not all areas of DOT activities and services are as amenable to measurement as pavement. The quality of services such as vehicle registrations and driver licenses may be among the most readily measured and monitored. In those areas, the public also has a feel for the level of service; citizens have frequent enough encounters with the operations so improvements are noticeable and appreciated. However, in measuring performance in transportation, a DOT must give attention to what transportation facilities and services allow the public to accomplish, and not just the physical outputs they deliver.

The public has an ongoing, essentially intuitive process for assessing pavement condition, congestion, air pollution, or licensing and registration services. They communicate their "findings" to their elected representatives by making complaints, or simply by calling them for assistance for a service that the DOT should be providing. Anticipating needs and problems and keeping up systems conditions and performance is by far preferable to receiving and reacting to complaints. Most important, as noted in items 1 and 2, the DOT must be in continuous touch with stakeholders and the general public, so public goals, not internal DOT measures, are the foundation of assessments of performance.

From the field work portion of this research, it is clear that many of the state DOTs are collecting data in almost every area, and some such as Oregon DOT are undertaking agency-wide benchmarking and performance measurement, and are managing according to performance goals and measures. Sharing experiences more broadly between the states can increase understanding of performance measurement and facilitate adoption of performance measures and performance-based management in state DOTs.

4. Near-term assessments of performance in selected key areas (i.e., fiscal, project delivery, procurement, grants management, training, audit procedures, legislative relations, planning and management systems [per ISTEA requirements], technology application, safety programs)

The performance capacity of a state DOT depends heavily on the internal performance of key functional areas, including budget and fiscal services, procurement, grants management, training, audit, legislative relations, planning and management systems, project delivery processes, and technology application. A CAO and top managers should be aware of how employees and funds are deployed, the role each functional area and unit plays in supporting the overall goals of the organization, and how efficiently and effectively each functional area is performing. The managers and employees in the functional areas and the other units they work with must be aware of these issues and regularly assess their performance. For an organization as complex as a DOT to be managed and operated effectively, each major function and/or program should regularly assess and report on its performance; CAOs should consider distributing all the functional area matrixes to all the program and functional area managers, to use in assessing their own areas and in offering feedback to the other units and functional areas with which they work.

CAO decisions on launching special assessments of individual functional areas in the DOT should relate to the answers to the questions in the earlier phases of the self-assessment matrixes on identifying issues and capacities. Priority areas for assessment might be selected on the basis of the number of interactions they have with others inside and outside the DOT, the number of complaints about their operations revealed in "customer surveys," the proportion they make up of the total organization's budget, or the employees' and managers' interests and commitment to review and "reengineer" their activities. Particular consideration should be given to any offices that have a significant influence on the organization's capacity and strategic resources.

The range and nature of the functional areas in a DOT depend on the organizational structure, historic experience, and specific operating practices of the DOT. The matrixes in Appendix I are targeted to five functional areas that are generally critical parts of a state DOT's programs and operations and its ability to perform effectively — budget and financial services; planning; highway engineering and administration; public transit and other activities related to modes of public transportation (rail, air, water); and personnel and administrative services.

Launching this kind of review and performance evaluation has an added benefit beyond simply providing information on how effectively the various functions of the DOT are being performed. First, in the process, the CAO can encourage managers and employees to actively and continually think about how well they are serving the organization's missions and to identify areas for improvement. In addition, a CAO should consider the value of establishing a personal reputation for intellectual/managerial curiosity — interest in having current information and understanding on what various functional areas are doing and how they relate — and a reputation for asking constructive, performance-oriented, if difficult, questions and comprehending the implications of the answers.

5. Refocused/directed human resource management initiative to develop and manage an appropriately diverse workforce (gender, ethnic, race, professional skills)

Just as ISTEA and state-based actions have moved state DOTs into new activities and missions, so these external changes have expanded requirements for new human resources outlooks and skills. Road and bridge building and maintenance remain a core business for the typical state DOT. Thus, engineering and design and operational skills are still required; indeed they must be enhanced to cope with new technology and the imperative to "do more with less." But if a DOT is to move successfully into its evolving roles and missions, serving new public interests and demands, it needs to build a new, broader range of skills and professional disciplines in the workforce. A different workforce balance will also be required in many state DOTs if they are to reflect the full capacities, voices, skills, and interests of the population, and serve the goals of justice and equity.

This new workforce balance can be a difficult, even divisive, matter for many state DOTs in which the core highway functions still predominate. State DOTs historically have been shaped and led by civil engineers, an appropriate emphasis when building

new roads was the greatest mission and mandate. Today, CAOs need to build competencies in other areas, while they still maintain competency in the core business of building, maintaining, and operating roads and bridges. Keeping up the necessary expertise and capacity in the highway engineering and administration is a particular challenge for many DOTs facing high rates of retirement in the staffs involved in highway functions. Both to fill the positions and to broaden the skill base and perspectives in these areas, people with more diverse backgrounds and skills must be given opportunities to take these positions; both the professional standards and the morale of these core staffs also have to be maintained.

The CAO must set the tone. Hiring, recruiting, and promotion practices must be assessed from an unbiased viewpoint, one that perhaps involves representatives of a range of groups and interests inside and outside the DOT. The key is the standards and criteria used to determine qualifications and competence for professional positions. The qualifications for each key position must be geared to essential requirements only, so that the application and selection criteria do not exclude strong potential candidates. Those standards that make the most sense for the future performance of the program and the organization, and incidentally for the balance and functioning of the workforce, are not necessarily the same as the standards and criteria that have been imposed in the past (including particular training and education and previous employment experience). As most DOTs' history proves, bright "quick-study" individuals can learn much of what they need to know on the job, even if their specific background does not appear to be a conventional match for the position.

Effective outreach to expanded and more diverse audiences can help identify and attract a wider range of applicants to DOT positions. Recruiters should include energetic and capable representatives of DOT leadership, along with representatives from many different backgrounds, functional areas, and levels in the organization. Cooperative programs with schools and expanded in-house training also offer mechanisms for extending the pool of qualified and interested candidates for DOT positions. One young employee interviewed in the course of this research, who had worked for several years in a state DOT, commented that he had not expected to stay more than a few years; however, once he was there and realized the commitment and caliber of the other DOT employees, the support he felt from the organization and his colleagues, and the sense of value in the work they were doing, he decided he would like to make his career in the DOT.

It is important for DOT leaders and managers to offer personalized support and development opportunities to every employee, and to track employee satisfaction as well as reasons for staying or leaving the agency. The department should continuously collect and report accurate and complete data on hiring, promotion, and retention experiences in different functional areas, with special attention to the experience of individuals with various backgrounds and skills. Human resources personnel need to take on new roles and priorities, and all DOT managers need to take human resources management as an ongoing responsibility. Ideally, career and appointed leaders in the department would bring a balance of management and technical competencies, and see management and development of employees as a vital part of carrying out their jobs.

6. Strategic planning initiative with broad/deep internal and external public participation

Many state DOTs have undertaken some form of strategic planning effort, and those experiences can provide valuable background for future efforts. *NCHRP Report 331*, dealing with strategic planning and management, also provides a valuable reference in this area (see below, item 8). The following questions provide a framework against which such efforts can be evaluated:

a. Do you have a clear vision and a strong sense of mission related to the emerging expectations of your citizens?

b. Do you have goals and benchmarks against which progress can be measured?

c. Has some representative group of employees been involved in developing the vision, mission, goals, and measures of success?

d. Do you have a team-based action plan for meeting goals, with specific objectives, timetables, and assignments?

e. Is there clear, unambiguous accountability for all the action steps leading to meeting goals and objectives?

f. Are there clear measures to chart progress toward the objectives from start to completion?

g. Are budgets tied to achievement of the goals and objectives in clear, positive ways?

h. Are the process and products fully integrated with day-to-day management? In other words, do decisions reflect closely what the agency has determined to be strategic priorities, values, and goals?

7. Reorganization, reallocation, or redirection of human and financial resources to serve strategic missions and priorities more effectively and efficiently

DOTs generally have well-established structures and organizational relationships. As complex organizations with relatively immediate and ever-increasing demands on them, DOTs also are likely to offer considerable resistance to organizational changes. CAOs must be aware of and respect the existing structures and systems, and both the people and processes who must be involved in any significant changes, whether in budget allocation, position titles, or organizational structures and relationships. Some changes, for example, require a change in the state law creating the department; others require approval of the governor or another official, or concurrence of a union or other employee organization. All these types of changes require at least tacit support of most of the individual employees and managers involved. On the other hand, many employees have their own hopes and plans for how the DOT could be better structured and operated.

In spite of the difficulty of making significant changes in an organization, a CAO needs to consider whether resources are appropriately, efficiently, and effectively deployed, and whether the organization, mission, and relationships of various units serve the overall goals of the agency as well as they might. There is no ideal allocation or structure. Conclusions on areas for improvement may flow from personal observations; some can be based on assessments of functional areas, public demands, and system condition and performance (see items 3 and 4 above). The CAO also needs to evaluate structures, practices, and experiences in other state agencies and other DOTs, and weigh the possibilities for improving performance against the costs of disrupting the institution, or absorbing scarce resources and atten-

tion of executive and legislative leadership that might be better used for other priorities.

8. Strategic Management Checklist from *NCHRP Report 331*

The questions included in the matrix for the CAO are reproduced from a larger report on strategic planning and strategic management, "Strategic Planning and Management Guidelines for Transportation Agencies," by John Cameron. These particular questions relate to both the leadership capacities and management actions of the chief executive. Appendix J presents the full list of questions from Appendix B of that publication, including questions for senior managers, staff managers, line managers, and various processes in the DOT as part of a comprehensive strategic planning and management process. The text of that report offers additional background information and guidance on leading and managing an organization according to a strategic vision and agenda.

The questions in the matrix provide useful benchmarks of how well a CAO is doing at strategic leadership. If a CAO wishes further technical assistance or assessment in these areas, assistance is available from public and private sector advisors and consultants in strategic management and organizational leadership skills such as represented in these NCHRP materials.

3.2.2. Phase V: Measures for Judging Success

Public pressure for greater government accountability is a theme in virtually every public opinion poll and every discussion of public administration. State DOT employees have a strong history of commitment to public service. However, the values and culture of most DOTs was built around the notion that the agencies knew what the public needed and wanted and they should be given substantial freedom in delivering projects to meet those needs. The typical DOT can point to decades of managing multibillion dollar programs with very few breaches of public trust.

But in the 1990s, state DOTs face additional missions under ISTEA and the Clean Air Act, expanding public expectations, and more urgent demands for transportation services, accountability, and greater public involvement in setting goals and determining how those goals will be met. The public has made its case with state legislatures and with the Congress; consequently, state DOTs feel immediate pressures to communicate more effectively what they are doing with public resources and what those investments are accomplishing for the people. Those pressures require more and better data and measures of effectiveness, so the state DOT can report its performance to the public and to political leaders. *NCHRP Report 357,* "Measuring State Transportation Program Performance," is a useful reference for this topic. It contains a compendium of program performance measures and indicators commonly use by state DOTs.

The heightened public attention and expectations require a great deal from the DOTs and their leaders. The CAO cannot escape personal involvement in performance issues. For performance monitoring to work, the CAO must know and apply the measures of success; in particular, the CAO must keep up with actual performance records relative to those measures DOT-wide and in each functional area. If he or she doesn't show a vital concern with performance and accountability for progress toward objectives, others cannot be expected to. (Because of its importance, this topic was also treated as an action step in item 3 in Phase IV above.)

Do I have ...

1. Indicators or "benchmarks" of success/progress for each major program, functional area, division, unit

In their dealings with private businesses and in their observations of services of all kinds and descriptions, the public develops standards of what it expects and/or will tolerate. The public may do this quite unconsciously, but it does it. So to be judged successful, a state DOT should set standards for its various services. It should "benchmark" them against exemplary service levels and "best practice" standards that others are achieving in similar or parallel types of services and products. As practices in other organizations are improved and the DOT raises its own performance, the DOT should adjust its benchmarks, so it always has a goal to attain.

2. Systems and people to monitor the accuracy and credibility of performance measures and progress reports, and to give me regular, timely, "unvarnished" input

Effective performance measurement systems require extensive data collection, evaluation, and reporting. The question spells out the difficulty inherent in the process. Effective measures require solid internal systems, trained staff people throughout the organization who support and implement the system, and credible data and performance indicators. All are scarce commodities.

Among the states visited, several have well-established processes for measuring and monitoring performance. The best advice to any state intending to do more in this area is to encourage senior staffs to learn from other organizations' experience, to bring in trained people to offer technical assistance, and to arrange personnel exchanges to those other organizations to transfer the techniques and knowledge.

3. Specific information and measures that are monitored and applied to drive the deployment of key resources (funds, people, and technology)

This consideration is absolutely critical. It is of little consequence simply to have measures of performance. What is important is that this information is used in identifying needs and opportunities and guiding the strategic decisions that can lead to improved performance. Evaluating the performance of programs, units, and processes is essential, including assessing the quality of goods and services and also analyzing the causes of any problems and potential means for correcting them. Budget officials need to be part of reviewing and implementing the results of performance evaluations, so their recommendations and actions affecting resource allocation will reflect assessments of which investment options achieve the most effective, efficient performance outcomes.

State DOTs have become well practiced in assessing corrective actions to take if the condition of a bridge is measured and found to be seriously deficient; the visibility and risk of the situation generally mean that resources are redirected to remedy the problem. If, however, the drivers licensing or vehicle registration processes are measured and found to be neither timely

nor reliable, the solutions are likely to require indepth operations analysis, market research, and organizational change. These types of analyses involve considerations with which most DOTs have far less experience. Improvement may require training and/or reallocation of persons; it may require major systems overhaul, a new management approach, or new relationships with a union, or a combination of all of these. The point is that measuring the quality of existing service is a first and necessary step toward improvement. But improvements will only be made if the organization is prepared to follow up on the findings, so the measurements are reflected in decisions and actions.

4. Effective instruments and outlets to the public and key political and other leaders for communicating the DOT's progress

Transportation facilities, congestion, air quality, safety, economic development, mobility, and access all have considerable public visibility, and in the past decades they have also become more politically powerful and sensitive issues. Thus it is necessary and inevitable that the DOT and its leaders interact with political leaders in the legislature, the governor, and local, national, and regional officials and business leaders. Effective CAOs will stay up to date with the policy goals of the governor, legislature, congressional delegation, transportation commission, or another decision-making body for the DOT. The CAO must also understand or develop links between transportation and other political priorities.

Many in professional roles have little understanding or tolerance for political concerns. In fact, many may feel embarrassed and uncomfortable at any exposure to political considerations, conditioned perhaps by the ethic of the professional engineer. DOT employees may also be deterred by stories of past abuses of patronage and contracting processes in construction, as well as the record of political support for what transportation professionals at least in part view as low-priority or ill-advised projects. Every public-sector organization needs to recognize that the people are the reason for the existence of the agency and its programs, and the basis for its projects; "politics" in a generic sense are the means for people to give voice to their interests. The public's business can't be done without some contact and cooperation with the people and their elected (political) representatives.

The CAO should protect DOT employees from getting into essentially political decisions and dealings, but CAOs also should communicate to employees the policy goals of the governor, legislature, and other policy-making authorities in their "authorizing environment." DOT managers and employees need to share perspectives on important policy, partisan, or constituent interests.

Likewise, DOTs have an obligation to share their perspectives and information with the people and their elected representatives. It is a truth of government service, and indeed of service in many contexts, that "You must not only do good, you must be perceived as doing good." When the DOT has good results to report on its public commitments and goals, they must be shared widely. For the sake of credibility, the results must also be shared when they are less impressive than the employees and leadership might wish. That is what measuring and managing for performance means; that is the commitment to the public and the entire "authorizing environment" that comes with developing goals and establishing performance targets. If the CAO doesn't share results when they are available, someone will always find out. It is far better to follow the cardinal rule in political life—"no surprises."

Key governmental leaders should be kept informed about the DOT's activities, plans, and priorities, to develop a framework for them to understand the performance results when they are reported. By maintaining communications and accountability, a CAO can reinforce a reputation for honesty and openness and maximize chances of obtaining others' support in addressing both priorities and problems. Any other course has a far greater likelihood of embarrassing failure.

5. Performance appraisals for key staff that focus on strengthening capacities and achieving mission and goals

The only way to get performance on organizational goals is for managers and employees at all levels to focus on achieving them. One means for reinforcing employees' awareness and commitment to the goals is to build them into individual employees' and managers' performance standards and the overall appraisal process.

Effective staff appraisals must include several ingredients. First, appraisals should be based on clear goals and objectives and mutually agreed-upon indicators of success, tied to key missions and performance measures for the organization related to the individual's areas of responsibilities. Employees at all levels must be given frequent feedback, good and bad, on how they are doing on their assignments and objectives, as well as comprehensive periodic evaluation of their performance. The links to organizational goals should be well defined and the targets must also be within the employees' practical capacity and resources.

Team assignments and performance measures are often as critical as individual targets, because they draw attention to the importance of working together and the fact that the organization cannot reach its goals through the work of one employee alone. The efforts and outcomes must go beyond one individual to reach across the entire unit and to other units in the agency and in many cases to partners outside the agency. One element of performance should be the feedback from that broader range of contacts and relationships.

Managers in particular should be assessed on the basis of how well they communicate organizational goals and performance measures to their staff, the mission and roles they emphasize, how well they develop and apply the capacities and potential of their employees, the relationships they create and encourage with other units and functions, and the leadership, support, and resources they give staff.

CHAPTER 4

CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Virtually everyone interviewed for this research could offer several major factors driving change in transportation and the state DOTs. Budget and financial constraints, ISTEA, environmental requirements, economic and demographic changes, patterns of use and demand for transportation services, needs to rehabilitate and maintain transportation facilities, proposals for new highways and other transportation options, changes in the demands on and demands from the DOT workforce—the list is long. What can we conclude from the results of the field research and considerations of potential management approaches to change? This chapter presents conclusions and suggestions for further research.

4.1. CONCLUSIONS

The challenges and demands on state DOTs are considerable. There are two key points to highlight. The first relates to the substance of the challenges: across the country, stakeholders and DOT officials see the need for their DOTs to take a new look at their mission and the overall challenge of assisting the state to meet society's goals, whether they involve the health of the economy, the life of their communities, or the state of the environment. Many respondents inside or outside a state DOT want the agency to continue to do its current job and to do it better. But all of the state DOTs and their leaders have to deal with state budget and finances, with ISTEA, and with evolving public demands on the transportation system and the organization. They all face, to varying degrees, questions of the economic, social, and environmental effects of transportation. They all have to continue to learn and apply new technologies. They all face the challenge and opportunity of working with and developing the workforce, and managing and structuring an effective organization for the future. The weight and priorities on those factors clearly differ across states and DOTs.

The second point is a process point. Most of the stakeholders, as well as DOT employees, want to be included in transportation debates; they want to participate in shaping the direction of the transportation system for the future. Respondents appreciated being asked their views. All had something to say, and they contributed meaningful and useful answers.

The project created an opportunity for dialogue. The interview guide allowed people to step back and take a longer term, more strategic view of the current and future situation for transportation and the state DOTs. Some had difficulty taking that perspective, but most had clearly thought about the question before and had a sensitive, informed view. Some of them knit together the diverse challenges they saw and painted a broad, integrated vision of transportation and the larger environment for the future.

The interviews underlined several key lessons: the need for broad participation in setting goals and developing plans for transportation, and the importance of taking a strategic "big picture" view of the transportation system and the overall environment in which it functions. The nature of the responses suggests that the DOTs cannot succeed in their mission unless they take a broad, systemic view. And no state DOT can understand its mission or do its job without the involvement of the public—the individuals, businesses, and other interests that transportation as well as every other public service agency is supposed to be serving.

