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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

SYNTHESIS 326

Strategic Planning and Decision Making in State Departments of Transportation

A Synthesis of Highway Practice

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

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Strategic Planning and Decision Making in State Departments of Transportation

A Synthesis of Highway Practice

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FOREWORD

By Staff
Transportation
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Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

Information exists on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

The synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This report of the Transportation Research Board examines state and provincial department of transportations' (DOTs) experience with strategic planning and synthesizes current approaches to linking strategic planning with other decision-making processes, including operational and tactical planning, resource allocation, performance management, and performance measurement. It will be of interest primarily to chief executive officers, executive team members, and other officials who are responsible for developing, supporting, and using strategic management systems in state and provincial DOTs. The report is intended to help these industry leaders strengthen the overall performance of their organizations by examining exemplary practices in various DOTs. Case studies are also provided documenting one transportation agency that has used strategic planning over an extended period and one that recently implemented strategic planning.

This synthesis report contains information drawn from survey responses from U.S. state and Canadian provincial transportation agencies. Follow-up telephone interviews were conducted with relevant personnel from many of those agencies that responded to the survey and some that did not to clarify responses and probe additional issues. A review of the relevant literature was also undertaken to provide background on the topic, help define the overall approach, and discuss the limitations of strategic planning.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title page. This synthesis is

an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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Crawford F. Jencks, Manager, National Cooperative Highway Research Program, assisted the NCHRP 20-5 Committee and the Synthesis staff.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

STRATEGIC PLANNING AND DECISION MAKING IN STATE DEPARTMENTS OF TRANSPORTATION

SUMMARY

Transportation agencies in the United States began initiating strategic planning efforts some 20 years ago, and leaders in the field have been working to strengthen their capacity for strategic management ever since. Strategic management encompasses planning, implementing, evaluating, and updating a strategic agenda aimed at maintaining the most viable fit between an organization and its external environment and moving into the future in a deliberate, purposeful manner. Although strategic planning is the cornerstone of the strategic management process, strategic management is the overarching process of managing large-scale, sometimes very fundamental change to ensure a high level of performance in the long run.

Effective strategic management practices are of critical importance to state departments of transportation (DOTs) precisely because they have been operating in an era of unprecedented change over the past decade, driven by a number of concerns regarding accountability, multi-modal emphases, economic and environmental goals, customer service, productivity, human resource challenges, technological advances, and intergovernmental mandates. Thus, in leadership forums for chief executive officers (CEOs) conducted in June 2000, and again in May 2003, the participants agreed that although DOTs have the capability of developing viable strategic plans, the real challenge facing them was strategic *management;* implementing strategic plans and using them effectively to drive other major management and decision-making processes.

This report examines state transportation departments' experience with strategic management and synthesizes current approaches to linking strategic planning with other key decision-making processes. It is intended to help CEOs and other high-level officials improve their own strategic management processes to strengthen the overall performance of their organizations. To obtain information on strategic management practices, a detailed survey instrument was distributed to the 50 state DOTs and the 11 Canadian provincial or territorial DOTs. The synthesis is based principally on the completed surveys received from 24 U.S. state DOTs and 6 Canadian DOTs, along with follow-up telephone interviews conducted from November 2002 to July 2003 with executive staff and other managers in numerous DOTs to clarify and expand the information they provided.

All responding DOTs reported having completed strategic planning efforts in the past 5 years, some on their own initiative and others in response to legislative or executive mandates in their states or provinces. Although some of these departments are relative newcomers to strategic planning, many currently have a history of strategic planning and have developed successive strategic plans over the past 10 to 15 years. Indeed, strategic planning has become institutionalized in at least some DOTs beyond the tenure of a given administration or chief executive.

Some of the DOTs that have been involved in strategic planning for a longer time have developed comprehensive approaches to strategic management. This entails linking a de-

partment's strategic planning process with its operational planning, measurement, performance management, and budgeting systems in an integrated process that allows the strategic plan to be used effectively as a framework for guiding all other decision making in the department. Whereas some departments rely heavily on action plans to implement their strategic initiatives as separate projects, DOTs increasingly are using ongoing business planning, program planning, or work planning to drive their strategic agendas into the management and decision-making processes of the organization.

Many of the DOTs contacted in this research use performance measures to monitor the implementation of strategic initiatives and track success in achieving strategic goals and objectives. Generally, DOTs are now trying to focus more on real outcome measures than previously; however, many find that defining good measures that are meaningful, reliable, accessible, and cost-effective is still difficult in some areas. Increasingly, with respect to both outcome and output measures, DOTs are establishing numerical targets for their strategic goals and objectives.

Almost all DOTs that are seriously engaged in strategic planning assign specific individuals to take responsibility for implementing particular strategic initiatives. It is important for managers who share responsibility for them to know what the expectations are regarding their individual contributions or performance with respect to these action items, particularly in the case of implementing cross-cutting strategic initiatives that cross organizational lines and are not "owned" by any particular organizational unit. Some departments are more directive than others in terms of specifying how strategic action items and tasks will be accomplished, but most rely on performance measures to provide accountability.

In many DOTs, the strategic plan and the budget influence each other, with overall budget realities influencing the development of strategic issues and plans, and strategic plans then influencing budget priorities within the range of discretionary decision making. However, it appears that costs are often not seriously considered in developing strategic initiatives. On the other hand, departments do employ a mix of budgetary mechanisms to make sure that strategic initiatives are funded.

Given the likelihood of a nonresponse bias in the survey, and a reliance on self-reported data in this study, it is impossible to generalize the results to the population of all state DOTs. Nevertheless, it is clear that many DOTs are taking proactive approaches toward strengthening their capacity for strategic management. Furthermore, it is clear that this is an area in which "one size does not fit all." Different agencies are at different stages in developing their strategic management capabilities; they differ substantially in terms of management style, organization culture, and available skill sets, and they tend to emphasize different aspects of the overall process. Although there is not "one best way" to manage strategically, success factors that enhance the efficacy of strategic management efforts in state DOTs included the following:

- Department-level strategic plans that focus selectively on corporate-level issues and priorities and provide overall direction for major decisions throughout the organization on an ongoing basis;
- Development of strategic plans by major divisions, districts, and/or other organizational units within the framework of the corporate-level strategic plan;
- Widespread participation of managers and employees at various stages of developing strategic plans, performance measurement systems, and other elements of the overall strategic management process;

- A customer orientation in terms of strategy, supported through systematic customer feedback and customer-oriented performance measures;
- Performance measurement systems incorporating outcome and output, and measures that are specifically designed to track success in achieving strategic goals and objectives;
- Numerical targets to be accomplished within specified time frames tied to strategic objectives and performance measures as appropriate;
- Proactive use of performance measures to manage strategic agendas;
- Top management commitment to the strategic agenda and its effective implementation, as demonstrated by the use of planning, decision making, and evaluation processes that flow directly from overall strategy;
- Formal assignment of responsibility to high-level staff for facilitating the strategic management process throughout the department and supporting the executive team in this area;
- Requirements for business plans at the division or program level, and/or project-level action plans, that must be evaluated and approved at the executive level in terms of consistency with overall departmental strategic plans;
- Identification of "owners" for strategic objectives, initiatives, measures, and/or action plans, who are responsible for accomplishing specific elements of strategic plans;
- Use of individual-level goals and objectives derived from strategic agendas in performance management and appraisal processes;
- Communication of the importance of, and the organization's commitment to, strategic goals and objectives to both internal and external stakeholders at every opportunity;
- Budget processes that allocate resources directly to strategic initiatives and strategically derived action plans and business plans;
- Emphasis on building "omni-directional alignment" between customer concerns and departmental goals, higher- and lower-level goals, strategic priorities and budget allocations, and strategies and performance measures; and
- A process for reviewing strategic agendas and environmental circumstances, refreshing relevant data collected both internally and externally, and revalidating or updating strategic plans on a regular basis.

CEOs and other officials in state DOTs also need to be concerned about the linkages between their strategic plans and transportation planning and programming processes. The strategic plans of DOTs and their transportation system plans are usually seen as complementary or overlapping, but the relation between the two is conceived differently by different departments. In some DOTs, for instance, the strategic plan sets the overall direction for what the department needs to do and, at least to some degree, it drives the long-range transportation plan. Conversely, in other agencies, the long-range plan establishes key initiatives and outcomes regarding the performance of the state's transportation system, and the strategic plan is intended to be a road map for what the department needs to do to move that plan toward realization.

State transportation improvement programs are seen as being responsive to strategic priorities in departments whose strategic plans include elements that need to be implemented through such programs. In addition, most departments with asset management programs in place or under development reported that these programs are designed within the framework of their strategic plans, linked primarily through performance measures and targets. A few, however, indicated that these two processes are largely independent of each other. Not surprisingly, some DOTs indicated that they need to forge stronger linkages between these processes to ensure that their strategic plans, transportation systems plans, and asset management programs are consistent or mutually reinforcing.

CHAPTER ONE

INTRODUCTION

Transportation agencies in the United States began initiating strategic planning efforts some 20 years ago, and leaders in the field have been working to strengthen their capacity for strategic management ever since. Strategic planning has been defined as "a disciplined effort to produce fundamental decision and actions that shape and guide what an organization is, what it does, and why it does it" (Bryson 1995, pp. 4–5). It blends futuristic thinking, objective analysis, and subjective evaluation of goals and priorities to chart future courses of action to ensure long-run vitality and effectiveness. In contrast to the more closed-system orientation of conventional program planning and short-term work planning, strategic planning is a "big picture" approach that

- Is concerned with identifying and responding to the most fundamental issues facing an organization,
- Addresses the subjective question or purpose and the often competing values that influence mission and strategies,
- Emphasizes the importance of external trends and forces as they are likely to affect the agency and its mission,
- Attempts to be politically realistic by taking into account the concerns and preferences of internal and especially external stakeholders,
- Relies heavily on the active involvement of top managers and sometimes elected officials and members of governing boards,
- Requires the candid confrontation of critical issues by key participants to build commitment to plans,
- Is action-oriented and stresses the importance of developing plans for implementing strategies, and
- Focuses on implementing decisions now so as to position the organization favorably for the future.

Strategic management, on the other hand, is the larger, more holistic process that encompasses the planning, implementation, evaluation, and updating of a strategic agenda aimed at maintaining the most viable fit between an organization and its external environment and moving into the future in a deliberate, purposeful manner. Whereas strategic planning is the "cornerstone" of the strategic management process (Vinzant and Vinzant 1996), strategic management is the overarching process of managing large-scale, sometimes very fundamental change to ensure a high level of performance over the long run.

Building a capacity for strategic management in large, complex organizations such as state departments of transportation (DOTs) entails developing managers who can think and act strategically, along with a culture and organizational climate that will encourage that kind of behavior. It also requires creating a clear strategic agenda and using it effectively to drive management and decision making throughout the organization. The essence of strategic management is to set a strategic direction and then to focus the attention and harness the energy of managers and employees to make concerted efforts to move the organization in that direction. Thus, strategic management provides a systematic, coherent, and effective approach to establishing, implementing, attaining, monitoring, and updating an agency's strategic goals and objectives. It is an integrative process in the sense of

- Focusing attention across functional divisions and throughout various organizational levels on common goals, themes, and issues;
- Tying internal management processes and program initiatives to desired outcomes in the external environment; and
- Linking programmatic, operational, tactical, and day-to-day decisions to longer-run strategic objectives.

Building this kind of strategic management capability is both necessary and challenging for transportation agencies; however, substantial progress has been made. This report examines state DOTs' experience with strategic management and synthesizes current approaches to linking strategic planning with other decision-making processes in these organizations. At a minimum, these other management and decision-making processes should include more operational or tactical planning, resource allocation, performance management, and performance measurement.

Other kinds of planning and decision-making processes commonly undertaken by DOTs include business planning, long-range transportation systems planning, and asset management. *Business planning* involves the preparation of shorter-term plans that are more operational in nature, focusing in some detail on the projects, work, or tasks to be completed by an organization, its major divisions, and/or individual work units over a 1- or 2-year period. These plans often include budgets and show how managers' and employees' time will be allocated to accomplish the work specified in the business plan.

Whereas business plans focus on organizations and the use of their resources in the immediate future, *long-range transportation planning* focuses on transportation systems

and the enhancement of transportation facilities and services to improve system performance over the long term. State DOTs are required by the U.S.DOT to maintain 20-year long-range transportation plans, which may be primarily policy-oriented, focus on transportation corridors, and/or entail project-specific recommendations. These transportation systems plans are statewide in coverage and multi-modal in scope.

As practiced by state DOTs, *asset management* refers to a systematic process for maintaining, upgrading, and operating the transportation infrastructure and facilities they own. Asset management combines engineering principles with sound business practices and economic theory in a set of tools to support logical, systematic decision making regarding the preservation, upgrading, and replacement of these physical assets on a cost-effective basis (*Asset Management Primer* 1999).

Although transportation systems planning, asset management, and even business planning can be carried out in the absence of strategic planning or management, the very purpose of strategic management suggests that all of these processes should be consistent and mutually reinforcing. Therefore, this report also examines the linkages between strategic management and these other forms of planning and decision making.

This report is written primarily for chief executive officers (CEOs), executive team members, and other officials who are responsible for developing, supporting, and using strategic management systems in state DOTs. By examining exemplary practices in various departments, this report is intended to help these industry leaders in designing, implementing, evaluating, and improving their own strategic management processes to strengthen the overall performance of their organizations.

NEED FOR EFFECTIVE STRATEGIC MANAGEMENT

Effective strategic management practices are of critical importance to state DOTs because over the past decade they have been operating in an era of unprecedented change (Lockwood 1998). The external "drivers" of this change include the following:

- Increased demands for accountability from the public, the media, and elected officials;
- Growing recognition of the need to find multi-modal solutions to transportation problems;
- Mandates for DOTs to support economic development and environmental stewardship goals, as well as transportation outcomes;
- Pressure to become more customer-oriented in the way they do business;
- Pressure to produce more, in some cases with fewer resources or smaller work forces;
- The aging of the work force, along with new challenges in attracting and retaining qualified personnel;
- Dramatic advances in available technologies; and
- Significant changes in the intergovernmental system regarding federal, state, regional, and local responsibilities for transportation planning and programming.

Whereas the traditional DOTs, as shaped in the 1960s and 1970s, were stable organizations operating in predictable environments, in recent years these organizations have undergone substantial transformations as *institutions* (Lockwood 2000). In response to changing mandates, constituencies, and circumstances, DOTs have been transforming themselves by

- Reorienting priorities;
- Building relationships with customers;
- Involving the public and a range of stakeholders in project planning and design;
- Instituting quality improvement and process reengineering programs;
- Streamlining structure and administrative processes;
- Rationalizing and decentralizing decision making;
- Expanding and sharpening measurement systems;
- Exploring innovative approaches to financing;
- Emphasizing work-force development and retention;
- Outsourcing increasing amounts of work to private vendors;
- Forming new types of partnerships; and
- Focusing more on operations, in addition to construction and maintenance of facilities, often with substantial investment in information technologies.

To proceed in an orderly and organized fashion, therefore, it is crucial for state DOTs to establish and implement strategic agendas that may well focus on strengthening organizational and management capacities in addition to enhancing performance through improved policies and programs. In a June 2000 workshop for CEOs of state DOTs held in Minneapolis, Minnesota, many of the participants indicated that they were comfortable with their organizations' strategic planning capabilities. However, there was a consensus that the process often breaks down in the implementation stage.

Among the top priority research needs identified by the participants in the workshop were several topics related to strategic management, including performance measurement in support of strategic management, obtaining customer input, building legislative support for agency strategic agendas, and linking strategic planning to resource and implementation decisions (*TRB Research Circular 501* 2000). Thus, forging links between strategic plans and other decision-making processes is a critical challenge facing many DOTs. Most re-

cently (May 2003), the DOTs' need for effective strategic management practices was underscored by it being one of three major topics addressed in an AASHTO-, TRB-, and FHWA-sponsored leadership forum for CEOs of state transportation departments and conducted in Minneapolis.

PREVIOUS RESEARCH

The early literature on strategic planning in transportation agencies defined the overall approach and discussed its limitations (Meyer 1983, 1988; Stein-Hudson and McDowell 1985). Transportation agencies that were cited in these reports as pioneers in this area included the Canadian Air Transportation Administration, the Pennsylvania DOT (PennDOT), the Port Authority of New York and New Jersey, the Toronto Transit Commission, and the Massachusetts Department of Public Works. Meyer (1983) pointed out that strategic planning adopts a far broader perspective than do other forms of planning in transportation agencies, incorporating an assessment of external conditions and an examination of the capacity of the organization to respond to changes or implement new programs. Significantly, Meyer presented a model that emphasized the implementation of strategic plans through the development of work programs, operations plans, and budgets, as well as tools for monitoring results.

Stein-Hudson and McDowell (1985) also identified strategic planning as a process that supplements and guides the traditional forms of planning in transportation agencies by determining general directions as opposed to specific products. The authors pointed out that the results of strategic planning are immediate managerial and resource decisions, rather than recommendations regarding the future operation of a program, facility, or organization; an actionable agenda that is intended to help these agencies initiate change, rather than just react to it. They also stressed the process aspects of strategic planning; that is, the need to develop a planning process that is congruent with the organization culture, and the importance of thoughtful team efforts, accessibility of agency leaders to the strategic planners, availability of timely data, and adequate time—perhaps several years—for the process to develop and mature.

Individual Case Studies

Much of the existing literature focuses on the use of strategic planning and management in particular transportation agencies. Harned et al. (1985) provided a case study of the creation in the early 1980s of PennDOT's strategic management process. They discussed the formation of PennDOT's strategic management committee as the focal point of the process, the formulation of department-wide objectives and strategies, the development of 4-year business plans by the engineering districts, and the use of the plans to influence the budgeting process.

Several years later, Margolis (1995) traced the evolution of strategic management at PennDOT over a 15-year period through two different administrations, emphasizing the parallel development of the department's strategic management and quality improvement processes, the use of periodic management conferences to energize strategic planning, and efforts to involve greater numbers of managers and employees in successive iterations of the strategic planning process. More recently, Margolis (2002) provided a brief synopsis of PennDOT's 4-year effort in a third administration to strengthen its approach to strategic management by linking more rigorous strategic planning practices to measurable targets of organization performance. This redesign process moved through four phases: (1) determination of the overall approach, (2) development of the strategic agenda, (3) alignment of business plans, and (4) management of the plan through performance measurement.

Roberts (1989) critiqued the first two annual cycles of the California DOT's (Caltrans) strategic management process. She found that it had led to considerable improvement in the budget development process, provided workable strategies to address key issues, and contributed to improved coordination and communication within the department. Roberts also identified some process problems, resulting largely from attempts to do too much too quickly, and recommended refinements for following the annual update process. Bishop-Edkins and Birkland (1991) focused on the implementation of strategic plans through the annual budget process in the New Jersey DOT, emphasizing the importance of budget-oriented performance measures in forging a strong link between strategic planning and the budgeting process.

Etmanczyk (1995a,b) described how initial strategic planning conducted by the Wisconsin DOT's division of highways identified emphasis areas regarding customer service, improved decision making, team work, performance measurement, job satisfaction, and resource management. This focus on process and organization capacity led to the development of an action plan, which in turn led the division to implement its quality-based leadership program. As an outgrowth of this planning process, the division of highways established a measurement system consisting of four categories of performance measures applied to each functional area: on-time, on-budget, at a reasonable cost, and of high quality.

Nelson et al. (1996) detailed the development of strategic planning at the Minnesota DOT (Mn/DOT). This approach was notable at the time for its substantial effort to solicit input from citizens through a series of eight regional dialogues designed to help create clear strategic objectives,

and the mapping of conceptual frameworks to clarify the linkages between the desired outcomes and Mn/DOT outputs, processes, and inputs. More recently, Wilson-Orndoff (2003) provided a case study of a pilot effort by the Illinois DOT (IDOT) to conduct focus groups to solicit customer input to guide the development of its highway transportation asset management program.

Sorrell and Lewis (1998) traced the development of the Virginia DOT (VDOT) strategic management process in the mid-1990s, involving the clarification of mission, vision, and values, and the identification of four strategic outcome areas and associated goals. Once the department-wide strategic plans had been completed, VDOT's divisions and districts were challenged to undertake their own situational analysis and develop their own strategic action plans to support the department's strategic outcome areas. These units had great flexibility in developing their plans, but they were all aligned with VDOT's overall mission and values. VDOT assigned champions to lead the effort in implementing each strategic outcome area and employed a rigorous process of performance measurement to track their success. In the process, VDOT's culture became much more comfortable with a performance orientation and the idea of holding people accountable for performance.

Performance Measurement

A substantial portion of the literature on strategic planning in transportation agencies focuses on performance measurement. Poister (1997) examined state DOTs' use of performance measures in a variety of program and functional areas and found that the "new" generation of performance measures tracked by DOTs were significantly more outcome-oriented, tied to strategic goals and objectives, and focused on quality and customer service than were the traditional input and output measures emphasized in the past.

Albertin et al. (1995) presented the system of Management Performance Indicators employed by the New York State DOT. Although not connected directly to a strategic planning process per se, this measurement system provided a tool that enabled New York State DOT executives to monitor departmental performance from a "big picture" perspective. Similarly, Ziegler (1996) focused on the development of performance measures to support transportation planning by the Washington State DOT. Again, although not geared specifically to strategic planning per se, the discussion of efficiency measures, program delivery measures, and system performance measures is relevant to strategic management. Along these same lines, Abbott et al. (1998) reported on a tiered system of performance measurement developed by the Delaware DOT that tracks performance indicators keyed to the goals, strategies, policies, and actions contained in its statewide long-range transportation plan.

Several states have employed the balanced scorecard approach in developing strategic plans, and identifying goals and performance measures in each of four "perspectives" focusing on customers, financial results, learning and growth, and internal processes (Kaplan and Norton 1996). Doyle (1998) discussed the use of the balanced scorecard model as adapted by the Texas DOT to monitor performance in support of the department-wide strategic plan, as well as at the division and district level in conjunction with their more operational strategic plans. Similarly, Poister and Streib (1999) examined the use of the balanced scorecard by a pioneering local transportation agency, the Charlotte, North Carolina DOT, in creating and managing its strategic plan. Other states that have used a balanced scorecard approach in developing their strategic plans include Utah, Illinois, and Virginia.

In an attempt to pull together a number of issues regarding performance measurement in state DOTs, Baird and Stammer (2000) presented a model for developing and implementing comprehensive measurement systems in transportation agencies. The model is anchored in an agency's mission, vision, goals, and stakeholder-defined quality, as well as targets regarding processes, outputs, transportation system outcomes, and quality of life outcomes. The authors also emphasized the importance of including measures of economy, efficiency, and equity, in addition to service-effectiveness, cost-effectiveness, and policy-effectiveness, with examples of each of these categories of performance measures presented. Reinforcing the need for the systematic integration of the myriad measures maintained by many DOTs, Kassoff (2001) emphasized the importance of "omnidirectional alignment" of performance measurement systems in which goals, strategies, policies, programs, projects, and measures are aligned vertically, spanning the organization hierarchy, horizontally across functional divisions and geographic regions or districts.

Strategic Management

Before the first Minneapolis workshop (June 2000) mentioned previously, 21 transit departments submitted brief write-ups on their experiences with strategic planning and management, and these were published in an annex to the circular produced by TRB on the research needs that were identified in the conference (*Annex to TRB Research Circular 501* 2000). Following the workshop, Poister and Van Slyke (2001, 2002) undertook a surface-level "initial scan" to examine how state DOTs carry out strategic planning and management functions. They focused largely on the linkages between strategic planning and implementation

and concluded that critical elements in the process included

- The use of business plans, program plans, and operational plans to drive the strategic agenda down into the decision making and work planning processes in the organization;
- The development of performance measurement systems that are specifically designed to track success in achieving strategic goals and objectives;
- The identification of "process owners" and the assignment of personal-level goals and objectives to build overall ownership of the strategic plan; and
- Budgeting systems that allocate funds directly to strategic initiatives and strategically derived action plans and business plans to ensure the alignment of resources with strategic goals and performance measures.

These elements are reflected in Figure 1, which portrays a holistic perspective on strategic management in state DOTs. This figure provides the framework for the principal lines of inquiry pursued in the synthesis research presented in this report.

ONGOING RESEARCH

Two other research projects are presently being completed that have relevance for this synthesis. First, in an NCHRP project conducted for TRB, TransTech Management, Inc., developed a guidebook on using performance measures to manage change in state DOTs (2003). This effort is specifically concerned with strategic performance measurement, focusing on the use of performance measures to manage strategic plans. Based in part on a review of measurement practices in several DOTs, the guidebook will discuss basic principles in developing measurement systems, selecting measures, and creating a framework for implementing and institutionalizing measurement systems.