As the study has consistently emphasized, all the states are different, and they face differing types and degrees of challenges and change. No single source or individual can provide all the information and skills and tools to understand and deal with the diverse forces that a state DOT faces. But by considering the general direction of the responses and suggestions in the research and undertaking the same kind of outreach and analysis as the research team designed for the study, each CAO and functional area could put together a more complete picture of the specific challenges they face and a valuable beginning toward the processes and approaches they need to take to respond.

Understanding the key issues is an essential starting point. Knowing the condition and performance of the transportation system and the various DOT programs and functions is always important, no matter what roles and responsibilities the DOT is assigned. Using funds efficiently and wisely, pursuing sound priorities in line with public goals and interests, keeping constructive relationships with other parts of government and the wide range of stakeholders—those responsibilities are also vital for any state DOT to do its job. The public, the stakeholders, are the basis for any vision of transportation; the employees form the internal organizational capacity to turn the public goals into reality. What they do makes the performance and reputation of the organization. They are the ones who have the greatest part in determining how well the DOT funds are used; their knowledge and understanding can have significant influence on the information and support of the public, legislative, and executive leaders at all levels; their voices carry the message of the DOT to the stakeholders and the stakeholders bring back the voices of the public.

A DOT's job is never as simple as just doing what someone else asks or directs. DOTs must synthesize the information related to public interests, needs, and options. They have to put that information into a framework based on public values and

measures of success, and establish priorities, strategies, and action plans. DOTs should not confuse "responding" with "reacting." A reaction is too often closer to an automatic reflex, without thoughtful reflection and assessment of how the new challenge fits into a larger context. The latter is what this report is designed to encourage—strategies for developing informed, considered, and effective responses that work together to achieve broad public and organizational goals.

The "toolkit" of matrixes and guidance in this report provides suggestions of questions CAOs and their organizations should ask themselves in understanding the issues, synthesizing the information and perspectives, and developing effective options for strategies and actions that will accomplish their objectives.

4.2. SUGGESTIONS FOR FURTHER RESEARCH

This research has revealed considerable information, insights, and suggestions for state DOTs in responding to change. The study raises numerous additional questions that the state DOTs as a group or individual DOTs might benefit in studying further.

The matrixes or templates should be applied in practice. The report is designed to allow a CAO to respond to the questions in the matrixes in Chapter 3, share the questions and perhaps preliminary perspectives with others inside or outside the DOT, and build a broader understanding and commitment to addressing the top-level opportunities and needs identified. The five more detailed functional area matrixes in Appendix I are designed for the CAO to provide to managers and employees throughout the DOT so they can assess their own areas' challenges, capacities, and options. These various instruments will only have value if they are used, and if the results are reviewed and applied.

To make the matrixes easier and more flexible for CAOs and others to apply, it would be useful if they could be presented in a more interactive format, using a standard office computer. That would allow managers using the matrixes to follow a clear path through the questions and options, depending on their individual answers; to move quickly to related materials in other parts of the text, tables, or appendixes, or even to enter modifications, responses, comments, and action plans within the same format and files.

The process of outreach and discussions with a broad range of DOT officials and stakeholders in the states produced a rare richness of information and perspective on transportation challenges. To have its maximum value for the state DOT, that type of process should be maintained by each DOT, and the same principles of outreach and listening should be built into further plans for addressing the range of challenges, interests, and stakeholders faced by the DOT.

In such a dynamic field, the factors driving DOTs undoubtedly have continued to evolve since the field work for this study was conducted; the picture presented by the respondents and the nature and status of the DOTs' challenges and responses have changed. More current data and information would be useful. The questions are important enough that for their own interest and learning, the state DOTs as a group should begin to collect longitudinal data on the evolving challenges, response options, and the effects of both their own efforts and the external influences on them. As this report highlights, many DOTs are building experience with budget pressures, legislation, leadership change, downsizing, and internal management initiatives. The state DOTs, their states, and transportation systems would benefit from continued knowledge and assessment of those experiences, as the lay of the land evolves—and particularly at this critical time for carrying out the provisions of ISTEA and the Clean Air Act and dealing with financial constraints.

This subject area—information and advice to state DOTs on how to respond most effectively to their changing challenges—will always be a "work in progress." The state DOTs are constantly facing new forces and taking actions to adjust and respond. They are truly "laboratories" for experiments in how to decide what services to deliver and the best means for delivering them. The only way to learn and profit from that ongoing process is to continue to observe the experiences, and document and evaluate them as the organizations go forward. With the ever-increasing range and degree of challenges DOTs face, the significant effect their actions have on public well-being, and their record of successful leadership, organizational performance, and achievement of public goals in the past, the question of effective leadership and management response to change appears to be an important avenue for constructive research in the future.

APPENDIX A

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

RESEARCH PROJECT STATEMENT

NCHRP Project 20-24(9), FY '93

State Departments of Transportation—Strategies for Change

RESEARCH PROBLEM STATEMENT

State departments of transportation (DOTs) are continually evolving because of planned and unplanned reactions to internal and external influences. Recently, however, the pace of this evolutionary process has greatly accelerated, so much so, that many state DOTs must rethink traditional ways of doing business. Influences contributing to this evolution include economic and demographic changes, variations in service and use demands, legislative edicts, rehabilitation needs versus new construction, modal integration, and elective and mandated changes in relationships with other governmental agencies and private organizations.

Specifically, requirements in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Clean Air Act Amendments (CAAA) of 1990 have accelerated changes in state DOTs and created more challenges to their operations and functions. A few examples of initiatives in response to these Acts are a renewed interest in transportation planning, which includes a requirement for statewide planning and the consideration of the interrelationships and trade-offs among the various modes; increased public involvement; more stringent air quality requirements; increased flexibility in the use of federal-aid transportation funds; and better cooperation among DOTs, metropolitan planning organizations (MPO), other state agencies, and transportation providers, particularly transit agencies. In addition, the CAAA and various energy considerations may force the use of alternative fuels and less gasoline consumption, jeopardizing the reliability of the gasoline tax (state and federal) as a major source of revenue. This fuel issue and other factors will require DOTs to explore alternative financing mechanisms, such as privatization, toll roads, revolving loan funds, assessments on transportation benefits, and other types of taxes or user fees.

Moreover, ISTEA has raised the expectations and the responsibilities of state DOTs. However, in many instances, these expectations and responsibilities are accompanied by reductions in staff to comply with across-the-board cuts in state governments, resulting in DOTs trying to do more with less. At the same time, ISTEA has raised the expectations and increased the responsibilities of other governmental and private organizations. Because of ISTEA's increased flexibility in the use of funds, many organizations now see the possibility for accessing these funds and sharing in decision-making responsibilities.

DOTs will have to respond to the various challenges principally by redeploying available resources (e.g., personnel, inventories, and funds), applying new technologies, and implementing innovative approaches to management. For example, the application of Total Quality Management (or, perhaps, better said, Continuous Quality Improvement) has the potential of producing flatter management structures (i.e., fewer layers) and more employee involvement. New technology may increase the span of management control, which also contributes to flatter management structures, by providing access to greater amounts of timely information. Unfortunately, the ability of DOTs to respond appropriately is often constrained by inadequate understanding of events, prescriptive state legislative requirements and personnel regulations, or reluctance to change by some civil servants.

These issues need to be addressed, and significant changes to the activities and organizational structure of state DOTs may have to occur. Guidance for planning a logical transition into the state DOT of the future will help to identify the critical organizational, institutional, and staffing issues facing DOTs and will facilitate independent state efforts, including interaction with state legislators. Guidance is also needed for defining the potential problems related to these issues and for developing possible remedies. The pace of change will continue to accelerate, and state DOTs must be prepared to react. Consequently, research is needed to ensure that DOTs will be prepared to continue to provide a fully integrated transportation system that is multimodal, safe, energy-efficient, environmentally sound, and cost-effective.

OBJECTIVES

The objectives of this research are to: (1) evaluate current and potential influences that affect the future of state DOTs, (2) describe and discuss the impacts on DOTs, (3) provide guidance for DOTs to assess their ability to respond, and (4) recommend solutions or techniques that will assist in the transition of DOTs to meet current and future challenges. The accomplishment of these objectives will require the following tasks. *These task descriptions intentionally lack specific guidance for conducting the research. The NCHRP is seeking the insights of proposers on how best to develop and package the research results in a way that will provide the greatest benefit to the various state DOTs. Innovation and thoroughness are expected, but proposing agencies must describe a research effort that can realistically be accomplished within the constraints of available funds and contract time.*

Task 1. Identify and evaluate the most significant current and potential influences that will affect the mission, responsibilities, organizational structure, staffing, and institutional arrangements of state DOTs.

Task 2. Describe the potential impacts of each of the items identified in Task 1 on state DOTs, recognizing the differences among states. Prepare an interim report on Tasks 1 and 2, which describes the effort and results, for review by the NCHRP. The researchers also shall make an oral presentation and interact directly with the NCHRP before proceeding with the remaining tasks.

Task 3. Develop guidance for state DOTs to assess their ability to react to the impacts described in Task 2. This guidance shall be specific to existing functional areas (e.g., finance, engineering, and construction) and shall assist in identifying the need for new functions. The guidance must take into account such factors as department size and responsibilities, regional location, and state demographics.

Task 4. Identify and discuss options by which state DOTs can make required changes based on the Task 3 assessment of capabilities. Recommend actions to respond to assessed shortcomings.

Task 5. Prepare the final report documenting the research effort. Because a significant audience for the research results will be top officials of state DOTs, the guidelines in this report should provide them with (a) an understanding of the issues, (b) methods for assessing a DOT's ability to respond to change, (c) potentially appropriate actions to initiate, and (d) measures for judging success. Effective communications techniques should be used as appropriate to facilitate the understanding and application of the research results.

SPECIAL NOTES:

A. The researchers will be expected to make at least 2 presentations to AASHTO Committees.
B. Proposals shall contain thorough, yet concise, explanations of the reasons and methods for accomplishing each task.
C. Proposals shall include a budget detailing all costs per individual task.

Funds Available: $280,000

Contract Time: 18 months (includes 2 months for review and approval of the interim report, and 3 months for review and revision of the final report)

Authorization to Begin: June 1993 — estimated

Submit Twenty Single-Bound Copies of Proposals to:

PROPOSAL - NCHRP
ATTN: Dr. Robert J. Reilly
Director, Cooperative Research Programs
Transportation Research Board
2101 Constitution Avenue, NW
Washington, D.C. 20418

APPENDIX B

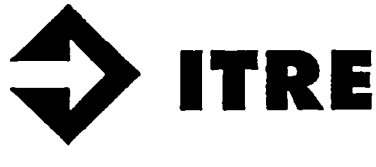
STRATEGIC MANAGEMENT CHECKLIST

State Departments of Transportation: Strategies for Change

National Cooperative Highway Research Program
Study 20-24(9)

Survey for Stakeholders

National Academy of Public Administration



Institute for Transportation Research and Education

NAPA
National Academy of Public Administration

- Chartered by Congress to improve governance and public management at all levels.
- Nonprofit, nonpartisan.
- 400 Fellows - elected by their peers, who are current and former executive branch officials, Senators and House members, governors, mayors, city administrators, business leaders, policy experts, scholars, and journalists.
- Works with the presidency, Congress, federal agencies, state and local government, civic and nonprofit organizations, universities, foundations, corporations and other nations.
- Combines experience with the best in new thinking that's pushing the frontiers of theory and practice.
- A meeting place for public and private innovators, and a network through which to share information.
- Specializes in institutional capacities: i.e., organization and management, planning and strategy, human resource management, performance measurement, budgeting and finance, asset management, information resource management, ethics, quality, and redesigning government.
- Expertise in the institutional dimensions of policy fields: i.e., criminal justice, community development, economic development, emergency management, environment, health, human investment, infrastructure, and science and technology.
- Home to the Alliance for Redesigning Government, the Center for Information Management, and the Center for Competitive Sustainable Economics.

NAPA Project Staff

Thomas D. Larson, Project Director
Ann Mladinov, Research Associate
Julie Oster, Research Assistant
Roger Sperry, Project Advisor and Director of Management Studies

ITRE
Institute for Transportation, Research and Education

- A multi-campus organization that facilitates transportation research on the various campuses of the University of North Carolina and Duke University.
- Administrative and project offices in Raleigh, North Carolina.
- 15 years of research expertise.
- Designated the FHWA Technology Transfer Center for the state.
- Houses three research centers:
  - Southeastern Transportation Center (STC), one of ten regional research centers established by the U.S. Department of Transportation in 1987.
  - Center for Transportation and the Environment, which is jointly funded by U.S. DOT and the North Carolina Department of Transportation.
  - Transportation Materials Research Center, which conducts research on a variety of transportation materials.
- Long working relationship with North Carolina Department of Transportation (NCDOT), including technical and managerial training, research, and technical assistance to meet transportation challenges.
- Active outreach program addressed to the needs of local transportation officials.

ITRE Project Staff

Gorman Gilbert, Director, UNC-ITRE
Thomas Harrelson, Consultant
Steve A. Martin, Consultant
Anna Nalevanko, Research Associate
Frank Rush, Research Assistant

INTRODUCTION

Change is the most constant feature of transportation today. In your work, you are undoubtedly aware of factors driving changes--economic, social, environmental, technological, and political forces that mean differences in what people need of transportation and how those needs are met. The research team would like to obtain your perspectives on those forces, the challenges they present to the state Department of Transportation (DOT) in your state, and the best approaches that the DOT can or do use to respond to those challenges. That is the purpose of the enclosed questionnaire.

The survey is part of a research study entitled "State DOTs: Strategies for Change," sponsored by the National Cooperative Highway Research Program (NCHRP). The study is being conducted by the National Academy of Public Administration (NAPA), in cooperation with the University of North Carolina Institute for Transportation Research and Education (ITRE). Your participation will be a valuable contribution to the project team's understanding and capacity to provide a full and informed response to the research questions.

BACKGROUND INFORMATION

The objectives of the research study set out by NCHRP are to: (1) evaluate current and potential influences that affect the future of state DOTs, (2) describe and discuss the impacts on DOTs, (3) provide guidance for DOTs to assess their ability to respond to those factors, and (4) recommend solutions or techniques that will assist in the transition of DOTs to be organizations better able to meet current and future challenges. The findings of the research will be presented in a written report which will be disseminated to all participants, state DOTs, and others with an interest in this area.

The research will draw on interviews and surveys of the state DOTs and groups with an interest and a stake in the way state DOTs operate--other state agencies, transit authorities, planning organizations, environmental and other community and public interest groups affected by transportation, federal agencies that work with state DOTs, and public and industry users of transportation services. Individual responses will be kept confidential. Any notes or records of the interviews will only be used to verify the interviewers' recollections. Unless they explicitly authorize use of their responses. The project will be completed by the end of 1994.

NCHRP is administered by the Transportation Research Board, a division of the National Research Council at the National Academy of Sciences. All NCHRP project reports are reviewed by panels of experts assembled by NCHRP.

CONFIDENTIALITY

No individuals completing the questionnaire will be identified or quoted in the analysis. Data presentations will be aggregated on the basis of categories such as the general nature of the organization, state or group of states.

Each respondent is provided with a return envelope to ensure confidentiality. No one in your organization will see your answers.

COMPLETING THE SURVEY

The survey should be completed by individuals knowledgeable about the state DOT's work. If more than one individual in the agency shares this knowledge, combined responses may be submitted on a single survey form. Please note the names and titles of all of the individuals who participate in the response.

Some items ask for circled or checked responses, while others ask for free form answers. Responses may be written directly on the questionnaire or submitted on separate sheets. Please feel free to attach additional pages of comments if you like.

Please return the completed survey in the enclosed envelope by December 17, 1993. It should be mailed in the enclosed envelope to Anna Nalevanko, ITRE, P.O. Box 17489, Raleigh, NC 27619-7489. Please call Ann Mladinov, National Academy of Public Administration at (202) 347-3190, ext. 3006, or Anna Nalevanko, Institute for Transportation Research and Education, (819) 878-8080, if you have any questions about the survey or the project.

Thank you for your help.

Please complete this page before you begin to answer the questionnaire. This information will assist us in tracking the questionnaires that have been returned and in grouping and analyzing the results. All responses will be kept confidential. Data will be reported in aggregate form.

Name: _____

Title: _____

Organization: _____

_____

Address: _____

_____

Phone: _____

State DOT you work with: _____

Total years working in some way with the state DOT: _____

Nature of contact with state DOT:

QUESTIONS

1. The first question is a very generic one. What are the five most important factors that are currently driving change in transportation in your state? These could be factors affecting the economy, population, political climate, etc. Please rank the 5 factors, starting with #1 as most important.
2. a. What is the state DOT doing to respond to these things?
   b. How effective is the response? (1 = HIGHLY EFFECTIVE, 2 = MODERATELY EFFECTIVE, 3 = NOT EFFECTIVE)
   c. What do you think will be the impacts of the steps that state DOT is taking to respond?

FACTOR	STATE'S RESPONSE	RATING	IMPACT OF RESPONSE
1.		_____	
2.		_____	
3.		_____	
4.		_____	
5.		_____	

3. What do you think will be driving change in transportation in the early years of the 21st century? Please list the five major factors that you see as forces for change in the years 2010-2015.

   1.

   2.

   3.

   4.

   5.

4. What do you think those "next century" factors will mean as far as change for the state DOT?

5. What are the greatest strengths of your state DOT in being able to respond effectively to forces driving change?

6. What are the greatest obstacles to your state DOT in responding effectively to forces driving change?

7. Increasingly in today's world, transportation "belongs" to everybody-- citizens, communities, environmental and other interest groups, businesses (particularly those that depend upon Just-in-Time delivery), legislators and political leadership. What do you think they could do that would be most helpful to the state DOT in responding to current and future challenges?

8. Several specific factors are listed below. Please indicate whether each of them currently or in the near term is a factor pushing for change in transportation in your state and in your state DOT (1 = SUBSTANTIAL, 2 = MODERATE, 3 = NOT AT ALL).

Please mark an "X" in the appropriate box.

FACTOR	RATING 1	2	3
A. Changes in industry and economy. For example, location of industries, international trade, Just-in-Time manufacturing			
B. Changes in population. For example, shifts among regions, urban/suburban/rural growth			
C. Changes in lifestyle. For example, aging of the population, two-worker households, women in the workforce			
D. Changes in demand. For example, volume of travel (freight v. personal), length of trips, occupancy, changes in choice of mode of transportation, size and type of vehicle			
E. ISTEA. In addition to the general category, please rate each of the following five elements: 1. Statewide planning requirements 2. Management systems 3. Consideration of interrelationships and trade-offs among the various modes 4. Greater authority for state and local decisionmakers 5. Requirements for better cooperation among DOTs, metropolitan planning organizations (MPOs), other state agencies, and transportation providers, particularly transit agencies			
F. Clean Air Act Amendments of 1990. In addition to the general category, please rate each of the following elements: 1. More stringent air quality requirements 2. Requirements for alternative fuel vehicles 3. Limits on growth on vehicle-miles traveled in non-attainment areas			
G. Uncertainties in reliability of gasoline tax as a revenue source for transportation			
H. Public resistance to state taxes			
I. Constraints on state spending			
J. Overall cuts in state employment			
K. Expanded roles and responsibilities of other government entities (outside the state DOT) and private organizations in surface transportation			
L. Demands for integrating/connecting/coordinating the multiple modes of transportation			
M. Public pressure for better community and transportation planning			
N. Increased public interest in participating in transportation decisions			
O. Inadequacy of transportation data and planning models			
P. Competing demands for new construction versus rehabilitating and maintaining existing facilities			
Q. Anti-highway sentiment			
R. NIMBY ("Not-in-my-backyard" syndrome)			
S. New technology such as IVHS, computer and information technology, different types of vehicles and systems			
T. Support for new transportation systems as alternatives for highways			
U. Increased public scrutiny of government performance			
V. Public concern and support for environmental quality			
W. Increased regional and interstate nature of issues			
X. Changing skills and roles expected of state DOT workforce			
Y. Privatization in transportation			
Z. Deregulation of transportation industries			

9. Does the state DOT have a process for determining key public concerns and factors driving change in transportation and the state DOT? If yes, please briefly describe the process and your participation in it.

10. Listed below are several specific types of changes related to organization and management of the state DOT. Please indicate if your state DOT is undertaking efforts in the following areas (1 = MAJOR EFFORT, 2 = MODERATE EFFORT, 3 = NOT AT ALL). If you don't know, please feel free to say "Don't Know."

Please mark an "X" in the appropriate box.

FACTOR	RATING 1	2	3
A. Moving toward a flatter organization (fewer layers of management between directors and employees			
B. Providing new types of training for employees to develop new skills and potential			
C. Seeking to hire, develop, and retain a diverse workforce and create an organizational culture open to people with different backgrounds, attitudes and skills			
D. Making changes in administrative procedures, for example, in procurement, personnel, document reviews and paperwork processing, to give employees greater flexibility and authority			
E. Changing state legislation to allow new, more flexible approaches to transportation systems and funding, such as flexibility for funding projects in different modes, toll road construction, and public-private partnerships			
F. Forging new arrangements with other agencies, including proactive involvement with environmental review agencies in review and permitting processes			
G. Establishing new contracting procedures and practices, particularly partnering, private sector alternatives, and design-build or design-build-warranty			
H. Adopting and encouraging new technologies such as GIS and IVHS			
I. Undertaking more aggressive approaches to communications and information flow between DOT and its stakeholders			
J. Adopting new management philosophies and techniques, such as continuous quality improvement and employee empowerment			
K. Taking more active DOT leadership in region-wide, broad-based planning			
L. Taking new approaches to transportation safety including involvement of new parties in defining, designing for, and delivering safety in transportation systems, operations, and projects			
M. Bringing in new parties and taking new approaches to transportation enhancements under ISTEA			
N. Focusing new attention on the people to be served by programs and the other "customers" of the state DOT			
O. Elevating the scope and stature of non-highway modes in the structure and operation of the organization			
P. Moving toward a functionally-based organization, for example, with all planning involving any mode located in a single organization			
Q. Moving from centralized to decentralized decisionmaking authority and systems			

11. Is authority in your state DOT decentralized (to field offices) for:

a - personnel _____
1 2 3 4 5

b - procurement _____
1 2 3 4 5

c - budget/programming _____
1 2 3 4 5

d - project decisions _____
1 2 3 4 5

CENTRALIZED DECENTRALIZED

12. Do you have any other comments about the survey, the project in general, or the specific topics raised in the questionnaire?

APPENDIX C

DETAILS OF SURVEY METHODOLOGY

The research approach in this study was designed to produce extensive empirical data as well as expert advice on organizational development and management. In designing and conducting the research, the team drew on its own experience, as well as the expertise of other expert contacts in transportation and management, particularly at the state level. The project team also conducted a search of recent NCHRP and AASHTO research and publications bearing on the research questions.

Underlying the research approach was the fundamental tenet that the best and most reliable information and perspectives on the challenges and options facing state DOTs would come initially from people most familiar with the environment, organization, and operations of the state DOTs. Those are the voices that are the most compelling for the key audience, the state DOTs, the CAOs and other employees and leaders in the organizations. Establishing effective contacts with the CAOs and staff at other levels of the state DOTs and awareness of the project among those individuals are also important in ensuring that the results will be communicated to the state DOTs where they are designed to be applied.

FIELD WORK

The research began with extensive data-gathering across the country with people involved in transportation at the state level and in the state DOTs, including CAOs and other DOT officials and their stakeholders. The first phase of the research involved gathering information on the research questions through three principal means: on-site interviews, telephone interviews, and a mail-out survey.

On-site Interviews

On-site interviews were conducted in 13 states. The states were selected so that at least three states were visited in each AASHTO region. The intention was to include a range of states from the perspectives of geography, economy, population, and the nature of their transportation systems. The states, however, were not randomly chosen; rather, they were selected to include state DOTs known for leadership and innovation in approaches to their programs and their stakeholders, technologies, human resource development, management philosophy, system finance, and organization structure. The research team consulted with AASHTO, the Highway Users Federation, and other stakeholder groups for suggestions of states to be visited.

The following states were selected for on-site visits:

California	Mississippi	Oregon
Colorado	Missouri	Pennsylvania
Connecticut	New Hampshire	Texas
Florida	Oklahoma	Virginia
		Wisconsin

Virginia was selected for the initial "pilot test" visit in July 1993, because of its proximity to the work locations of the research team members. Texas was the second state visited, in order to gather data before the transition that occurred at the Texas Department of Transportation in fall 1993. All 13 states were visited between July and November 1993.

The basis for the on-site interviews was an interview guide (see Appendix B), which included a series of both open-ended and closed-ended questions on the key subjects of the study. The final interview guide was developed on the basis of the research proposal and the expertise of the research team, the team's experiences in the pilot visit, and comments from the respondents in the pilot interviews, as well as from AASHTO and Highway Users Federation staff. The interview guide was also tested with representatives of the trucking industry, shippers, travel and other user groups, the National Association of Regional Councils, the U.S. Conference of Mayors, and the National League of Cities.

The research team contacted interviewees ahead of the scheduled visits and made appointments for the interviews. Interviewees were informed in advance of the purpose of the research and the general nature of the questions. In the initial interviews, at least two members of the research team were present; later, as the interviewers became more experienced with the questions and the format, a single interviewer often conducted each interview. In all cases, either Tom Larson or Tommy Harrelson conducted interviews with CAOs.

The overall plan for the on-site visits was similar in each state. The researchers visited each state for 2 to 4 days, during which time they conducted interviews with individuals from the state DOT and from other levels and arms of government, transportation carriers, contractors, developers and other businesses, and environmental and other public interest groups. At minimum, five DOT officials and five stakeholders were interviewed in each state, with most interviews lasting approximately 45 minutes but some much longer. In each state, the CAO of the DOT was interviewed along with other top DOT managers, usually including the directors of finance, planning, human resources, highway engineering, and public transit and other non-highway programs.

The stakeholders to be interviewed were selected on the basis of references from colleagues in that state or other states, national or regional organizations, the state DOT, local officials, and community representatives. The research team made an intensive effort to contact a broad and diverse range of stakeholders. In each state, interviews were generally scheduled with persons representing environmental interests, transportation users, transportation engineering and construction, a Metropolitan Planning Organization (MPO), urban and community transit systems, and other transportation organizations such as a port authority or an airport.

The interview guide used with stakeholders was the same as the guide used with CAOs and other DOT personnel, except for the wording of some phrases to address the appropriate category of respondent. (In some cases, although the interview guide was the same for all categories of respondents, non-DOT respondents did not answer all the questions about specific actions internal to the DOTs.)

The study team conducted 203 in-person interviews. They included 13 interviews with CAOs, 57 with other DOT officials, and 133 with stakeholders.

Telephone Interviews

The study team expanded the planned interviews to include telephone interviews with the CAOs in states not included in the on-site visits. CAOs were telephoned in these 37 states plus the District of Columbia. In each case, the protocol for the telephone interviews was as similar as possible to the protocol used in the on-site interviews. The study team called to explain the project and to schedule a telephone interview with the CAO. The study team then sent the interview guide in advance of the interview so that each CAO had the interview guide and could see the questions as they were asked. The interviewer called at the appointed time and began each interview with a brief explanation of the study and noted that the interview would likely last about 45 minutes.

Between October 1993 and January 1994, those additional CAOs were contacted. Where it was not possible to complete a telephone interview, additional responses were submitted in writing and coded along with the other written questionnaires. A total of 33 CAOs completed telephone interviews and/or submitted responses to the questions in written form. In six states, the CAOs did not complete a telephone or in-person interview or a written questionnaire.

Mail Survey

Because it was impractical to conduct telephone interviews with all the identified stakeholders and key DOT officials other than the CAOs in the states not visited, the study team conducted a mail survey of these persons. In addition to the names of individuals recommended during the course of developing the research guide and preparing for on-site visits, lists of potential contacts across the country were provided by the following:

Air Transport Association
American Association of Airport Executives
American Association of Port Authorities
American Association of Railroads
American Road and Transportation Builders Association
American Consulting Engineers Council
American Short Line Railroad Association
American Trucking Associations
Association of General Contractors
National Conference of State Legislators
National Highway Traffic Safety Administration Office of Traffic Safety Programs (for Governors' Highway Safety Representatives and Coordinators and the State Chiefs of Police)
National Wildlife Federation
Sierra Club
U.S. Chamber of Commerce

The survey was mailed in December 1993 to approximately 900 stakeholders. They were each sent a printed questionnaire containing the same questions as the interview guide used for in-person and telephone interviews (see Appendix B), along with a letter informing them about the nature and purpose of the study. Survey forms for state DOT personnel other than the CAOs were mailed to the CAOs in connection with scheduling the telephone interviews; the CAOs then distributed the questionnaires to the other top officials in their organizations.

Completed questionnaires were received from 56 DOT officials and 126 stakeholders, for a total of 182 returns to the mail-out survey (not including 3 CAO returns submitted in writing). That brought the total number of respondents to 421, including 46 CAOs, 114 other DOT officials, and 261 stakeholders.

ESSENTIAL CONSIDERATIONS IN EVALUATING RESULTS

The research had to take into account several significant facts. One of the challenges pertains to the qualitative nature of much of the data. While some data, such as importance scores for individual forcing factors, can be quantitatively assessed, much of the pertinent information concerning changes inside and outside state DOTs is qualitative. Thus, the research approach was designed to gather a considerable degree of qualitative data, particularly data that can only be obtained through personal, on-site interviews. The qualitative data cover not only forcing factors, but also impacts, responses, and the set of conditions that contribute to or deter changes in a given state DOT.

Because geography, economics, traditions, and other conditions inside and outside state DOTs differ widely in nature and degree from state to state, pressures for change are not uniform across all the state DOTs. The impacts they generate are also different. Hence, any effective research must account for the state-by-state variation in factors and conditions. The research approach, therefore, was structured to solicit data from all 50 states and to look for factors and impacts on a disaggregated basis.

The respondents are not and were not intended to be a representative sample. The individuals were contacted for their expertise and interest in transportation in their area. To some extent, they went through a form of self-selection in deciding to schedule an interview with the research team or complete a mail questionnaire on the research questions. In addition, the responses to the survey are clearly geared to change, in line with the focus of the study: the interview guide opened by asking respondents to name factors that are driving change, although in their own work, some of the respondents are not focusing on change, some of them don't see a need for significant change in the DOT, and some of them don't want change.

Inevitably, the research encounters the multiple perceptions that exist within even a single state. Not all senior managers of a state DOT, for example, have the same perceptions about how that DOT is being affected by factors forcing change. There is much less consensus about these changes or the appropriate responses when the survey extends beyond the state DOT. To

take into account these variations in outlook, the research approach was structured to include multiple perspectives, both within each DOT and in those organizations that deal with DOTs and might fairly be called DOT "stakeholders." Data were tabulated for those groups in aggregate and by type of stakeholder or interest area, and also were reviewed individually.

A survey of this kind must also gather full information without leading the respondents or biasing the data. Respondents asked to list factors that are or may in the future be forcing a state DOT to change might neglect to mention those forces that are most pressing at the particular moment, even though they might be important to the organization from a broader or longer range perspective. However, by mentioning specific categories for a respondent to consider, the survey could be suggesting answers that do not reflect the respondents' true views. If an interviewer asks specifically about the importance of technology as a force in the DOT, for example, the respondents might find it logical and appropriate to indicate technology is an important force, although in their experience they have observed that technology is having any significant effect. To avoid these two difficulties, the research used both open-ended questions and closed-ended questions, which allowed comparison of the results.

Of course, the people within a DOT are not necessarily aware of all the factors that might be creating a need or an opportunity for change, while those working outside the DOT may not be able to gauge the forces that are actually having an impact in the DOT. To avoid these shortcomings, the research considered responses from both employees and stakeholders, and did not rely exclusively on the number of quantitative responses in any case.

Finally, among all groups, individuals may be aware of the factors that are most immediate, visible, or widely publicized and discussed in their area, but those factors may not be the most significant or powerful influences for the future. (The adage goes that when everyone has picked up on a trend, it is likely to be over!) For that reason, the research team recorded and assessed all the narrative responses obtained in the research, recognizing that important observations often come from the "outliers."

PROCEDURES FOR ANALYSIS OF SURVEY RESULTS

The interviews produced both qualitative and quantitative data. These two types of data required different analysis steps.

Qualitative responses to the questions in the survey were coded and entered in an electronic data base, to allow tabulation, sorting, and statistical analysis. The qualitative data came from the open-ended questions in the interview guide and questionnaires, primarily questions 1, 2, 3, 4, 5, 6, and 7. For example, for both question 1 and question 3, which respectively asked respondents to list important forcing factors for today and the future, the responses were coded into a set of 15 groupings. Each response was coded in only one category, generally the one that appeared to be most important in the view of the respondent and/or was more prominent among other responses. The coded responses were then tabulated to produce frequency counts for the 15 coding categories and also were disaggregated by respondent type and by region. Differences among the three categories of respondents and regions were tested using chi-square tests. When applied to the three groups, the chi-square test produced a result that was considerably short of statistically significant. The responses of the two DOT groups ("CAO" and "other DOT") were then combined and the chi-square test was repeated. In that test, the results were close to statistically significant, yet still not at the level to reject the hypothesis that the groups are the same in their responses to current forcing factors. Based on the statistical evidence, therefore, it was not possible to conclude that the three groups had statistically different responses with respect to the forcing factors they cited as currently driving change.

The interviews produced a large number of narrative comments about the forcing factors, impacts, and responses of DOTs, as well as many other aspects of the change process affecting each DOT. While this information was difficult to code or tabulate, the research team recognized the importance of the perspectives and the deeper analysis reflected in the comments, for both addressing the research questions and understanding the process of change within state DOTs. To analyze these data, the research team conducted a structured assessment of the qualitative results gathered in each state covered in the site visits, supplemented by information from the telephone interviews, the mail-out survey, and review of the literature. Each team member who participated in the field interviews was asked to synthesize observations and findings from the states he or she visited and share notable individual comments, as well as conclusions on conditions and pressures faced by the state DOT, responses to date, and lessons learned. The team combined these findings and examined them across states to look for commonalities, differences, and other salient points. Appendix G presents more of the specific comments from DOT officials and stakeholders.

The quantitative data from the survey consisted of three types. The questions on the importance of specific factors in forcing change in the DOT (Question 8 in the interview guide), the effectiveness of the DOT's responses to change factors to date (Question 2b), and the DOT's level of effort on various organizational and management changes (Question 10) produced numerical ratings on a 1 to 3 scale. Those quantitative data items were analyzed by computing the mean rating for each attribute. These ratings were also computed for each category of respondent in each state and region, and for each category of respondent (CAOs, other DOT employees, and stakeholders). Chi-square tests were used to test for differences in the responses by category of respondent and by region.

To help group and analyze the responses, the study team compiled demographic, transportation, and economic data from other sources for each state. Those data and some of the survey data were analyzed using cluster analysis to form groupings of states. Essential to any grouping of states is the requirement that all states in a single group be more similar to each other than to states in other groupings. Clearly, there are many possible variables to use in selecting groups, such as geographic area, population, miles of roadway, per capita income, degree of urbanization, size of state-controlled roadway system, and other variables. A cluster analysis was performed using these and other similar variables to group states. This cluster analysis was repeated using various combinations of variables and different numbers of clusters. All results produced clusters that were intuitively unsatisfactory, such as New England states and Plains states grouped together.

To resolve this dilemma, the study team decided to use the AASHTO regions, which are geographic. To differentiate further

the states within each of those four groups, the AASHTO regions were subdivided: the western region was divided into three subgroups and the other three regions were divided into two subgroups each. Thus, the study team considered nine state groups—all geographic—in the study analysis.

The regions and subregions were as follows:

Group 1: Northeast

Group 1A	Group 1B
Maine	New York
New Hampshire	Pennsylvania
Vermont	New Jersey
Massachusetts	Maryland
Rhode Island	Delaware
Connecticut	District of Columbia

Group 2: South

Group 2A	Group 2B
Alabama	Florida
Arkansas	Georgia
Kentucky	North Carolina
Louisiana	South Carolina
Mississippi	Virginia
Tennessee	West Virginia

Group 3: Midwest

Group 3A	Group 3B
Illinois	Kansas
Indiana	Minnesota
Iowa	Missouri
Michigan	Nebraska
Ohio	Wisconsin

Group 4: West

Group 4A	Group 4B
Arizona	Colorado
New Mexico	Idaho
Oklahoma	Montana
Texas	Nevada
	North Dakota
Group 4C	South Dakota
Alaska	Utah
California	Wyoming
Hawaii	
Oregon	
Washington	

NOTE: Responses from Puerto Rico were coded separately, and were not combined with the returns from one of the regions.

APPENDIX D

State Departments of Transportation - Future Strategies
NCHRP Project Panel 20-24(9)

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APPENDIX E

NAPA ADVISORY PANEL FOR NCHRP Project 20-24(9) "STATE DOTs: STRATEGIES FOR CHANGE"

Sharon Banks General Manager, AC Transit, Oakland, California, and leader in the Bay Area Partnership, a "laboratory" for discovering solutions to clean air and mobility problems.

Larry Bonine Director, Arizona Department of Transportation. Formerly project-wide area construction manager and partnering champion for the Massachusetts Highway Department's Central Artery/Tunnel Project, with the joint venture of Bechtel/Parsons Brinckerhoff; 26 years' experience with the U.S. Army Corps of Engineers; positions included district engineer in Mobile and Little Rock. Chair of the AASHTO Standing Committee on Quality, a strong proponent of Total Quality Management, and one of the pioneers of public-sector partnering.

Nancy Rutledge Connery Transportation consultant in Maine, working with state and community groups, as well as with federal agencies and the World Bank on transportation and development policies and programs, environmental issues, and planning and management processes. Formerly executive director, National Council on Public Works Improvement, which produced *Fragile Foundations* and the supporting volumes on infrastructure needs; consultant to USDOT and the Advisory Commission on Intergovernmental Relations on national transportation policy.

Tom Downs President, Amtrak. Formerly commissioner, New Jersey DOT; president, Triborough Bridge and Tunnel Authority; city administrator, Washington, D.C.; executive director, Urban Mass Transportation Administration, USDOT; and associate administrator for planning and policy development, Federal Highway Administration, USDOT. NAPA Fellow.

Ed Emmett President, National Industrial Transportation League. Formerly commissioner, Interstate Commerce Commission; member of the Texas legislature; and director of Tex-Aid, a Texas-based trucking deregulation group.

Karen Gislason Ender Consultant in telecommunications, transportation (including "telecommuting"), marketing, and organizational development. Former executive with Bell Atlantic in strategic planning and marketing; 1990–91 Presidential Commission on Executive Exchange assignment to USDOT working on implementing Secretary's national transportation policy, strategic management, and organizational change process.

Andy Fogarty Vice president, CSX Corporation. Formerly chief of staff for the Office of the Governor in Virginia; secretary of transportation and public safety, secretary of administration, and assistant secretary for financial policy in Virginia; and staff director, Committee on Appropriations, Virginia House of Delegates. NAPA Fellow.