Second, researchers at the University of Illinois at Chicago are currently investigating best practices for linking strategic planning to resource allocation and implementation decisions using elements of transportation asset management programs (Pagano and McNeil 2003). Focusing in large part on performance metrics and benchmarks as common elements in both strategic plans and asset management programs, this research is also intended to produce a guidebook for practitioners. Based on information

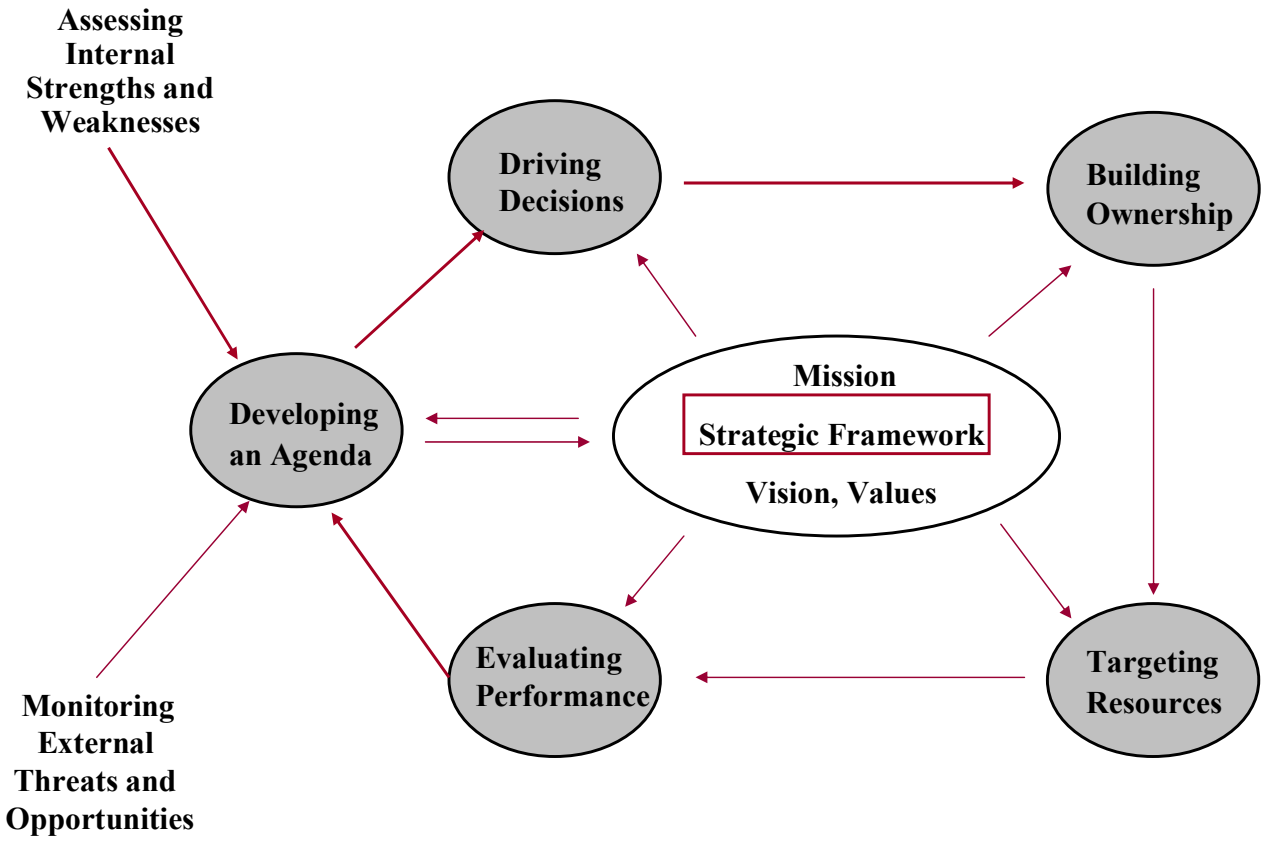

FIGURE 1 Strategic management in state DOTs.

obtained from a survey of the 50 state DOTs, follow-up site visits, and review by an expert panel, this research is also designed to develop a handbook that provides a model process and guidelines for practitioners.

METHODOLOGY AND ORGANIZATION OF THE REPORT

The principal focus of the synthesis research presented in this report is on effective approaches for implementing strategic agendas in state transportation departments. The primary research questions addressed here include the following:

- To what extent have DOTs been successful in advancing their strategic agendas and in accomplishing their strategic goals and objectives?
- To what extent do DOTs link their strategic plans to other management and decision-making processes, and what are effective approaches to forging such linkages?
- What are the principal obstacles that DOTs face in developing and implementing strategic agendas, and what approaches seem to be helpful in trying to overcome them?

Drawing on a review of the relevant literature, summarized previously, this synthesis research collected further information from DOTs through a survey and follow-up telephone interviews. The self-administered survey instrument was distributed in December 2002, to the CEOs of all 50 state DOTs and all 11 Canadian provincial or territorial DOTs over the signature of the executive director of AASHTO. The survey, which could be returned either electronically or by mail, was sent out again in February 2003, to those departments that had yet not responded. The survey questionnaire is shown in Appendix A.

A total of 24 U.S. state DOTs and 6 Canadian provincial or territorial DOTs returned completed surveys. It should be noted that approximately one-half of the 50 state DOTs were undergoing changes in their top leadership during the course of this study, primarily the result of transitions in gubernatorial administrations, which may have contributed to the reduced response rate to this survey. A list of those DOTs responding to the survey is shown in Appendix B. Most responses were completed by the senior staff members responsible for leading or supporting strategic planning efforts in their departments. After reviewing the completed surveys and processing the survey data, follow-up telephone interviews were conducted with relevant personnel from many of these departments, along with individuals from a few departments that did not return the survey, to clarify their responses and/or probe additional issues. A list of the states contacted by telephone for additional information is shown in Appendix C.

Chapter two of this report presents the findings from the survey and telephone interviews regarding strategic planning and management practices in state DOTs. This chapter includes examples from numerous DOTs regarding different elements of the overall process. This is followed by a discussion in chapter three of the findings concerning the relationship of strategic planning to transportation planning and programming in these departments. In an attempt to illustrate the integration of the various elements discussed in chapter two into a holistic strategic management process, chapter four presents mini-case studies of strategic planning and management at IDOT and PennDOT. Chapter five then reports findings regarding the kinds of obstacles faced by DOTs in developing and implementing strategic plans. Finally, chapter six summarizes the results of this synthesis research and presents conclusions regarding best practices in strategic management in state DOTs.

CHAPTER TWO

STRATEGIC PLANNING AND MANAGEMENT PRACTICES

The completed surveys and the follow-up telephone interviews with key personnel in many departments provided a rich variety of information regarding current strategic management practices in state DOTs. Following the elements in Figure 1, this chapter first discusses strategic planning and then turns to the use of strategic plans in driving decisions through action plans and business plans. This is followed by a discussion of performance measurement practices incorporated in the process of strategic management, which is followed in turn by a discussion of the DOTs' approaches to assigning ownership for strategic goals or initiatives. The chapter concludes with a discussion of approaches to linking budgets with strategic plans.

STRATEGIC PLANNING

All 24 state DOTs and 6 Canadian provincial DOTs responding to the survey reported that they had completed a strategic planning effort within the past 5 years. Although some of these departments are relative newcomers to strategic planning, many have a history of strategic planning at this time and have developed successive strategic plans during the past 10 to 15 years. Fifteen of the departments responding to the survey had completed new strategic plans or updates in 2002.

In some cases state DOTs have undertaken strategic planning efforts on their own initiative, whereas other departments were responding to external mandates. A total of eight DOTs reported that they developed strategic plans in response to legislative requirements, whereas four departments indicated that they did so in response to executive mandates. On the other hand, 15 DOTs reported that they undertook strategic planning on their own initiative, and the remaining 3 departments indicated that they did so as a result of a combination of their own initiative coupled with external mandates. Interestingly, in several states including Kentucky, Maryland, New Mexico, Idaho, and Wisconsin, strategic planning efforts grew out of previously existing quality programs, although in most cases strategic planning was initiated as a separate, stand-alone undertaking.

There was widespread variation among these DOTs in terms of who led their strategic planning efforts. Of the four departments whose strategic planning was carried out in response to executive mandates, two reported that their efforts were led by someone from a central executive office outside the DOT. In the other two cases, it was led by a deputy secretary or deputy minister. In those DOTs that were required to prepare strategic plans by legislative mandates, strategic planning efforts tended to be led by administrators from staff support offices such as planning and budgeting, finance and administration, management analysis, legislative affairs, special projects, planning and research, or a quality bureau. Conversely, in those DOTs that reported engaging in strategic planning on their own initiative, these efforts tended more to be directed by the CEO (such as a secretary, commissioner, or executive director), a board of directors or cabinet, or a deputy for planning or a strategic planning director, although in some cases these efforts were also led by a staff manager in charge of finance and administration, management and budget, or quality.

As might be expected, these 30 DOTs also vary in the pattern of involvement of various stakeholders in their strategic planning efforts. As shown in Table 1, CEOs and executive teams have been centrally involved in most, but by no means all, of these departments' strategic planning efforts. Senior managers, and to almost the same extent middle managers, have been centrally involved in strategic planning in a majority of these DOTs, whereas lower-level managers and rank-in-file employees tend to be more moderately or only peripherally involved in strategic planning. External stakeholders were reportedly moderately or peripherally involved in most of these departments. Interestingly, strategic planning tends to be led by internal stakeholders—CEOs, other executives, and senior managers—in these DOTs, whereas in most cases, outside consultants are used more sparingly to help flesh out the process.

TABLE 1
STAKEHOLDER INVOLVEMENT IN STRATEGIC PLANNING

Stakeholders	Centrally	Moderately	Peripherally
Chief executive officer	23	5	2
Executive team	25	5	–
Senior managers	21	9	–
Middle managers	18	12	–
Lower level managers	7	17	6
Employees	4	15	10
External stakeholders	2	12	13
Consultants	2	4	21

Strategic planning is appropriately seen as a top management responsibility by the DOTs and, in most cases, a group consisting of the CEO and 10 to 25 executives assumes the lead and guides the overall process. Increasingly, however, these executive strategic planning groups are including more managers, employees, and even external

stakeholders in parts of the process. Therefore, although the executive team may set the strategic direction for a department in establishing a mission and vision and defining strategic goals and objectives, many more managers and employees may be involved in committees or task forces created for the purpose of planning strategic initiatives, action plans, and performance measures.

The Maryland State Highway Administration (MDSHA), for example, invites input for its strategic plan from a range of personnel, including rank-and-file employees. Working through seven key performance area councils (for workplace safety, customer service, systems preservation, managing mobility, economic development, environment, and highway safety), the MDSHA's 26 senior managers have completed several iterations of the agency's strategic plan. As strategies were being developed, these councils worked with "vertical slice teams," representative groups of managers and employees from up and down the ranks and cutting across various divisions of the organization, to solicit ideas and feedback on proposals. At the operating level, MDSHA "local" quality councils worked with their own vertical slice teams to develop business plans within the framework of the overall strategic plan. Although this process has been time consuming, senior managers believe that it has provided useful input and helped to ensure that employees understand the agency's mission, identify with its goals and objectives, and feel committed to advancing their strategic plan.

Strategic Planning Process

Strategic planning processes in the public sector vary widely on several factors, including the degree to which they go into detail, the extent to which they are data based, the degree to which they are externally driven, and the extent to which they are issue driven versus goal driven. However, most of the DOTs developing strategic plans have employed components of what has become the "conventional" strategic planning process; that is, clarification of mission and values, development of a vision of success, environmental scanning and assessment of the driving forces behind external threats and opportunities, an analysis of the department's capabilities and performance and assessment of internal strengths and weaknesses, development of strategic goals and objectives and/or conduct of situational analyses to identify the strategic issues facing the department, development of overall strategies and/or strategic initiatives, and definition of associated performance measures.

For example, the planning process used by VDOT in developing its strategic plan for 2002–2004 is outlined in Figure 2. After clarifying its purpose, vision, mission, and values, VDOT conducted a strategic assessment to identify critical issues, and then developed goals and strategies for resolving those issues. The resulting strategic plan was built around seven goals focusing on customer satisfaction; employee satisfaction and development; maintenance and operations; construction program delivery; technology and research; financial management; and environmental, planning, and regulatory affairs. For each of these goals, the plan defines performance measures for tracking the intended outcomes and then presents a set of strategies for accomplishing the goal, along with estimated costs and an indication of who in the department will be responsible for implementing them. With a new commissioner in 2003 and operating in difficult financial circumstances, VDOT has condensed its approach to strategic planning, at least in the short run, as discussed near the end of this report.

Strategic Goals and Objectives

All 30 DOTs responding to the survey indicated that their strategic plans defined strategic goals and objectives. A total of 28 of these DOTs reported that these strategic goals and objectives were "aggressive but realistic," whereas one indicated that they were "not particularly aggressive," and one reported that its goals and objectives were "overly aggressive and possibly somewhat unrealistic."

As might be expected, the substantive focus of these goals and objectives is quite far ranging. The survey instrument presented the DOTs with a number of broad results areas and asked about the extent to which they were emphasized in their strategic goals and objectives, using a scale from 1 to 10 in which 1 indicates "little emphasis" and 10 indicates "strong emphasis." The number of DOTs according substantial emphasis on these areas (with ratings of 7 or higher) is shown in Table 2.

Strategic Initiatives

When asked whether their plans presented specific strategies for achieving goals and objectives, 18 of the state DOTs and all 6 of the Canadian provincial DOTs responded in the affirmative, whereas 6 of the state DOTs indicated that they did not. Those DOTs with specific strategies identified in their plans were then asked about the extent to which their strategies were to be implemented through particular functional divisions or other existing organizational units, as opposed to cross-functional strategic initiatives that need to be implemented across all units or through special projects outside the normal structure. Although no respondents reported that their strategies were implemented solely through existing functional units, the results indicate that the DOTs' strategic plans differ substantially along these lines, as shown in Table 3.

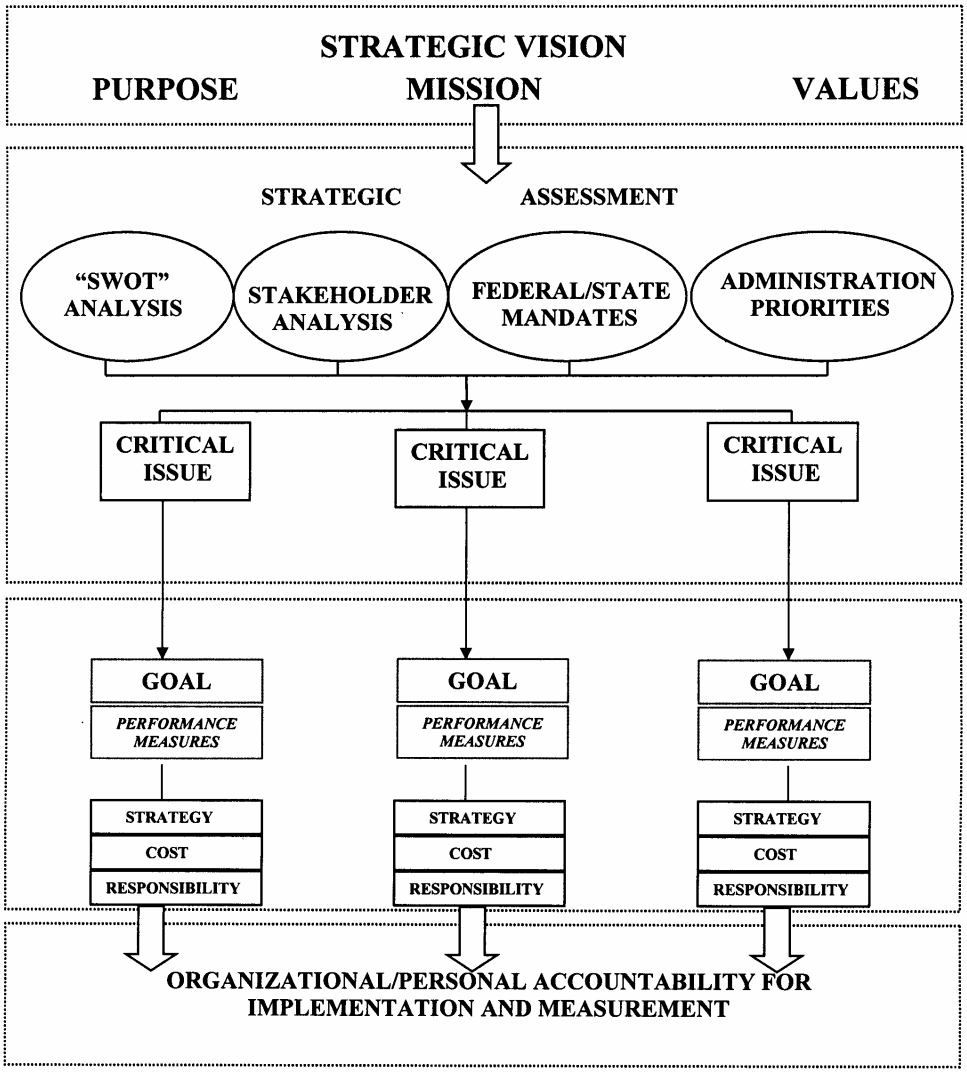

FIGURE 2 Virginia DOT strategic planning process.

TABLE 2
AREAS WITH STRONG EMPHASIS IN STRATEGIC PLANNING

Emphasis Area	DOTs
Safety	28
Transportation system preservation	27
Operational efficiency, productivity	25
Management capacity, organizational effectiveness	24
Environmental stewardship	22
Employee development	22
Transportation system enhancement	21
Relationships with partners and suppliers	21
Customer service and satisfaction	20
Congestion mitigation	18
Economic development	18
Financial viability	16

TABLE 3
IMPLEMENTATION MODES FOR STRATEGIC INITIATIVES

Implementation Mode	DOTs
Primarily through functional divisions, but some cross-cutting strategies	8
An even mix of functional and cross-cutting strategies	10
Primarily cross-cutting strategies, but some through functional units	11
All cross-cutting initiatives	1

There is no particular relationship between the impetus for undertaking strategic planning and reported success in achieving strategic goals and objectives except that the one DOT indicating a lack of success in achieving its goals and objectives (Hawaii) initially engaged in strategic planning primarily in response to a legislative mandate. However, there is a fairly pronounced relationship between success along these lines and identifying specific strategies in the plan. Not surprisingly, those DOTs that do identify specific approaches or strategies in their plans have a substantially greater tendency to report that they have been very successful in achieving their strategic goals and objectives.

South Carolina DOT's Strategic Plan

As is the case with the Florida DOT (FDOT) and the Kentucky Transportation Cabinet (KTC), the South Carolina DOT (SCDOT) has developed and manages its strategic plan in conjunction with the FHWA. Although the plan itself is the strategic plan of the SCDOT, the state division of the FHWA has bought into the plan, and FHWA representatives participate in annual goal setting to update the plan. In addition, the quarterly reports that present data on the performance measures specified in the strategic plan are produced on behalf of both the SCDOT and FHWA. The SCDOT's Strategic Plan Update for 2002–2003 consists of the following seven strategic goals:

1. Increase safety and security on South Carolina's transportation systems and within the SCDOT.
2. Improve the quality, efficiency, and appearance of the state highway system.
3. Improve and expand the multi-modal transportation system in South Carolina.
4. Enhance and implement integrated financial and project management systems.
5. Improve employee skills, their work environment, and provide opportunities.
6. Improve management of our property, equipment, and technology.
7. Provide the highest level of customer service.

For each of these seven goals a number of objectives, ranging from 2 to 31, are identified. For example, the first objective under Goal 1 is to "Reduce the number of highway crashes, injuries, and fatalities in South Carolina by 5% by 2005 through the development and implementation of a variety of statewide safety initiatives." (The South Carolina Division of the FHWA has its own separate strategic plan, which contains five of the seven SCDOT strategic goals, but its objectives are stated in more general terms.) The plan identifies "owners" for each strategic objective, who are broadly responsible for coordinating all efforts required to implement that strategy, and generally doing whatever is necessary to accomplish the intended results. In addition, target dates are established in the plan for completing each strategy or objective, along with performance measures for tracking progress on each one.

Kentucky's "Paths to Progress"

Like the SCDOT and FDOT, the KTC has "strategically merged" with their state division of the FHWA. They share a joint strategic plan, called "Paths to Progress," which was developed together by the key decision makers in both organizations. This plan is built around the following four strategic goals:

1. Manage congestion,
2. Improve safety,
3. Ensure environmental stewardship, and
4. Improve organizational performance.

Although the first three of these correspond closely to FHWA's vital strategic goals, the fourth was added separately for the KTC. For each of these goals, the plan establishes a cluster of strategic objectives, some of which are identified as joint activities and some as KTC activities. The KTC and FHWA review the progress of the plan in formal face-to-face meetings at least annually, but they also work together on plan implementation, review, and updating on an ongoing basis through ad hoc teams of people from both agencies that are built around specific goals and objectives.

At this point, the KTC had been engaged in strategic planning for 8 or 9 years; however, since 2001, the process has been undergoing substantial revision, particularly in terms defining more specific and realistic strategic objectives and stronger performance measures for tracking success in achieving them. As was the case with both the New Mexico DOT (NMDOT) and the MDSHA, KTC's strategic planning process grew out of the quality improvement tradition, and in keeping with a continuous improvement philosophy earlier versions of the strategic plan indicated the nature of the desired outcome in an open-ended format; for example, "Increase commercial vehicle safety." More recently, however, the KTC has moved to setting clearly defined goals and objectives and then establishing numerical targets that specify not only what kind of results are intended, but also how much and by when; for example, "To reduce intersection crashes by 10% by June 2007."

Mn/DOT's Strategic Directions and Policies

The Mn/DOT has been engaged in strategic planning since 1993. Each successive version of its strategic plan has been shorter because it has been more selective; more focused on strategic issues. The most recent version is summarized in a tri-fold publication, and the new one being submitted at this time was to be bi-fold. Since 1997, Mn/DOT's strategic direction has been framed by these three guiding principles: (1) safeguard what exists, (2) make the transportation network better, and (3) make the Mn/DOT work better.

Mn/DOT's strategic plan begins with these three strategic directions and is fleshed out with 10 supporting policies. For example, the three plan policies that support the strategic principle of safeguarding what exists are (1) preserve essential elements of existing transportation systems, (2) support land-use decisions that preserve mobility and enhance the safety of transportation systems, and (3) effec-

tively manage the operation of existing transportation systems to provide maximum service to customers.

One or more performance measurement categories have been defined for each of these 10 policies. Specific performance measures were then defined within each category, *separately for each modal group*, as appropriate. However, these measure sets and specific measures are not evident in the strategic plan. Rather, they are incorporated in the department's 20-year transportation plan and in the business plans developed by various organizational units. Mn/DOT measures the gap between actual and targeted levels on these measures and, to the extent feasible, converts the gaps into dollar amounts that go into budget requests.

Overlaid on the framework of strategic directions and policies are Mn/DOT's strategic objectives. Although the strategic directions and policies are envisioned as being relatively stable over the long term, the strategic objectives are intended to reflect a given administration's priorities for the immediate 4 years. Under the previous commissioner, the strategic objectives focused on multi-modal enhancements, interregional corridors, program delivery, and information technology (IT). With a new administration now in office, these immediate priorities—building more, building faster, building better—will be referred to as strategic investments. They will be matrixed across the 10 policies in the strategic plan.

Montana DOT's Strategies and Actions

Agencies often find that they need to resist the temptation to include too many goals, objectives, and action items in their plans, thereby making them less strategic. For example, the Montana DOT (MDT) began its strategic planning efforts in 1999. The MDT used a balanced scorecard framework to develop its strategic plan, and at the highest level identified three principle initiatives in each of the four quadrants of the model. A summary performance measure or set of measures was identified for each of these strategies. These are general strategic initiatives, but the goal structure unfolds from them to more specific goals and actions. For instance, the three strategies in the financial quadrant are as follows:

- Maximize revenue streams and explore innovative funding options;
- Deliver a cost-effective transportation program to the citizens of Montana; and
- Develop a consistent, statewide programming methodology.

The MDT has defined a set of goals to advance each of its 12 strategic initiatives and then has identified a number of specific actions to be undertaken to accomplish each of the goals. For example, one of the five goals defined in support of the first of these financial initiatives is to "protect user fees and examine user fee equity ratios." A total of 14 specific actions have been developed for achieving this goal, as represented by the following:

- Pursue a strategy to prevent all dedicated revenues from being diverted for nontransportation uses,
- Pursue a strategy to determine a method for taxing alternative fuels vehicles,
- Explore the potential for sign permitting fees, and
- Continue to protect MDT proprietary funds through continued review of rate and rate structures to ensure equity.

Similar sets of goals and supporting actions have been elaborated for each of the MDT's 12 strategic initiatives. In all, some 643 action items have been specified in the overall strategic plan to advance the 12 strategic initiatives. Linear responsibility charts were then developed to assign involvement and lead responsibility for each of the specific actions across the department's functional divisions (Administrative Services, Maintenance, Aeronautics, Planning, Engineering, and Motor Carrier Services), as well as the Director's Office.