Stephen Goldsmith Mayor of Indianapolis. Former prosecuting attorney and corporation counsel; research fellow at the John F. Kennedy School of Government; assistant professor of public and environmental affairs at Indiana University. Frequently cited for his leadership and understanding of management, public service, and "reinventing government".

David Keever Social scientist, facilitator, and "change agent" with SAIC, an employee-owned consulting firm based in Virginia; consultant to state DOTs and USDOT as well as other government, public-private, and industry groups in strategic planning, management processes, technology sharing, and organizational development.

Lillian Liburdi Director, Port Department, Port Authority of New York and New Jersey. Formerly deputy administrator, Urban Mass Transportation Administration, USDOT; and senior transportation technician, Metropolitan Washington Council of Governments. NAPA Fellow.

Michael Meyer Professor of civil engineering, Georgia Institute of Technology, and director of the Transportation Research and Education Center in Atlanta. Extensive experience in research and consulting, working closely with state DOTs and private firms on transportation, particularly transit and intermodal topics.

APPENDIX F

SUPPLEMENTARY TABLES OF SURVEY RESULTS

TABLE F-1. Factors Currently Driving Change (Share of Responses)

Factor	Share of Responses by Type of Respondent			
	CAO N=189	Other DOT N=457	Stakeholder N=966	All N=1,612
Finances	15%	12%	15%	14%
ISTEA	15	14	14	14
Environment	13	12	14	13
Governmental Processes	8	10	11	10
Economics	9	9	10	10
Demographics	11	9	8	9
Internal DOT Organization	8	11	6	8
Land Use	4	4	5	5
Congestion	4	5	4	4
Public Concerns	5	4	4	4
Infrastructure	3	2	4	3
Technology	2	4	1	1
Amer. with Disabilities Act	0	1	0	0.5
Travel Behavior	1	0	0	0.5
Other	2	2	2	2

NOTE: Numbers shown are percentages of the total number of individual factors listed by respondents in the various categories. Numbers may not add up to 100 percent because of rounding. (The figures for N shown in the column headings represent the total number of factors cited in response to this question by respondents in the particular category.)

TABLE F-2. Factors Currently Driving Change Reported by Region (Share of Responses)

Share of Responses					
Factor	1 Northeast N=407	2 South N=385	3 Midwest N=324	4 West N=496	All Regions N=1,612
Finances	15%	13%	16%	14%	14%
ISTEA	18	13	14	13	14
Environment	18	8	12	13	13
Governmental Processes	8	15	11	7	10
Economics	9	12	8	9	10
Demographics	3	10	6	13	9
Internal DOT Organization	7	8	10	8	8
Land Use	4	4	6	4	5
Congestion	4	5	2	5	4
Public Concerns	6	3	6	4	4
Infrastructure	2	4	4	4	3
Technology	2	1	3	2	1
Amer. with Disabilities Act	1	0	1	0	0.5
Travel Behavior	1	0	0	0	0.5
Other	0	2	0	5	2

NOTE: All numbers are percentages of total responses by respondents in the region. Numbers may not add up to 100 percent because of rounding. (The figures for N shown below the region name in the column headings represent the total number of factors cited in response to this question by respondents from the particular region.)

TABLE F-3. Factors Currently Driving Change Reported by Sub-Region (Share of Responses)

Factor	Share of Responses								
	AASHTO Region and Subregion (N=Total Number of Responses in Subregion)								
	Northeast		South		Midwest		West		
	1A 193	1B 214	2A 158	2B 227	3A 116	3B 208	4A 171	4B 168	4C 157
Finances	15	15	15	11	16	16	15	14	13
ISTEA	17	19	10	15	10	16	16	9	13
Environment	21	16	5	11	9	14	14	12	13
Governmental Processes	8	8	21	11	11	12	8	7	6
Economics	8	10	12	12	11	6	5	13	11
Demographics	4	3	4	15	6	7	11	15	12
Internal DOT Organization	8	5	11	6	12	8	8	9	7
Land Use	3	6	3	6	7	6	2	2	6
Congestion	5	5	6	4	3	1	2	7	8
Public Concerns	6	5	3	3	4	6	5	2	4
Infrastructure	1	2	5	4	5	3	2	7	3
Technology	1	3	1	1	3	3	2	2	3
Amer. with Disabilities Act	1	1	1	0.5	1	0.5	0.5	0	0
Travel Behavior	1	0.5	0	0.5	0	0.5	1	0	0
Other	0.5	0.5	3	1	0	0.5	10	2	3

NOTE: All numbers are percentages of total responses by respondents in the subregion. Numbers may not add up to 100 percent because of rounding. (The figures shown below the subregion number in the column headings represent the total number of individual factors cited in response to this question by respondents from the particular subregion).

TABLE F-4. Top 5 Factors Currently Driving Change in States Visited for On-Site Interviews

OPEN-ENDED QUESTION
Share of Responses

CALIFORNIA (64 responses)

1. Environment	19%
2. Economic factors	16
3. ISTEA	14
4. Finances	13
5. Demographics	9

COLORADO (42 responses)

1. ISTEA	23%
2. Environment	16
3. Internal DOT	11
3. Finances	11
3. Economic factors	11
3. Demographics	11

CONNECTICUT (83 responses)

1. Environment	20%
2. ISTEA	17
3. Finances	16
4. Internal DOT	11
5. Economic factors	8

FLORIDA (85 responses)

1. Demographics	18%
2. ISTEA	15
3. Finances	12
3. Environment	12
5. Governmental processes	11
5. Land use	11

MISSOURI (54 responses)

1. Finances	19%
2. Governmental processes	17
3. Internal DOT	13
3. Environment	13
4. ISTEA	11

NEW HAMPSHIRE (63 responses)

1. Environment	25%
2. ISTEA	21
3. Finances	13
4. Internal DOT	8
4. Demographics	8

OKLAHOMA (58 responses)

1. Finances	22%
2. Governmental processes	17
3. ISTEA	14
4. Environment	12
5. Demographics	10

OREGON (45 responses)

1. Demographics	20%
2. ISTEA	18
3. Finances	11
4. Public concerns	9
4. Land use	9

PENNSYLVANIA (85 responses)

1. ISTEA	24%
2. Environment	18
3. Finances	9
4. Public concerns	8
4. Governmental processes	8

TEXAS * (75 responses)

1. ISTEA	17%
1. Environment	17
3. Internal DOT	12
3. Finances	12
5. Demographics	9

* A set of other factors including NAFTA and international trade received 11% of the mentions.

WISCONSIN (79 responses)

1. ISTEA	22%
2. Environment	18
3. Governmental processes	14
4. Public concerns	10
4. Financial factors	10

NOTE: Numbers shown are percentages of the total number of individual factors listed by respondents in each state. Factors are listed as tied in ranking if they were cited by the same percentage of respondents. (Of the 13 states visited for the study, 11 are represented in the table.)

TABLE F-5. Facors Likely to Drive Change in Future (Share of Responses)

Share of Responses				
Factor	**CAO N=176**	**Other DOT N=433**	**Stakeholder N=925**	**All N=1,534**
Technology	12%	13%	12%	13%
ISTEA	16	12	11	12
Environment	12	12	12	12
Finances	12	12	11	11
Demographics	10	8	7	7
Economics	6	7	5	6
Fuel/Energy	2	5	6	5
Governmental Processes	5	4	6	5
Congestion	5	4	5	5
Land Use	3	4	5	4
Internal DOT Organization	4	6	3	4
Public Concerns	3	3	4	4
Infrastructure	3	2	4	3
Travel Behavior	1	1	2	2
Other	7	6	7	7

NOTE: Numbers shown are percentages of the total number of individual factors listed by respondents in the various categories. Numbers may not add up to 100 percent because of rounding. (The figures for N shown in the column headings represent the total number of factors cited in response to this question by respondents in the particular category.)

TABLE F-6. Rankings of Factors Driving Change Current v. Future By Type of Respondent

Factor	CAO		Other DOT		Stakeholder	
	Current	Future	Current	Future	Current	Future
Finances	2	3	2	4	1	4
ISTEA	1	1	1	3	2	3
Environment	3	3	3	2	3	2
Governmental Processes	6	7	5	11	4	6
Economics	5	6	6	6	5	9
Demographics	4	5	7	5	6	5
Internal DOT Organization	7	9	4	7	7	13
Land Use	9	10	10	9	8	10
Congestion	9	8	8	10	9	8
Public Concerns	8	10	9	12	11	11
Infrastructure	11	10	12	13	9	12
Technology	12	2	10	1	12	1
Americans with Disabilities Act	N/A	N/A	13	N/A	13	N/A
Travel Behavior	13	14	14	14	14	14
Fuel/Energy	N/A	13	N/A	8	N/A	6

NOTE: Numbers shown indicate the ranking of the particular factor among all the categories, in descending order of frequency of mention as a current or future factor driving change, for the particular category of respondent. Two factors are listed as tied in ranking if they accounted for the same percentage of responses.

APPENDIX G

SPECIFIC COMMENTS FROM INTERVIEWS WITH CAOs, OTHER DOT OFFICIALS, AND STAKEHOLDERS ON FORCING FACTORS, IMPACTS, AND RESPONSES

CHANGING ROLE AND MISSION OF DOTS

"With completion of the interstates, the state DOT is now asking 'What's next?' It has left everyone in a quandary. Even before ISTEA, they had reoriented the DOT away from new design and big projects to improvement and maintenance and system management."

—former DOT official, southeastern state

"We were so good at something that's no longer the motivating force, i.e., building roads. It's more difficult to focus on a common goal. DOT's role is not as clear as it used to be."

—DOT official, western state

"The DOT needs to take risks. They need to be risk-takers for the 21st century. They need to push environmentally, break new territory. They don't need to break laws or squander resources, but should venture into new areas, with the private sector as their buddy."

—corporate development official, southeastern state

"From individuals and from a variety of concerned groups, the message has come that we need to look in a new direction for economic, environmental, and social reasons. The old solutions no longer work."

—state planning group, northeastern state

"We need to advance technically more in transportation—all modes. There will be more intermodal trade-offs. Somebody will have to work toward blending the modes so that there will be a more efficient movement of goods."

—CAO, midwestern state DOT

"[The greatest challenges to the state DOT are] . . . to transition from a construction and development organization to an operations and management organization . . . [The state DOT] will be able to do this, but right now it is stronger on construction and development and not as strong on the other side. [And the] lack of ability to support non-highway modes. They don't see this as part of their business yet. They aren't considered opportunities or growth areas."

—MPO official, southern city

"We are capacity constrained for reasons of law but don't have the physical space to build anything. The question is how do we get the most out of the existing system. Our economic viability will be at risk unless they come up with an intermodal plan to increase mobility."

—transit official, western city

"Because of urban congestion, we will require a higher capacity transportation system. DOT will have to redefine its mission to moving people and goods, not vehicles."

—MPO official, southwestern city

"There has been an out migration from center cities to suburban areas. . . . Suburban cities will start to play a bigger role in transportation policy decisions. . . . There will be more urban sprawl and infrastructure problems. We will need new roads for suburban growth. We will have to redirect priorities."

—MPO official, southern state

"With suburban sprawl, they can't keep up with road improvements. People don't travel to urban centers any more. It's more suburb to suburb. It's very difficult for transit to figure out what to do, too."

—community transit official, southwestern state

"The state DOT ought to focus attention on addressing the lack of strong, effective regional planning and implementation."

—corporate development official, southeastern state

"Young people are not interested in ribbons of concrete. We're going to have to design transportation systems that work together and that are aesthetically pleasing."

—CAO, southern state DOT

"We need to look at total transportation now, while it's less expensive to do it, before there is major congestion. I'd like to get ahead of the game."

—CAO, southern state DOT

"We're still in the development stage and have a chance to do something on land use, parking, highways, and transit with a lot of resultant benefits. We want to make sure that we don't create another LA."

—transit official, southeastern state

"We will only build facilities that support growth patterns and our state's vision. We have to get away from the typical highway engineering mentality. We need to be more creative, innovative and involve our citizenry. We will have to work smarter and recognize we will have to live with highways we've already built."

—CAO, mid-Atlantic state DOT

"How do you keep commerce efficient without sprawl? We don't have that licked yet."

—stakeholder, western state

"At least early on, most state DOTs are highway departments with a fresh coat of paint."

—transit official, western state

"There is a lack of understanding [in the state DOT] of the total picture."

—port official, Gulf Coast

"[The state DOT] needs to enlarge its role, not just highways. We need a DOT that considers all modes. We need to integrate the modes and help them fit together. They [modes] need to unify rather than compete. [The state DOT] needs to be ready, to be intermodal and be concerned with moving goods and people. We have proved in this area you can't build your way out of this mess."

—railroad official, western state

"We're behind and staying behind [on funding and investment. In our state,] you can't do away with congestion. You can't build your way out of congestion.

—CAO, southeastern state DOT

"The road is still deserving of respect and funding. Air quality issues will drastically affect our ability to build roads. Some of the public has felt left out and there is a desire for more public transportation but most of the public want roads."

—CAO, southeastern state DOT

"For right now, we've been able to keep growing as before, using the argument that it [economic development] is developments of regional significance that have already been approved. We are just starting to come up against it. In the future, growth will taper off and be diverted to states without all the rules [governing growth]. We are starting to see the pressures on the legislature from development interests in this state who can see what's coming."

—stakeholder, southeastern state

"Some planners say 'Let's not build any more highways. Let them get congested, and make people turn to transit.' That's not very far from a centrally planned economy. That's counter to the way our democracy was designed, which is for the individual, not the common good. The thing to do is to make the alternatives more attractive (including through pricing) . . . as sound voluntary options."

—toll authority official

"There won't be many more roads and the interstate won't get any bigger."

—CAO, southeastern state DOT

"We have made public transportation a real player in the DOT. While the highway is the backbone of the transportation system for the foreseeable future, you cannot build enough highways in [the state] to meet the transportation demands on the system."

—CAO, southeastern state DOT

"I think ISTEA is healthy and I support it. . . . I don't apologize for the roads. The Interstate system is the miracle of transportation. I'm amazed at people apologizing for roads. I do think we have to balance modes because we can't build enough roads to beat morning and afternoon peaks."

—CAO, mid-Atlantic state DOT

"Within 10 years there will be a communications explosion—220 channel TVs, digital information. The DOT will have to have the capacity such that individuals will have access to information on transportation so consumers will be able to get around on different modes.

—MPO official, western state

"[The state DOTs] will say they've been strategic. . . . I don't think so, especially between cities. They need a strategy for urban and for rural, and they are not the same. Transportation is not the same for rural and urban."

—stakeholder, southeastern state

"I don't detect a cohesive and comprehensive state transportation plan in any state. You need to make choices. What is this state about? What you've got as available infrastructure, where are the population centers, what kind of transportation do you want?

—railroad official, eastern state

"Planners need to get into the transportation discussion. There has been lots of talk about how bring together land use and transportation. We've got to get local planners' thinking to coincide with the state DOT's."

—common carrier official, northeastern state

"If the DOT sees itself as not an agency that plays public policy but just plows roads, they won't get there."

—state legislator, northeastern state

"This is a time when every DOT is facing more change than in 40 years, particularly in non-attainment areas."

—CAO, mid-Atlantic state DOT

CHANGING RELATIONSHIPS WITH STAKEHOLDERS

"The DOT needs to listen to groups more—environmental groups, business groups. Many times they have good ideas that could save money."

—public transport director, southern state DOT

"They need to be engaged with us [state DOT] in helping define [the state's] future. There needs of be a heightening of awareness. This requires the public to be involved in ways they are not used to."

—CAO, mid-Atlantic state DOT

"[The stakeholders] should create partnerships, to seek common ground. . . . They shouldn't make DOT a scapegoat on environmental issues. They should make an effort to maintain a positive relationship with the DOT. The DOT is now showing a willingness to listen to various constituencies but citizens have the responsibility to maintain vigilance themselves."

—highway users group, southern state

"Sure [stakeholders can help]. By communicating what we are doing and sharing what's going on."

—common carrier, northeastern state

"DOT has the responsibility to educate so they'll adapt to change. Businesses and citizens won't go out and try to help on their own. We've got to be out there finding out their needs and if we do that, they'll respond to us."

—CAO, midwestern state DOT

"[The state DOT] just needs to ask for help. They are often reluctant to do that and they are busy putting out fires, dealing with problems. If [the state DOT] asks for assistance in advance, they always get it. Public hearings which are [usually] used are not productive. Associations don't like to participate. But if they go to them, they will help.

—stakeholder, midwestern state

"When we invite them [stakeholders] to the table, they need to come. We all need to trust each other. No one should appear with a hidden agenda. Everyone should play like adults. We need diverse teams at the table. They should leave their rank at the door."

—CAO, southern state DOT

"We all have our own interests, not common interests. There's no sense of "family" any more. How could it be different? Maybe if we had a grand 'sit-down' in transportation . . . and invited shippers, environmentalists, landowners—not lobbyists—and discussed what we've got, problems, and ideas to get a general common 'family' direction. We don't have it now. Transportation is seen as being against everyone and it's not."

—stakeholder, southeastern state

"[To be most helpful, interest groups should] get involved. The environmental movement needs to get realistic. There needs to be more involvement. They are opposing NAFTA and opposing transportation improvements. They didn't show any interest in border problems until NAFTA came up."

—NAFTA coalition, border state

"[Groups] should put aside immediate parochial interests. There is a common set of facts that people could agree on. We could cull opinion, semi-fact, and hysteria. The process would help DOT set more of a common course—acceptable to communities. Citizens advisory groups could be given the feeling they are in on decision-making at an early level if the state DOT could give a little more manpower to the advisory groups."

—Chamber of Commerce, southern city

"A masterful DOT—a 21st century organization—will coalesce a plethora or stakeholders by serving them with multiple products. You can't have an infinite number of products, but you can bring some order to the process. Land use is a good way to simplify those competing demands."

—transit official, western state

"It is not realistic to think that the stakeholders will just come forward. The leadership has to come from the state DOT or the state in some form. The DOT needs to be the convener and look to the long term."

—transportation commissioner, western state

"[The primary process the state DOT has for determining key public concerns] is through the newspapers. They look at newsclips from across the state. If they get a good response, that's good. If they get a bad response, they figure the public doesn't understand."

—stakeholder, southeastern state

"We still have highway officials running the transportation departments. As a consequence, the focus is still on 'growing' concrete. When multimodal folks come together, it's not in balance. Of course you'll still have more people working on highways. . . . Maybe when it comes to decisions, the vote ought to be more like the Senate than the House [instead of proportional to the number of people in each constituency] especially when it comes to the strategic side, and how you invest."

—railroad official, eastern state

"ISTEA is a 6-year document, now in its second year. It requires a change in business practices. There is no guarantee that this is a permanent change. Will the pendulum swing back? There is a lack of certainty in the business community. They need certainty to make long-range decisions. People remember vanpooling and the other initiatives of the 70s."

—Chamber of Commerce, southern city

"The [public] mindset: each person with his own horse. People want to get there fast. There aren't many satisfactory answers—to clean air problems, urban, financial, etc. [Another obstacle] is the inertia of DOT's supporting cast of characters. The contractors are resistant to change. Some of the business community has a resistance to change. Plus the historical lack of willingness [of the state DOT] to work with local transportation agencies."

—Chamber of Commerce, southern city

"Obstacles? Environmental interests—[they have] a non-negotiable, non compromising attitude."

—planning director, southern state DOT

"With respect to environmental issues, we buried our heads in the sand at first. We are paying for our sins."

—DOT official, western state

"Overall, our agency is too slow to recognize the legitimacy of some of the new issues. The attitude is that these issues have been dreamed up by some radical wackos, without recognizing that there's a core of very legitimate concerns.

—planning director, midwestern state DOT

"We have the most stringent environmental policies in the nation. The DOT spends what it takes [to meet environmental requirements]. We don't argue about permits or mitigation."

—CAO, southeastern state DOT

"The state has reformulated all its planning processes. [Another department] is primarily responsible for growth management, but the DOT has tried to coordinate with local areas and community people."

—stakeholder, southeastern state

"The state has to play an aggressive leadership role in relationship to communities. They bring a statewide perspective and resources. If they truly take to heart the responsibility for multiple modes, they can really make progress in empowering communities."

—transit official, southeastern state

"The MPO doesn't have much staff and has been a weak influence. It's time that it matures."

—transit official, southeastern state

"Of all the state agencies, we have the most interaction and cooperation with [the state DOT]. It has turned into a partnership . . . every month we have a management meeting with [the state DOT] to study policy and existing issues. Policy changes come from that."

—MPO, western state

"DOT needs to allow connectivity between major urban areas and rural areas. DOT should back out and let urban areas deal with growth and transportation."

—engineer, southeastern state DOT

"There is no 'shared vision' for the future, unless in the rural areas where it [the vision] is more paved roads."

—transit official in western state

PUBLIC AND POLITICAL PRESSURES

"[The state DOT] will have to be more connected to public perception. State and federal legislators will be running for their lives. Public agencies will have to be responsive to the public, in terms of [getting them] where they want to go quickly and safely. It's a matter of survival in the business world. The customer gets used to it in the private sector and comes to expect it in the public sector.

—CAO, midwestern state DOT

"We need to treat them all as customers. We have to educate them about needs especially as to the importance of good transportation, what congestion costs the economy and the environment. We need to let them know that Just-in-Time is important."

—CAO, southwestern state DOT

"Neighborhood resistance will increase involvement as far as public participation."

—MPO official, southwestern state

"People need to be educated as to how important transportation is to them, how difficult it is to accomplish, and the costs involved. Everyone takes transportation for granted. There is no appreciation for the costs of maintenance."

—planning director, southern state DOT

"There needs to be better understanding of the importance of transportation to the overall economy. Congestion costs money. People don't understand that."

—state legislator, western state

"There is no longer a build-build mentality. There is more grass roots support to consider getting [people] out of their cars."

—planning director, southwestern state DOT

"Society as a whole tends to dwell on the negative. Society needs to focus on more positive aspects—DOT too. Be more customer-oriented."

—public transportation director, state DOT

"What we did first [at the state DOT] was to go on the defensive and clean up the bad press and try to avoid any future mistakes. Now they [state DOT] can take risks."

—former state DOT official

"Executive branch weakness is structural in the [state] Constitution. The DOT can't reorganize without a change in the law. Even the criteria for Commissioner are specified in law. There's lots of change in the legislature, and the governor is night and day different, but the process didn't change. You'd have to have a strategy to change anything at DOT; you'd have to sell the governor, the cabinet officials involved, the chairs of committees, a few others. That's very risk-taking."

—former state DOT official

"How much does the Governor know about the challenges facing the DOT? The primary attitude of governors to DOTs is 'If it ain't broke, don't fix it.' You can only get access if there's a crisis. That's not adequate for the future. For the future, the question is, 'How are you going to do better and be competitive?' [State DOTs] don't get kudos for things like fiber optics right-of-way because that doesn't get votes. Yet that may have the most effect of anything the [CAO] does."

—state legislator, northeastern state

"People are not afraid to voice their opinions in public. From the opposite side, the challenge is how to keep the process less public. A public hearing is so political, it could produce bad decisions and override valid transportation priorities."

—business/environmental group, northeastern state

"[The greatest obstacle to the state DOT in responding effectively to forces driving change is] politics—doing things for political reasons rather than because they're the right thing. The legislature 'passes the laws and leaves town.' They should pay more attention to department needs."

—public transportation director, state DOT

"I don't think they [state DOT] know why they have micromanagement from the legislature. They don't work very well with the legislature. We will end up with less roads, less effective system, less credibility with the public which will produce less public willingness to spend money on transportation."

—stakeholder, southeastern state

"If we become an open and responsive state agency, we won't have trouble with the governor and the legislature."

—CAO, southern state DOT

"DOT success depends greatly on the ability to work with

the legislature. The CAO needs skills to negotiate between the governor and the legislature."

—CAO, northeastern state DOT

"I have mixed feelings with the legislature micro-managing . . . Political people tend to be kneejerking. They try to represent what constituents want and their careers are short if they don't see results immediately."

—stakeholder, southwestern state

"The legislature and governor should be more concerned with appointing people with diverse backgrounds [to the state transportation commission]. Currently they have people on the commission who are either developers or social activists. They need modal expertise on the commission."

—port official, western state

"We don't have the best land use policies, so transportation becomes a way indirectly to control land use. This makes legislators unhappy."

—highway official, western state DOT

"The legislature is rural-dominated. The DOT has to contend with rural pressures in the face of crying urban needs."

—MPO official, southern state

"We need transportation access to health facilities. Hospitals and clinics are dying because people can't get to the facilities. The DOT needs to interact, design systems to help get people to medical facilities for routine services. DOT has yet to accept this perspective. They will have to change due to public outcry and from legislative pressure. This could be a crisis if something is not done about it."

—public transportation director, state DOT

"There is an elite group of people who want to control how people live, where they live, and how they get to and from work. Transportation is becoming more costly because of mandates that don't work effectively."

—contractor, southwestern state

"[The greatest obstacle to the state DOT is] funding and the [lack of] understanding by elected officials (governor and legislature) of the funding problem. This may be a case where the Federal government isn't the answer. Get the states back into funding more of their own transportation and have the Federal government reduce the [Federal] gas tax every year. Then you can address the diversity of states and missions. South Dakota can build highways and Massachusetts can fund transit. They can raise taxes for their own needs. The Interstate system was a common mission but now that's over."

—common carrier, northeastern state

"[There's an] inherent lack of willingness by the federal bureaucracy in allowing states to participate in planning and implementing transportation improvements with the Mexican states. Hopefully, "reinventing government" will take care of this—to give states more authority."

—NAFTA support group, border state

"There is a lack of understanding at the federal level of problems in geographic regions. . . . Rural problems in Colorado are different from rural Texas or Louisiana."

—state legislator, western state

"Federal policy dictates that people will move around in other ways than the automobile. Rural America will rebel against this at some point."

—rural stakeholder group, western state

"As long as we live in a democracy, people will continue to do and live as they please. There will still be pressures from Washington to change lifestyles but people will resist."

—CAO, midwestern state DOT

FINANCIAL PRESSURES

"When ISTEA passed, the U.S. Congress talked about lots of extra money. [Our state] is getting less money. Increased flexibility means more players are vying for less money. We have had to educate internally and externally about obligation limitations."

—finance director, western state DOT

"Limited funds are making it very difficult to implement change. People are reluctant to change because they feel a lack of resources."

—finance director, southeastern state DOT

"[The response to lack of funding] has not been what I'd like—innovation. There's not much they [state DOTs] can do to get more money, but there's a lot they can do to get more out of the money."

—tollway authority official

"The cost of transportation goes up but revenues go down because less gas is being used. Taxes are not levied on costs but on quantity and with fuel efficiency going up . . ."

—planning director, southern DOT

"The finance system will need an overhaul because the gasoline tax is no longer reliable."

—MPO official, southern state DOT

"The Highway Trust Fund should be used for good transportation only. It should not be used for deficit or other purposes."

—rural stakeholder group, western state

"[The greatest obstacle is] absolutely funding. Where we've had constitutionally dedicated funding in the past, now revenues are flat or decreasing."

—finance director, southern state DOT

"Money is always the biggest problem—how and where you spend it."

—transit official, western metropolitan region

CHANGING DEMANDS ON DOT WORKFORCE

"The greatest strength of the state DOT is the people. They have exceptionally bright, intelligent people with amazing skills and capabilities . . . if they could just be broken loose so they could be used. They're thinking people. They can

really think through an idea, if only it could be channeled to innovation. . . ."

—toll authority official, former state DOT official

"[The greatest obstacle to the state DOT in responding effectively to change is] tradition. It's the same in all states."

—former state DOT official

"They have a lot of deadwood they've got to get rid of throughout state government. It's nearly impossible to get rid of people for poor performance. The leaders' hands are tied. It's hard to create a new vision."

—MPO director, western state

"One of the real tragedies is the rate of turnover in executive leadership. Every two years they change. Senior executive positions should be four to five years."

—CAO, western state DOT

"[The state DOT] has a very good group of talented people but they have a highways mindset. They have always promoted from within so it's inbred. They need more infusion of different thinking at the state level and more turnover of senior staff."

—port official, western state

"The government has a continuing bureaucratic process that doesn't allow change. I'm not sure they [state DOT] have recognized the problem. They may not see themselves as traditionalists. there's a very strong sense of "family" in the DOT. If you are an innovator, you're branded as a "maverick."

—former state DOT official

"DOT will need more expertise to deal with these [future] issues. They only know highways. They will need railroad and transit expertise."

—contractors in southern state

"I believe that TQM will have more of an impact in the future than anything. I believe that the DOTs that do it will do well. Those that don't will be in trouble."

—CAO, midwestern state DOT

"DOT is going to be customer-oriented. But it's like trying to turn a battleship around with a canoe paddle. . . . Changing a damn engineer is about as easy as standing on the beach and holding back the tide."

—CAO, southeastern state DOT

"The retirement of older management will change the face of the department forever. Now there are fresh new faces without preconceived biases. They are more willing to take a different look as opposed to the way things were done in the past."

—planning director, southern state DOT

"After 20 or 25 years, 'bright young people' don't shine any more! You can't or you won't be promoted. Change only comes from the outside."

—former state DOT official

"The greatest obstacle to the state DOT in responding effectively to change is] finding sufficient technical people to get the job done—engineers, planners, etc. Downsizing has been going on. If the private sector can respond, that could be good, if it's successful. But consultants are having trouble finding good people too."

—planning director, southeastern DOT

"Personnel will be more of a problem for DOT and contractors. We will not be able to get the right type people. People will not be as dedicated. There will be more lawsuits, discrimination suits. Now we can't fire people without red tape. There will be more cumbersome type operations. Contractors will have the same problem. It shows up in workmanship."

—chief engineer, southern state DOT

"There needs to be more technology such as video and virtual reality to communicate the geometric work they [state DOT] do. The technology is available now."

—MPO official, southwestern city

"We will have to put greater emphasis on technology such as IVHS. That in itself will mean highway departments will have to be more professionally diverse. Not just civil engineers."

—FHWA official

"[The DOT has] a good but small planning staff. They need stronger planning. They have a problem bringing in people who are not P.E.s. Their engineering mentality can be a limiting factor in responding to change. Engineering expertise is a strength and a weakness."

—MPO official, southern city

"They need more people who can talk non-technical language when they go to the public. . . . You can't sound like a bureaucrat when you're talking dreams. The message won't get through."

—transportation commissioner, western state

"They [people of state DOT] have a natural desire to be the best, get the highest score. They have pride in wanting to be the best, like the Dallas Cowboys, the Marine Corps."

—trucking company executive

"Our people . . . are very well educated and I don't just mean academic degrees. They have a high degree of competence and an ability to respond. They have a commitment to creativity and innovation. We don't park our brains at the door."

—CAO, northern state DOT

"What motivates people more than money is that we are all born with the innate need to be part of something and to have our contributions valued."

—CAO, southern state DOT

"So much is leadership. Leadership is a strength right now, but that can change. It's important that there be continuity in the next decade in terms of the philosophical perspective in management [at the state DOT]. . . . From World War II until 1990, they could go from one [CAO] to another and it

didn't matter because the mission was the same. Now the mission is changing year by year and the person at the top has to figure out where the world is going and really has to lead."

—common carrier executive, northeastern state

"The greatest strength of [the state DOT] is the fact that we've decided we're going to lead and we're going to guide our own destiny before someone else forces us to change."

—CAO, western state DOT

APPENDIX H

GENERAL PRINCIPLES OF ORGANIZATIONAL EFFECTIVENESS

What makes an effective organization? How do you know one when you see one? What action steps do organizations take to get there?

Over the last century, many theories, models, and principles have been developed for managing organizations. The question of what is the best model or "best practice" is far from settled, for any kind of organization—large, small, public, private, transportation or other fields. Most state DOTs and their predecessor agencies have undoubtedly heard, and probably tried, a number of strategies for organizing, managing, and improving their organizations.

No single institutional model or approach to management can take in every consideration or deal with every challenge, and no management prescription will work in every organization or environment. Management theories, principles, and practices are continuously evolving, and the public administration community has not and may never come to agreement on the definition or techniques for achieving the ideal government organization.

The National Academy of Public Administration (NAPA) has given substantial attention in recent years to the issues of public management and the essential elements and attributes of effective organizations.

1. Model of Organizational Effectiveness

One very effective basic model for considering the elements of an effective organization (which some states and DOTs have seen or applied) has been advanced by Harvard University's John F. Kennedy School of Government. The model is generally presented as a schematic diagram with three parts — Vision, Authorizing Environment, and Organizational Capacity. By this model, an effective organization needs to have those three elements in alignment. The most common graphic demonstration of the model is a Venn diagram of three equal and intersecting circles (see Figure H-1). The effective organization operates as much as possible at the union of the three circles, where Vision, Authorizing Environment, and Organizational Capacity come together, and works to bring the elements into greater alignment to maximize the size of the area of congruence in the three circles.

The first and most essential element for a leader is a clear and compelling vision of a future course or desired state for the organization and its activities. The vision and activities must be in sync with and supported by the governmental and private sector and the general public that is served by the organization and has a stake in its activities, as well as a say in what and whether it is authorized to perform. With both the vision and authorizing environment in line, the organization must have the capacity to carry out the desired activities and advance the vision.

The vision must come first. The power of vision can carry an organization over formidable hurdles. Few organizations have a clear and compelling sense of their future course, a strategic direction that can guide their agenda and actions. Only an effective leader at the top of an organization is in the position to articulate and implement a successful organizational vision. Most leaders either have not taken a broad enough perspective to constitute an effective vision, or have not been able to pull together current interests and future opportunities compellingly, or communicate their sense of direction and vision. For state DOTs and their leaders, the one best foundation for an organizational vision is the public, with their goals and aspirations. The public includes the individual citizens, their communities, and the firms and other bodies served and affected by transportation in the state. As broad-ranging, complicated, and even confusing as public perspectives may be, public organizations cannot function in isolation from them. And particularly when public goals and objectives are as diverse as they are, reflected in so many voices and groups, and constantly evolving and changing, transportation cannot be cut off from the political arena. That political arena, in its broadest sense — the citizens and their representatives — also makes up to a large degree the authorizing environment for transportation organization. They not only may be affected by the DOT's actions, but also can affect its authority and capacity to act, and can contribute to forming and achieving the organizational vision.

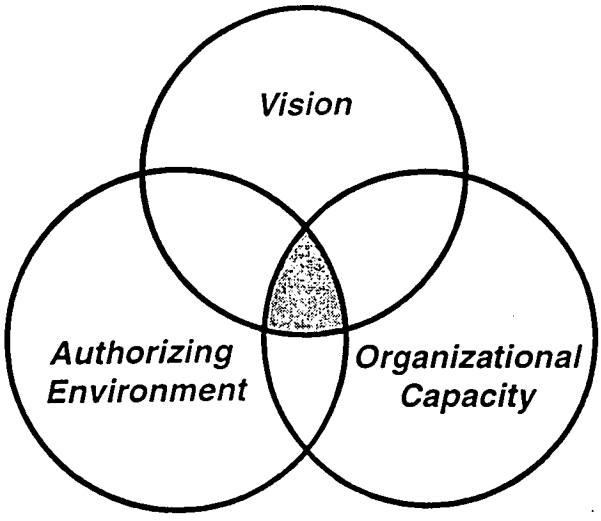
Modern management literature and theory provide numerous approaches to developing organizational capacity, and these approaches are supported by many different management tools and techniques. Virtually all of them require that top leadership be fully committed over an extended period and unstinting in giving time and resources to the effort. The CAO must also give careful consideration to the form, process, and techniques he or she chooses to try, based on a sensitive assessment of the organization and circumstances.

2. NAPA Framework of Governance

NAPA has developed a framework of key questions and principles for public sector and other civic organizations in developing their organizational capacity. The framework emphasizes four key elements:

- Clear sense of mission or "public purpose"
- Capacity to perform the mission
- Appropriate institutional structure, roles, and relationships
- Ability to change and adapt to evolving circumstances.

These elements can be applied to any public sector organization in any field. It is relatively easy to link them to transportation and develop a sense of what each of the four elements would mean in a transportation organization. This section draws on the



Source: Harvard University, John F. Kennedy School of Government, Program for Senior Executives in State and Local Government.

The model has been illustrated and applied in:

Mark H. Moore, *Creating Public Value: Strategic Management in the Public Sector*. Harvard University Press (forthcoming).

Philip B. Heymann, *The Politics of Public Management*. New Haven: Yale University (1987) 196 pages.

David A. Lax and James K. Sebenius, *The Manager as Negotiator: Bargaining for Cooperation and Competitive Gain*. London: Collier Macmillan; New York, Free Press (1986) 395 pages.

Figure H-1. Venn Diagram of Organizational Effectiveness

recent work of NAPA with organizations of all kinds, at the state as well as federal and local levels (see Figure H-2 for an example from the recent report on the U.S. Department of Housing and Urban Development).

a. Mission. What does it mean to have a clear sense of mission and public purpose? It means to have a strong and clear charter in the laws establishing the organization and governing its programs; compelling and well-supported public goals; a solid understanding of the purpose, functions, and priorities by the people of the organization, from the top leaders to the rank and file; and a doable and politically supportable agenda, accepted inside and outside the DOT. Particularly in comparison with other programs and organizations with which NAPA has worked, ISTEA creates an unusually strong and clear charter.

b. Performance capacity. What is performance capacity for a state DOT? That relates to the resources, skills, and expertise to do the jobs set out for the organization, as established by law, public goals, and current organizational and/or political priorities. Leadership and human resources, financial resources, and information and other internal systems and processes all play a part in determining whether a state DOT has the capacity to carry out its mission. For example, does the organization have capable political leaders, a strong core of senior-level career executives, and good working relationships between all those officials? Is the workforce size appropriate to the mission and agenda? Do the employees and managers have adequate training to handle their mission and specific tasks effectively? Are the employees well motivated, building on their sense of mission as well as a sense of accomplishment in their work? Does the organization appreciate and make constructive use of diversity in the workforce, provide equal employment opportunities to all individuals, and ensure a nondiscriminatory and nonhostile work environment in which every employee can develop and apply his or her potential?

Staff development programs should provide a range and breadth of experience to employees, particularly those who advance to supervisory, management, and executive positions. Human resource management—recruitment, training and employee development, staff assignment, and employee evaluation—should be given high priority and adequate funding to have the desired effects.

Are budgeting, program planning, and other internal systems designed and operated to support the organization's missions and programs? Financial management systems should supply accurate and timely data that are useful in managing the programs, and in preparing, auditing, and evaluating financial statements and summary program reports. Information systems should take advantage of modern information technology, permit integration of diverse data, and provide information that staff and managers can use to monitor and evaluate program performance. Procurement processes and grants and contract management practices should contribute to meeting program needs, keeping costs low, avoiding waste and fraud, and maintaining the integrity of the program and the process. Critical to all these functions is an effective effort at establishing clear objectives, defining

ELEMENTS OF INSTITUTIONAL CAPACITY
Mission and Vision
Leadership
Policy Formulation
Organization
Workforce
Policy Implementation
Management Systems

SOURCE: National Academy of Public Administration, *Renewing HUD: A Long-Term Agenda for Effective Performance*, Report by a Panel of the Academy for the U.S. Department of Housing and Public Administration, Washington, D.C., July 1994, pp. 178-179.