Although this provides a very systematic structure, the MDT has retrospectively concluded that the plan included far too many action items and that many of them were not particularly well thought out. Some action items were very general, with no specific indication of tasks to be undertaken, whereas others called for specific actions that were very unpredictable in terms of effectiveness. In some cases, this occurred because "divisions insisted on including anything that might fit," according to one MDT representative. Not surprisingly, top management has found the present strategic plan to be unwieldy, and the department is now working to reduce the number of action items to perhaps 150 to 200, and to develop and evaluate these proposals more carefully to increase the probability of success in advancing its strategic agenda.

DRIVING DECISIONS THROUGH ACTION PLANS AND BUSINESS PLANS

If an agency is committed to advancing its strategic agenda, it must use the plan effectively to drive decisions that are made throughout the organization. Although this requires tying performance measurement, budgeting, and performance management systems to the strategic plan, as will be discussed in subsequent sections of this report, first and foremost this integration of strategy into the ongoing work of the department is achieved through linking lower-level planning processes to the overall strategic planning

framework. DOTs do this through action plans and business planning processes. Whereas action plans are project plans developed specifically to implement a strategic initiative, business plans are comprehensive work plans or operating plans developed by organizational units, and they can be made responsive to an organization's overall strategic plan. This section describes action plans and business plans and then provides several examples of how DOTs use them in their overall strategic management processes.

Action Plans

The Oklahoma DOT's (ODOT) "Strategic Plan 2002" consists of a mission statement, a vision, a statement on values and behaviors, 5 strategic goals, and a set of 67 action plans for moving toward those goals. Once the mission, vision, and goals were finalized, senior managers, with input from hundreds of ODOT employees, developed the action plans to address the question "What do we need to do next to meet our mission, vision, and goals?" Forty-four action plans were approved for implementation, in addition to 23 department action plans that were already under way.

ODOT's action plans are basically project plans for implementing strategic initiatives. They focus on 12 emphasis areas including preconstruction, construction, bridges, safety, maintenance, modal enhancement, project management, administration, finance, infrastructure, internal work force, and communications, but they are also cross-referenced within these categories across the 5 strategic goals. Each new action plan defines an objective, presents a set of tasks to be completed, identifies a responsible individual and the divisions or work units that need to be committed to it, a performance measure or measures for tracking success, an estimated completion time, and antecedent projects that must be completed to begin work on the current action item. The team leaders for each of these action plans are selected on the basis of substantive ability and position in the department, as well as their enthusiasm and ability to ensure that the work is accomplished. They are held accountable to top management largely through the review of the performance measures.

Business Plans

The use of shorter-term business plans and/or subordinate work plans or operations plans as vehicles for implementing longer-term strategic plans has increased substantially among state DOTs over the past few years. The Idaho DOT (ITD) is a case in point. Up until 2 years ago, ITD's strategic plan included an enumeration of all strategies for accomplishing targeted objectives and measures in some detail, but there was no systematic approach to ensure that they would be implemented by the operating units. Because ITD is a highly decentralized department, with a high degree of autonomy delegated to its six districts, top management did not always have complete control on their efforts to advance the strategic plan.

Currently, however, ITD's "2003 Strategic Plan" consists of three overarching strategic goals concerning facility improvement, safety, and efficiency, each supported by a number of performance standards to be achieved by specified target years. This strategic plan is implemented through the annual business plans or work plans developed by all six districts, as well as several headquarters units, with imbedded strategies that support the accomplishment of the department's strategic goals and objectives. Although these organizations still have some flexibility as to the elements and performance measures included in their business plans, they are reviewed by top management and therefore the process encourages them to address ITD's overall strategic priorities in their annual work planning and ongoing decision-making processes.

In response to the question "Does your department require district or regional offices, and/or functional divisions or units, to develop annual or multi-year business plans or operating plans that directly contribute to accomplishing your overall strategic goals and objectives," 17 of the 24 state DOTs responding to the survey answered in the affirmative, whereas the remaining 7 indicated that they did not use business plans this way. All six Canadian provincial DOTs reported using business plans to advance their strategic agendas.

Furthermore, of those departments indicating that they required districts and/or functional units to develop business plans that contributed to achieving strategic goals and objectives, in all but one case these units are required to submit their business plans to top management for review and/or approval to ensure that they are directly aligned with department-wide strategic plans. The use of business plans to drive department-level strategic plans down into the organization is seen as critical for encouraging a focus on the department's overall strategic agenda, imposing discipline on operating decision making, enforcing strategic priorities throughout the organization, and identifying and emphasizing action items designed to achieve strategic objectives. Many of the survey respondents made comments to the effect that without implementing the business plans in this way, strategic goals and objectives simply would not be achieved.

The MDSHA is currently operating out of its "Four-Year Business Plan 2000–2004," which is actually a product of the agency's second round of strategic planning. At one level, this business plan ties the highway administration to the strategic goals of the overall DOT (which in

Maryland consists of a departmental core and five quasi-autonomous modal administrations along with a separate authority that operates toll facilities) as well as gubernatorial initiatives. Then, at a more local level, the MDSHA requires all district and headquarters offices to develop their own business plans to support its overall set of strategies. In turn, operating-level business plans identify key performance areas, goals, more specific objectives, strategies for accomplishing them, performance measures, and action plans designed to implement the strategies. These annual business plans must be approved by the administrator, and the status of the action items contained in the business plans is reported up through the chain of command over the course of the year.

Missouri DOT's Strategic Plan and Business Plan

In addition to statements of mission and values, the Missouri DOT's (MoDOT) "Strategic Plan 2003–2008" consists of three strategic priorities and a total of 13 strategic goals. A companion piece, MoDOT's department-wide "Business Plan 2004–2005," presents one or more strategies and supporting actions for achieving each of these goals. The overall strategic plan is prepared primarily for communicating MoDOT's priorities with external audiences and thus it is brief and limited to goal statements. The department's overall business plan, on the other hand, documents strategies to be implemented over the next 2 years for accomplishing these goals.

MoDOT also requires field offices and functional divisions to develop more operational plans, referred to as work plans, in support of the strategic plan. The department's 10 districts and 5 headquarters business units (planning, project development, operations, financial services, and administration) all prepare annual work plans, as do the functional units that comprise the headquarters business units. In these work plans the districts and business units are charged with charting out (1) how they will keep routine work and service going, (2) how they will deploy the strategies presented in the department's overall business plan, and (3) how they will respond to unique challenges in their area that do not relate directly to either their routine work or the strategic plan. At this point, the districts and business units are not required to submit their work plans for review and approval by top management, but MoDOT is considering moving in this direction to ensure closer alignment between the work plans and the overall strategic plan.

Aligning Business Plans with Mn/DOT's Strategic Plan

The Mn/DOT has been using business plans since 2000, but this past year was the first time the department forged a direct link between its strategic plan and the business plans. Annual business plans are developed by each of Mn/DOT's six divisions, and these are largely devised from the plans developed for the bureaus and sections within the divisions. The eight districts comprise the operations division and each develops a business plan as well. The six division business plans are then used to develop the overall departmental business plan.

Mn/DOT executives ensure a close alignment between the strategic plan and the business plans by providing the strategic framework, along with instructions on how to incorporate it, in the business plans. Then, the business plans prepared by the districts and divisions are reviewed, and must be approved by, the executive team, which also develops the strategic plan and has ultimate responsibility for the 20-year transportation plan.

Minnesota has a biennial budget process, and Mn/DOT's budget proposal comes out of its business plans. Business planning at Mn/DOT is intended to link the department's strategic objectives and future directions with customer service and funding from an activity-based budgeting perspective. The business plans contain cost data and performance measures, and the units' budget requests are based on these.

Action Planning and Business Planning at the Wisconsin DOT

The Wisconsin DOT's (WisDOT) strategic plan consists of six emphasis areas that cut across all divisions and affect the entire department. These are broad statements of goals concerning the work force, customers, efficiency, safety, multi-modal transportation, and partnerships, which have been in place since 1997. WisDOT uses both action plans and business plans to drive these emphasis areas down into the department.

The action plans, developed every 2 years, call for department-wide initiatives that cut across organizational lines to advance the overall emphasis areas. Action teams, led by sponsors who are usually division directors, with representation from appropriate units from throughout the department, are created for each emphasis area. Each action team is responsible for defining strategic objectives for their emphasis area and then developing and implementing specific initiatives designed to achieve those objectives. Sponsors are held accountable for the implementation of these action plans through monthly and quarterly reports to WisDOT's board of directors and the secretary. The action teams develop status reports that describe the elements of the action plans along with an indication of which tasks have been completed and which still need to be accomplished.

These action team reports are presented to top management at the outset when the action plan is chartered, perhaps in the middle of the project, and then finally when the project has been concluded. This information is used to evaluate progress advancing the strategic plan and for establishing new action items that should be undertaken to make further progress in each emphasis area.

In addition to the cross-cutting action plans, WisDOT's functional divisions develop their own business plans, which focus on strategic initiatives designed to support the department's emphasis areas as well as plan their more routine, ongoing work. In these biennial business plans the divisions define in greater detail what they will be doing over the next 2 years to contribute to each of WisDOT's emphasis areas. Because WisDOT's district operations constitute the Division of Transportation Districts, they collaborate in preparing a single business plan for that division, and then they tie their own individual work plans to this business plan. Progress on selected business plan items is reported to the top management team twice each year, usually focusing on those projects that are of particular interest to the secretary or of particular interest to multiple districts. In the meantime, more detailed status reports on progress in implementing business plan items are updated and made accessible to department managers and employees through WisDOT's intranet.

Kansas DOT's Strategic Management Plan

The Kansas DOT (KDOT) employs a somewhat different approach to driving strategy down into the organization. KDOT's "2003 Strategic Management Plan" includes both a strategic plan and a management plan. Whereas the strategic plan establishes direction for changes that will be required to move the agency toward its mission and vision, the management plan provides guidance for day-to-day operations of the agency and creates performance measures for determining progress toward successful pursuit of its mission. Both of these plans are keyed to KDOT's mission, vision, and values, and both identify goals, objectives, and strategies.

Although these are to some extent parallel plans, the strategies established in KDOT's strategic plan are used to identify needed objectives and strategies in the management plan. Therefore, the strategic management links the department's six strategic goals to the four management goals with objectives, and strategies are then determined for achieving these objectives. Responsibility for implementing each strategy is assigned to a particular organizational unit—division, bureau, section, district—and one or more performance measures are defined for tracking the progress made on each objective.

EVALUATING PERFORMANCE WITH MEASURES

Of the 30 departments responding to this survey, the great majority, 21 state DOTs and 4 Canadian provincial DOTs, reported that their strategic plans identify specific performance measures for gauging success in achieving individual strategic goals and objectives. Furthermore, the majority of these departments, 16 state DOTs and 3 Canadian DOTs, indicated that they establish specific target levels on these performance measures to be achieved within certain time frames.

All 25 departments indicating that their strategic plans identify specific performance measures to be tracked also reported that top management reviews the performance data at regular intervals to track progress in achieving strategic goals and objectives. Furthermore, all but one of these departments reported that their district or regional offices, functional divisions, or other organizational units also review relevant performance data on a regular basis. The frequencies with which these strategically oriented performance data are reviewed by top management and by districts and functional divisions is shown in Table 4. Not surprisingly, district and regional offices, as well as functional divisions and other organizational units, tend to review the performance data more frequently than does top management, given that they are closer to the operating level.

TABLE 4
FREQUENCY OF REVIEW OF STRATEGIC PERFORMANCE DATA

Frequency of Review	Top Management	Districts and Functional Divisions
Annually	4	3
Quarterly	14	7
Monthly	1	7
Other	2	6
Total	21	23

For example, the SCDOT publishes an *SCDOT/FHWA Strategic Plan Quarterly Report* that monitors progress on each measure set out in its strategic plan. In some cases the measures are tracked over time, whereas others chart actual performance against targets or plans. These reports are provided for quarterly reviews by the department's leadership, consisting of approximately 40 top managers and FHWA staff. They are produced in a professional format and convey the pertinent information in a clear framework using meaningful comparisons. (SCDOT's internal audit review group also reviews these quarterly reports and sometimes provides feedback on the performance measures themselves, the comparisons made, or the presentation formats employed.)

KTC's *Path*

The KTC produces the *Path*, a report on a set of performance measures keyed to the strategic plan. The *Path* is reviewed annually by the executive team; however, the KTC is planning to move to a quarterly electronic production of the *Path* to track progress, and then roll it up into an annual report. Top management at the KTC is also considering a move to begin conducting an overall review at a management retreat each January to see where the agency stands on short-term strategic initiatives halfway through the fiscal year. If progress was determined to be behind schedule, there would still be 6 months left to hit the July 1 target.

MoDOT's Dashboard and Scorecards

MoDOT employs a dashboard—a reporting format using green, yellow, and red symbols to convey the status of indicators at a glance—format to monitor progress in implementing its department-wide business plan through a high level set of performance measures. The dashboard, which is geared toward outcomes envisioned in MoDOT's business plan, is produced every 6 months and is targeted to the Transportation Commission, legislators, and other key external stakeholders.

In addition, every headquarters business unit maintains a scorecard of measures tied to the work plan. These scorecards track the implementation of strategies in the business plan as well as service delivery and work processes in key core functions in the department. The scorecards are reviewed by top management on a quarterly basis and are used more as a management tool to ensure the accountability of these units in advancing MoDOT's strategic plan.

Currently, the 10 district offices are not required to track performance measures in any particular format; however, MoDOT is likely to add district scorecards to its performance measurement hierarchy in the coming year. Although the departmental dashboard and the business unit scorecards tend to focus more on intended outcome measures, the district scorecards will primarily track the outputs produced by specific activities called for in their work plans.

New Mexico's *Compass*

Many state DOTs use performance measurement systems proactively as management tools, and the NMDOT's *Compass* is the prototypical case in point. Intended to help NMDOT not lose sight of its direction and stay focused on "True North" values, the *Compass* incorporates 16 customer-focused key results, with at least one performance measure for each one, for a current total of 80 measures. Wherever possible, the measures were chosen on the basis of available data to minimize the additional burden of data collection, as well as to facilitate the analysis of trends over time. However, as weaknesses in some of the indicators have become apparent, the measures have been revised to be more useful. Because the *Compass* was born out of a quality improvement tradition, numerical targets have not been set on these performance measures. NMDOT looks for continuous improvement in these measures and wants to avoid the quota or ceiling effects that might result from such targets.

The 16 key results tracked by the *Compass* range from stable letting schedule, adequate funding and prudent management of resources, timely completion of projects through smooth roads, access to divided highways, and safe transportation systems, to less traffic congestion and pollution, increased transportation alternatives, and economic benefits to the state. Each of these results has a "result driver" assigned to it; a higher level manager who is responsible for managing that function and improving performance in that area. Each individual measure also has a "measurement driver," assisted in some cases by a measurement team, who is responsible for maintaining the integrity of the data.

The NMDOT conducts quarterly *Compass* reviews; half-day sessions involving 50 to 70 top department managers, including the executive team, division directors, and district engineers. A detailed review on each result and performance measure is conducted to assess how well each area is performing, identify problems and emerging issues, and discuss how to improve performance as needed. As shown in Figure 3, the feedback resulting from these reviews prompts results drivers and middle management "trailblazers" responsible for particular functions to develop or revise action plans, budgets, and measures to keep these key activities on track. These collective reviews provide a strong incentive for the results drivers to ensure that progress is being made on those measures for which they are responsible and they allow top management to hold others accountable for advancing the department's most important priorities.

Currently, the NMDOT has conducted some 30 of these *Compass* reviews over the past 8 years, and the process has provided an opportunity for the organization to learn to "think together" about the department as a whole and the direction in which it is moving. Although not conceived as a strategic plan, the *Compass* in effect has constituted the department's real strategic agenda, and a few years ago it provided the substantive framework for the strategic plan developed by the NMDOT in response to a legislative requirement. Thus, the *Compass*, a carefully crafted measurement system, became the real driving force and the central management tool in the department.

More recently, however, business planning has been introduced into the NMDOT, and each division and each dis-

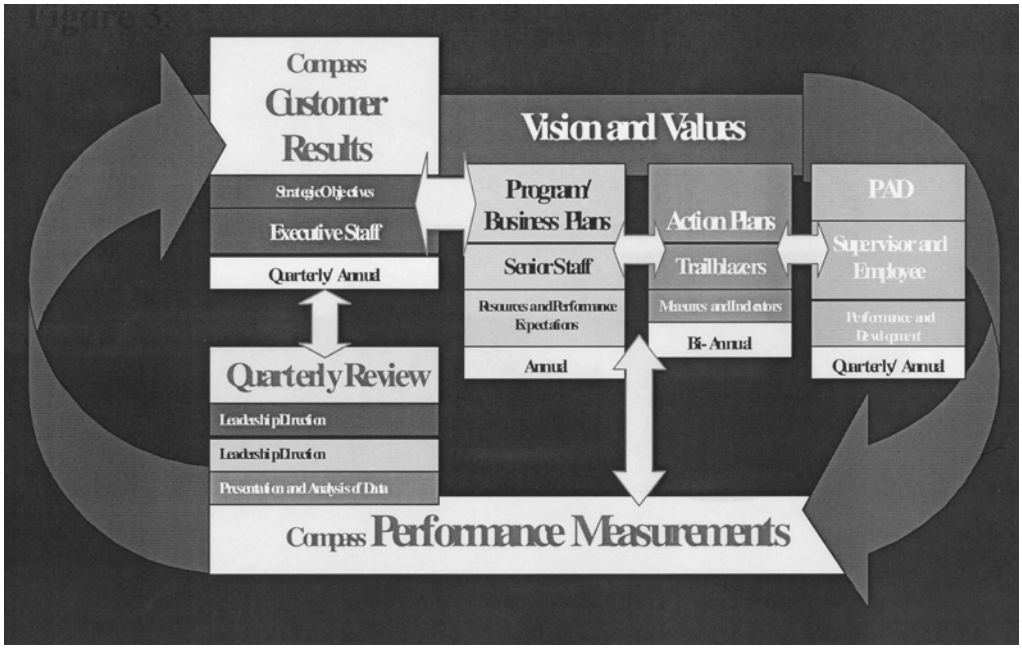

FIGURE 3 Strategy review in New Mexico State Highway and Transportation Department.

trict now develops annual business plans. The business plans contain strategic goals and objectives and, in a departure from earlier thinking in the department, they do set numerical targets on associated performance measures. The strategic goals, objectives, and targets in the division and district business plans are developed to support the NMDOT's official strategic plan as well as the key results and performance measures in the *Compass*.

At the next level down, bureaus, sections, and some work units within sections develop their own action plans; more specific work plans in support of the business plans. Furthermore, individual employees have performance appraisal and development plans in conjunction with the state government's pay for performance system, and these are tied to the action plans of each individual's section or work unit. Therefore, the overall structure is intended to ensure alignment from the *Compass* through business plans and action plans to individual work performance plans, providing a cohesive sense of direction that guides the overall work of the organization.

Performance Measures Pyramid

The current performance measurement framework at the MnDOT is referred to as the performance measures pyramid. As illustrated in Figure 4, it starts at the top with system-level measures that are based on Mn/DOT's strategic policies, as well as district plans and modal plans, and flows down to business plan measures and then to operating measures linked to work plans for organizational units.

At the top of the pyramid, the policy-based system-level measures reflect outcome targets over a 20-year period, as reflected in the state's transportation plan, which in turn is consistent with the department's strategic directions and strategic policies. The business plan measures, on the other hand, are tied to both output and outcome targets over a 2-year period, although the operations-oriented or project-related measures are tied to output targets to be achieved within 1 year.

At the system level, the Mn/DOT is developing measure sets; groups of performance measures that collectively track performance related to a particular policy or measurement category, for each of the 10 strategic policies in the strategic plan. For example, pavement condition, a measure set supporting the system preservation policy, incorporates some 25 specific measures. Wherever appropriate, these measure sets include subsets or specific measures linked to a given policy for each of four modal groups, including highways and bridges, passenger service/bicycle/pedestrian, motor carrier/railroad/waterways, and aeronautics. The Mn/DOT has a plan for developing each new measure required to support the plan; for example, travel reliability, and core groups of employees have been identified to develop each measure set. At this time, major sets have been completed; however, others are still under development.

The top management team at the Mn/DOT uses a dashboard, which provides a "snapshot" to monitor the status of some 30 performance measures tied to the strategic plan. As shown in Figure 5, a green light (circle) signifies that performance on a particular measure is at or above

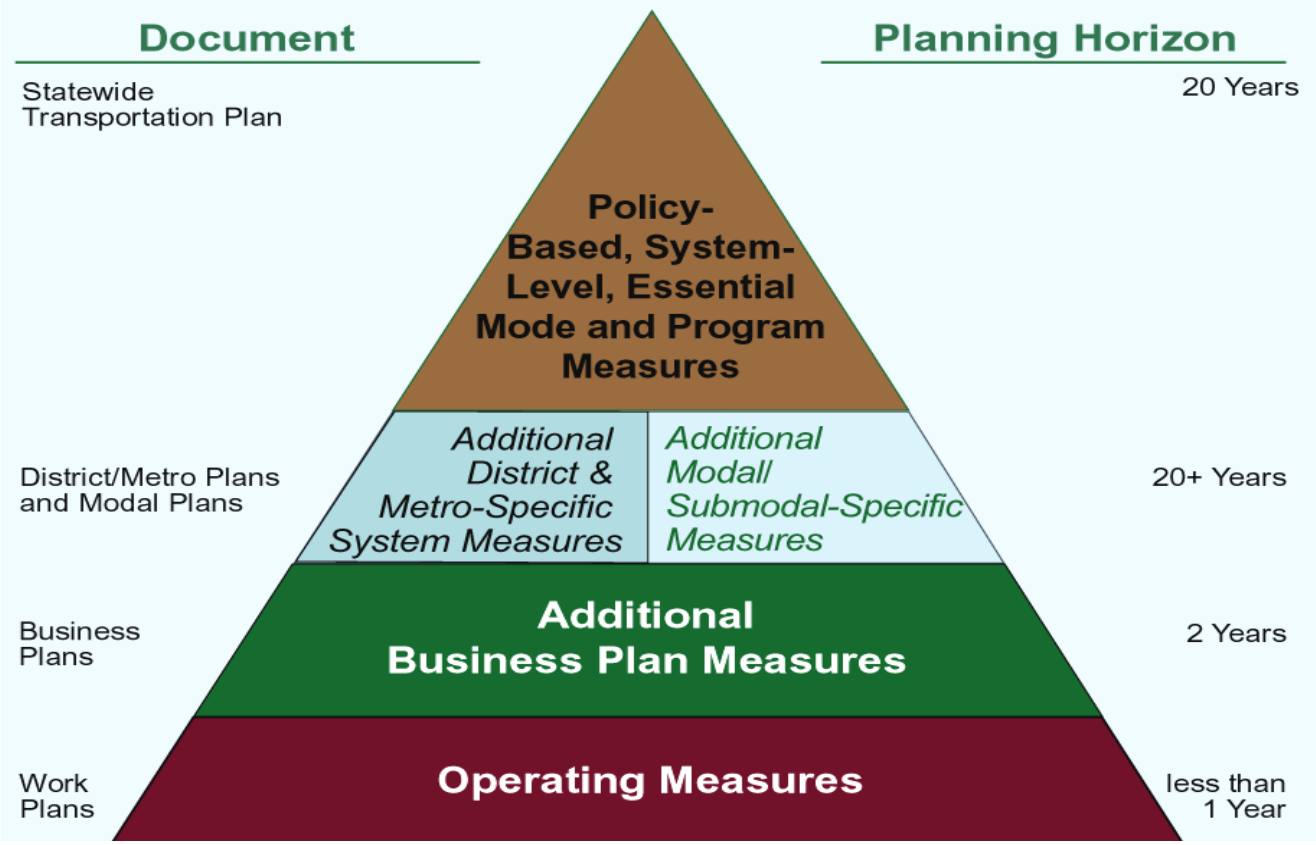

FIGURE 4 Performance measures pyramid.

the target, whereas a yellow triangle cautions that it is below target, and a red (octagonal) stop sign indicates that some intervention is needed to get performance back on track. Dashboards are also under development in conjunction with the business plans managed by districts and divisions.

Caltrans has also developed a pyramid, consisting of three tiers of measures for monitoring its strategic plan. At the top of the pyramid are six categories of outcome measures (e.g., accident/injury reduction and transit ridership) that are tied to Caltrans strategic goals and monitored at the departmental level. In the second tier are measures for evaluating products and services provided to customers in terms of quality, efficiency, and customer satisfaction, whereas the third tier consists of process and output quantity indicators. Although the measures in the second and third tiers are defined at the departmental level to link directly to Caltrans' strategic goals, they are monitored separately for all relevant divisions and districts.