Figure H-2. Elements of Institutional Capacity

indicators that are useful in measuring performance toward those objectives, collecting data to track changes in the indicators, and then providing feedback on the performance so that managers and staff can see needs for improvement and adjust the data and measurement systems—or leaders can refine the objectives and indicators, as appropriate to meet the organization's mission.

c. Institutional roles. What are the appropriate structure, roles, and relationships for an effective state DOT? There are undoubtedly as many answers as there are states—probably more. But in every case the size and structure of the organization and its location in the system of governance should fit its statutory charter and mission. Headquarters units should have clear functions and lines of authority and accountability, which do not usurp or encroach on those roles most appropriately carried out outside the headquarters, in other agencies, or at other levels of government. The structure of field units and operations should be effectively connected to headquarters and to other agencies and field staffs, but with clear delegation of functions and authority consistent with the size, capacity, and location of field units, within the overarching mission and agenda of the overall organization. As far as possible and prudent, responsibilities should be delegated to the level with greatest access to needed information, skills, and resources.

Similarly, roles and responsibilities should be assigned among agencies and levels of government consistent with their skills, resources, and location in government. Cooperation and coordination of roles between organizations with related missions and functions is essential to avoid duplication and achieve the greatest contribution toward accomplishing their mutual purposes. State DOTs cannot function effectively without solid relationships and status with the governor, legislature, other parts of state government, other levels of government, key beneficiaries of the DOT programs and those who have a stake in them, and the general public. The DOT must have effective communications and relationships with suppliers, contractors, stakeholders, and public interests.

d. Capacity for change. Organizations capable of change have the ability to monitor trends and developments, see emerging issues, and develop responses tailored to fit the organizational, public, and political context (a set of change principles developed by the state of North Carolina is presented in Figure H-3). Measurement systems and feedback processes must tell the organization the outcomes being achieved and course corrections needed. Individual staff members must be open to and encouraged to be constantly learning and seeking opportunities to improve; leaders must support that learning and improvement process, even recognizing that it will often mean dramatic changes in the organizational culture. And the leadership must also adjust priorities in response to changing internal and external circumstances, including evaluations of performance and continual learning, and then communicate and support the new priorities. Management systems and structures must be suited to carrying forward the agenda and managing people and processes to make change possible.

There are many approaches and techniques for achieving high performance. Most of them incorporate considerations of mission, performance capacity, institutional roles and relationships, and ability to change and adapt to changing conditions. Figure H-4 presents the fundamental findings of a "design team" project on creating "high-performance work organizations" in the public sector, conducted by the Alliance for Redesigning Government at NAPA. The project's "primer" for public agencies focuses on practical suggestions for developing organizations of employees who will produce the desired goods or services at continually higher quality with the same or fewer resources to achieve their mission. The project emphasized that for public agencies to become high-performance work organizations, they often must undergo changes in three important areas:

- Change in the relationship between people and their work
- Change in the relationship between organizations and their customers
- Change in the relationship between organizations and their external environment.

As the Alliance project and NAPA's study of HUD underline, many fundamental components of the organization are likely to have to be strengthened or changed for an agency to improve its effectiveness: the people and their training and skills; structure; leadership style; human resource systems; information/decision systems; and values and norms in the culture of the organization.

Why should a state DOT spend any time thinking about what would make an ideal high-performance organization? There are many good answers. First, all government organizations face judgments on their performance, even if they are not driven by the competitive market. The Alliance design team noted that "people are looking for more from their governments, governments are looking for more from their people, and people [in government] are looking for more from their jobs." Reflecting the comments of respondents in the field research for this NCHRP report, the Alliance team identified several factors that make change both necessary and appropriate.

Most public agencies and programs face fiscal pressures and all of them are subject to increasingly sophisticated and demanding consumers. "People see revolutions in quality and productivity, new services offered through information technology and many other innovations developed as a result of intense global competition . . . they are increasingly living in a world where goods can be produced, information exchanged and service provided in a very short time. They want the same level of service from government."[1] Many citizens also have a perception that government agencies' operations are plagued by waste and inefficiency, which produces an even stronger motive for government to improve productivity and quality. Elected officials must redesign public programs or organizations, or terminate them if they are not performing satisfactorily. Voters can elect officials committed to making that kind of change, and can vote down bond issues and tax proposals that support a program or agency. Finally, government operates "for the people," and the public deserves quality service from its government organizations.

The Alliance primer for public agencies points to four fundamental requirements for building a high-performance work organization:

- Consistent sustained leadership

[1] Alliance for Redesigning Government, National Academy of Public Administration, *Creating High Performance Organizations: A Primer for Public Agencies*. National Academy of Public Administration, Washington, D.C. (November 1994 draft), p. 14.

North Carolina Government Performance Audit: Change Principles

Principle 1: Mindset. To succeed, you must want to succeed. No longer can our leaders or employees tell us why something cannot be done. They must make the internal commitment to what we can do to succeed. They must dedicate themselves to delivering services to the citizens of North Carolina.

Principle 2: Continuous Improvement. In a world of constant change, the way the State conducts its business must likewise continue to change. The most successful of our State activities are those that continually monitor and modify what they do and how they do it. We call upon everyone in government to commit to a quality of service-based concept of continuous improvement. No longer can any of us shy away from the risks that often accompany innovative practice. Recognizing risks and responding to them is what the future is all about.

Principle 3: Standards. Our historically high standards for service delivery should not be compromised by temporary, or even structural, fiscal strategies. We must commit ourselves to setting high standards for quality services to our citizens.

Principle 4: Fundamentals. Good government depends on the basics. It is essential that every one of our State employees, from managers to individuals providing direct services, know and do the fundamentals right. The fundamentals of government include everything from answering a telephone promptly and courteously to doing something accurately the first time so that it doesn't have to be done again.

Principle 5: Accountability. Too often it is difficult to pinpoint responsibility for the failure--or success--of a State activity. But people run programs, people make decisions, people determine the outcome of what we do; we need to make sure that they have the tools and resources to do what they have to do. We want to know who is accountable to the General Assembly and the people of North Carolina for the quality, cost, and results of State programs.

SOURCE: Sharon M. Caudle, *Reengineering for Results: Keys to Success from Government Experience*. National Academy of Public Administration, August 1994, p. 2.

Figure H-3. North Carolina Government Peformance Audit: Change Principles

- Willingness to develop performance measures
- Willingness to change whole organizations to provide higher quality and more appropriate services at equal or reduced costs
- Willingness to allocate resources to continual learning.

How does an agency know where to begin? The primer points to the need for a strategic plan, to set a course, identify necessary changes, and anticipate opportunities and potential barriers to meeting the goals. While some experts advise building the ability to change into the organization itself and allowing it to respond to its environment, without a strategic plan, the Alliance design team observed that in the public sector, enduring change appears to require a well-thought-out strategic plan, involving four types of activities:

- Clarifying purpose
- Understanding the environment
- Identifying stakeholders
- Building commitment to change.

The primer will provide concrete case examples and suggestions for how to launch and carry forward these activities to achieve improved performance. Appendix J also includes a checklist for a state DOT to assess the extent to which it is effectively managing according to strategic plans, from *NCHRP Report 331*, "Strategic Planning and Management Guidelines for Transportation Agencies."

WHAT IS A HIGH PERFORMANCE WORK ORGANIZATION?

High performance work organizations have certain characteristics that distinguish them from other organizations:

- They are clear on their mission.
- They define outcomes and focus on results.
- They empower their employees.
- They institute new processes in order to motivate and inspire people to succeed.
- They are flexible, adaptable, and quick to adjust when conditions change.
- They are competitive in terms of performance.
  They are characterized by collaborative and cooperative working relationships within the organization but the performance of the organization is highly competitive with other similarly focused organizations or with past performance.
- They restructure their work processes to meet customer needs.
- They maintain open and productive communications among stakeholders.

SOURCE: Alliance for Redesigning Government, National Academy of Public Administration, *Creating High Performance Organizations: A Primer for Public Agencies* (November Draft) 135 pages.

MOVING TOWARD HIGHER PERFORMANCE

- Move from reacting to engaging and enabling.
- Move from a primary focus on programs to a mission mentality.
- Move from compliance with rules to emphasis on quality and customer satisfaction.
- Move from narrow expertise to multi-skilled team players.
- Move from repetitive jobs and routine training to continuous learning.
- Move from routine behaviors to involvement, innovation, and cooperation.
- Move from command and control leadership style to leaders as facilitators.
- Move from fragmentation and rigid organizational boundaries to alliances within and across organizations to achieve results.
- Move from a focus on spending to strategic investment.
- Move from centralized information and decision systems to decentralized approaches and open communications.

Figure H-4. What Is A High Performance Work Organization?

APPENDIX I

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Budget and Financial Services Director Do I know the ...	I have ...			
	Comprehensive information and systematic processes to keep me up to date	Good information, but information-gathering processes are ad hoc and spotty	Some information but far from systematic/complete data or processes for gathering it	Very limited information and limited processes for gathering it
1. DOT's overall mission and vision and how my functional area fits into these?	❑	❑	❑	❑
2. Overall goals and objectives of the DOT and the strategies identified for achieving these goals and objectives?	❑	❑	❑	❑
3. How my financial area contributes to meeting the overall mission and goals of the DOT?	❑	❑	❑	❑
4. DOT's measures of success?	❑	❑	❑	❑
5. Expectations and concerns of the govenor and state legislators relating to DOT budget, finances, and financial services?	❑	❑	❑	❑
6. Expectations and concerns of the Department of Administration, the state budget office, the office of state controller or treasurer, and legislative staff?	❑	❑	❑	❑
7. Expectations and concerns of the DOT managers and employees who use our services? How do they assess our services?	❑	❑	❑	❑
8. Ideas, needs, aspirations, values of my managers and employees?	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Budget and Financial Services Director *Do I know the . . .*	*I have . . .*			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
9. Full range of budget and financial services that are being provided in the state DOT?	❑	❑	❑	❑
10. Innovative/alternative budget, financial, and management strategies that are being tested and/or implemented in other state agencies or the private sector?	❑	❑	❑	❑
11. Unmet needs of employees in my functional area for additional training, skills, experience, and technical assistance.	❑	❑	❑	❑
12. Performance levels of the various sub-units and how they relate to each other and the people they serve?	❑	❑	❑	❑
13. Educational and performance monitoring activities in other state DOTs' budget and financial services sections that can be modeled?	❑	❑	❑	❑
14. Extent of employee development and empowerment occurring in the budget and financial services section?	❑	❑	❑	❑
15. Do I have a clear understanding that employee development is an ongoing, every day need?	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION
(Synthesis Phase)

Key Questions for the Budget and Financial Services Director *Can I develop . . .*	*I have . . .*			
	A solid, comprehensive synthesis	**A fair/good synthesis**	**A very limited understanding**	**Insufficient information to make a synthesis**
1. A vision and clear overall direction for my functional area responsive to overall goals, conditions and state priorities?	❑	❑	❑	❑
2. Long-term goals and short-term objectives?	❑	❑	❑	❑
3. Priority issues and activities?	❑	❑	❑	❑
4. Strategies for dealing with priority issues and activities?	❑	❑	❑	❑
5. An immediate agenda?	❑	❑	❑	❑
6. A comprehensive strategy to improve the skill level, diversity, and performance of functional area staff?	❑	❑	❑	❑
7. Financial resources needed to increase effectiveness and efficiencies in the financial services function?	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND—METHODS FOR ASSESSING THAT ABILITY (Response Assessment Phase)

Key Questions for the Budget and Financial Services Director *I have...*	*I...*			
	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. The management style and skills to allow me to respond effectively to external factors forcing change within my functional area.	❑	❑	❑	❑
2. A skilled team of professionals to respond to the challenges and forces driving change in transportation.	❑	❑	❑	❑
3. The organizational structure to respond efficiently and effectively to change.	❑	❑	❑	❑
4. The motivation to seek out professional training to enhance my performance in a leadership position.	❑	❑	❑	❑
5. An established network of professional and political support to back me in carrying out the DOT/functional area mission.	❑	❑	❑	❑
6. Support from the CAO's office.	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Budget and Financial Services Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	*This action is . . .*			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
1. Develop a strategic and operations planning process in my functional area? - develop a clear mission statement linked to the agency's mission and goals? - develop goals for my functional area? - establish measurable objectives, timetable, and assignments each year? - tie the budget to goals and objectives? - track progress and manage for performance of goals and objectives?	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑
2. Commit to professional training to develop my leadership skills?	❑	❑	❑	❑
3. Examine the organizational structure and reorganize my functional area to increase efficiencies, effectiveness, and workforce diversity?	❑	❑	❑	❑
4. Decentralize authority within my functional area to empower staff at all levels?	❑	❑	❑	❑
5. Clarify procedures, rules, directives so managers and employees outside my area can understand and apply them more easily and effectively?	❑	❑	❑	❑
6. Develop a process so that rules and procedures are reviewed periodically and revised or deleted as appropriate?	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Budget and Financial Services Director **(Answers may be shaped and directed by responses in Phases I-III)** ***Should I...***	***This action is...***			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
7. Organize more routine meetings with the management team to improve communications and town involvement in the planning process?	❑	❑	❑	❑
8. Evaluate and improve technologies (e.g., communications software) in my functional area?	❑	❑	❑	❑
9. Improve and expand the employee training program for my own staff?	❑	❑	❑	❑
10. Improve collection and use of information we need to carry out area missions?	❑	❑	❑	❑
11. Establish performance criteria for my sub-units?	❑	❑	❑	❑
12. Improve the level and quality of technical assistance and training to the people we serve?	❑	❑	❑	❑
13. Develop an outreach/information program to increase communications with people we serve?	❑	❑	❑	❑
14. Develop a strategy to educate legislators, political entities, and other state departments on DOT budget and financial services?	❑	❑	❑	❑

BUDGET AND FINANCIAL SERVICES
Guidance/Option Development Matrix

PHASE V: MEASURES FOR JUDGING SUCCESS (Performance Monitoring Phase)

Key Questions for the Budget and Financial Services Director *Do I need to ....?*	*There are ....* Comprehensive and successful programs	Fair to good programs, but with some gaps	Limited efforts, and significant room for improvement	Poor to no efforts in this area
1. Establish performance criteria for all key service and control elements of budget and financial services?	❑	❑	❑	❑
2. Design a structured process of obtaining feedback from the management team?	❑	❑	❑	❑
3. Improve processes for involving and listening to the public on their goals and measures of success for budget and financial services?	❑	❑	❑	❑
4. Develop/improve upon performance monitoring reports for use in budget and financial services units?	❑	❑	❑	❑
5. Regularly and consistently use performance measurement output to drive personnel, policy, organizational, and budget decisions within my functional area?	❑	❑	❑	❑
6. Develop/improve upon performance appraisals for functional area staff to build in more effective feedback and focus on contribution to the performance of the organization and the highway and transportation system?	❑	❑	❑	❑

Action Implementation Plan for Budget and Financial Services Directors

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
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PLANNING
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Planning Director *Do I know the...*	*I have...*			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
1. DOT's overall mission and vision and how my functional area fits into these?	❑	❑	❑	❑
2. Overall goals and objectives of the DOT and the strategies identified for achieving these goals and objectives?	❑	❑	❑	❑
3. How my functional area contributes to meeting the overall mission and goals of the DOT?	❑	❑	❑	❑
4. DOT's measures of success?	❑	❑	❑	❑
5. Broad expectations and concerns of the citizens, governor, state legislators and business leaders relating to planning?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Planning Director *Do I know the . . .*	*I have . . .*			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
6. Expectations and concerns of the planning functional area?	❑	❑	❑	❑
7. Expectations and concerns of the DOT managers and employees who use our services?	❑	❑	❑	❑
8. Ideas, needs, aspirations, values of my managers and employees in my functional area?	❑	❑	❑	❑
9. Full range and relative values of the planning activities that are being provided in the state?	❑	❑	❑	❑
10. Innovative planning strategies that are being tested and/or implemented on the local level and in other states?	❑	❑	❑	❑
11. Ideas, needs, aspirations of local government transportation planning entities throughout the state?	❑	❑	❑	❑
12. Local transportation planning entities' effort in developing transit-sensitive land use policies?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION (Synthesis Phase)

Key Questions for the Planning Director Can I develop...	I have...			
	A solid, comprehensive synthesis	**A fair/good synthesis**	**A very limited understanding**	**Insufficient information to make a synthesis**
1. A vision and clear overall direction for my functional area responsive to overall goals, conditions, and state priorities?	❑	❑	❑	❑
2. Long-term goals and short-term objectives?	❑	❑	❑	❑
3. Priority issues and activities?	❑	❑	❑	❑
4. Action plans to deal with priority issues and activities?	❑	❑	❑	❑
5. An immediate agenda?	❑	❑	❑	❑
6. A comprehensive strategy to improve the skill level, diversity, and performance of functional area staff?	❑	❑	❑	❑
7. Financial resources needed to increase effectiveness and efficiencies in the planning function area?	❑	❑	❑	❑
8. Long range planning that considers the range of intermodal transportation needs, environmental concerns, and priorities of local transportation planning entities?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND—METHODS FOR ASSESSING THAT ABILITY (Response Assessment Phase)

Key Questions for the Planning Director I have...	I...			
	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. The management style and skills to allow me to respond effectively to external factorsforcing change within my functional area.	❑	❑	❑	❑
2. A skilled, balanced, diverse team of professionals to respond to the challenges and forces driving change in transportation.	❑	❑	❑	❑
3. The organizational structure to respond efficiently and effectively to change.	❑	❑	❑	❑
4. The motivation to seek out professional training to enhance my performance in a leadership position.	❑	❑	❑	❑
5. An established network of professional and political support to back me in carrying out the DOT/functional area mission.	❑	❑	❑	❑
6. Support from the CAO's office.	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Planning Director **(Answers may be shaped and directed by responses in Phases I-III)** ***Should I . . .***	***This action is . . .***			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
1. Develop a strategic and operations planning process in my functional area? - develop a clear mission statement linked to the agency's mission and goals? - develop goals for my functional area? - establish measurable objectives, timetable, and assignments each year? - tie the budget to goals and objectives? - track progress and manage for performance of goals and objectives?	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑
2. Commit to professional training to develop my leadership skills?	❑	❑	❑	❑
3. Examine the organizational structure and reorganize functional areas under my supervision to increase efficiencies, effectiveness, and workforce diversity?	❑	❑	❑	❑
4. Decentralize authority within my functional area to empower our own employees and those we work with around the DOT?	❑	❑	❑	❑
5. Clarify procedures, rules, directives so managers and employees outside my area can understand and apply them more easily and effectively?	❑	❑	❑	❑
6. Develop a process so that rules and procedures are reviewed periodically and revised or deleted as appropriate?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Planning Director (Answers may be shaped and directed by responses in Phases I-III) Should I...	This action is...			
	Appropriate, and we are doing it effectively	Appropriate, and we are doing it, but with limited progress	Appropriate, but we have not acted on it	Inappropriate because of specific factors at DOT
7. Organize more routine meetings with the management team to improve communications and team involvement in the planning process?	❑	❑	❑	❑
8. Evaluate and improve technologies (e.g., communications software) in my functional area?	❑	❑	❑	❑
9. Improve and expand the employee training program for my own staff?	❑	❑	❑	❑
10. Improve and expand the employee training program for all employees?	❑	❑	❑	❑
11. Improve collection and use of information we need to carry out area missions?	❑	❑	❑	❑
12. Establish performance criteria for my sub-units?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Planning Director (Answers may be shaped and directed by responses in Phases I-III) Should I...	This action is... Appropriate, and we are doing it effectively	Appropriate, and we are doing it, but with limited progress	Appropriate, but we have not acted on it	Inappropriate because of specific factors at DOT
13. Improve the level and quality of technical assistance and training to the people we serve?	❑	❑	❑	❑
14. Develop an outreach/information program to increase communications with people we serve?	❑	❑	❑	❑
15. Develop a strategy to educate legislators, political entities, and other state departments on planning issues?	❑	❑	❑	❑
16. Increase the involvement of local transportation planning entities in the decision making process through routine meetings and information sharing sessions?	❑	❑	❑	❑

PLANNING
Guidance/Option Development Matrix

PHASE V: MEASURES FOR JUDGING SUCCESS (Performance Monitoring Phase)

Key Questions for the Planning Director Do I need to...	There are...			
	Comprehensive and successful programs	Fair to good programs, but with some gaps	Limited efforts, and significant room for improvement	Poor to no efforts in this area
1. Establish performance criteria for all key service and control elements of planning?	❑	❑	❑	❑
2. Design a structured process for obtaining feedback from the management team?	❑	❑	❑	❑
3. Improve processes for involving and listening to the public on their goals and measures of success for transportation and planning?	❑	❑	❑	❑
4. Establish a process for regular, meaningful examination of measures and subsequent communication of results to internal and external parties?	❑	❑	❑	❑
5. Regularly and consistently use performance measurement output to drive personnel, policy, organizational, and budget decisions?	❑	❑	❑	❑
6. Develop/improve upon performance appraisals for the staff of this functional area to build in more effective feedback and focus on contributions to the performance of the organization and the transportation system?	❑	❑	❑	❑

Action Implementation Plan for Planning Directors

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
3.			
4.			
5.			
6.			
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10.			