ASSIGNING OWNERSHIP

Similarly, when asked whether their departments assign responsibility to specific individuals or organizational units to take the lead in implementing particular strategic initiatives, or for achieving specific goals and objectives, all but 2 departments responding to the survey, 22 state DOTs and 6 Canadian provincial DOTs, indicated that they do this. Only two state DOTs reported that they do not assign such responsibilities to specific managers or organizational units.

The individuals who are assigned such responsibilities are most often called goal or strategy "owners"; however, in some departments they are referred to as leaders (Oklahoma and California), sponsors (Wisconsin), champions (Virginia and Illinois), and results drivers (New Mexico). Of the 28 departments that assign responsibilities to specific individuals or units for implementing strategic initiatives, all but 4 reported that these individuals or units are held accountable for accomplishing their strategic objectives through the use of performance measures and/or their performance management systems.

SCDOT's Accountability System

As mentioned previously, the SCDOT assigns individual owners, usually senior managers, to take the lead in pursuing each of its strategic objectives. Although they use their organizational units and others, as well as their own staffs,

Snapshot - Mn/DOT Performance vs. Targets April 2003 **Snapshot**

KEY: Green: At or above target; Yellow: Below target; Red: Needs intervention

Product/ Service	Measure	Status Yr Before	Status Current	Yrs of Data	State Trend	Dist./Metro Performance	Budget Status	Notes
Infrastructure Investment and Planning								
State Roads Investment	**Pavement – Ride Quality -** PSR – Principal Arterials	Green	Green 2002	8	**On Target** - declined last 2 years.	5 of 8 on target % Good PSR, 8 of 8 on target % Poor PSR.		Several districts short of targets for Minor & Coll.
State Roads Investment	**Pavement – Remaining Service Life** (RSL) – Average Principal Arterials	new measure	Yellow 2002	1	**Short** of all RSL Targets (Average, High & Low).	1 on target Average RSL, 2 exceed target, 5 short of target.		
State Roads Investment	**Pavement Preventive Maintenance** $ Investment	new measure	Yellow 2002	1	**Short** of target	4 of 8 on target.		
State Roads Investment	**Bridge Condition**- Principal Arterials	Yellow	Yellow 2002	6	**Well short** of 20-yr Targets, declining	4 of 8 on target % Good. 5 of 8 on target % Poor.		
State Roads Investment	**Bridge Condition** - Minor Arterials & Collectors	Yellow	Yellow 2002	6	**On target** % Good **Off target** % Poor	6 of 8 on target % Good. 2 of 8 on target % Poor.		
Construction Project Dev.	**Balanced Letting**	Yellow	Yellow 3-2003	3	**Short** of target; Improved.	3 of 8 on target.		
Construction Project Development	**Project Turn-In Timeliness** - Major Project Milestones	Yellow 11-2002	Yellow 2-2003	2	**Short** of target FY03 & FY04 declined. **On target** FY05	1 Yellow, 1 Red, FY03. 2 Yellow, 2 Red, FY04. All Green, FY05.		
Construction Project Development	**Right-of-Way Timeliness** Major Project Milestones	Red 11-2002	Red 2-2003	2	**Well short** of target FY03; **Yellow** FY04; **Green** FY05	5 dist & Metro Red, FY03. 2 Yellow, 2 Red, FY04.		
Construction Project Development	**Letting Timeliness -** 1st Year STIP - All Projects	Yellow	Yellow 2002	5	**Short** of target, stable trend	5 districts Green, 1 dist & Metro Yellow, 1 district Red.		
Construction Project Development	**Letting Timeliness -** 3rd Year STIP - All Projects	new measure	Red 2002	1	**Far short** of target.	2 Green, 2 Yellow, 3 & Metro Red.		
Construction Project Dev.	**Plan Quality for Bid**	Green	Green 2002	8	**Above target** ongoing	5 Green % Exceptional, 6 Green % Poor.		Contractors perceive decline in plan quality.
Construction Project Mgmt	**Construction Timeliness -** % of MC, RC & BR Projects meeting completion dates	Green	Yellow 2001	4	**Dropped below** 95% target in 2001 (from 100% to 91%)	2 Green, 5 & Metro Yellow.		
Construction Project Mgmt	**Construction Cost Deviation** from letting to completion - MC, RC, & BR	Yellow	Red 2001	4	**Dropped far below** 7% target (from 8% to 16% overrun in '01)	4 Green, 4 Red.		

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FIGURE 5 Mn/DOT's dashboard (first half).

to implement their strategies and accomplish their strategic objectives, these owners are held personally accountable for producing results.

In addition, to drive SCDOT's strategic plan down through the organization, each department division, office, and engineering district develops an annual business plan to support the agency's overall strategic plan. Objectives identified in these business plans are then tied to individual employees' performance appraisals through the Employee Performance Management System. Overall, objective owners, individual managers, and employees are held accountable for delivering various portions of SCDOT's strategic plan through the following three mechanisms:

- Each manager's or employee's individual employee performance plan developed through the Employee Performance Management System specifies how that individual will work to contribute to achieving at least one of SCDOT's strategic goals. Annual employee performance appraisals are therefore based in part on their performance in advancing the overall strategic plan.
- The quarterly performance reports mentioned previously track the amount of progress being made on all of SCDOT's strategic objectives. In keeping with the premise that "What gets measured, gets done," quarterly leadership reviews of these performance reports, in which the objective owners present their performance data, provide a strong incentive to place priority on these objectives.
- Monthly reports are also made to the senior leadership team on 12 to 15 performance measures that are of more immediate interest. The executive director determines what will be reported on and by whom in each monthly review. Because many of these measures also reflect progress toward achieving strategic goals and objectives, and because most if not all of the senior staff reviewing both the monthly and quarterly reports are also owners of one or more strategic objectives, there is a strong incentive to deliver on these tasks.

KTC's Informal Approach

Currently, the process for maintaining accountability regarding strategic goals and objectives at the KTC is fairly

informal. The director of the Office of Quality negotiates with each division director about how they can contribute to advancing the strategic plan, in effect saying: "Here are the four strategic goals and their supporting objectives; tell me what your division can do to help achieve them." The philosophy at the KTC is that it is top management's job to set the strategic direction, but that the goals, objectives, and strategic initiatives must "roll up" in the organization rather than being forced down from the top. The KTC does not use written performance contracts as do some other DOTs; however, the division directors do make commitments to deliver on certain strategic goals. They are then held accountable through the normal reporting chain. Currently, the KTC is in the process of developing a dashboard measurement tool to more systematically monitor progress on these commitments.

Caltrans Performance Agreements

At Caltrans, each corporate-level deputy director and each district director negotiate annual performance agreements with the director. These documents outline four or five key objectives to be accomplished by that individual in support of Caltrans' strategic goals. This process is extended down into the divisions and districts. For example, the district directors have performance agreements with their immediate subordinates, the deputy district directors who are responsible for their functional divisions, which also focus on their efforts to support the district's contributions to achieving the department's strategic goals.

The key to success in Caltrans' strategic management process is seen as having strong performance measures in place to monitor progress in achieving the strategic goals and the supporting objectives stipulated in the individual-level performance agreements, rather than micromanaging how strategies are deployed. For example, the headquarters divisions and some districts prepare annual business plans to guide their work, but they are not submitted to the director or executive team for approval. Instead, the top management team at Caltrans delegates considerable flexibility to senior managers regarding their own areas of responsibility. The director sets the overall direction for the department through the strategic plan and focuses on the outcome measures that are tied to the strategic goals, and then counts on the managers to determine the strategies and deliver the results.

TARGETING RESOURCES

In response to a general question about the relationship between their departments' strategic plans and budget processes, only 3 DOTs reported that their strategic plans drive budget decisions in unidirectional relationships, whereas 17 indicated that strategic planning and budgeting influence each other. In contrast, the remaining six respondents indicated that these two decision processes are basically independent of each other in their departments. No respondents chose "budgets drive strategic plans" in their departments, although several commented to the effect that their strategic plans were developed within the context of fiscal realities. This duality was succinctly expressed by a respondent from the Manitoba Ministry of Transportation and Government Services as follows: "While budget constraints limit our flexibility and give rise to issues that demand strategic attention, our strategic plan remains focused on what is needed and what we need to do in order to serve our mandate as expected and obliged."

Somewhat surprisingly, since most departments reported that budgeting and strategic planning do influence each other, only a few indicated that costs were seriously considered in developing strategic plans. When asked whether their strategic plans include the estimated costs of implementing strategic initiatives or accomplishing strategic goals and objectives, only five state DOTs and two provincial DOTs responded in the affirmative. To the contrary, 19 state DOTs and 4 Canadian DOTs indicated that the estimated costs of strategic initiatives were not included in their strategic plans. However, respondents from a few DOTs reported that many of their strategic initiatives could be carried out using existing personnel with proper time management techniques and would not require additional budgetary support.

Nevertheless, most of the departments responding to the survey, 20 state DOTs and 4 provincial DOTs, reported that they do take steps to ensure that budgetary resources will be allocated to fund their strategic initiatives one way or another. In response to a follow-up question, these 24 departments reported using one or more of the specific mechanisms shown in Table 5 to ensure that resources are available to fund their strategic initiatives as needed.

For example, as mentioned previously, all engineering districts and headquarters offices in the SCDOT develop business plans to support the department's overall strategic plan. The objectives identified in these various business plans are also tied to their budgets. Each organizational unit that produces a business plan also prepares an annual budget. Tasks contained in the business plans, including action items that are closely aligned with the department's strategic plan, that require additional resources to complete, must also be provided for in their proposed budgets.

NMDOT's Performance Budgeting Process

Similarly, business plans provide a critical link to the budget process in the NMDOT. At present there is no di-

TABLE 5
BUDGETARY APPROACHES TO FUND STRATEGIC INITIATIVES

Budgetary Mechanisms	No. of DOTs Using
Establish separate budgets to fund strategic initiatives	10
Earmark sources within the regular budget to fund strategic initiatives	14
Require organizational units to demonstrate in their budget proposals that they are allocating sufficient resources to fund strategic initiatives	13
Use other budget mechanisms	8

rect link between the department's strategic plan (as embodied largely in the *Compass*) and the budget; however, the two are linked through business plans and associated performance measures. As required by New Mexico's Government Accountability Act, the NMDOT transitioned to a performance-based budgeting process in 2001. This entails budgeting funds to programs rather than organizational divisions and then tracking the success of those programs with performance measures.

Thus, NMDOT has developed a program structure that overlays the organizational structure. The major program areas consist of construction, maintenance, program support, aviation, traffic safety, and public transportation, and each of these is divided into various programs. For instance, the overall maintenance program comprises three separate but related programs: preservation, scheduled maintenance, and routine maintenance. Responsibility for these programs crosses organizational lines. For example, the engineering design division, the transportation planning division, the field operations division, and the road betterments division all share responsibility for the construction program, and the overall budget for the construction program is allocated among them, as shown in Figure 6.

The business plans developed by the functional divisions and the districts are organized around this program structure, as are the performance measures that accompany them, but they also emphasize the key results and measures contained in the *Compass*. Thus, proposed budgets submitted through the performance-based budgeting process are derived in large part from the *Compass* priorities, and the department reports to the legislature on the performance measures, largely drawn from the *Compass*, that are tied to these budgets.

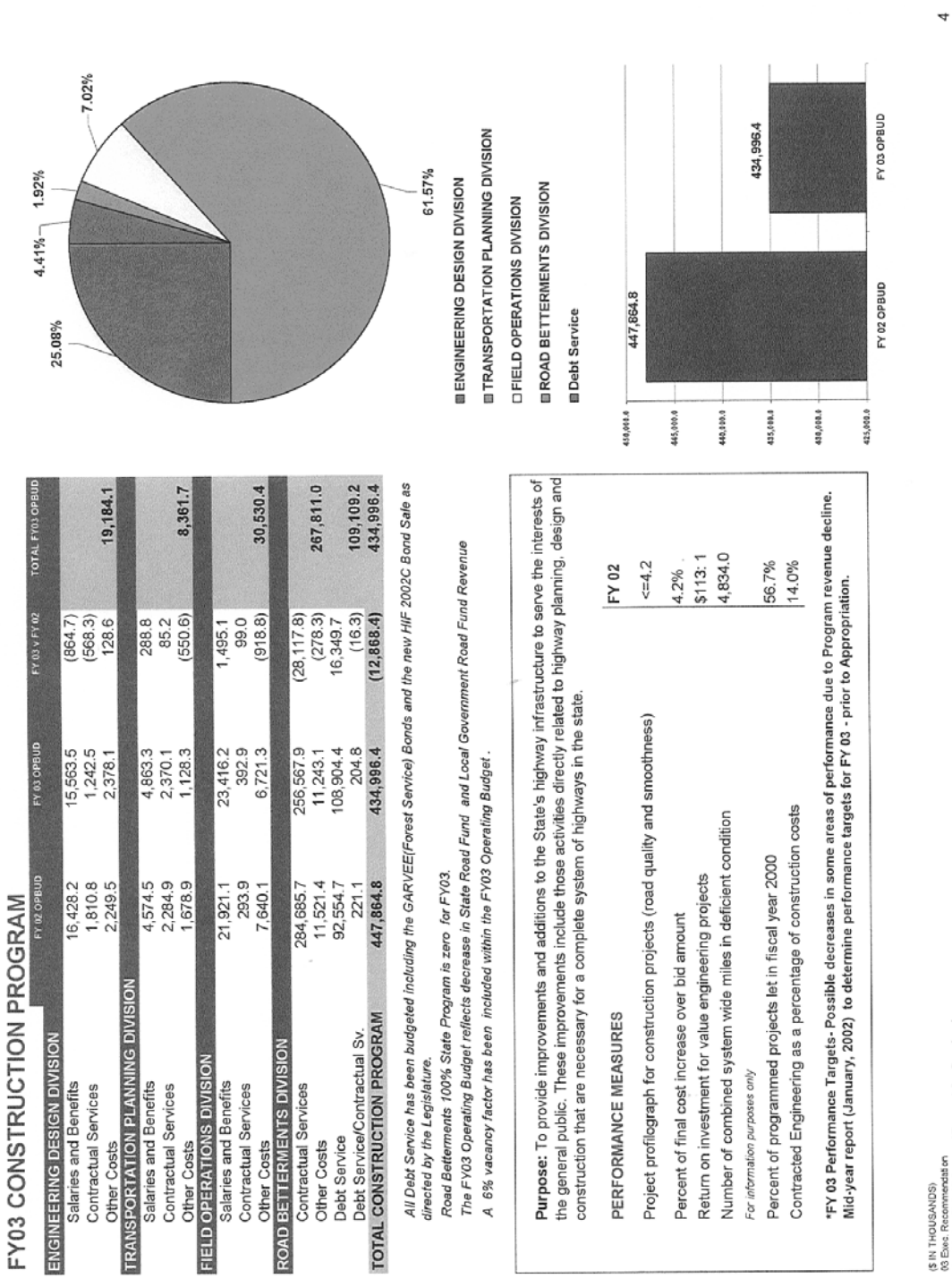
Mn/DOT's Activity-Based Budgeting

A new innovation in Mn/DOT's approach to strategic management is the organization of the budget along product and service lines using an activity-based budgeting structure. For the current budget cycle, the Mn/DOT has established four major product and service lines including multi-modal systems, state roads, local roads, and general support and services. The biennial budget is formatted on this same structure to display financial resource needs in product and service language that is understood by the department's customers and funding sources to better relate what customers will receive in exchange for the funds appropriated. The budget hierarchy consists of

- Product and service lines—Groups of closely related products and/or services; for example, multi-modal transportation systems.
- Budget activities—Specific service delivery choices in support of a product or service line; for example, aeronautics.
- Products and services—Tangible or intangible items that individuals are willing to pay for; for example, airport system planning.
- Core activities—Groupings of related activities within a product or service; for example, an airport improvement program.
- Activities—Specific types of work being done on a project or a job to provide certain products or services; for example, hangar loans.

Regarding the lowest level in this budget hierarchy, the Mn/DOT has approved sets of activity codes, and each individual employee's time sheet records the time spent on each activity.

Mn/DOT's biennial budget allocates resources to these products and services rather than organizational units, and each product and service is tracked in the budget with performance measures that coincide with measure sets in the overall measurement pyramid. The budget is therefore linked to the strategic plan through these measures as well as the 20-year statewide transportation plan, the supporting district/metro plans and modal plans, and the business plans, all of which are driven directly by Mn/DOT's strategic directions and policies. Mn/DOT districts and divisions prepare biennial business initiatives to advance the strategic agenda and the 20-year transportation plan, and these become the basis of the department's budget. Because funds are being allocated to products and services, core activities, and specific activities, which are the building blocks of the new budget format, and because these units can be related directly to the strategic policies they support, the Mn/DOT expects to be able to track the dollar investment in each of its 10 strategic policies and evaluate the results by cumulating the corresponding sets of performance measures.



FY03 CONSTRUCTION PROGRAM

	FY 02 OPBUD	FY 03 OPBUD	FY 03 v FY 02	TOTAL FY03 OPBUD
ENGINEERING DESIGN DIVISION				
Salaries and Benefits	16,428.2	15,563.5	(864.7)	
Contractual Services	1,810.8	1,242.5	(568.3)	
Other Costs	2,249.5	2,378.1	128.6	19,184.1
TRANSPORTATION PLANNING DIVISION				
Salaries and Benefits	4,574.5	4,863.3	288.8	
Contractual Services	2,284.9	2,370.1	85.2	
Other Costs	1,678.9	1,128.3	(550.6)	8,361.7
FIELD OPERATIONS DIVISION				
Salaries and Benefits	21,921.1	23,416.2	1,495.1	
Contractual Services	293.9	392.9	99.0	
Other Costs	7,640.1	6,721.3	(918.8)	30,530.4
ROAD BETTERMENTS DIVISION				
Contractual Services	284,685.7	256,567.9	(28,117.8)	
Other Costs	11,521.4	11,243.1	(278.3)	267,811.0
Debt Service	92,554.7	108,904.4	16,349.7	
Debt Service/Contractual Sv.	221.1	204.8	(16.3)	109,109.2
TOTAL CONSTRUCTION PROGRAM	447,864.8	434,996.4	(12,868.4)	434,996.4

All Debt Service has been budgeted including the GARVEE(Forest Service) Bonds and the new HIF 2002C Bond Sale as directed by the Legislature.
Road Betterments 100% State Program is zero for FY03.
The FY03 Operating Budget reflects decrease in State Road Fund and Local Government Road Fund Revenue
A 6% vacancy factor has been included within the FY03 Operating Budget.

Purpose: To provide improvements and additions to the State's highway infrastructure to serve the interests of the general public. These improvements include those activities directly related to highway planning, design and construction that are necessary for a complete system of highways in the state.

PERFORMANCE MEASURES	FY 02
Project profilograph for construction projects (road quality and smoothness)	<=4.2
Percent of final cost increase over bid amount	4.2%
Return on investment for value engineering projects	$113: 1
Number of combined system wide miles in deficient condition	4,834.0
For information purposes only	
Percent of programmed projects let in fiscal year 2000	56.7%
Contracted Engineering as a percentage of construction costs	14.0%

***FY 03 Performance Targets- Possible decreases in some areas of performance due to Program revenue decline. Mid-year report (January, 2002) to determine performance targets for FY 03 - prior to Appropriation.**

($ IN THOUSANDS)
03 Exec. Recommendation
New Mexico State Highway and Transportation Department

FIGURE 6 Excerpt from MNDOT's program budget.

Colorado's Investment Strategy

Another approach to targeting resources more strategically is the Colorado DOT's (CDOT) Investment Strategy, which was initiated approximately 4 years ago (1999) to replace a previous incremental budgeting process focusing on separate programs. The emphasis is now on measuring performance, focusing on tradeoffs, and setting priorities among programs to provide greater accountability and tie funding decisions to basic purposes. Briefly, CDOT has identified five broad investment categories: safety, system quality, mobility, program delivery (support functions), and "strategic projects," which is a one-time list of high-priority highway projects from a statewide perspective, the

results of which are intended to appear in the first three categories.

CDOT's long-range transportation plan provides the strategic framework for the department. It establishes department-wide goals and objectives for each investment category, with groups of corresponding measures in place to track performance in each category. In the future, CDOT intends to establish numerical targets for the investment categories. In addition, measures have also been developed for each of the core services within each investment category, focusing on productivity, timeliness, results, customer perceptions, and quality of life, to provide a balanced view of performance. Finally, more operational and process-oriented measures have not yet been developed for each of the tools and services that make up the core services.

This year, for the first time, all budgeted activities are assigned to one particular investment category and the categories sometimes cross organizational lines. For example, most highway maintenance activities fall under the system quality investment category, which is concerned with preserving existing infrastructure; however, some activities, such as guardrail replacement or traffic line painting, fall into the safety category. Similarly, winter maintenance activities are carried out by maintenance forces; however, this program is assigned to the mobility category rather than the system quality category, because its purpose is to facilitate travel rather than to maintain infrastructure.

With the Investment Strategy, CDOT budgets funds to the program structure, rather than organizational units, at the top two levels. First, resources are budgeted to the five investment categories to focus on the broad goals and performance measures that are of strategic interest to the Transportation Commission and the legislature. Second, at the program level, funds are allocated to the core services within the investment categories, which are the primary responsibility of department managers. Finally, at the operating level, funds are budgeted to the operating units that are responsible for completing the work using the designated tools and services. Thus, the Investment Strategy establishes major objectives and priorities for CDOT as a whole, on the basis of current and projected performance levels, and then allocates funds to programs and activities to fulfill them.

VDOT's Work-Force Planning Process

New strategic priorities may also required changes in the level and allocation of a DOT's work force, which would then have to be reflected in the budgets. One of the strategies resulting from VDOT's strategic plan was that the department would establish a process for determining the most effective and efficient means of allocating resources, including both state forces and contract forces, to accomplish its programs. Therefore, VDOT has developed a process to forecast major workload requirements, focusing on the 20% of its activities that consume 80% of its resources. For example, estimated workload requirements in the operational areas are based on a weighted lane-miles model including congestion and road type, although in the preliminary engineering areas they are based on construction program allocations. This process is applied consistently across all divisions and districts to project how workload indicators and numbers of required full-time equivalent employees will be affected by changes in strategies and programs, and these projections are then fed into successive annual budgets.

CHAPTER THREE

STRATEGIC PLANNING IN RELATION TO TRANSPORTATION PLANNING AND PROGRAMMING

The survey and follow-up telephone interviews also addressed the extent to which DOTs ensure consistency between their strategic planning efforts and other key transportation decision-making processes, as well as the extent to which their strategic plans drive these other processes.

STRATEGIC PLANS AND TRANSPORTATION SYSTEMS PLANS

All of the state DOTs and three of the Canadian DOTs responding to the survey reported that they had long-range transportation systems plans in place. As shown in Table 6, these included a mix of detailed plans that enumerate specific transportation improvement projects to be completed, along with more general conceptual or policy-oriented transportation plans.

TABLE 6
LONG-RANGE STATE TRANSPORTATION SYSTEMS PLANS

Type of Plan	DOTs
Policy or conceptual plans	10
Project-specific plans	10
Combined	8

Although 1 of the Canadian DOTs reported that its strategic plan and its transportation systems plan were identical, 8 of the departments responding to the survey indicated that these two plans were different but overlapping; whereas 16 DOTs reported that their strategic plans and long-range transportation plans were complementary. Only five of these DOTs indicated that there were possible inconsistencies between the strategic plans and transportation systems plans. Furthermore, only two, both Canadian, reported that inconsistencies between these two plans had created difficulties in implementing their strategic plans. None of the state DOTs responding to the survey indicated that they had encountered such problems.

For example, the KTC's strategic plan is consistent with both the 6-year highway plan and the 20-year transportation plan; however, there is a need to forge stronger linkages so that the strategic plan drives the long-range transportation systems plan to a greater degree. Therefore, the KTC hopes to move to a process of reviewing and possibly revamping the transportation systems plan with an eye toward more effectively advancing the goals in the strategic plan. This will be done by prioritizing the roughly 700 projects included in the 20-year transportation plan according to their importance for achieving KTC's strategic goals. Thus, priority will be given to projects that support the strategic goals to manage congestion, ensure environmental stewardship, and improve safety, in that order.

The Mn/DOT has developed a new, comprehensive 20-year statewide transportation systems plan, one of the first performance-based plans in the country. To ensure consistency between the two plans, the development of this long-range systems plan was guided by the strategic direction provided in the strategic plan. Within the framework of these three guiding principles, Mn/DOT's transportation systems plan is structured around policies and outcomes and includes performance measures. In addition, the systems plan contains specific numerical targets to be achieved within the 20-year planning time frame and also feeds into the business plans and budget proposals prepared by Mn/DOT's districts and divisions.

By contrast, in Wisconsin consistency between the strategic plan and the transportation systems plan is not an issue, simply because the strategic plan does not focus in a substantive way on the state's transportation system. One of WisDOT's six emphasis areas calls for supporting multimodal transportation through long-range planning, and this is being carried out through the development of a 20-year transportation systems plan. With the exception of safety, which is also being addressed in the long-range plan, the other emphasis areas in WisDOT's strategic plan focus on strengthening the organization itself and its functioning and relationships as opposed to the transportation system.

STRATEGIC PLANS AND TRANSPORTATION IMPROVEMENT PROGRAMS

When asked whether their strategic plans included objectives that would need to be implemented in part through their state transportation improvement programs (STIPs), 20 of the DOTs responded in the affirmative, whereas 7 reported that this was not the case. Of those 20 departments whose strategic plans do require some degree of implementation through an STIP, 5 reported that the STIP has been "somewhat responsive" to their department's strategic

goals and objectives, whereas 15 indicated that the STIP has been "very responsive" to their strategic plans. Furthermore, only one of these states indicated that they had encountered difficulties in relating their STIP to their strategic plan, and this was a DOT that reported that the STIP had been very responsive to the strategic plan.

In New Mexico, for example, the strategic plan does directly affect the STIP. Since the *Compass*, which has constituted NMDOT's de facto strategic plan, has become the central driving force in the department, the districts are motivated to emphasize more high-priority projects that move in the direction of specific *Compass* results as they prepare their annual STIPs.

STRATEGIC PLANS AND ASSET MANAGEMENT

A total of 25 departments, 20 state DOTs and 5 provincial DOTs, reported that they had asset management programs in place or under development, whereas 5 departments responded that they did not. Because managing highways and other transportation facilities is a central responsibility of all DOTs, and because asset management is generally seen as embodying a strategic approach to operating, maintaining, and upgrading transportation infrastructure, a direct link between strategic planning and asset management programs would appear to be a logical connection. Therefore, of the 25 departments with asset management programs, 15 reported that their program was being developed within the framework of their strategic plan, whereas 4 indicated that their asset management programs and their strategic plans were largely independent of each other.

The KTC's asset management program has been inadequate, according to a departmental representative; however, they are currently moving to a new system that should strengthen it considerably. The new approach will integrate information from the Operations Management System, the Pavement Management System, the Bridge Maintenance Management System, and the Maintenance Rating Program. With this integrated system in place, the KTC will be able to establish realistic strategic objectives in the "Paths to Progress" plan regarding the condition of the infrastructure and then realize them through the asset management program.

A representative of the NMDOT indicated that their strategic plan and asset management process are now linked through the use of a performance and planning matrix, which is keyed to six categories of highway priorities ranging from Interstate highways to dead-end or unpaved roads. Relying on the same program structure for highway construction and maintenance that is used in the performance budgeting process, the asset management program employs performance criteria and decision factors drawn from the *Compass*, and thus the strategic results and measures contained in the *Compass* to some degree drive NMDOT's asset management process.

Mn/DOT

The Mn/DOT coordinates its asset management process with its strategic plan through the measure sets, which are nearly identical for the two processes. In addition to the outcome-oriented measure sets from the strategic plan, Mn/DOT's asset management process uses additional measures that are more detailed and more operational in nature; however, Mn/DOT's asset management practices are fairly consistent with its strategic plan as determined by these performance measures.

CDOT

CDOT's asset management process provides a format for integrating decision making across the pavement management, bridge management, and maintenance management "stovepipes," separate functional units whose programs were largely insulated from each other in the past. The department is now developing a uniform reporting structure that will facilitate the analysis of tradeoffs among these programs. The asset management program is geared to making decisions regarding the allocation of resources for maintenance, pavements, and bridges so as to achieve the goals, objectives, and targets set out in the CDOT Investment Strategy. The associated performance measures are then used to evaluate success and inform decisions regarding future resource allocation, tactics, or the objectives and measures themselves.

Michigan's Asset Management Process

The Michigan DOT's (MDOT) asset management program has set specific targets regarding both pavement and bridge conditions; namely, that 95% of all freeways and 85% of all other highways will be in good condition by 2007 and 90% of all bridges will be in good condition by 2008. These targets are keyed to a standard pavement distress index and national bridge inventory criteria. However, in the long term, the plan calls for basing decisions on performance rather than condition criteria.

Interestingly, this process was initiated in response to an act passed by the Michigan State Legislature requiring asset management on a statewide basis, including all city- and county-owned roads, as well as those owned by the state. (Michigan has a transportation trust fund, and because the distribution of funds among the state and local agencies has been in dispute over the past 50 years, the legislature wanted such decisions to be based objectively

on asset management criteria rather than the traditional transportation needs studies.) This process will be managed by a 10-member asset management council, which is a subset of the state's Transportation Commission, the policy-making body.

Before the initiation of the asset management process, MDOT had developed a corporate-level business plan that established strategic goals and objectives and served as the department's strategic plan. Although there is no particular mechanism linking the asset management process to the business plan, the business plan helped to focus the agency's attention on the performance of the highway system and established goals that led to the targets for the asset management program mentioned previously. In addition, the business plan led MDOT to decentralize operations and provide greater accessibility to the public and other constituencies through creation of 7 regional offices and more than 25 transportation service centers throughout the state. This decentralized structure has helped to coordinate efforts with cities and counties in the asset management process.

PennDOT's Transportation Planning and Programming Processes

Through several administrations over the past 15 to 20 years, PennDOTs top management has considered the department's strategic plan as the overarching framework that should drive all other decision-making processes. Thus, planning officials at PennDOT indicated that their long-range transportation systems plan, or "PennPlan," is fairly consistent with their strategic plan. Although input was solicited from numerous external stakeholders and constituencies in developing the "PennPlan," it was also heavily influenced by the department's strategic plan, "Moving Pennsylvania Forward." "PennPlan" has numerical targets, some of which are linked to targets in PennDOT's overall scorecard, and the department prepares annual achievement reports that track actual performance against the targets. Although not a perfect fit, PennDOT managers believe that their long-range transportation plan is closely aligned with their strategic plan.

PennDOT also works to maintain a clear linkage between its strategic plan and the biennial STIP. For example, the strategic plan calls for targeting 80% of its resources to preserve the transportation system currently in place, and the department comes close to hitting that target in assembling the STIP. Aligning the STIP with the strategic plan is a challenging task, given PennDOT's decentralized programming process in which local governments and planning organizations have a strong voice in determining regional priorities and moving projects forward. However, PennDOT district engineers and planning representatives have been able to work through the metropolitan planning organizations and local development districts around the state to develop regional plans, priorities, and transportation improvement programs that are largely consistent with the department's strategic goals and objectives.

The linkages between PennDOT's strategic plan and its asset management process are less mature at this point; however, to the extent that the asset management process focuses largely on system preservation, it is very consistent with the strategic plan. Again, PennDOT views its strategic plan as the overarching set of principles that guide all other department decision making, and the asset management program is being developed to be responsive to the department's strategic goals and objectives and its need to achieve targets in the strategic plan concerning system condition and preservation.

FDOT's Transportation Planning and Strategic Planning Processes

By way of contrast, FDOT adheres to a different hierarchy of planning and measurement activities in which long-range comprehensive transportation systems planning provides the overall framework for all strategic planning, business planning, work planning, and programming. Therefore, FDOT has produced a transportation systems plan that is fully compatible with its strategic plan, because the strategic plan is subordinated to the systems plan. The "2020 Florida Transportation Plan" is a long-range policy plan for managing Florida's transportation system, with four principle goals

1. Safe transportation for residents, visitors, and commerce;
2. Preservation and management of Florida's transportation system;
3. A transportation system that enhances Florida's economic competitiveness; and
4. A transportation system that enhances Florida's quality of life.

Each of these goals is supported by several long-range objectives, and the 2020 transportation plan provides guiding principles and a planned investment strategy, focusing most notably on a planned strategic intermodal system, in general terms for moving the plan to realization. Supporting documentation also provides implementation strategies for advancing the plan.

FDOT's principal vehicle for actually implementing the strategies for accomplishing its long-range goals, however, is a short-range component of the long-range plan, as shown in Figure 7. Updated annually, this short-range plan actually constitutes FDOT's strategic plan, moving forward year by year. It contains strategic goals and focus areas that

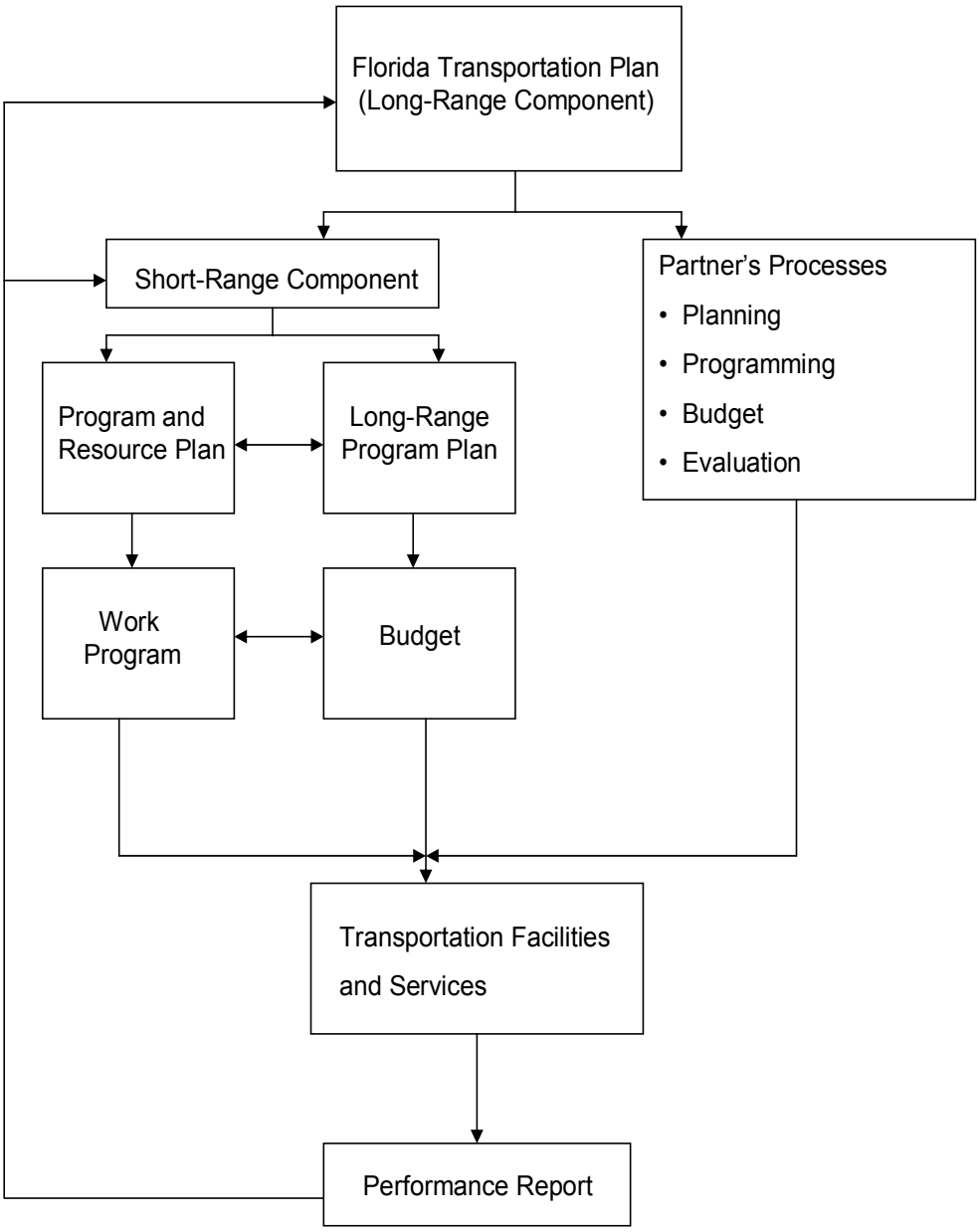


FIGURE 7 Florida's transportation planning process. (*Source*: Florida Department of Transportation 2002; the "2002 Short-Range Component"; and the department's plan for implementing the "2020 Florida Transportation Plan".)

are cross-referenced with the long-range 2020 goals, and for each focus area the short-range component enumerates short-range objectives that set numerical targets to be achieved in specified time frames over the next several years. The short-range component, which includes a goal concerning organizational excellence, as well as system goals regarding system preservation and enhancement, also identifies measures of effectiveness for many of the short-range objectives.

Top managers at FDOT are careful to note that the "2020 Florida Transportation Plan" is not just a transportation plan for the department, but rather is a transportation plan for the state and, whereas FDOT took the lead in its development, the 2020 plan was crafted in conjunction with numerous partners and external stakeholders throughout Florida. The short-range component, on the other hand, is conceived of as FDOT's strategic plan for how the department will help advance realization of the 2020 transportation plan.

Supporting both the 2020 long-range transportation plan and the short-range strategic plan, FDOT's overall planning process (Figure 7) also produces three other plans that make program and resource commitments for advancing the department's long-range and strategic goals and objec-

tion programs and guides program and funding decisions to implement the Florida Transportation Plan's goals and objectives, (2) a 5-year long-range program plan that provides the framework for developing budget requests and related performance measures, and (3) a 5-year work program that lists all transportation projects planned for each fiscal year. Collectively, these plans drive annual legislative budget requests as well as an annual performance report that tracks progress on achieving FDOT's short-range strategic objectives.

In addition, FDOT has developed a business plan for the entire department, which focuses primarily on employee development, organizational capacity, and excellence. FDOT is a very decentralized agency, and the district secretaries are not required to prepare business plans for their districts or submit them to the central executive team.

Although FDOT does not have a separate program designated for asset management, asset management is imbedded in a number of other management and decision-making processes. Throughout the year, FDOT conducts monthly executive workshops for the purpose of reviewing the department's major programs such as safety, pavements, bridges, maintenance, intelligent transportation systems, and capacity enhancements. In these reviews, these programs are evaluated in terms of performance and resource needs against the goals and targets set out in both the "2020 Florida Transportation Plan" and the short-range component. The results of these evaluations determine programming and budget decisions in the annual updates of FDOT's 5-year work program, which incorporates all work performed by the department. Thus, FDOT's work program and asset management practices are tied directly to the transportation systems plan and the department's strategic plan.

CHAPTER FOUR

TWO MINI-CASE STUDIES

Because the essence of strategic management entails the integration of numerous management and decision processes around a strategic framework that sets the direction for moving into the future in a deliberate manner, it can be helpful to have an overview of how given organizations tie the various elements of the process together. Therefore, this chapter presents mini-case studies of two state DOTs at very different stages in developing their strategic management processes. The first is the Pennsylvania Department of Transportation (PennDOT), a seasoned leader in the field, and the second is the Illinois Department of Transportation (IDOT), a relative newcomer to strategic planning. Although different in many respects, both cases illustrate carefully crafted approaches to strategic management.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

Strategic planning was first initiated at PennDOT in 1982. That initial effort produced a set of 24 major objectives for the department, with the strategies for achieving them to be developed by the relevant organizational units. It also led to the formation of the top-level strategic management committee (SMC), which still exists as the highest level policy-making body at PennDOT, and a requirement for the major divisions and the 11 engineering districts to develop 4-year business plans and accompanying budget requests designed to help accomplish the major objectives.

Over the past 20 years the process has been repeated and enhanced at roughly 4-year intervals, coinciding with the beginning of new gubernatorial administrations. Along the way, participation in developing PennDOT's strategic planning has broadened considerably, to include as many as 400 to 500 managers and employees in fleshing out strategic objectives and actions as opposed to the 50 top managers who were involved in the initial exercise.

Although the process became deeply imbedded in the organization, the first round of the Baldrige assessment process, a comprehensive approach to strengthening organizational effectiveness, which PennDOT began in 1998, revealed that the lack of an effective strategic planning process constituted a major performance gap in the department. This assessment showed that although strategic planning was taken very seriously at PennDOT, the resulting plans did not drive decisions and behavior in the department on a consistent basis, the plans were not used effectively to manage people and organizational units, and the plans were not necessarily tied to fiscal reality. Therefore, the secretary and the SMC chartered a gap-closure team to lead a 2-year effort to design and implement a revamped strategic planning process.

Strategic Planning

From this effort a continuing process emerged consisting of planning, implementation, and evaluation on an ongoing basis (Poister 2002). PennDOT's strategic plan was developed through a process that included the following five steps:

1. Leadership direction—Developing or revalidating the department's mission, vision, values, and strategic focus areas.
2. Customer expectations—Identifying customer expectations as related to the strategic focus areas through analysis of survey data, focus groups, and key stakeholder interviews.
3. Customer service capabilities—Assessing the department's capacity to meet customer expectations through focus groups with employees, and separately with partners and suppliers, as well as analyzing relevant operating data.
4. Priority tasks and strategies—Developing and evaluating alternatives within each focus area to produce a set of high-level goals and strategic objectives, and the strategies for achieving them.
5. Plans and performance targets—Reconciling strategic objectives, performance measures, targets, and budgets to produce plans and strategies that were effective, technically realistic, and fiscally responsible.

The 8 strategic focus areas, 13 high-level goals, and 21 strategic objectives that came out of this process in 1999 are summarized in Figure 8, which also identifies the owners and leaders for each strategic objective. The owners serve as the sponsors of these strategic initiatives, whereas the leaders take the technical lead in implementing them. The targets were meant to be aggressive, but not unreasonable, and they were established based on budget realities so that the owners, leaders, and other responsible managers would know where the required funding was coming from.

STRATEGIC FOCUS AREAS	HIGH-LEVEL GOAL	STRATEGIC OBJECTIVE	OWNER/ LEADER
Maintenance First	**Smoother Roads**	*Improve ride quality by incorporating smooth road strategies into a comprehensive pavement program.*	**Ryan/ Moretz**
	Cost-Effective Highway Maintenance Investment	*Refine winter services best practices to achieve more timely and efficient response.*	**Hoffman/ Wise**
		Use life-cycle criteria as a tool for asset management and investment to reduce outstanding maintenance needs.	**Hoffman/ Christie**
Quality of Life	**Balance Social and Environmental Concerns**	*Improve customers' experiences of our facilities by enhancing beautification efforts and reducing roadside debris.*	**Yearick/ Peda & Hull**
		Develop timely transportation plans, programs, and projects that balance social, economic, and environmental concerns.	**King/ Schreiber**
	Demonstrate Sound Environmental Practices	*Implement a strategic environmental management program that adopts sound practices as our way of doing business.*	**Ryan/ Kober**
Mobility and Access	**Delivery of Transportation Products and Services**	*Meet project schedules and complete work within budgeted costs.*	**Ryan/ Azzato**
	Efficient Movement of People and Goods	*Implement congestion management strategies that limit work zone restrictions, address incident management, and reduce corridor travel delays.*	**Hoffman/ Koser**
		Implement Keystone Corridor rail passenger improvements as a pilot multi-modal initiative.	**Peltz/ Smedley**
Customer Focus	**Improve Customer Satisfaction**	*Implement a department-wide systematic process to continue to improve customer satisfaction.*	**Serian/ Cross**
	Improve Customer Access to Information	*Improve information access by providing quality customer contacts across the organization with special attention to driver and vehicles inquiries.*	**Serian/ Cleaver**

FIGURE 8 PennDOT strategic focus areas, high-level goals, and strategic objectives.

STRATEGIC FOCUS AREAS	HIGH-LEVEL GOAL	STRATEGIC OBJECTIVE	OWNER/ LEADER
Innovation and Technology	**World Class Process and Product Performance**	*Map key processes and improve those with the most strategic impact on business results.*	**Tartline/ Harris**
		Deliver business results through planned enterprise-focused information technology.	**Tartline/ Reed**
Safety	**Safer Travel**	*Implement cost-effective highway safety improvements at targeted high-crash/fatality locations.*	**Ryan/ Bryer**
		Upgrade safe driving performance through education and enforcement initiatives.	**Yearick/ Seitz & Bryer**
	Safer Working Conditions	*Implement prevention strategies to reduce the employee injury rate.*	**Tartline/ Dennin**
		Implement prevention strategies to reduce the vehicle accident rate.	**Tartline/ Dennin**
Leadership at All Levels	**Improve Leadership Capabilities and Work Environment**	*Provide employees with the tools and expectations to communicate effectively to facilitate leadership at all levels.*	**Yearick/ OCCR Internal Com. Mgr.**
		Develop employee skills and capabilities through a structured process of instruction, practice and leadership opportunities.	**Tartline/ Harris**
Relationship Building	**Cultivate Effective Relationships**	*Implement a methodology to involve partners and stakeholders more meaningfully in PennDOT activities.*	**Zimmerman/ Cvejkus**
		Strengthen the efficiency and effectiveness of transportation grant programs using the methodology for partners and stakeholders.	**Voras/ Brown**

FIGURE 8 (*Continued*).

Scorecard

The strategic plan that emerged in early 2000 from the imposition of fiscal reality onto proposed strategic objectives and targets is summarized in a scorecard that presents the goals and objectives, performance measures, and targets. There are actually two versions of the scorecard: the secretary's scorecard and the SMC scorecard. The SMC scorecard is used internally to manage the strategic agenda. It is organized by the strategic objectives and shows a measure and a target, or multiple measures and targets, for each of the 21 strategic objectives. The secretary's version of the scorecard, shown in Figure 9, provides a simpler format structured by the 13 high-level goals. Although the SMC scorecard is used internally to manage the plan, the secretary's version is oriented more toward public consumption, focusing attention more generally on PennDOT's overall goals.

Cascading Plans

The department's scorecard provides a framework for developing organizational scorecards and business plans. Strategic planning at PennDOT is cascaded down into the organization by requiring the 11 districts and 6 deputates to develop their own strategic objectives and scorecards driven by the enterprise-level strategic agenda. These organization scorecards, which must be approved by the SMC, are built, tested, and justified with the same five-step planning process used at the departmental level. The leadership direction comes directly from the strategic objectives in the enterprise-level scorecard that relate to the division or district's responsibilities, along with the underlying rationale that produced them. Each of these organizational units must establish objectives, measures, and targets that contribute to those in the enterprise-level scorecard that the organization "owns," although it can add other "indirectly aligned" objectives as well.

Business Planning

Business planning is the vehicle PennDOT uses to align organizational units' activities and priorities with the enterprise-level strategic agenda. Thus, to advance the department's strategic plan, each of the districts and deputates develops business plans designed in part to accomplish its own scorecard objectives. (Some central office bureaus and county maintenance units develop scorecards and business plans as well; however, this is not required at this point.) All of PennDOT's strategic objectives are implemented through the 4-year business plans, which are updated annually. The business plans, which encompass all core functions and routine activities as well, present planned efforts for each objective in the organizational scorecards, spelling out exactly how the district or deputate will accomplish a given objective in terms of tasks, work programs, projects, action items, and schedules. This is important because the owners and leaders, and responsible managers at subunit levels, have considerable flexibility as to how they plan to accomplish certain objectives.

Resource Allocation

Some of PennDOT's strategic initiatives, primarily those relating to IT, are funded separately through one-time allocations from special funds held expressly for that purpose. However, most strategic initiatives are supported through the normal budgeting process, which allocates resources to organizational units for particular uses. Therefore, the business plans all contain specific budgets that invest resources in planned actions responding to strategic objectives as well as other activities. This requires the districts and deputates preparing business plans to tie their budget request directly to strategic initiatives and to make sure that their plans and work programs are fiscally realistic. When the SMC approves business plans and their associated budgets, usually after some degree of revision and negotiations with respect to targets, programs, and budgets, these managers can be confident that they will have sufficient resources to achieve the targets for which they will be held accountable.

Performance Management

For many years PennDOT has used a management-by-objectives participative approach to providing direction and control over the work of individual managers and employees. In its current form, the more formal written performance contracts have been shortened and incorporated in annual employee reviews (EPRs) as "expected work results," which are grafted onto the more constant annual job descriptions. With the new strategic management process, the EPRs are driven primarily by the strategic agenda, so that individuals who are owners or leaders of strategic objectives, or otherwise identified as having some responsibility for them, have those objectives and their attendant action items, along with accompanying performance measures, embodied in the EPRs.