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for Highway Engineering/Administration Director ***Do I know the . . .***	***I have . . .***			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
1. DOT's overall mission and vision and how my functional area fits into these?	❑	❑	❑	❑
2. Overall goals and objectives of the DOT and the strategies identified for achieving these goals and objectives?	❑	❑	❑	❑
3. DOT's measures of success?	❑	❑	❑	❑
4. The broad expectations of citizens, the governor, state legislators, and business leaders for transportation, particularly in relationship to highway programs?	❑	❑	❑	❑
5. Ideas, needs, aspirations, frustrations, values of our employees working on highway administration and also compared to the overall DOT workforce?	❑	❑	❑	❑
6. Full range and relative values of the many highway administration services being provided?	❑	❑	❑	❑
7. Skills, education, and training required of highway administration employees, vs. that required by other employees in DOT, for carrying out the evolving highway administration mission?	❑	❑	❑	❑
8. Costs and potential performance improvements associated with various levels and choices for possible funding in highways, bridges, or alternatives?	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for Highway Engineering/Administration Director	***I have . . .***			
Do I know the . . .	**Comprehensive information and systematic processes to keep me up to date**	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
9. Details of highway and bridge project delivery—the flow path and all key "check points" and the value added at each?	❑	❑	❑	❑
10. Safety records and associated design features, condition, and investment levels in various segments of highway system?	❑	❑	❑	❑
11. Age, condition, and performance levels of the highway and bridge systems in current, comprehensive, quantitative terms?	❑	❑	❑	❑
12. Age, condition, and performance of equipment and support facilities for the highway functions?	❑	❑	❑	❑
13. Operating and capital allocation methodologies and principles for highway and bridge systems?	❑	❑	❑	❑
14. Innovative/alternative highway-related strategies, management systems, and operating practices being tested and/or implemented in other states and in other countries?	❑	❑	❑	❑
15. Highway administration-related research and education programs, concerns, applications, and priorities?	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION (Synthesis Phase)

Key Questions for Highway Engineering/Administration Director ***Can I develop . . .***	***I have . . .***			
	A solid, comprehensive synthesis	**A fair/good synthesis**	**A very limited understanding**	**Insufficient information to make a synthesis**
1. A vision and clear overall direction for my functional area responsive to overall goals, conditions, and state priorities?	❑	❑	❑	❑
2. Long-term goals and short-term objectives?	❑	❑	❑	❑
3. An immediate agenda?	❑	❑	❑	❑
4. Action plans to deal with priority issues and activities?	❑	❑	❑	❑
5. A comprehensive strategy to improve the skill level, diversity, and performance of functional area staff?	❑	❑	❑	❑
6. A plan to re-engineer project delivery (engineering, construction, maintenance, other operations) to shorten the required time, achieve higher quality, and control costs on projects?	❑	❑	❑	❑
7. Strategies to leverage more broadly the skills and capacity of the workforce, and public and private sectors?	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND–METHODS FOR ASSESSING THAT ABILITY (Response Assessment Phase)

Key Questions for Highway Engineering/Administration Director *I have...*	*I...*			
	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. The management style and skills to allow me to respond effectively to external and internal factors forcing change within the highway administration area.	❑	❑	❑	❑
2. The motivation and opportunity to seek out professional training to enhance my performance in a leadership position.	❑	❑	❑	❑
3. A skilled, balanced, diverse team of professionals to respond to the challenges and forces driving change in highway administration and transportation.	❑	❑	❑	❑
4. The organizational structure to respond efficiently and effectively to change.	❑	❑	❑	❑
5. The tenacity and skill to examine all resources and reassign, realign, down-size as necessary.	❑	❑	❑	❑
6. The management tools and systems for effective operational planning, resource management, budgeting, and scheduling.	❑	❑	❑	❑
7. An established network of professional and political support to back the DOT in carrying out its evolving highway administration intermodal mission.	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for Highway Engineering/Administration Director **(Answers may be shaped and directed by responses in Phases I-III)** ***Should I . . .***	***This action is . . .***			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
1. Develop a strategic and operations planning process in my functional area? - develop a clear mission statement linked to the agency's mission and goals? - develop goals for my functional area? - establish measurable objectives, timetable, and assignments each year? - tie the budget to goals and objectives? - track progress and manage for performance of goals and objectives?	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑
2. Commit to professional training to further develop my leadership skills and those of my key team members?	❑	❑	❑	❑
3. Examine the organizational structure, reassign, redirect, or reorganize resources and units in the highway administration area to increase effectiveness?	❑	❑	❑	❑
4. Decentralize authority, by function and geographically, to gain efficiency and effectiveness, depending on modern data and communications for control?	❑	❑	❑	❑
5. Improve team involvement and gain empowerment, input, and new ideas through meetings, training, new team assignments, etc.?	❑	❑	❑	❑
6. Reform the way we prepare our budget proposals and allocate resources to make our goals, priorities, and performance the drivers for budgeting?	❑	❑	❑	❑
7. Establish measurable objectives for project delivery and other operations and back them up with an ongoing process to focus attention and commitment of the workforce on meeting target measures and timetables?	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for Highway Engineering/Administration Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	*This action is . . .*			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
8. Build a comprehensive project management system and institute a process for ensuring positive control on all aspects of the program for measurably improved performance?	❑	❑	❑	❑
9. Revamp DOT highway administration relationships with highway administrations of other levels of government—federal, city, local, so as to (a) improve communications, (b) sort out roles and responsibilities, (c) re-calibrate cost allocations, (d) share technology and competencies, and (e) deliver the improved, seamless highway service the public expects?	❑	❑	❑	❑
10. Expand our competency to find, pull in, and apply new information, practices, and technologies to all aspects of the highway function?	❑	❑	❑	❑
11. Evaluate, introduce, and use new technologies to the maximum extent to improve effectiveness? (CADD, communications software, computer networks, GIS, IVHS, etc.)	❑	❑	❑	❑
12. Improve and expand employee training to master new and additional skills? (A training budget should be a top, non-negotiable priority.)	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for Highway Engineering/Administration Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	*This action is . . .*			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
13. Develop a proactive program for public outreach and feedback related to the state's highways and bridges and their role in the overall transportation system?	❑	❑	❑	❑
14. Develop a more proactive partnership with environmental and resources agencies?	❑	❑	❑	❑
15. Increase contracting-out, with partnership relationships, and streamlined processes to enhance effectiveness, as well as effective tracking and early warning systems to detect and correct problems?	❑	❑	❑	❑
16. Reorient highway administration so that it is performance and product driven, rather than driven by procedures and rules?	❑	❑	❑	❑

HIGHWAY ENGINEERING AND ADMINISTRATION
Guidance/Option Development Matrix

PHASE V: MEASURES FOR JUDGING SUCCESS (Performance Monitoring Phase)

Key Questions for Highway Engineering/Administration Director *Do I need to...*	*There are...*			
	Comprehensive and successful programs	Fair to good programs, but with some gaps	Limited efforts, and significant room for improvement	Poor to no efforts in this area
1. Establish performance criteria for all key service and control elements of highway administration?	❑	❑	❑	❑
2. Design a structured process for obtaining feedback from the management team?	❑	❑	❑	❑
3. Improve processes for involving and listening to the public on their goals and measures of success for highway programs and transportation?	❑	❑	❑	❑
4. Establish a process for regular, meaningful examination of measures and subsequent communication of results to internal and external parties?	❑	❑	❑	❑
5. Regularly and consistently use performance measurement output to drive personnel, policy, organizational, and budget decisions?	❑	❑	❑	❑
6. Develop/improve upon performance appraisals for the staff of this functional area to build in more effective feedback and focus on contributions to the performance of the organization and the highway and transportation system?	❑	❑	❑	❑

Action Implementation Plan for Highway Engineering/Administration Directors

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
3.			
4.			
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PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Public Transportation Director Do I know the ...	I have ...			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
1. DOT's overall mission and vision and how my functional area fits into these?	❑	❑	❑	❑
2. Overall goals and objectives of the DOT and the strategies identified for achieving these goals and objectives?	❑	❑	❑	❑
3. DOT's measures of success?	❑	❑	❑	❑
4. Expectations and concerns of the governor and state legislators relating to transit/other public transportation modes?	❑	❑	❑	❑
5. Ideas, needs, aspirations, values of my employees?	❑	❑	❑	❑
6. Full range of public transportation services being provided in the state?	❑	❑	❑	❑
7. Innovative/alternative transportation service strategies that are being tested and/or implemented?	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for the Public Transportation Director ***Do I know the . . .***	***I have . . .***			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
8. Public transportation needs that are not being met?	❑	❑	❑	❑
9. Performance levels of the transit systems and/or public transportation modes in the state?	❑	❑	❑	❑
10. Technical assistance needs of transit/other public transportation modes in the state?	❑	❑	❑	❑
11. Condition of equipment and facilities for transit/other public transportation modes?	❑	❑	❑	❑
12. The operating and capital subsidies and allocation methodologies for transit systems/other public transportation modes?	❑	❑	❑	❑
13. Transit/other public transportation-related educational and performance monitoring activities in other DOTs that can be modeled?	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION
(Synthesis Phase)

Key Questions for the Public Transportation Director Can I develop ...	I have ...			
	A solid, comprehensive synthesis	**A fair/good synthesis**	**A very limited understanding**	**Insufficient information to make a synthesis**
1. A vision and clear overall direction for my functional area responsive to overall goals, conditions, and state priorities?	❑	❑	❑	❑
2. Long-term goals and short-term objectives?	❑	❑	❑	❑
3. Priority issues and activities?	❑	❑	❑	❑
4. Strategies for dealing with priority issues and activities?	❑	❑	❑	❑
5. An immediate agenda?	❑	❑	❑	❑
6. A comprehensive strategy to improve the skill level, diversity, and performance of functional area staff?	❑	❑	❑	❑
7. Financial resources needed to increase effectiveness and efficiencies in public transportation systems?	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND—METHODS FOR ASSESSING THAT ABILITY (Response/Assessment Phase)

Key Questions for the Public Transportation Director *I have . . .*	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. The management style and skills to allow me to respond effectively to external factors forcing change within my functional area.	❑	❑	❑	❑
2. A skilled team of professionals to respond to the challenges and forces driving change in transportation.	❑	❑	❑	❑
3. The organizational structure to respond efficiently and effectively to change.	❑	❑	❑	❑
4. The motivation to seek out professional training to enhance my performance in a leadership position.	❑	❑	❑	❑
5. An established network of professional and political support to back me in carrying out the DOT/functional area mission.	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for the Public Transportation Director (Answers may be shaped and directed by responses in Phases I-III) Should I ...	This action is ... Appropriate, and we are doing it effectively	Appropriate, and we are doing it, but with limited progress	Appropriate, but we have not acted on it	Inappropriate because of specific factors at DOT
1. Develop a strategic and operations planning process in my functional area? - develop a clear mission statement linked to the agency's mission and goals? - develop goals for my functional area? - establish measurable objectives, timetable, and assignments each year? - tie the budget to goals and objectives? - track progress and manage for performance of goals and objectives?	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑
2. Commit to professional training to develop my leadership skills?	❑	❑	❑	❑
3. Examine the organizational structure and reorganize my functional area to increase effectiveness, efficiencies, and workforce diversity?	❑	❑	❑	❑
4. Decentralize authority within my functional area to empower staff at all levels?	❑	❑	❑	❑
5. Organize more regular meetings with the management team to improve communications and team involvement in the planning process?	❑	❑	❑	❑
6. Evaluate and introduce technologies (e.g., communications software, GIS) in my functional area?	❑	❑	❑	❑
7. Improve and expand the employee training program?	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS (Action Identification/Assessment Phase)

Key Questions for the Public Transportation Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	*This action is . . .*			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
8. Improve the level and quality of technical assistance and training to transit/other modes?	❑	❑	❑	❑
9. Develop performance criteria for transit/other public transportation modes?	❑	❑	❑	❑
10. Design a program and/or funding strategy to support public transportation based on performance criteria?	❑	❑	❑	❑
11. Increase the budget for capital or operating assistance to local transit systems and/or other public transportation modes under my functional area?	❑	❑	❑	❑
12. Provide demonstration grants for local initiatives that enhance productivity in transit/other modes?	❑	❑	❑	❑
13. Encourage/financially support the implementation of cutting-edge technologies (e.g., electronic fare card media, "smart" kiosks) in transit and/or other public transportation modes and technologies that interconnect all these modes?	❑	❑	❑	❑
14. Develop an outreach/information program to increase public involvement?	❑	❑	❑	❑
15. Develop a strategy to educate legislators, political entities, and other state departments on public transportation issues?	❑	❑	❑	❑

PUBLIC TRANSPORTATION
Guidance/Option Development Matrix

PHASE V: MEASURES FOR JUDGING SUCCESS (Performance Monitoring Phase)

Key Questions for the Public Transportation Director Do I need to...	There are... Comprehensive and successful programs	Fair to good programs, but with some gaps	Limited efforts, and significant room for improvement	Poor to no efforts in this area
1. Establish performance criteria for transit/other public transportation modes?	❑	❑	❑	❑
2. Design a structured process for obtaining feedback from public transportation providers, funders, and users?	❑	❑	❑	❑
3. Improve processes for involving and listening to the public on their goals and measures of success for public transportation services?	❑	❑	❑	❑
4. Design a structured process for obtaining feedback from my management team?	❑	❑	❑	❑
5. Develop/improve upon performance monitoring reports for use in transit/other public transportation modes?	❑	❑	❑	❑
6. Develop a funding allocation strategy for public transportation subsidies based on performance criteria?	❑	❑	❑	❑
7. Regularly and consistently use performance measurement output to drive personnel, policy, organizational, and budget decisions?	❑	❑	❑	❑
8. Develop/improve upon performance appraisals for functional area staff to build more effective feedback and focus on contributions to the performance of the organization and the highway and transportation system?	❑	❑	❑	❑

Action Implementation Plan for Public Transportation Directors

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
3.			
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PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for Personnel/Administrative Services Director *Do I know the*	*I have...*			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
1. DOT's overall mission and vision and how my functional area fits into these?	❑	❑	❑	❑
2. Overall goals and objectives of the DOT and the strategies identified for achieving these goals and objectives?	❑	❑	❑	❑
3. How my functional area contributes to meeting the overall mission and goals of the DOT?	❑	❑	❑	❑
4. DOT's measures of success?	❑	❑	❑	❑
5. Expectations and concerns of the governor and state legislators relating to personnel/administrative services?	❑	❑	❑	❑
6. Expectations and concerns of the Department of Administration, the state budget office, the office of state personnel, and legislative staff?	❑	❑	❑	❑
7. Expectations and concerns of the DOT managers and employees who use our services? How do they assess our services?	❑	❑	❑	❑
8. Ideas, needs, aspirations, values of my managers and employees?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for Personnel/Administrative Services Director *Do I know the . . .*	*I have . . .*			
	Comprehensive information and systematic processes to keep me up to date	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
9. Full range of personnel and other administrative services that we are providing in the state?	❑	❑	❑	❑
10. Performance levels of the various sub-units and how they relate to each other and the people they serve?	❑	❑	❑	❑
11. Innovative/alternative human resource, budgetary, purchasing, and information services strategies that are being tested and/or implemented in other state agencies or the private sector?	❑	❑	❑	❑
12. Educational and performance monitoring activities in other state DOT's administrative services sections that can be modeled?	❑	❑	❑	❑
13. Make-up of workforce by area and patterns over time (educational background and level, professional experience, and rank by race, gender, age, etc.)?	❑	❑	❑	❑
14. Whether the DOT has the mix of professional disciplines appropriate to its current mission and goals?	❑	❑	❑	❑
15. Whether the skill level of the DOT workforce matches the organization's existing and emerging needs?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE I: UNDERSTANDING THE ISSUES
(Information Gathering Phase)

Key Questions for Personnel/Administrative Services Director	***I have***			
Do I know the . . .	**Comprehensive information and systematic processes to keep me up to date**	**Good information, but information-gathering processes are ad hoc and spotty**	**Some information but far from systematic/complete data or processes for gathering it**	**Very limited information and limited processes for gathering it**
16. Whether the current rank and salary of DOT employees are appropriate to their skills, experience, responsibilities, and contribution to the organization?	❑	❑	❑	❑
17. Likely retirements and other attrition in coming years?	❑	❑	❑	❑
18. Retention rates and reasons that employees leave the DOT?	❑	❑	❑	❑
19. Unmet needs of employees for additional training, skills, experience, and technical assistance within the DOT workforce?	❑	❑	❑	❑
20. Extent of employee development and empowerment occurring in the personnel/administrative services area and in the overall organization?	❑	❑	❑	❑
21. Do I have a clear understanding that employee development is an ongoing, every day need?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE II: SYNTHESIZING THE INFORMATION (Synthesis Phase)

Key Questions for Personnel/Administrative Services Director *Can I develop*	*I have*: A solid, comprehensive synthesis	A fair/good synthesis	A very limited understanding	Insufficient information to make a synthesis
1. A vision and clear overall direction for my functional area responsive to overall goals, conditions, and state priorities?	❑	❑	❑	❑
2. Long-term goals and short-term objectives?	❑	❑	❑	❑
3. Priority issues and activities?	❑	❑	❑	❑
4. Action plans to deal with priority issues and activities?	❑	❑	❑	❑
5. An immediate agenda?	❑	❑	❑	❑
6. A comprehensive strategy to improve the skill level, diversity, and performance of functional area staff?	❑	❑	❑	❑
7. Financial resources needed to increase efficiencies in the personnel/administrative services function?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE III: ABILITY TO RESPOND—METHODS FOR ASSESSING THAT ABILITY (Response Assessment Phase)