This is the case at the enterprise level, but also with the organizational scorecards and associated business plans. Whether or not business plans are used below the district or deputate level, managers at many levels negotiate with subordinates to contribute specified efforts toward accomplishing strategic objectives and hold them accountable for those results through quarterly performance reviews. Therefore, by tying individuals' expected work results to strategic objectives, PennDOT's performance management

Strategic Focus Area	High-Level Growth Pledge to Customers	How Success Will be Measured?	External (Customers)	Internal (Support)	Measurement Tool (Metric)	Target 2002	Target 2005
MAINTENANCE FIRST	Smoother roads	Better ride conditions on major (NHS) highways	X		International Roughness Index (IRI)	104 for NHS roads	99 for NHS roads
	Cost-effective highway maintenance investment	Reduction in outstanding maintenance needs		X	Condition assessment for highways and bridges	Complete asset management system	Meet target established in 2002
QUALITY of LIFE	Balance social, economic, and environmental concerns	Timely decisions based on public and technical input on project impacts	X		Highway project environmental approvals meeting target dates	75% meeting target dates	90% meeting target dates
	Demonstrate sound environmental practices	Attaining world class environmental status		X	ISO 14001 environmental criteria	Implement a pilot program	Meet ISO standards
MOBILITY and ACCESS	Delivery of transportation products and services	Honoring commitments on scheduled transportation projects	X		Dollar value of 12-year program construction contracts initiated	$1.3 billion per year	$1.4 billion per year
	Efficient movement of people and goods	Reduced travel delays	X		2002–peak period work zone lane restrictions 2005–travel delays on selected corridors	Set baseline in 2000 for reduced 2002 lane restrictions	Meet target set in 2002 to reduce corridor travel delays
CUSTOMER FOCUS	Improve customer satisfaction	Competitiveness on Malcolm Baldrige Criteria for Excellence	X		Baldrige Organizational Review Package Scores—Customer Criteria	80 department average	100 department average
	Improve customer access to information	Prompt answers to telephone inquiries	X		Answer rate of calls to the Customer Call Center	94% of calls answered	94% of calls answered
INNOVATION and TECHNOLOGY	World class process and product performance	Competitiveness on Malcolm Baldrige Criteria for Excellence	X		Baldrige Organizational Review Package Scores—All Criteria	500 level met by lead organizations	600 level met by lead organizations
SAFETY	Safe travel	Fewer fatalities from highway crashes	X		Number of fatalities per year	5% reduction in fatalities	10% reduction in fatalities
	Safer working conditions	Fewer work-related injuries		X	Injury rate per 100 employees working 1 year	8.25% injury rate	7.5% injury rate
LEADERSHIP at all LEVELS	Improve leadership capabilities and work environment	Positive trends in employee feedback on job-related factors		X	Organizational Climate Survey (OCS)—Selected Items	48% positive rating	54% positive rating
RELATIONSHIP BUILDING	Cultivate effective relationships	Effectiveness of partnerships to achieve business results	X		PennDOT/partner business effectiveness survey scores	Establish metric, baseline and target	Meet target established in 2002

FIGURE 9 PennDOT scorecard of measures.

process uses the EPRs to instill individual responsibility for advancing the strategic agenda deep into the department.

Dashboards and Scorecards

Basically, the scorecards are used to manage PennDOT's strategic agenda at multiple levels. The districts and deputates are responsible for reviewing their scorecards on a quarterly basis, and monitoring the performance measures for each objective against the targets and milestones that have been set. Adjustments in programs, work plans, assignments, and resource allocations are made as necessary to keep their objectives on track.

As the embodiment of PennDOT's strategic agenda, the SMC scorecard contains the most important set of performance measures to monitor in terms of guiding the department into the future. However, the SMC also concluded that focusing solely on the scorecard could be problematic in that many goals, processes, and functions that are important to the department do not appear on it. Therefore, the SMC decided to develop and monitor a dashboard in addition to the scorecard.

In contrast to the change-oriented scorecard, the dashboard tracks a number of measures that pertain to the department's core functions; important activities and business results it must produce on an ongoing basis. Although there is considerable overlap between the two, the dashboard is concerned more with more immediate performance, whereas the scorecard is more future oriented. Thus, the dashboard focuses on ongoing operations rather than strategic initiatives, and tends to be more input and output oriented, whereas the scorecard is more oriented to outcomes and results.

PennDOT's dashboard, which uses a green light/yellow light/red light format, is reviewed on a monthly basis using a management-by-exception approach. As is the case with the SMC, the districts, deputates, and other units that have scorecards also have complementary dashboards for tracking the performance of their core functions. Dashboards as well as scorecards are required in business plans, because the districts and deputates cannot afford to lose track of their core functions while they focus on implementing their strategic agendas. Thus, the scorecards align PennDOT's change-oriented objectives to create a direct path from the department-wide strategic agenda through the business plans to work units and individual employees. Conversely, the dashboards are more daily-work oriented to create a direct path from the individual employees and work units through the organization dashboards to department-level core business priorities or objectives.

Reviewing and Revising the Strategic Agenda

The SMC reviews progress in achieving the strategic objectives identified in "Moving Pennsylvania Forward" on a rotating basis, examining a few each month over a 6-month period, with progress on each objective reviewed every 6 months. The more detailed SMC scorecard is the principal reporting mechanism for tracking the success of the business plans in advancing the strategic agenda. The SMC scorecard, as opposed to the secretary's version of the enterprise-level scorecard, tracks progress on each strategic objective, not the more general goals, and often incorporates multiple measures for a given strategic objective.

Therefore, the owners and leaders prepare semi-annual progress reports for the SMC on each objective as it comes up on the rotating schedule. They are held accountable by the secretary and the SMC for achieving department-wide results on their strategic objectives, and their progress along these lines also feeds into their quarterly EPRs and thus their own individual annual performance appraisals. In turn, the deputy secretaries and other executives who are the owners and leaders of strategic objectives track those same indicators, or other appropriate ones, for organizational units under their direction to hold those units responsible for their piece of the plan.

Each December, the SMC conducts a systematic review of the entire enterprise-level scorecard to determine whether and how it might need to be updated. For example, if a particular strategic initiative has been completed, the SMC will probably decide to remove it from the scorecard. Alternatively, the SMC may decide, perhaps based on its continued scanning of the external environment, that new strategic objectives are needed. For example, in December 2001, two additional strategic objectives addressing post-September 11 security concerns were added to the scorecard. Such new objectives are developed by technical teams of managers and employees at the direction of the SMC and they follow the same process that was used to develop the original scorecard objectives. Finally, the SMC may consider changing the measure or the targets that have been defined to track the progress of particular strategic objectives.

To summarize, at Penn DOT strategic management is an ongoing process, moving through a continuous cycle of planning, implementation, and evaluation. The enterprise-level strategic agenda, summarized in the departmental scorecard, is implemented through scorecards and business plans developed by the districts and deputates, and in some cases by county maintenance units and central office bureaus. These organizations review their scorecards on a quarterly basis to manage with the measures and ensure that they achieve scorecard targets. The district and depu-

tate business plans, containing both organization scorecards and dashboards, must be updated annually and approved by the SMC to ensure alignment with enterprise-level strategic objectives.

At the departmental level, the SMC monitors its scorecard on an ongoing basis and annually reviews the overall strategic agenda, sometimes making modifications based on current external and internal scan data in addition to the department's progress in achieving "Moving Pennsylvania Forward" scorecard targets. Periodically, at roughly 4-year intervals coinciding with changes in administrations, PennDOT has undertaken more comprehensive efforts to update its strategic agenda so as to respond more deliberately to changing trends and forces, newly emerging issues, new customer demands, and shifting political mandates.

Administrative Transitions

PennDOT's strategic planning process has evolved through the administrations of three governors and has become well institutionalized at this point. With a new governor and a new secretary of transportation taking office in January 2003, the stage was set for possible additional refinements and further direction setting through strategic planning. Initially, the new secretary has decided to retain the process, and the SMC has reviewed the scorecard and made some changes in the strategic objectives in time to guide the current round of business planning and budget development throughout the organization. The intention then is to use this coming year to undertake a more comprehensive effort to update the strategic plan, and the process may be further refined along the way.

ILLINOIS DEPARTMENT OF TRANSPORTATION

IDOT initiated strategic planning activities in early 2000. Although the secretary of transportation had considered the possibility earlier, a blanket mandate from the governor in 1999 provided the leadership commitment from the top of state government that the secretary felt was needed to make strategic planning effective. The effort was led by the deputy secretary and the assistant to the secretary for strategic planning, working with a 30-member strategic planning team, and it was facilitated by an external consulting group.

Strategic Plan

Working with the balanced scorecard approach, the planning team completed the enterprise-level strategic plan in a few months, and it was approved by the department's executive committee in July 2000. As shown in Figure 10, the original strategic plan included 14 objectives spread across the four quadrants of the public-sector balanced scorecard, which substitutes a "mission effectiveness" or "program delivery" quadrant for the "financial" quadrant found in private-sector scorecards. For each of these objectives, one or more types of performance measures were identified for tracking success. In addition, for each strategic objective, targets or more specific objectives were identified, whose accomplishment would lead to achieving the overall strategic objective. Furthermore, for each of these targets, the plan identifies specific initiatives to be undertaken to accomplish the target. This specification of measures, targets, and initiatives is illustrated in Figure 11 for IDOT's objective concerning improved safety for the traveling public and department employees.

Cascading Strategic Plans

Once the enterprise-level strategic plan was approved, IDOT began training division and office teams made up of cross sections of managers and employees in strategic planning and use of the balanced scorecard model. These groups then set about developing their own strategic plans in support of the department-wide plan. As an interesting process innovation, a mobile laptop system was employed to help these teams develop their strategic plans. This collaborative software, supported by a wireless system of laptop computers, serves as an "electronic flipchart" in facilitated sessions; helps groups in brainstorming, analyzing, and processing information; and greatly reduces the meeting time required to accomplish particular planning tasks.

As of April 2003, IDOT had completed 28 balanced scorecards, including those for the 4 major divisions, 8 central office bureaus, 6 staff support offices, and 9 regional highway districts, in addition to the department's overall enterprise-level scorecard. Each of these scorecards is reviewed and must be approved by the next level up in the chain of command. For instance, district engineers take the lead in selecting members of their strategic planning teams and in developing their scorecards, but these teams and plans must be approved by the director of the division of highways. This ensures alignment of the scorecards developed by these organizational units with the department's overall scorecard. Several of these scorecards have now been revised and updated from their original versions.

All of IDOT's scorecards are reviewed at least annually and updated as appropriate. For example, although the enterprise-level scorecard originally consisted of 14 objectives, it then added one new objective for a total of 15, and now is likely to be reduced to 13 objectives through the successful completion of one and the combining of two others. These scorecards constitute strategic plans at the division, office, bureau, and district levels, all within the

CUSTOMER SATISFACTION & PARTNERSHIPS

C1. Expedite the delivery of work and services to minimize public inconvenience.

C2. Continue to assess customer satisfaction and needs—to drive process improvement.

C3. Improve safety for the traveling public and Department employees.

C4. Improve proactive external communications—increase public understanding of IDOT objectives programs, and projects.

LEARNING & GROWTH

L1. Attract, develop and retain a diverse, quality workforce—tools include cohesive employee recognition program.

L2. Develop knowledge management/sharing process and create an environment that encourages innovation.

L3. Establish consistent internal communications to ensure all employees have access and the ability to share information about IDOT activities and progress.

L4. Revitalize a department professional identity.

BEST BUSINESS PRACTICES

B1. Document, evaluate, and improve business processes.

B2. Acquire and allocate resources (including money, people, technology, and capital assets) based on demonstrated needs—evaluate investment strategy and use to ensure mission accomplishment.

B3. Create an organizational environment where leadership is fostered at all levels in an effort to improve decision making.

DELIVERY OF PROGRAMS AND SERVICES

P1. Assess and/or establish levels of delivery of programs and services.

P2. Design and develop a mechanism to better integrate and coordinate the delivery of programs and services—reduce overlap.

P3. Develop program/service risk assessment process relating to external factors (examples of external factors are special interest groups, resources, and components necessary for the completion of the program.)

P4. Assist appropriate agencies to ensure ongoing security of transportation services in the face of credible threats or attacks.

FIGURE 10 IDOT Enterprise Plan at May 31, 2002.

framework of the overall enterprise-level strategic plan. Most of these units also develop their own annual work programs, and the scorecards are a driving force in developing the work programs.

Assigning Responsibilities

IDOT assigns lead responsibility for several elements in its strategic plans. First, each of the scorecards is assigned a champion for the entire plan. Typically, this is the head of the organizational unit for which the plan has been designed (i.e., division or office director, district engineer, or bureau chief) or his/her designee. Second, each objective on a scorecard has a champion or leader to coordinate and report on progress on that objective as needed. Optionally, the targets specified for each objective may also have target managers. Finally, most objectives and/or targets have multiple initiatives to help guide actions that will accomplish the objectives and targets. Each initiative is assigned an initiative manager who takes the lead in developing action plans for implementing the plans as well as achieving the targets.

To be measured by:

1. Change in internal attitudes and understanding surrounding safety.
2. Percent of reported work zone accidents that involved noncompliance with IDOT safety policy.
3. Percent of development of the General Accident Information System against established milestones.
4. Number of safety innovations implemented during the review period.
5. Percent change in vehicle crashes involving fatalities and/or serious injury.

To be accomplished through:

Target No. 1: Establish consistency and internal cohesion in the department's employee safety focus:
Initiatives: 1. Conduct review of current safety policy.
2. Review internal structure and recommend improvements if warranted [i.e., zone activities (internal and external)].
3. Establish employee attitude/understanding baseline.

Target No. 2: Examine and improve (internal and external) safety information flow:
Initiatives: 1. Rework and implement the General Accident Information System (GAI).
2. Educate the public on a continuing basis.

Target No. 3: Imbed safety in all department processes:
Initiatives: 1. Develop process to find, share, and implement innovative ideas on safety.
2. Integrate safety into all relevant process steps under Objective B1.

FIGURE 11 Objective C3: Improve safety for the traveling public and department employees. (*Source*: Illinois DOT.)

At each level, these champions and managers are responsible for both coordinating efforts and reporting on progress in achieving their strategic objectives. In essence, the hierarchy of strategic plan implementation and reporting mirrors the traditional top-down hierarchy of the whole agency, which is comfortable for most managers and employees. The difference is that implementation of the plans for the most part relies on teams on which individual rank has little meaning to the process.

The initiative managers put together cross-functional or multidisciplinary teams as needed to implement their strategic initiatives. Moving away from the command and control management style that traditionally has dominated IDOT, these initiative managers are encouraged to communicate across chains of command, if necessary, to achieve their objectives. However, they are required to report through the normal chains of command to ease possible concerns about unsupervised activities taking place.

At present, these individual-level assignments to take additional responsibilities as objective coordinators, target managers, or initiative managers are completely voluntary, and although they are recognized as an important part of the employee's duties, they do not lead directly into the normal annual employee evaluation process. Rather, motivation for attending to these assignments and performing effectively in these roles is based primarily on leadership and communication, a sense of professional pride, peer support, and a highly visible process for reporting success or failure in implementing strategic initiatives and achieving strategic objectives.

IDOT's assistant to the secretary for strategic planning indicated that assigning individual responsibility and follow-up on implementation activities is crucial to the successful completion of strategic initiatives. Eliciting commitments from individuals regarding specific tasks in the plan, emphasizing team work and collective responsibility, and then conducting quarterly, semi-annual, or annual reviews and updates in public settings serves to provide a powerful incentive for target managers and initiative managers to ensure that these strategic initiatives are implemented effectively.

Performance Measurement

To track overall success, IDOT uses a few general performance measures for each objective and encourages the use of more focused measures at each successive lower level of planning. The teams created to implement strategic initiatives use outcome measures derived from ongoing motorist surveys, employee surveys, crash reports, average daily travel counts, and so forth, to show long-term trends in bottom line results. Other more output-oriented meas-

ures (e.g., the number or percent of targeted process reviews completed) are used to track the efforts expended on strategic initiatives, assess needed changes in tactics, or understand when manpower shortages or other factors are slowing down progress.

The assistant to the secretary for strategic planning usually suggests performance measures at the outset of a new project; however, the teams have the option of rejecting them as long they have replacement measures that are better suited to the purpose. The general philosophy regarding performance measurement at IDOT is to make the measures as nonthreatening as possible, rather than emphasize accomplishment of objectives; identify what is going well versus what may need to be changed. However, once agreement is reached regarding objectives, initiatives, implementation plans, and performance measures, tracking the measures and reporting performance data provides a powerful accountability tool for ensuring that a high priority is placed on achieving the strategic objectives.

Budget Linkages

IDOT's strategic planning process for the most part is loosely linked to budgeting. When additional financial resources are necessary, funds are earmarked in the budgets prepared by the division, office, bureau, or district that is responsible for implementing a particular strategic initiative. On the other hand, budget realities are often a major factor in determining whether the department can more forward with proposed strategic objectives, planned initiatives, or recommendations from an implementation team in the first place.

However, given the nature of most of IDOT's strategic objectives, the budget is often not a major issue, even in a period of tighter fiscal constraints. Most of the strategic objectives cut across organizational lines and focus on organization development or process improvement rather than the capital program or direct investment in the transportation system, meaning that the costs of these initiatives are typically measured in man-hours rather than dollars. Many of the activities derived from these initiatives; for example, process or program reviews, or on-the-job training by peers and supervisors, can be completed using existing personnel, and with appropriate time management techniques they can be cost-neutral and not require additional funds.

Conversely, the strategic plan does help IDOT delineate and prioritize additional spending in some areas, particularly with respect to IT. Although the department does not have a strategic objective that focuses on IT per se, virtually all of the process improvements that are called for by several of the objectives require technological improvements designed to upgrade communication and information, save time, and/or reduce paperwork or other costs. In addition, IDOT's Bureau of Information Technology has developed its own scorecard to further the improvement of IT processes and services in support of strategic objectives in higher-level plans. Through the strategic planning process IDOT identifies needs for additional IT that substantially exceed currently available budget levels. Rather than relying on the standard incremental approach, the ongoing planning work provides a systematic approach to assembling a priority list of IT acquisitions with fairly firm costs that the department can readily promote in future budget cycles.

Evaluation of the Planning Process

A cost-benefit analysis conducted in the spring of 2002 (SAIC 2002), and random surveys of both motorists and IDOT employees conducted in 2001, 2002, and 2003, show that the results of the strategic planning activities are paying off for the transit department and Illinois taxpayers. The benefit-cost analysis projects that all start-up costs of the strategic planning initiative, including employee time for training, planning, and implementation, will have been recovered by early 2004, primarily through process improvements that have come out of the strategic plan.

An in-house survey completed in April 2003, indicated that more than 40% of IDOT employees believe that goals and objectives are clearer as a result of the strategic planning initiative. The survey also indicated that nearly two-thirds of IDOT employees believe that worker productivity and job satisfaction have improved over the 36 months that the strategic initiative has been in place. Correspondingly, annual surveys of the motoring public, conducted by the University of Illinois at Springfield, showed that a majority of motorists believe that IDOT is doing a good or excellent job, particularly in terms of roadway maintenance, highway construction and repair, travelers' services, and employee conduct on the job.

New Administration

At the beginning of 2003, with a new governor in Illinois, a new secretary of transportation assumed direction of IDOT and, for the most part, assembled a new executive team. However, the new secretary also decided to retain the strategic planning process and the top staff personnel most closely associated with it, even though the new administration may alter strategic priorities. Therefore, strategic planning has survived its first administrative transition at IDOT, and this is expected to help provide a sense of continuity in a department that has seen substantial turnover in personnel over the past several years.

COMPARISONS

These two departments were selected for mini-case studies as part of this synthesis because they illustrate both similarities and differences in their approaches to strategic management. At this time, PennDOT has been involved in strategic management for some 20 years and has worked to sharpen and deepen the process to ensure positive results in achieving its strategic goals and objectives. Currently, PennDOT has a mature strategic management process that affords a high degree of alignment among all the elements shown in Figure 1. By way of contrast, IDOT initiated its first strategic planning efforts in 2000, and it may not, like PennDOT, have all the elements in place. However, IDOT also presents a noteworthy case, because it is installing a very deliberate strategic management process, which ensures follow-through in implementing and evaluating strategic plans.

Driving Decisions

Both PennDOT and IDOT have developed strategic plans for their organizations that are summarized succinctly in scorecards. Both departments then require districts and divisions to develop their own strategic plans or scorecards within the framework of the overall corporate-level strategic plan and, in both cases, these lower-level scorecards must be approved by higher-level management. However, PennDOT also requires these units to develop 4-year business plans, updated annually, which are the principal vehicles for driving the department's strategies down into the operations of the organization. IDOT, in contrast, relies primarily on action plans developed for individual strategic objectives and/or targets as the means of implementing strategic plans at each level of the organization.

Building Ownership

Both PennDOT and IDOT place great importance on assigning individual executives or managers to take the lead responsibility for implementing strategies and achieving strategic objectives. Whereas PennDOT identifies owners and leaders for each strategic objective, however, the IDOT process is more elaborate, with owners assigned for overall strategic plans, strategic goals, objectives, targets, and strategic initiatives. This is consistent with IDOT's reliance on the action plans developed by these owners and the teams they put together for implementing the department's strategic objectives. Interestingly, for PennDOT, the responsibilities assigned to individuals for implementing strategic plans lead into these individuals' annual performance appraisals, whereas for IDOT these are considered to be "additional responsibilities," which do not.

Allocating Resources

Many of the strategic initiatives established by both of these departments can be supported with existing budgetary resources, although PennDOT uses its business planning process to work these initiatives into the operating budgets of organizational units, whereas IDOT has numerous labor-intensive initiatives whose costs are covered principally by assigning individuals and teams to work on them. The two departments also differ with respect to strategic initiatives that entail additional direct monetary investment, such as substantial upgrades in IT. Whereas PennDOT estimates the cost of such initiatives as part of the planning process and earmarks funding sources at that point, IDOT establishes the initiative as part of the planning process and then, as part of the implementation process, begins to identify costs and prioritize investments to be made as funds become available.

Evaluating Performance

Each of these transportation departments establishes performance measures for each strategic objective, including typically a mix of output and outcome indicators. For each of its measures, PennDOT sets numerical targets to be achieved within a given time frame, whereas IDOT identifies the measure and preferred direction of movement, but does not set numerical targets. Both departments, however, emphasize the importance of performance measures in managing their strategic agendas, and both review the performance data generated to track progress in implementing strategic initiatives and flag problems that need to be addressed.

System Maintenance and Enhancement

Both PennDOT and IDOT have an individual assigned on a full-time basis to support its strategic management process, providing staff support at the executive level and generally facilitating development and use of the process. Both departments have also provided training to managers regarding strategic planning, performance measurement, and related elements of strategic management. In addition, both have commissioned evaluations of their strategic management processes by consultants to help strengthen them. Finally, new administrations have recently taken office in both departments, and in each case the new executives have decided to adopt the in-place strategic management processes and use them to revalidate or redirect future directions and priorities for these organizations.

CHAPTER FIVE

OBSTACLES TO EFFECTIVE STRATEGIC MANAGEMENT

The survey also requested information about political, institutional, organizational, and technical obstacles that pose special challenges to effective strategic planning and decision making in state DOTs. When asked "Have you encountered any particular problems involving partisan politics in your state in trying to develop an appropriate strategic plan and implement it effectively?" only one respondent (Saskatchewan) answered in the affirmative. However, when asked a similar question regarding institutional problems emanating from the legislature, governor's office, central executive offices, federal agencies, or local governments, respondents from six DOTs indicated that they had encountered those kinds of problems.

Furthermore, in response to a similar item concerning organizational problems regarding culture, personnel, available resources, capacity, management commitment, bureaucratic inertia, or the normal press of business, a large majority, 22 of the 30 DOTs responding to the survey, reported that they had faced such problems. Finally, eight of the DOTs indicated that they had encountered technical challenges that made it difficult to develop and implement appropriate strategic plans. These results are summarized in Table 7.

TABLE 7
PROBLEMS ENCOUNTERED BY DOTs IN STRATEGIC MANAGEMENT

Type of Problem	Yes	No
Political	1	26
Institutional	6	23
Organizational	22	7
Technical	8	21

INSTITUTIONAL OBSTACLES

Concerns about institutional problems sometimes focus on procedural issues as well as more substantive matters regarding strategic planning. For example, although the principal impetus for undertaking strategic planning at the TxDOT came from a mandate from the state legislature, the Texas Transportation Commission decided to produce a more streamlined version of the strategic plan than the standard format prescribed for all Texas state agencies. The "state" form was perceived as unmanageable by the DOT, largely because it required so much detail that a sense of strategy was greatly obscured.

Therefore, the TxDOT refused to use the standard format and submitted its own streamlined version of the strategic plan, which included, for example, some 30 performance measures as compared with the more than 200 measures contained in previous versions keyed to the standard form. This streamlined version, which summarizes TxDOT's priorities, strategies, and performance measures in fewer than 10 pages, has been accepted by the Legislative Oversight Board, and is proving to be a useful tool for communicating the department's strategic direction to its employees as well as a range of external stakeholders.

Many DOTs responding to the survey indicated that although their efforts to develop and implement their own strategic plans are frustrated by different ideas along these lines coming from the governor's office or the state legislature, that is the legitimate institutional framework within which they operate. Several respondents indicated that although they obviously have to be responsive to the policy priorities emanating from these sources, their own ability to "manage by fact" through strategic planning and performance measurement helps them to make their case with these stakeholders more effectively in the long run.