Key Questions for Personnel/Administrative Services Director I have...	I...			
	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1. The management style and skills to allow me to respond effectively to external factors forcing change within my functional area.	❑	❑	❑	❑
2. A skilled, balanced, diverse team of professionals to respond to the challenges and forces driving change in transportation.	❑	❑	❑	❑
3. The organizational structure to respond efficiently and effectively to change.	❑	❑	❑	❑
4. The motivation to seek out professional training to enhance my performance in a leadership position.	❑	❑	❑	❑
5. An established network of professional and political support to back me in carrying out the DOT/functional area mission.	❑	❑	❑	❑
6. Support from the CAO's office.	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for Personnel/Administrative Services Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	***This action is . . .***			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
1. Develop a strategic and operations planning process in my functional area? - develop a clear mission statement linked to the agency's mission and goals? - develop goals for my functional area? - establish measurable objectives, timetable, and assignments each year? - tie the budget to goals and objectives? - track progress and manage for performance of goals and objectives?	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑	❑ ❑ ❑ ❑ ❑ ❑
2. Commit to professional training to develop my leadership skills?	❑	❑	❑	❑
3. Examine the organizational structure, reorganize functional areas, and make such legal and regulatory changes as required to improve recruitment and selection, classification, compensation, supervision, and promotion of DOT employees in a manner consistent with the needs of a high performance organization?	❑	❑	❑	❑
4. Decentralize authority within my functional area to empower our own employees and those we work with around the DOT?	❑	❑	❑	❑
5. Clarify procedures, rules, directives so managers and employees outside my area can understand and apply them more easily and effectively?	❑	❑	❑	❑
6. Develop a process so that rules and procedures are reviewed periodically and revised or deleted as appropriate?	❑	❑	❑	❑
7. Organize regular meetings with the management team to improve communications and team involvement in the planning process?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE IV: POTENTIALLY APPROPRIATE ACTIONS
(Action Identification/Assessment Phase)

Key Questions for Personnel/Administrative Services Director (Answers may be shaped and directed by responses in Phases I-III) *Should I . . .*	*This action is . . .*			
	Appropriate, and we are doing it effectively	**Appropriate, and we are doing it, but with limited progress**	**Appropriate, but we have not acted on it**	**Inappropriate because of specific factors at DOT**
8. Evaluate and improve technologies (e.g., communications software) in my functional area?	❑	❑	❑	❑
9. Improve and expand the employee training program for my own staff?	❑	❑	❑	❑
10. Improve and expand the employee training program for all employees?	❑	❑	❑	❑
11. Improve collection and use of information we need to carry out our missions?	❑	❑	❑	❑
12. Establish performance criteria for my sub-units?	❑	❑	❑	❑
13. Improve the level and quality of technical assistance and training to the people we serve?	❑	❑	❑	❑
14. Develop an outreach/information program to increase communications with people we serve?	❑	❑	❑	❑
15. Develop a strategy to educate key legislators, political entities, and other state departments on major DOT personnel/administrative issues?	❑	❑	❑	❑

PERSONNEL/ADMINISTRATIVE SERVICES
Guidance/Option Development Matrix

PHASE V: MEASURES FOR JUDGING SUCCESS (Performance Monitoring Phase)

Key Questions for Personnel/Administrative Services Director Do I need to...	There are...			
	Comprehensive and successful programs	Fair to good programs, but with some gaps	Limited efforts, and significant room for improvement	Poor to no efforts in this area
1. Establish performance criteria for all key elements of personnel/ administrative services?	❑	❑	❑	❑
2. Design a structured process of obtaining feedback from the management team in my functional area?	❑	❑	❑	❑
3. Improve processes for involving and listening to DOT managers and employees on their goals and measures of success for personnel/ administrative services?	❑	❑	❑	❑
4. Develop/improve upon performance monitoring reports for use in personnel/administrative services units?	❑	❑	❑	❑
5. Regularly and consistently use performance measurement output to drive personnel, policy, organizational, and budget decisions within my functional area?	❑	❑	❑	❑
6. Develop/improve upon performance appraisals for functional area staff to build in more effective feedback and focus on contribution to the performance of the organization and the transportation system?	❑	❑	❑	❑

Action Implementation Plan for Personnel/Administrative Services Directors

ACTION STEPS	OBJECTIVES/ MEASURES OF SUCCESS	MILESTONES/ DUE DATES	PROGRESS ACHIEVED/ COMMENTS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

APPENDIX J

STRATEGIC MANAGEMENT CHECKLIST FROM *NCHRP REPORT 331*

Strategic Management Checklist

Note: This checklist enables an agency to determine the extent to which it exercises strategic management in its day-to-day operation. The checklist is associated with two critical stages in the development of a strategic management process: *I - Identification of the Need for Strategic Management*, and *II - Key Element Establishment/Enhancement*. The key elements are categorized as follows:

1.0 Participant Elements	Individuals and units that have major roles in strategic management.
2.0 Process Elements	Basic management processes such as goal structuring and planning and budgeting
3.0 Product Elements	Products produced by or in support of strategic management

The questions are structured such that the more "yes" answers an agency denotes, the more likely it is to have a strategic management process in place. In this respect, the checklist may serve as a continual gauge of the extent to which an agency embraces strategic management principles.

1.0 PARTICIPANT ELEMENTS CHECKLIST	YES	NO
1.1 Chief Executive		
1.1.1 Is the CEO actively and visibly involved with the major planning and control activities of the organization, e.g.,	☐	☐
• Developing goals and objectives		
• Developing organization-wide priorities		
• Deciding organization-wide strategies		
• Setting primary policies		
• Reviewing program plans		
• Reviewing budgets		
• Monitoring program operations		
• Reviewing the performance of senior manager		
• Providing an organization structure conducive to strategy development?		
1.1.2 Does the CEO seek the advice of senior managers on critical decisions?	☐	☐
1.1.3 Does the CEO meet regularly, i.e., at least once a month, with senior managers, individually and collectively, to assess their performance and that of their units in relation to established plans?	☐	☐
1.1.4 Does the CEO willingly make the "tough calls" in a timely manner, e.g.,	☐	☐
• Deciding among competing priorities		
• Acting on poor manager performance		
• Adjusting the organization when necessary		
• Adjusting plans on the basis of new information?		
1.2 Senior Managers		
1.2.1 Do senior managers actively provide advice to the CEO on critical decisions affecting the organization?	☐	☐
1.2.2 Is the authority delegated to senior managers commensurate with their responsibilities?	☐	☐
1.2.3 Are senior managers actively and visibly involved in the planning and control activities of the organization — particularly with regard to the units for which they are responsible?	☐	☐
1.2.4 Do senior managers closely monitor the performance of the managers reporting to them?	☐	☐
1.2.5 Do senior managers make decisions within their scope of authority in a timely manner — as opposed to delaying the decisions or passing them up to the CEO?	☐	☐
1.2.6 Do senior managers work together to address problems confronting one or more of them?	☐	☐
1.2.7 Do senior managers meet regularly with their subordinate managers to assess their performance and that of their units in relation to established plans?	☐	☐

		YES	NO
1.2.8	Do senior managers willingly adjust plans and programs on the basis of performance or new information even if it is out of the normal planning and budgeting cycle?	☐	☐
1.2.9	Do senior managers surface issues for discussion and resolution when they occur?	☐	☐
1.2.10	Do senior managers recommend organizational changes or redefinitions of their units to improve their strategic focus?	☐	☐
1.3	**Staff Managers**		
1.3.1	Do managers of staff units function in a support rather than a control role?	☐	☐
1.3.2	Have staff managers thoroughly informed their personnel that their purpose is to support and not to control other units of the organization?	☐	☐
1.3.3	Is the authority delegated to staff managers commensurate with their responsibility?	☐	☐
1.3.4	Do staff units provide line managers with sufficient information and assistance to facilitate the efficient and effective execution of line programs, e.g.,	☐	☐
	• Internal and external environmental information		
	• Program performance reports		
	• Current and accurate budget/financial information		
	• Quick turnaround on personnel requests		
	• Timely procurement of needed supplies and services		
	• Timely action on systems requests?		
1.3.5	Are all staff managers knowledgeable about the scope of activities for which the line units are responsible?	☐	☐
1.3.6	Is the budget staff precluded from making decisions on the advisability of specific, legal expenditures of funds?	☐	☐
1.3.7	Is the planning staff precluded from developing plans for line units or programs?	☐	☐
1.4	**Line Managers**		
1.4.1	Are line managers actively involved in setting the objectives and priorities for the programs/activities for which they are responsible?	☐	☐
1.4.2	Is the authority delegated to line managers commensurate with their responsibilities?	☐	☐
1.4.3	Do line managers have the authority to make decisions in their areas of responsibility so long as they are consistent with established plans and budgets?	☐	☐
1.4.4	Do line managers readily make these decisions rather than pass them along to their superiors?	☐	☐
1.4.5	Are all line managers thoroughly knowledgeable about the organization's administrative and management processes?	☐	☐
1.4.6	Do line managers routinely adhere to prescribed administrative and management processes?	☐	☐
1.4.7	Do line managers meet regularly with their superiors to discuss performance and emerging issues?	☐	☐
1.4.8	Are line managers inclined to surface issues and problems with their superiors?	☐	☐
1.4.9	Do line managers meet regularly with their subordinates to discuss performance and emerging issues?	☐	☐
1.4.10	Do line managers in a unit act together to develop the unit's strategies?	☐	☐
1.4.11	Are most operational decisions in the organization made by line managers?	☐	☐

2.0 PROCESS ELEMENTS CHECKLIST

		YES	NO
2.1	**Environmental Scanning**		
2.1.1	Does the organization engage in environmental scanning?	☐	☐
2.1.2	If so, is it done on a continual basis rather than cyclically?	☐	☐
2.1.3	Does the scanning result, among other things, in a succinct set of key issues to be addressed?	☐	☐
2.1.4	Is responsibility for scanning shared by staff and line units of the organization?	☐	☐
2.1.5	Does the scanning done by the organization include:	☐	☐
	• The internal environment		
	• The intragovernment environment		
	• The intergovernment environment		
	• The external environment		
	• Strengths and weaknesses of the organization		
	• Opportunities and threats facing the organization?		
2.1.6	Are the data used in the scans dependable?	☐	☐
2.1.7	Is the time frame of the scans five years or under?	☐	☐
2.1.8	Is the scope of the scans directly relevant to the activities and programs of the organization?	☐	☐
2.1.9	Does the scope of the scans cover every operational and program area of the organization?	☐	☐
2.1.10	Can specific scans be requested by organizational elements?	☐	☐
2.1.11	Is the data from the organization's scans routinely compared with other externally available information?	☐	☐
2.1.12	Is the information from past scans checked periodically to judge the accuracy of the methodologies being used?	☐	☐
2.1.13	Are established methodologies established for each type of scan conducted by the organization?	☐	☐
2.1.14	Are the analyses performed during the scans reviewed by upper management before they are used as the basis of plans and strategies?	☐	☐
2.1.15	Are all scan results shared with all senior managers?	☐	☐
2.1.16	Are the results of environmental scans provided in sufficient time to be incorporated in the annual planning cycle?	☐	☐
2.2	**Goal- and Objective-Setting**		
2.2.1	Does the organization have a formal goal- and objective-setting process?	☐	☐
2.2.2	Are goals and objectives reviewed on at least an annual basis?	☐	☐
2.2.3	Are goals set for each major category of the organization's activities?	☐	☐
2.2.4	Do all goals tie directly to the organization's mission statement?	☐	☐
2.2.5	Are the goals general in nature?	☐	☐
2.2.6	Are goals stated without any time parameters?	☐	☐
2.2.7	Are there five or fewer goals for each element of the organization?	☐	☐
2.2.8	Do all goals have a real possibility of being achieved without the occurrence of extraordinary, unpredicted events?	☐	☐
2.2.9	Are all levels of the organization's management involved in the goal-setting process?	☐	☐

		YES	NO
2.2.10	Are clear priorities established among the goals for each planning category?	☐	☐
2.2.11	Are overall priorities established among all the goals of the organization?	☐	☐
2.2.12	Are priorities established among the objectives in each planning area?	☐	☐
2.2.13	Do objectives attempt to close only a portion of the existing gap if it is considerable?	☐	☐
2.2.14	Do all objectives tie directly to one or more goals?	☐	☐
2.2.15	Are all objectives stated in measurable terms?	☐	☐
2.2.16	Do all objectives have a time frame of two years or under?	☐	☐
2.2.17	Is there a real possibility that all objectives can be achieved in the proposed time frame without the occurrence of extraordinary, unpredicted events?	☐	☐
2.2.18	Are all levels of the organization's management involved in the setting of objectives?	☐	☐
2.2.19	Are there fewer than fifteen objectives for each element of the organization?	☐	☐
2.2.20	Are priorities established among the objectives in each planning area?	☐	☐
2.2.21	Are overall priorities established among all the objectives of the organization?	☐	☐
2.3	**Strategy Development**	☐	☐
2.3.1	Are alternative strategies developed and discussed among key decision makers?	☐	☐
2.3.2	In strategy development, are considerations given to probable future resource commitments to accomplish the strategies?	☐	☐
2.3.3	Are the strategies tied specifically to the goals and objectives?	☐	☐
2.3.4	Are the strategies shared with all managers involved in setting program objectives and in implementing the action plans for meeting those objectives?	☐	☐
2.3.5	Do the strategies consider probable counterstrategies by the competition?	☐	☐
2.3.6	Is contingency planning part of the strategy development process so that the consequences of not achieving each strategy are considered?	☐	☐
2.4	**Action Planning**		
2.4.1	Do written action plans exist for the achievement of each objective?	☐	☐
2.4.2	If so, do these action plans include:	☐	☐
	• All the specific actions to be taken in sequence to meet each objective		
	• The unit or individual responsible for each action		
	• The start and end dates for each action		
	• The resource that will be devoted to each action?		
2.4.3	Are action plans reviewed by superiors before they are implemented?	☐	☐
2.4.4	Does a methodology exist for coordinating actions between two or more units?	☐	☐
2.4.5	Does a methodology exist for coordinating actions that impact two or more objectives?	☐	☐
2.4.6	Are contingency plans developed as part of the action planning component?	☐	☐

		YES	NO
2.5	**Resource Allocation and Budgeting**		
2.5.1	Does the organization budget by program?	☐	☐
2.5.2	Is the budget cycle annual?	☐	☐
2.5.3	Is a budget call issued at the beginning of the planning process?	☐	☐
2.5.4	Is the final budget developed to accommodate program plans as opposed to program plans being developed to meet predetermined budget marks for each program area?	☐	☐
2.5.5	Are funds freely transferred among program areas depending on their priority?	☐	☐
2.5.6	Is the budget routinely adjusted during the course of the budget year on the basis of performance, or shifting program priorities?	☐	☐
2.5.7	Are all program decisions made external to the budget office?	☐	☐
2.5.8	Is the organization's budget based on actual revenues expected?	☐	☐
2.5.9	Are funding decisions resolving conflicts among competing priorities made at successive management levels of the organization?	☐	☐
2.6	**Performance Monitoring**	☐	☐
2.6.1	Are regular management reports provided to all managers in the organization?	☐	☐
2.6.2	If so, are the reports: • Timely • Accurate • Directly related to the operational and financial performance against established plans • Aggregated at appropriate levels for successive levels of management?	☐	☐
2.6.3	Are managers at all levels responsible for providing raw data to serve as the basis for management reports?	☐	☐
2.6.4	Are the organization's management reports void of information extraneous to performance/effectiveness?	☐	☐
2.6.5	Do managers use the reports provided in discussions with subordinate managers about their performance and that of their units and programs?	☐	☐
2.6.6	Does a mechanism exist to adjust plans and budgets if management reports indicate that this is necessary?	☐	☐
2.6.7	Are the results indicated by management reports at year end used as an integral component of the annual review and goal- and objective-setting process?	☐	☐
2.6.8	Do the performance reports of individual managers reflect the regular management reports of their programs and activities?	☐	☐
2.7	**Information Collection and Dissemination**		
2.7.1	Are the organization's information systems: • Up to date • Capable of producing accurate information in a timely manner • Free of nonessential information?	☐	☐

		YES	NO
2.7.2	Is essential information collected on a regularly scheduled basis?	☐	☐
2.7.3	Do all managers receive the quantity and quality of information they need to make management decisions?	☐	☐
2.7.4	Is the information collected designed to serve as the basis for management decisions?	☐	☐
2.7.5	Is the information disseminated to managers in a format that facilitates the execution of their decision-making responsibilities?	☐	☐
2.7.6	Is there a 2-5 year documented information systems plan for the development of future application systems?	☐	☐

3.0 PRODUCT ELEMENTS CHECKLIST

3.1 Mission Statement

3.1.1	Does the organization have a written statement of its mission?	☐	☐
3.1.2	If so, does the mission statement succinctly establish a vision for the organization?	☐	☐
3.1.3	Has the mission statement been reviewed in recent years to determine if it is still appropriate?	☐	☐
3.1.4	Is the mission statement used as the basis for establishing organizationwide goals?	☐	☐
3.1.5	Have all pertinent managers been involved in the development of and accepted the mission statement?	☐	☐
3.1.6	Does every member of the organization have a copy of the mission statement?	☐	☐

3.2 Goals and Objectives

3.2.1	Does the organization have written goals and objectives?	☐	☐
3.2.2	If so, are these goals and objectives clearly communicated to all members of the organization?	☐	☐
3.2.3	Are the goals reviewed on at least an annual basis to determine if they are still relevant?	☐	☐
3.2.4	Are the goals used as the basis for the development of operating objectives?	☐	☐
3.2.5	Are the objectives reviewed prior to each planning cycle to determine the extent to which they have been met and the extent to which they are still relevant?	☐	☐
3.2.6	Have at least 80 percent of the objectives changed over the last two years?	☐	☐

3.3 Organizational Strategies

3.3.1	Does the organization develop overall strategies to achieve the goals it has established for itself?	☐	☐
3.3.2	If so, are these strategies communicated to all managers in the organization before objectives are set and action plans developed?	☐	☐
3.3.3	Can a direct relationship be shown between the organization's goals and the strategies it develops?	☐	☐

3.4 Component Strategies

3.4.1	Does each component of the organization develop substrategies that are consistent with the organization's overall strategies?	☐	☐
3.4.2	If so, are these substrategies reviewed by higher management prior to their implementation?	☐	☐
3.4.3	Are all component strategies available to all managers in the organization, if only for informational purposes?	☐	☐

		YES	NO
3.5	**Component Action Plans**		
3.5.1	Does each component of the organization develop action plans for the achievement of the objectives for which it has responsibility?	☐	☐
3.5.2	If so, are these action plans reviewed for internal consistency within the component?	☐	☐
3.5.3	Are the action plans written?	☐	☐
3.5.4	Are the action plans accessible to all managers in the component?	☐	☐
3.5.5	Are all action plans available to all managers in the organization, if only for informational purposes?	☐	☐
3.6	**Program Budgets**		
3.6.1	Does the organization prepare program budgets, even if they are used only internally?	☐	☐
3.6.2	If so, are the program budgets used as the basis for regular financial reports to managers?	☐	☐
3.7	**Performance Measures**		
3.7.1	Does the organization have written program performance measures for each of its programs?	☐	☐
3.7.2	If so, are these performance measures clearly understood by each of the affected program managers?	☐	☐
3.7.3	Do the management reports received by program managers reflect progress against these measures?	☐	☐
3.7.4	Does the organization have written performance measures for each manager that are directly related to the manager's responsibility regarding meeting objectives?	☐	☐
3.7.5	If so, have the managers participated in setting these measures?	☐	☐
3.7.6	**And, if so, are these measures clearly understood by each manager?**	☐	☐
3.7.7	**Does a superior review a manager's performance with the manager against these measures on at least a quarterly basis?**	☐	☐
3.7.8	**Is a manager's annual performance rating based directly on these performance measures?**	☐	☐
3.8	**SWOT Analyses**		
3.8.1	**Does the organization prepare written results of its environmental scans?**	☐	☐
3.8.2	**If so, are these results made available to all affected managers in the organization?**	☐	☐

SOURCE: "Strategic Planning and Management Guidelines for Transportation Agencies." NCHRP Report 331 (1990) 49 pp.

APPENDIX K

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