IDOT was concerned about fluctuating commitment to strategic planning among state government leaders outside the agency, the extent to which that commitment might be diminished by a change in administrations, and the simple lack of understanding of the value of strategic planning in parts of the general assembly. Thus, IDOT tries to build support for its strategic planning efforts by communicating the department's achievements and linking them to the strategic plan where appropriate, to external stakeholders, and by offering IDOT personnel and technical resources to help the governor's office and other agencies to strengthen their own strategic planning and implementation procedures. This effort is time consuming; however, it does help to build a stronger appreciation for strategic planning within the larger state government establishment.

Administrative Transitions

Precisely because strategic planning is first and foremost a tool for chief executives and top management teams to chart future directions and manage change in their organizations, it should not be surprising that when new administrations assume office they sometimes change the way departments determine strategic planning and management.

In New Mexico, although the *Compass* was not developed as a strategic plan, from 1996 through 2002 it was the central driving force in managing the NMDOT. When state government accountability legislation mandated that all state agencies develop strategic plans, the NMDOT at first declared that the *Compass* constituted its strategic plan. Later the department did produce a formal strategic plan largely based on the *Compass* to meet the legislative requirement; however, the *Compass*, which was really a strategic performance measurement system, was still the de facto strategic plan and the tool that was really used to drive top priorities into the organization.

Presently, however, under a new administration, NMDOT is planning to redesign the entire process and develop an overarching strategic plan. Current thinking is that the more strategic measures tracked by the *Compass* will be retained in a "Compass type" dashboard approach to monitor a smaller number of truly strategic measures that are tied to the goals and objectives in the new strategic plan, many of which are likely to reflect *Compass* key results. On the other hand, the less strategic measures currently tracked in the *Compass*, those that are more output- and process-oriented, will probably be moved down to the division and district level to be incorporated in their business plans and associated measurement systems. This is by no means a rejection of the value of the *Compass* in strengthening performance at the NMDOT, but rather a recognition that with a change- and performance-oriented culture now permeating the department, the business planning process in place, and the high level of personal accountability that results from goals and measurement at all levels, the department can decentralize much of what has been in the *Compass* and allow top management to focus on issues that are truly strategic.

Transition at VDOT

Although VDOT had been engaged in high-level strategic planning for some time, the process had not been used to discipline organization decision making. In 2002, however, in the wake of serious financial management concerns in the previous administration, the current commissioner has jump-started the process by focusing on a selective group of key performance measures, setting targets on those measures and developing strategies to achieve those targets. To a great extent these performance measures and targets established in VDOT's strategic plan for 2004–2006 focus on the development and delivery of the transportation program; accountability focuses on the department's nine districts, which helped establish the targets to ensure that they would be realistic. Other measures targeted by the plan focus on environmental compliance, tighter financial controls, employee development, and improved customer relationships.

With new systems in place that make the performance data accessible to all concerned on a real-time basis, the commissioner conducts monthly video conferences with top officials at headquarters and in the district offices to review VDOT's dashboard on a measure-by-measure and district-by-district basis. The focus of these reviews is on the current status of the measures, anticipated problems, and generally what can be done to strengthen the department's core businesses. This process is also beginning to have an impact on the STIP in terms of disciplining decisions regarding projects entering the pipeline to ensure that overprogramming is fiscally realistic. Having affected a "quick fix" with the performance measures to gain control over the program, VDOT will now revert to a more comprehensive approach to strategic planning, as overviewed in Figure 12, to update the plan every 2 years as required by recent state legislation. However, with the measurement and review process in place, now for the first time the plan can be used to drive decision making throughout the organization.

ORGANIZATIONAL OBSTACLES

Although the kinds of institutional issues discussed previously concern external factors affecting DOTs, the organizational obstacles referred to in the survey pertain to internal DOT issues. In the surveys and follow-up interviews, representatives from several DOTs pointed out problems in gaining acceptance of strategic planning in their organizations and building commitment on the part of managers and employees to advancing their strategic agendas. However, as the process has been refined and matured in some departments, especially in terms of involving larger numbers of managers and employees in plan updates, strategic planning has become institutionalized as part of normal business practices. In addition, at the other end of the process, when plans are completed, several transportation departments, such as PennDOT and TxDOT, distribute abbreviated or simplified versions of their strategic plans to all employees to help achieve buy-in from the work force. When the Kansas DOT completed its strategic management plan, all employees were given a pamphlet that showed how they could locate their particular functions in the overall plan.

Many respondents discussed the importance of communication from top management at the outset of the process to explain why it is important to the department, what the expected benefits will be, how the process will unfold, who will be involved in various steps, what products will be produced, and the overall timeline for completing the plan, as well as what implementation of the strategic plan will mean for the operating units. In addition, several noted the importance of keeping managers and employees informed about progress along the way.

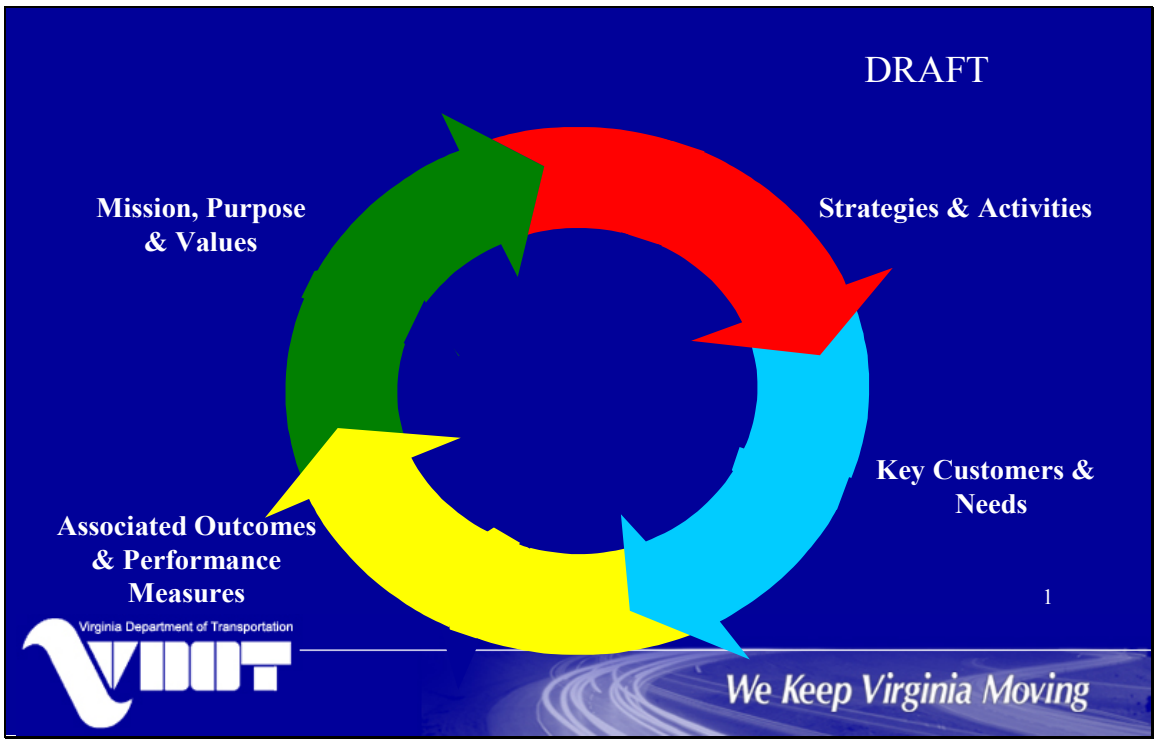


FIGURE 12 Virginia DOT 2003–2004 strategic planning and performance measures process.

Perhaps most importantly, however, is that strategic planning in the long run has to sell itself in a very visible way as being beneficial to the organization and individuals. As reported by several respondents, when it becomes clear that a strategic plan is setting the overall direction for a DOT, that top management is committed to using the plan to guide other decision making, that it is indeed having an impact on what a department does and how it does it, then managers and employees will buy into it. In the words of one survey respondent: "In time managers realized that managing performance in conjunction with a strategic plan could work to their advantage because expectations were clear and tied to a larger framework, and they in turn could hold people accountable for getting things done. This has changed the culture to where measurement is now commonplace in all units and used to promote programs and strategic priorities."

Developing the Culture in the SCDOT

In the early days of strategic planning at the SCDOT, the prevailing organization culture was not particularly receptive to the development and use of a strategic plan as a guide to how the department carried out its business. Therefore, there was a need to change the culture and inculcate an understanding that the strategic plan was an important part of the department's normal business practice. Building middle management commitment to this principle was especially challenging.

In the early 1990s, the governor at that time had split the state's Department of Highways into two organizations, the DOT and the State Patrol. This reorganization was traumatic for many employees who still identified with the Highway Department. In part, the initiation of strategic planning in 1997 was intended to focus attention on the new DOT, its mission, vision, values, and so forth. At the outset of the process, the department conducted a "funeral" for the old highway department and encouraged employees to look forward to the future of the DOT.

The principle approach to changing the culture involved a mix of continuing strong leadership and promotion of the strategic planning model along with demonstrated commitment on the part of senior staff, coupled with extensive training and the development of interpersonal skills throughout the department. Much of this training focused on teambuilding and promotion of SCDOT's values embodied in the RIGHT concept (Respectful of others, Integrity at all times, Good at what I do, Honest and fair in all my actions, and Teamwork through communication).

When SCDOT's initial strategic plan was completed in 1998, each of the department's 5,300 employees attended a 1-day seminar on the plan, hosted by agency managers who had been involved in its development. At the seminars, the plan was presented to the employees and they were encouraged to support it. In addition, they were given RIGHT lapel pins and invited to sign certificates with others

in their work units stating that they would do their best to uphold the DOT's core values. Since then, the executive team has continued to promote buy-in to updates of the strategic plan by involving more employees in its development and promoting it to them. More recently, SCDOT's employee performance management system has provided for a minimum of 12 hours of training for each employee annually, with much of the training available relating directly to the department's strategic goals. This has helped to build ownership of the strategic plan.

Building Ownership at KTC

KTC also encountered substantial resistance from middle-level managers as the department began to tighten up its strategic planning and performance measurement processes. However, when necessary, they were able to "force feed" it to these managers through state legislation, which requires this kind of results-oriented approach. The idea was to let these managers know that they had responsibilities to plan and measure, and the Office of Quality could provide help if desired. Initially, again in keeping with the quality improvement tradition, KTC was aiming for a 60% success rate in hitting their targets; however, they have exceeded that standard.

Building Commitment at MoDOT

When the current director and executive team assumed the leadership of MoDOT 3 years ago, they wanted to develop a strategic plan and use it to guide the department into the future. However, they soon found that the organization was not particularly ready to embrace the idea. First, strategic planning at MoDOT had historically been seen as an "exercise" that required considerable time and effort, but then was not really used to manage the department. Second, MoDOT had become highly decentralized under the preceding administration, which had emphasized empowerment of lower-level managers and employees to strengthen organizational capacity, and many of the districts and functional business units had developed a high degree of autonomy in managing their own areas of responsibility.

Thus, many managers in these units saw strategic planning at best as a waste of time and at worst as an attempt by top management to reassert a higher level of authority over them and limit their own discretionary decision making. There was also some fear that measurement systems associated with strategic planning would result in undue pressure to work harder and perform at higher levels. Not surprisingly, therefore, many managers resisted the new top management's effort to reinitiate strategic planning, particularly in the early stages.

In the face of such skepticism and resistance, MoDOT created a strategic planning team that included several district engineers, a few members of the Transportation Commission, and representatives from the FHWA, along with the executive team, to develop a strategic plan that would establish MoDOT's overall goals and priorities. Then, when work on the strategic plan was completed, all the district engineers and business unit managers were invited to nominate managers and/or employees in their areas to participate on a team created to develop the overall business plan, which charted strategies for achieving the department's strategic goals.

A draft of the business plan was then presented to the original strategic planning team for review and approval. MoDOT executives are convinced that involving people throughout the organization in developing these plans was crucial for building commitment to the process and to the plans themselves. In addition, assigning strategy owners to take charge of strategy deployment and reporting on progress in achieving strategic goals has also gone a long way toward promoting buy-in to MoDOT's strategic and business plans.

Cross-Functional Strategies

Like many other DOTs, Caltrans has a strong functional organizational structure and culture; however, its strategic goals are primarily cross functional. Therefore, there is a tendency for the functional units to focus on their own operation and not the larger departmental goals. Ensuring cross-functional cooperation and commitment to the strategic goals is therefore a continuing challenge.

This is a challenge for many DOTs, and like several other departments, Caltrans tries to overcome it by assigning ownership for strategic goals. Complementing the chain of performance agreements with individual managers that focus on their contributions to achieving the department's strategic objectives, each of the five strategic goals has been assigned to a goal leader to provide direction and coordination in implementing its attendant strategies and to monitor progress across functional lines. Because the goal leaders are deputy directors, and because each of the deputies has a performance agreement with the director concerning contributions to all appropriate strategic goals, the process reinforces collective buy-in to the strategic plan among members of the top management team and encourages them to look beyond their own functional areas and be concerned with achieving the overall set of strategic goals.

At WisDOT, the six functional divisions—transportation districts, transportation infrastructure development, transportation investment management, motor vehicles, state

patrol, and administration—all use a business planning process to develop goals and actions that support the department's strategic emphasis areas. The divisions then organize their own goals under the emphasis areas and they are coordinated across the divisions to ensure overall effectiveness in achieving WisDOT's strategic goals.

Although issues arise around the tension between cross-cutting strategic emphasis areas versus division responsibilities, the three multi-modal divisions—transportation districts, infrastructure development, and investment management—are committed to working as a team to develop and accomplish shared goals that are consistent with WisDOT's strategic plan. Many of the subunits within these divisions are interconnected, and the divisions have a specific partnering agreement regarding interrelated responsibilities. To accomplish shared goals, the partnering agreement defines common business practices concerning goal and priority setting, communication, program budget and policy or standards development, application of policies and standards, and performance measures. Using these business practices, these three divisions meet regularly to work out shared goals and timelines. Furthermore, a conflict resolution process is clearly defined, with specific actions to be taken in the event that the process breaks down.

TECHNICAL OBSTACLES

The technical obstacles that were cited most frequently by survey respondents concerned inadequate knowledge and skills to effectively undertake strategic planning. This is seen as a much greater challenge as DOTs undertake to involve more managers and employees in developing and evaluating strategies, and particularly as they "unfold" the process to cascade down into the organization. As divisions, bureaus, districts, and other operating units are engaged in developing their own strategic plans, business plans, objectives, targets, and performance measures, the need for technical skills in these areas increases significantly.

Thus, the most successful departments invest considerable time and effort in training managers and employees in these areas. Such training, sometimes provided by outside consultants, is often made available at key points during the process, focusing on different topics (e.g., situational analysis, business planning, and performance measurement) and may be taken "on the road" to district offices as well as offered in central locations. Some agencies have found that hands-on project-based training; for example, helping a district team actually develop a set of measures, is more effective than a generic program. Furthermore, transportation departments such as PennDOT and IDOT have found that making staff support available to provide personal coaching for individuals undertaking key strategic initiatives can be invaluable in ensuring success.

Performance Measures

The most frequent technical problems cited by survey respondents concerned the implementation of performance measurement systems. Some agencies lack the appropriate technology to gather and disseminate performance metrics efficiently, given that the data typically come from multiple sources and that reports need to be generated for various levels of management. Thus, some agencies such as the Virginia and Montana DOTs are trying to address these kinds of problems by investing in new systems or new data bases to relate different kinds of data; for example, operating data and accounting data, more efficiently.

Regarding performance measures themselves, several DOTs pointed out difficulties in developing valid indicators of the kinds of outcomes they would like to track. Clearly, many DOTs are making careful distinctions between outcome measures and output measures and ultimately trying to focus their strategic measurement systems on the impact they have on transportation outcomes in their state. Considerable progress has been made along these lines; however, the issue of measuring real transportation outcomes continues to present challenges in the field.

Perhaps the most ambitious attempt to date to develop a comprehensive set of measures of transportation outcomes is FDOT's Mobility Performance Measures Program. The purpose of these measures is to monitor system-wide performance, provide accountability regarding transportation investments, and link strategic planning to resource allocation. Thus, FDOT has identified four dimensions of mobility—accessibility, quantity of travel, quality of travel, and utilization—and then defined multiple performance indicators for each. For example, with respect to highways, the quality of travel is measured by average speeds weighted by person-miles traveled, average delay, average travel time, average trip time, and maneuverability measured by vehicles per hour per lane.

These measures are operationalized through a combination of actual field data and modeled data, but implementation is still uneven. Although the guiding concept was to design comparable mobility measures for all transportation modes, not all the requisite data are available, and some of the data that are available are not comparable across models in terms of time and coverage.

CHAPTER SIX

CONCLUSIONS

Many state and provincial departments of transportation (DOTs) have adopted strategic planning as a means of charting future directions to ensure their long-run viability and performance. Although it is not possible based on the research of this report to make a reliable inference regarding the total number of DOTs that are seriously involved in strategic planning it is clear that many are actively engaged in developing and updating strategic plans and using them to manage their organizations.

Although some DOTs may produce strategic plans primarily because they are required to do so by legislative or executive mandate, and may largely be "going through the motions" to comply with such a requirement, others proactively engage in strategic planning because they believe that it helps them to manage more effectively. At this time, several transportation departments have completed multiple rounds of strategic planning, have seen evidence that it is a worthwhile investment of time and effort, and are committed to continue using and improving this tool.

Indeed, in at least some DOTs, strategic planning has become institutionalized beyond the tenure of a given administration or chief executive. Although support staff are sometimes concerned that it may be de-emphasized or even abandoned by a new administration, experience to date suggests that when effective strategic planning processes have become imbedded in transportation departments, new administrations are likely to employ them to flesh out their own strategic visions and drive them down into the organization. The new strategic agenda may be very different from the preceding one, and the process may well be further revised or enhanced; however, the value of an effective, responsive, policy-neutral strategic planning process is not likely to be lost on many incoming administrations.

Evolving Processes—Most transportation departments involved with strategic planning reported that their chief executive officers, executive teams, and senior managers are heavily involved in the process. Over time there has also been a trend of providing for more widespread involvement of managers and employees in the process of developing initiatives and evaluating options. Although this makes the process more challenging to manage, it is consistent with the participative management culture in many departments, and it can help produce better plans and increased buy-in to those plans. A few departments have also experimented with including representatives of external stakeholder groups in their strategic planning efforts, and some DOTs coordinate with their FHWA divisions in developing and managing their strategic plans.

Strategic planning in DOTs tends to be an iterative process, often involving annual updates, with more comprehensive efforts to revalidate or change plans undertaken periodically. In many departments the overall strategic planning and management process has evolved incrementally over several years. A typical pattern might focus on the following elements over a few years in a loose sequence:

- Mission, vision, and values;
- Strategic goals;
- Strategic objectives;
- Objective owners;
- Performance measures;
- Business plan linked to strategic plans; and
- Budgets tied to strategic plans through business plans.

Simultaneously, transportation departments can continue to refine their strategic planning and management processes, or even to make major overhauls, to develop better plans and use them more effectively to guide decisions and actions throughout their operations.

Need for Selectivity—The goals, objectives, and strategies contained in most DOT's strategic plans include a mix of substantive items that focus on organizational capacity (employee development, management capacity, organizational effectiveness, and operating efficiency) and relationships with external stakeholders (customers, partners, and suppliers), as well as the transportation system itself (safety, system preservation, congestion reduction, and multi-modal enhancements). In addition, the strategic plans of DOTs are increasingly addressing economic development and environmental stewardship issues.

Although DOT's strategic plans have become increasingly broad in coverage, experience has shown that agencies often need to be more selective in defining the goals, objectives, initiatives, and priorities that constitute strategic plans to ensure that these plans are truly *strategic* and that they can be implemented effectively. When strategic planning begins to be accepted in an agency, there may be

a tendency to include any number of items in the plan and to "give everybody a piece of the action." However, this can dilute the effectiveness of the plan by dispersing attention across a wide variety of issues that do not have real long-term importance.

Therefore, DOTs have found that it is important to discipline the process by identifying the relatively few truly strategic issues facing the department, focusing attention on these issues, and devoting substantial energy and effort to developing strategies that will effectively address these issues. The Montana DOT, for example, is working now to reduce the number of action items included in its strategic plan to less than one-third of the current number. Similarly, the Texas DOT substantially reduced the number of performance measures in its balanced scorecard model, because many of the indicators were not really beneficial. There has also been a trend among state DOTs toward producing very brief, concise strategic plans to be elaborated through further strategic and/or business planning by organizational units.

Integrated Strategic Management Systems—Some DOTs that have been involved in strategic planning for a longer time have developed, or are currently developing, comprehensive approaches to strategic management. This entails linking a department's strategic planning process with its operational planning, measurement, performance management, and budgeting systems in an integrated process that allows the strategic plan to be used effectively as a framework for guiding all other decision making in the department.

Although some departments develop action plans to implement their strategic initiatives as separate projects, DOTs increasingly are using ongoing business planning, program planning, or work planning to drive their strategic agendas into the management and decision-making processes of the organization. The business planning model requires, or at least encourages, districts, functional divisions, and other organizational units to address department-wide strategic goals and objectives. In most DOTs, the business plans developed by the organizational units must be approved by top management; however, that is not always the case.

Performance Measures—Most DOTs contacted for this synthesis use performance measures to track success in implementing strategic initiatives and in achieving strategic goals and objectives. Generally, DOTs are currently trying now to focus on real outcome measures more than previously, as illustrated by the California DOTs measurement pyramid, the Minnesota DOT's parallel measures for different modal groups, and the Florida DOT's mobility measures. However, defining good outcome measures that are meaningful, reliable, accessible, and cost-effective is still difficult in many areas. Interestingly, with respect to both output and outcome measures, DOTs increasingly are establishing numerical targets for the strategic goals and objectives. For example, both the Kentucky Transportation Cabinet and the New Mexico DOT purposefully avoided numerical targets in the past, because their strategic planning efforts were closely associated with their quality improvement programs. However, at this time, both departments are moving toward numerical targets as a more effective approach to defining and tracking strategic objectives.

Building Commitment—Almost all DOTs that are seriously engaged in strategic planning assign individuals to take responsibility for implementing particular strategic initiatives. This process is more elaborate in some departments than others. In some DOTs the process of assigning individual responsibilities for implementing action items in support of strategic plans extends down into the operating units, often tied to business plans or scorecards, and in some cases it is tied to the performance appraisal process in a way that provides a line of sight from the strategic plan down to individual employees' performance plans, as is the case with the South Carolina DOT.

Particularly in the case of implementing cross-cutting strategic initiatives that cross organizational lines and are not "owned" by any particular functional division, it is important for managers who share responsibility for them to know what expectations are regarding their individual contributions or performance with respect to these action items. Some departments provide more direction than others in terms of specifying how action items and tasks will be accomplished, although most rely on the use of performance measures to provide accountability.

As with other organizations, DOTs will often encounter skepticism among managers and employees about the efficacy of strategic planning. Many have found that proactive communications and educational efforts are critical to develop buy-in to the process. In addition, involving larger numbers of managers and employees in strategic planning and subsequent business planning can help to build a stronger commitment to both the process and the resulting plan. On a similar note, particularly as strategic planning and business planning are extended down into the organization for the first time, substantial training efforts may also be required to enable managers and employees to productively engage in these processes.

Strategic Plans and Budgets—In many DOTs the strategic plan and the budget influence each other, with overall

budget realities influencing the development of strategic issues and plans, and strategic plans then influencing budget priorities within the range of discretionary decision making. However, it appears that costs are often not seriously considered in developing strategic initiatives. On the other hand, transportation departments do employ a mix of budgetary mechanisms, when necessary, to ensure that strategic initiatives are funded. In addition, states differ substantially in the extent to which their strategic initiatives require additional resources

In many transportation departments, the business planning process provides the link between strategic initiatives and funding decisions (South Carolina DOT, New Mexico DOT, Minnesota DOT, Pennsylvania DOT) as organizational units develop business plans that respond to strategic priorities and then prepare budget proposals to support the action items in their business plans. Furthermore, several DOTs are moving in the direction of performance-based budgeting systems in which they essentially budget funds directly to program structures, which may cross organizational lines that facilitate tying resource allocations to strategic priorities (New Mexico DOT, Minnesota DOT, and Colorado DOT).

Transportation Planning and Programming—DOTs' strategic plans and their transportation systems plans are usually seen as complementary or overlapping. However, the relation between the two is conceived differently by different departments. At the Wisconsin DOT, for example, they are largely independent of each other, with the strategic plan focusing on the organization and the long-range transportation plan focusing on the system. In other DOTs, such as the Kentucky Transportation Cabinet, Minnesota DOT, and Pennsylvania DOT, the strategic plan sets the overall direction regarding what the department needs to do, and at least to some degree it drives the long-range transportation plan. Conversely, in at least one department (Florida DOT), the long-range plan establishes key initiatives and outcomes regarding performance of the transportation system, and the department's strategic plan is intended to be a road map for what the department needs to do to bring that plan to realization.

In any case, the state transportation improvement plans (STIPs) are seen as being responsive to strategic priorities in departments whose strategic plans include elements that need to be implemented at least in part through the STIP. Most departments with asset management programs in place or under development indicated that these programs are designed within the framework of their strategic plans. A few indicated that these two processes are largely independent of each other. Performance measures and targets provide the critical link between strategic plans and asset management programs. Not surprisingly, some DOTs indicated that they need to forge stronger linkages between the two to ensure that their strategic plans and transportation systems plans are consistent or mutually reinforcing.

Observations Regarding Effective Practices—Given the nonexperimental, descriptive nature of this synthesis research, the ability to draw hard and fast conclusions about causal relationships between strategic management practices and outcomes is limited. In addition, the possibility of nonresponse bias in the survey makes interpretation of the self-reported data collected in this study less than certain. Furthermore, it is clear that this is an area, not surprisingly, in which "one size does not fit all." Different agencies are at different stages in developing their strategic management capabilities; they differ substantially in terms of management style, organization culture, and skill sets available to support strategic management; and they tend to emphasize different aspects of the overall process.

Nevertheless, this research has generated numerous insights concerning the strategic management process, and the information obtained through the survey and follow-up interviews leads to some observations concerning effective practices for driving strategic plans down into an organization's management and decision making. Therefore, although there is no one best way to manage strategically, success factors that enhance the efficacy of strategic management in state DOTs could include the following:

- Department-level strategic plans that focus selectively on corporate-level issues and priorities and provide overall direction for major decisions throughout the organization on an ongoing basis.
- Development of strategic plans by major divisions, districts, and/or other organizational units within the framework of the corporate-level strategic plan.
- Widespread participation of managers and employees at various stages of developing strategic plans, performance measurement systems, and other elements of the overall strategic management process.
- A customer orientation in terms of strategy, supported through systematic customer feedback and customer-oriented performance measures.
- Performance measurement systems incorporating outcome and output and measures that are specifically designed to track success in achieving strategic goals and objectives.
- Numerical targets to be accomplished within specified time frames tied to strategic objectives and performance measures, as appropriate.
- Proactive use of performance measures to manage strategic agendas.
- Top management commitment to the strategic agenda and its effective implementation, as demonstrated by the use of planning, decision-making, and evaluation processes that flow directly from overall strategy.

- Formal assignment of responsibility to high-level staff for facilitating the strategic management process throughout the department and supporting the executive team in this area.
- Requirements for business plans at the division or program level, and/or project-level action plans, which must be evaluated and approved at the executive level in terms of consistency with overall departmental strategic plans.
- Identification of "owners" for strategic objectives, initiatives, measures, and/or action plans, who are responsible for accomplishing specific elements of strategic plans.
- Use of individual-level goals and objectives derived from strategic agendas in performance management and appraisal processes.
- Communication of the importance of, and the organization's commitment to, strategic goals and objectives to both internal and external stakeholders at every opportunity.
- Budget processes that allocate resources directly to strategic initiatives and strategically derived action plans and business plans.
- Emphasis on building "omni-directional alignment" between customer concerns and departmental goals, higher-level goals and lower-level goals, strategic priorities and budget allocations, strategies and performance measures, etc.
- A process for reviewing strategic agendas and environmental circumstances, refreshing relevant data collected both internally and externally, and revalidating or updating strategic plans on a regular basis.

Although this synthesis on strategic management in state DOTs has found that the state of the practice is indeed advancing, several outstanding issues remain. Further research is needed in a number of areas to help DOTs strengthen their strategic planning practices and integrate them with other management and decision-making processes. Therefore, suggested areas for future research include the following:

- The frequent disconnect between strategic planning and budgeting and the types of budgeting systems and processes that lend themselves most readily to strategic management.
- The role of work-force planning in strategic management and the extent to which work-force allocations are adjusted in response to changes in strategic priorities.
- The skills that are required at various levels to support effective strategic management processes and the kinds of training programs that are needed to ensure that they are available among managers and employees as needed.
- The most effective practices for implementing cross-functional strategic initiatives and achieving cross-functional strategic goals and objectives.
- The varying relationships between strategic planning and transportation systems planning in state DOTs, and promising approaches to ensure consistency among strategic plans, transportation system plans, STIPs, and asset management processes.
- The length of time typically required to implement comprehensive, effective strategic management processes and the level of effort required to support them.
- Effective approaches for institutionalizing strategic management processes to withstand top management turnover and be responsive to policy directions of new administrations.
- The extent to which strategic management processes actually result in producing the desired outcomes over both the short term and the long term.

These issues can be addressed through a variety of surveys, site visits, interviews, and executive forums. However, truly useful results along these lines are most likely to be produced by the development of a set of in-depth comparative case studies of strategic management processes in a number of state DOTs. In addition to leading edge cases, this research should also include cases where strategic management efforts have been derailed and/or where major problems have arisen and been overcome.

Based on the review of relevant documents and other materials, along with a mix of surveys, telephone interviews, site visits, and in-depth interviews conducted on-site, this research would make comparisons across DOTs to gain further insight regarding approaches to strategic management that are effective in different organizational contexts. A principal product built on the findings of these comparative case studies could be an in-depth guide to best practices for developing strategic plans and using them to lead DOTs into the future.

REFERENCES

Abbott, E.E., J. Cantalupo, and L.B. Dixon, "Performance Measures: Linking Outputs and Outcomes to Achieve Goals," *Transportation Research Record 1617*, Transportation Research Board, National Research Council, Washington, D.C., 1998, pp. 90–95.

Albertin, R., J. Romeo, L. Weiskopf, J. Prochera, and J. Rowen, "Facilitating Transportation Agency Management Through Performance Measurement: The NYSDOT Experience with the 'Management Performance Indicators' Report," *Transportation Research Record 1498*, Transportation Research Board, National Research Council, Washington, D.C., 1995, pp. 44–50.

Annex to TRB Research Circular 501: Strategic Management Research Needs for State Departments of Transportation: Summaries of State DOT Experience, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Asset Management Primer, Federal Highway Administration, U.S. Department of Transportation, Washington, D.C., 1999, 31 pp.

Baird, M.E. and R.E. Stammer, Jr., "Conceptual Model to Support Systematic Use of Performance Measures in State Transportation Agencies," *Transportation Research Record 1706,* Transportation Research Board, National Research Council, Washington, D.C., 2000, pp. 64–72.

Bishop-Edkins, C. and T.A. Birkland, "Linking Strategic Planning and Budgeting: A Case Study of the New Jersey Department of Transportation," *Transportation Research Record 1305*, Transportation Research Board, National Research Council, Washington, D.C., 1991, pp. 147–152.

Bryson, J.M., *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement,* Jossey–Bass, San Francisco, Calif., 1995.

Doyle, D., "Performance Measure Initiative at the Texas Department of Transportation," *Transportation Research Record 1649*, Transportation Research Board, National Research Council, Washington, D.C., 1998, pp. 124–128.

Etmanczyk, J.S., "Strategic Planning, Total Quality, and Performance Measurement: A Quality Director's View," *Transportation Research Record 1498*, Transportation Research Board, National Research Council, Washington, D.C., 1995a, pp. 65–70.

Etmanczyk, J.S., "Wisconsin DOT Measures Quality from Top to Bottom," *Journal of Management in Engineering,* Vol. 11, No. 4, July/Aug., 1995b, pp. 19–23.

Harned, E.W., L.M. Proctor, L.H. Bowser, and K.M. Chase, "Development of a Strategic Management Process: A Case Study of the Pennsylvania Department of Transportation," *Transportation Research Record 1028*, Transportation Research Board, National Research Council, Washington, D.C., 1985, pp. 47–53.

Kaplan, R.S. and D.P. Norton, *The Balanced Scorecard: Translating Strategy into Action,* Harvard Business School Press, Cambridge, Mass., 1996.

Kassoff, H., "Implementing Performance Measurement in Transportation Agencies," in *Performance Measures to Improve Transportation Systems and Agency Operations,* Transportation Research Board, National Research Council, Washington, D.C., 2001, pp. 47–58.

Lockwood, S.C., *The Changing State DOT*, American Association of State Highway and Transportation Officials, Washington, D.C., 1998, 101 pp.

Lockwood, S.C., *Factors Affecting the Future of State DOTs as Institutions*, NCHRP Project 8-36A, Part 2, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Margolis, D.L., "Management Conferences Can Be Your Key to Change," *Journal for Quality and Participation*, 1995, pp. 60–64.

Margolis, D., "Performance-Based Management in PennDOT," *PA Times*, Vol. 25, No. 6, 2002, p. 3.

Meyer, M.D., "Strategic Planning in Response to Environmental Change," *Transportation Quarterly*, Vol. 37, No. 2, Apr. 1983, pp. 297–310.

Meyer, M.D., "Strategic Management in a Crisis-Oriented Environment," *Transportation Research Record 1156*, Transportation Research Board, National Research Council, Washington, D.C., 1988, pp. 88–95.

National Academy of Public Administration, *NCHRP Report 371: State Departments of Transportation: Strategies for Change*, Transportation Research Board, National Research Council, Washington, D.C., 1995, 139 pp.

Nelson, B.L., R.C. Johns, and R.J. Benke, "Challenges of Upgrading Strategic Capability in the Public Sector," *Transportation Research Record 1558,* Transportation Research Board, National Research Council, Washington, D.C., 1996, pp. 122–129.

Pagano, A.M. and S. McNeil, *Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program,* Urban Transportation Center, University of Illinois at Chicago, 2004, in press.

Poister, T.H., *NCHRP Synthesis of Highway Practice 238: Performance Measurement in State Departments of Transportation*, Transportation Research Board, National Research Council, Washington, D.C., 1997, 69 pp.

Poister, T.H., *PennDOT's Strategic Management Process: A Review and Critique*, Pennsylvania Transportation Institute, University Park, 2002.

Poister, T.H. and G.D. Streib, "Strategic Management in the Public Sector: Concepts, Models, and Practices," *Public Productivity & Management Review*, Vol. 23, No. 3, 1999, pp. 308–325.

Poister, T.H. and D.M. Van Slyke, *Innovations in Strategic Leadership and Performance Measurement for State DOTs: An Initial Scan,* Transportation Research Board, National Research Council, Washington, D.C., 2001 [Online]. Available: http://gulliver.trb.org/publications/nchrp/nchrp_w39-1.pdf.

Poister, T.H. and D.M. Van Slyke, "Strategic Management Innovations in State Transportation Departments," *Public Performance & Management Review*, Vol. 26, No. 1, 2002, pp. 58–74.

Roberts, N., "Evaluation of Strategic Management at Caltrans," *Transportation Research Record 1229*, Transportation Research Board, National Research Council, Washington, D.C., 1989, pp. 25–34.

Science Applications International Corporation, *Using the Balanced Scorecard* (*BSC*) *in Strategic Planning at the Illinois Department of Transportation,* Illinois Department of Transportation, Springfield, 2002.

Sorrell, C.S. and J.F. Lewis, "VDOT Is Moving in a New Direction: How Virginia's Department of Transportation Is Using Strategic Management to Revamp its Entire Operation," *Transportation Research Record 1649*, Transportation Research Board, National Research Council, Washington, D.C., 1998, pp. 115–123.

Stein-Hudson, K.E. and B. McDowell, "Applying Strategic Planning in the Transportation Sector," *Transportation Research News,* July–Aug., 1985, pp. 20–24.

TRB Research Circular 501: Strategic Management Research Needs for State Departments of Transportation, Transportation Research Board, National Research Council, Washington, D.C., 2000

TransTech Management, Inc., *Strategic Performance Measures for State Departments of Transportation: A Handbook for CEOs and Executives*, Transportation Research Board, National Research Council, Washington, D.C., 2003

Vinzant, D.H. and J. Vinzant, "Strategy and Organizational Capacity: Finding a Fit," *Public Productivity & Management Review*, Vol. 20, No. 2, 1996, pp. 139–157.

Yew, C., *Performance Management in the U.S.A.: Pennsylvania Department of Transportation* (*PennDOT*), *A Case Study,* Federal Highway Administration, Washington, D.C., June 2002.

Wilson-Orndoff, C.J., "Citizen-Based Priorities in Transportation: A Study in Customer Focus," *Public Works Management and Focus,*" Vol. 7, No. 4, 2003, pp. 256–266.

Ziegler, B.J., *Transportation Research Circular 465*: *Transportation Planning and Performance Measurement in Washington State,* Transportation Research Board, National Research Council, Washington, D.C., 1996, pp. 14–16.

APPENDIX A

Survey Questionnaire

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Project 20-5, Synthesis Topic 34-03

STRATEGIC PLANNING AND DECISION MAKING IN STATE DOTs

QUESTIONNAIRE

State transportation departments increasingly engage in strategic planning to manage long-term change, but they often find that the process breaks down in the implementation stage. This synthesis will document leading practices used by DOTs to align major management and decision-making processes with their strategic agendas in order to assure the accomplishment of strategic goals and objectives.

You are being asked to provide information on strategic planning and management in your department. Your responses will provide valuable input to the development of a synthesis report on this crucial topic.

Please return your completed questionnaire to Dr. Ted Poister via email, FAX, or U.S. mail as indicated below. Also, please send any supporting documents to him at the address below. If you have any questions, please call Dr. Poister at 404-651-4594 or email him at tpoister@gsu.edu.

Dr. Theodore H. Poister	Phone: 404-651-4594
Department of Public Administration	FAX: 404-651-1378
Georgia State University	
Atlanta, Georgia 30303-3083	Email: tpoister@gsu.edu

Please provide the following information for someone from your department who may be contacted to obtain any needed follow-up information.

Name:

_____

_____

_____

_____

_____

1. Has your department completed a strategic planning process in the past five years?

   ☐ Yes ☐ No

   If No, you may skip the rest of this questionnaire.

2. If Yes, what year was your most recent strategic plan completed? _____

3. What was the principal impetus for developing this strategic plan?
   ☐ A legislative requirement
   ☐ An executive mandate from the governor's office or central executive agency
   ☐ The department's own initiative.

   Please add any comment you may wish to make about how or why your department decided to undertake a strategic planning effort.

   _____

4. Who led this strategic planning effort? Please provide title and organization.

   _____

5. Please indicate the extent to which each of the following was involved in developing this strategic plan.
   The CEO ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   The executive team ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   Senior managers ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   Middle level managers ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   Lower level managers ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   Employees ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   External stakeholders ☐ Centrally ☐ Moderately ☐ Peripherally or not at all
   Consultants ☐ Centrally ☐ Moderately ☐ Peripherally or not at all

6. To what extent does your department's strategic plan consist of (1) strategies that are implemented through particular functional divisions or other organizational units, versus (2) cross-functional strategic initiatives that are implemented across all units or through special projects outside the normal structure?
   ☐ All implemented through particular functional units
   ☐ Primarily through functional divisions, but some cross-cutting strategies
   ☐ An even mix of the two
   ☐ Primarily cross-cutting strategies, but some implemented through functional units
   ☐ All cross-cutting strategic initiatives.

7. In general, how successful has your department been to date in *implementing the strategic initiatives* contained in your strategic plan?
   ☐ Very successful
   ☐ Somewhat successful
   ☐ Not particularly successful.

8. Does your department's strategic plan define strategic goals and/or strategic objectives?
   ☐ Yes ☐ No

9. If Yes, to what extent do your strategic goals and objectives emphasize each of the following? (Use a scale from 1 to 10 where 1 indicates "little emphasis" and 10 indicates "strong emphasis.")
   _____ Transportation system preservation
   _____ Transportation system enhancements
   _____ Safety
   _____ Congestion mitigation
   _____ Environmental stewardship
   _____ Economic vitality
   _____ Customer service, customer satisfaction, customer relationships
   _____ Financial viability
   _____ Working relationships with partners and suppliers
   _____ Improved management capacity, organizational effectiveness
   _____ Employee development, morale
   _____ Improved operational efficiency, productivity, and internal processes.

10. If Yes, how ambitious would you say these goals and/or objectives are?
   ☐ Not particularly aggressive
   ☐ Aggressive, but realistic
   ☐ Overly aggressive, possibly somewhat unrealistic.

11. Does your department's strategic plan present particular strategies, initiatives, action items, or approaches for accomplishing these strategic goals and objectives?
   ☐ Yes ☐ No

12. To what extent has your department been successful in *actually achieving the strategic goals and objectives* defined by your strategic plan?
   ☐ Very successful
   ☐ Somewhat successful
   ☐ Not particularly successful.

13. Does your department require district or regional offices, and/or functional divisions or units, to develop annual or multiyear business plans or operating plans that directly contribute to accomplishing your overall strategic goals and objectives?
   ☐ Yes ☐ No

14. If Yes, are these business or operating plans submitted to top management for review and/or approval in order to assure that they are directly aligned with the department's strategic plan?
   ☐ Yes ☐ No

   Do you have any particular comments regarding the use or effectiveness of business plans or operational plans to advance your strategic plan?

   _____

   _____

15. Does your department assign responsibility to specific individuals or organizational units to take the lead in implementing particular strategic initiatives or achieving specific strategic goals and objectives?
   ☐ Yes ☐ No

16. If Yes, are these individuals or organizational units held accountable for accomplishing their strategic objectives through the department's performance management process?
   ☐ Yes ☐ No

   If Yes, how do you maintain this accountability?

   _____

   _____

Do you have any particular comments regarding the effectiveness of assigning responsibility to specific individuals or organizational units for implementing particular strategic initiatives or achieving strategic goals and objectives?

_____

_____

17. In general, how would you describe the relationship between the strategic plan and the budget process in your department?
    - ☐ The strategic plan drives budget decisions
    - ☐ The budget drives strategic planning
    - ☐ Each influences the other
    - ☐ They are basically independent of each other
    - ☐ Other. Please explain: _____

    _____

18. Does your strategic plan include the estimated costs of implementing strategic initiatives or accomplishing your strategic goals and objectives?
    ☐ Yes ☐ No

19. Do you try to assure that budgetary resources will be allocated to fund strategic initiatives?
    ☐ Yes ☐ No

    If Yes, how do you do this? Check any that apply.
    - ☐ Establish separate budgets to fund strategic initiatives
    - ☐ Earmark sources within the regular budget
    - ☐ Require organizational units to demonstrate in their budget proposals that they are allocating sufficient resources to fund strategic initiatives
    - ☐ Other budgetary mechanisms.

    Do you have any particular comments regarding your approach to, or effectiveness of, linkages between your strategic plan and your department's budget process? _____

    _____

20. Does your department's strategic plan identify specific performance measures for gauging success in achieving individual strategic goals and objectives?
    ☐ Yes ☐ No

21. If Yes, do you establish specific target levels on those measures to be achieved within certain time frames?
    ☐ Yes ☐ No ☐ In some cases only

22. Does top management in your department review the performance data at regular intervals in order to track progress in achieving strategic goals and objectives?
    ☐ Yes ☐ No

23. If Yes, how frequently does top management review the performance data?
    - ☐ Annually
    - ☐ Quarterly
    - ☐ Monthly
    - ☐ Other. Please specify: _____

24. Do districts or regions, functional divisions, and/or other organizational units review the performance data on a regular basis in order to track progress in achieving strategic goals and objectives?
    ☐ Yes ☐ No

25. If yes, how frequently do they review the data?
    - ☐ Annually
    - ☐ Quarterly
    - ☐ Monthly
    - ☐ Other. Please specify: _____

26. Do you have any particular comments regarding your approach to, or the effectiveness of, using performance measures to manage your strategic plan?

    _____

    _____

27. Have you encountered any particular problems involving *partisan politics* in your state in trying to develop an appropriate strategic plan and implement it effectively?
    ☐ Yes ☐ No

    If Yes, please describe: _____

    _____

    How have you tried to overcome these obstacles, and how well has it worked?

    _____

28. Have you encountered any particular *institutional problems* emanating from the legislature, the governor's office, central executive offices, federal agencies, local governments, etc., in trying to develop an appropriate strategic plan and implement it effectively?
    ☐ Yes ☐ No

    If Yes, please describe: _____

    _____

    How have you tried to overcome these obstacles, and how well has it worked?

    _____

29. Have you encountered any particular organizational problems regarding culture, personnel, available resources, capacity, management commitment, bureaucratic inertia, or the normal press of business, etc., that have made it difficult to develop an appropriate strategic plan and implement it effectively?
    ☐ Yes ☐ No

    If Yes, please describe: _____

    _____

    How have you tried to overcome these obstacles, and how well has it worked?

    _____

30. Have you encountered any particular *technical challenges* that have made it difficult to develop an appropriate strategic plan and implement it effectively?
    ☐ Yes ☐ No

    If Yes, please describe: _____

    _____

    How have you tried to overcome these obstacles, and how well has it worked?

    _____

31. Have you encountered any other particular problems in trying to develop an appropriate strategic plan and implement it effectively?
    ☐ Yes ☐ No

    If Yes, what kind of problems were they, and how have you tried to overcome them?

    _____

    _____

32. Does your department currently have a statewide transportation systems plan in effect?
    ☐ Yes ☐ No

33. If Yes, is it a project specific plan, a conceptual plan, or more of a policy plan?
    ☐ Project specific plan
    ☐ Conceptual plan
    ☐ Policy plan.

34. How would you best describe the relationship between your department's strategic plan and the transportation systems plan?
    ☐ Identical, or nearly identical
    ☐ Overlapping, and strongly aligned
    ☐ Overlapping, but with possible inconsistencies
    ☐ Complementary, and highly compatible
    ☐ Complementary, but with possible inconsistencies
    ☐ Other. Please explain:_____

    _____

35. If there are inconsistencies between the strategic plan and the transportation systems plan, please describe:

    _____

    _____

36. Has this created difficulties regarding implementation of your strategic plan?
    ☐ Yes ☐ No

    If Yes, please describe these difficulties, and how you have tried to overcome them. _____

    _____

37. Does your strategic plan include goals or objectives that need to be implemented, at least partially, through the state transportation improvement programming (STIP) process?
    ☐ Yes ☐ No

38. If Yes, how responsive has the STIP been to the department's strategic goals and objectives?
    ☐ Very responsive
    ☐ Somewhat responsive ☐ Not responsive

39. Have you encountered difficulties in relating the STIP process to your strategic plan?
    ☐ Yes ☐ No

    If Yes, please describe these problems, and how you have tried to overcome them.

    _____

40. Does your department have an asset management program in place or under development at this time?
    ☐ Yes ☐ No

41. If Yes, how would you describe the relationship between the strategic plan and the asset management process in your department?
    - ☐ The asset management program constitutes the strategic plan
    - ☐ The asset management program is being developed within the overarching framework of the strategic plan
    - ☐ The strategic plan exists within the overarching framework of the asset management process
    - ☐ They are separate and largely independent of each other
    - ☐ Other. Please explain: _____

    _____

42. Has your department encountered any problems regarding inconsistencies between the strategic plan and the asset management program?
    ☐ Yes ☐ No

    If Yes, please describe any particular challenges you have encountered in this area and how you have tried to approach them. _____

    _____

43. Do you have any additional comments or observations regarding your department's strategic planning and management process that might be helpful for this research?

    _____

    _____

44. Please provide the following information about you department:
    - Number of employees _____
    - Annual budget _____
    - Miles of highway owned _____
    - Title of the Chief Executive Officer _____
    - Person or body to whom the CEO reports _____

APPENDIX B

Departments of Transportation Providing Completed Surveys

United States

Arizona Department of Transportation
Arkansas State Highway Commission
California Department of Transportation
Connecticut Department of Transportation
Florida Department of Transportation
Hawaii Department of Transportation
Idaho Transportation Department
Illinois Department of Transportation
Kansas Department of Transportation
Kentucky Transportation Cabinet
Maine Department of Transportation
Maryland State Highway Administration
Minnesota Department of Transportation
Missouri Department of Transportation
Montana Department of Transportation
Nebraska Department of Roads
New Mexico Department of Transportation
Oklahoma Department of Transportation
Pennsylvania Department of Transportation
South Carolina Department of Transportation
Texas Department of Transportation
Utah Department of Transportation
Virginia Department of Transportation
Wisconsin Department of Transportation

Canada

British Columbia Ministry of Transportation
Manitoba Ministry of Transportation and Government Services
New Brunswick Department of Transportation
Northwest Territories Department of Transportation
Prince Edward Island Department of Transportation and Public Works
Saskatchewan Department of Highways and Transportation

APPENDIX C

State Transportation Departments Contracted in Follow-Up Interviews

California Department of Transportation
Colorado Department of Transportation
Florida Department of Transportation
Georgia Department of Transportation
Illinois Department of Transportation
Kentucky Transportation Cabinet
Maryland State Highway Administration
Michigan Department of Transportation
Minnesota Department of Transportation
Missouri Department of Transportation
Montana Department of Transportation
New Mexico Department of Transportation
Pennsylvania Department of Transportation
South Carolina Department of Transportation
Texas Department of Transportation
Virginia Department of Transportation
Wisconsin Department of Transportation

Abbreviations used without definition in TRB Publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation