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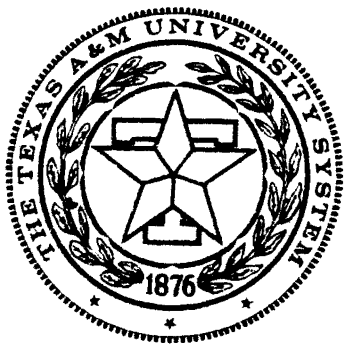

TEXAS
TRANSPORTATION
INSTITUTE

STATE DEPARTMENT
OF HIGHWAYS AND
PUBLIC TRANSPORTATION

COOPERATIVE
RESEARCH

STRATEGIC PLANNING AND MANAGEMENT CONCEPTS: AN APPLICATION TO THE TEXAS SDHPT

RESEARCH REPORT 289-1F
STUDY 2-1-82-289
PLANNING AND MANAGEMENT

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
289-1F		

4. Title and Subtitle	5. Report Date
Strategic Planning and Management Concepts: An Application to the Texas SDHPT	November 1982
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Emily Braswell and Dock Burke	Research Report 289-1F
9. Performing Organization Name and Address	10. Work Unit No.
Texas Transportation Institute The Texas A&M University System College Station, TX 77843	11. Contract or Grant No. Study 2-1-82-289
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Final - September 1981 November 1982
Texas State Department of Highways & Public Transportation P. O. Box 5051 Austin, TX 78763	14. Sponsoring Agency Code

15. Supplementary Notes

Research Study Title: Strategic Planning Methodologies and Variables

16. Abstract

This report presents concepts, processes, and organizational approaches that may be applicable to SDHPT planning. Private sector case studies were reviewed and some public agency strategic planning efforts were analyzed. The interaction between budgets and strategic planning is emphasized. The importance of top management's role in strategic management is analyzed. Impediments to successful implementation and control are suggested.

17. Key Words	18. Distribution Statement
planning, management, strategic, transportation, public agency	No Restrictions. This document is available to the public through the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	74	

Form DOT F 1700.7 (8-69)

STRATEGIC PLANNING AND MANAGEMENT CONCEPTS:

An Application to the Texas SDHPT

(Report 289-1F)

by

Emily Braswell
Dock Burke

In Cooperation With

Texas State Department of Highways and
Public Transportation

November 1982

Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843

DISCLAIMER

The authors are wholly responsible for the views, interpretations, and analysis in this report. Any errors or omissions are also the responsibility of the authors.

ACKNOWLEDGEMENTS

The authors are grateful to Messrs. Marcus Yancey, Phillip Wilson, Tom Alford, and John Barker, all of SDHPT for their support in this research effort. Ms. Sue Freedman of TTI typed the manuscript and deserves our thanks for her help.

On October 1, 1982, Ms. Braswell became the Transportation Planner for Victoria, Texas.

Dock Burke
Emily Braswell

IMPLEMENTATION

The work reported here is being guided by the SDHPT's D-10 (SP) section for use in its on-going strategic planning efforts. Additionally, the strategic management process is an aspect of the organizational emphasis being pursued by SDHPT's Administration.

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INTRODUCTION

Management style, process, and structure have been key factors throughout the history of private and public institutions. In the late nineteenth century, following the industrial revolution, firms were primarily entrepreneurial with fairly common goals--to stake-out a market share and to establish the production and organization technology to maintain and increase that share. Power was concentrated in the hands of the owner/manager and decisions and planning were solely his responsibility.

With the coming of mass-production, the focus shifted to producing and selling the "most at the least cost," which is still a fairly straightforward goal structure. The increase in size and process complexity did force some entrepreneurs into delegating decision-making, but the trend was still entrepreneurial. In the 1930's, producing and selling the most at least cost was replaced by the need for greater product differentiation, because people no longer wanted only one choice in the marketplace. As the various markets reached saturation, firms were forced to begin paying more attention to consumer demands and desires. This shift from a product to a consumer emphasis was slow and often painful, but by the mid-1950's, most firms had made the change. After the 1950's, in what Ansoff calls "the Post-industrial Era," changes became more frequent, more complex, and more certain (1). No longer would one philosophy replace another. Inflation, governmental regulation, international politics and economics, consumerism, technological breakthoughs - all of these added to the complexity of the corporate

environment. From this turmoil, as managers attempted to deal with the growing complexity of their internal and external environments, the concept of strategic management emerged.

In their article, "Strategic Management for Competitive Advantage," Gluck, Kaufman and Walleck describe four evolutionary phases of strategic management: 1) Basic Financial Planning; 2) Forecast-based Planning; 3) Externally Oriented Planning; and 4) Strategic Management (6). Mintzberg's article "Strategy Making in Three Modes," identifies three possible modes of planning: 1) Entrepreneuerial; 2) Adaptive; and 3) Strategic Planning (12). The evolution in each of these classifications is from a single source of authority to shared authority; from reaction to proaction; and from piecemeal to coordinated planning. The underlying assumption is that surveying the environment and predicting significant changes is not only possible, but will allow the firm to progress toward its goals. Although there is some question of whether coordinated planning is a factor in an organization's success, it is generally accepted as a working premise. Even when radical changes occur that have not been foreseen, the existence of a planning mechanism and planning data base can be used in meeting the unforeseen situation.

Although most of the research and practice of strategic management has been in the private sector, there is a corresponding need for it in the public sector. The increasing complexity in governmental agencies has at least paralleled that in the private sector, and may well have outstripped it. In the nineteenth century, much of what is now considered governmental responsibility did not exist or was the responsibility of private citizens and charity. In transportation,

getting from one place to another was primarily a private problem with some government aid in the form of land grants and the granting of the right of eminent domain to the railroads, once the possibility of a network of canals and railroads came into being. The problems of environment were confined to the few industrialized cities, and there was plenty of room to expand if the physical environment was exhausted or fouled. Charity was still a private affair dealt with by citizens or a local charitable organization if necessary.

In the twentieth century, transportation is supported by such massive programs as the Urban Mass Transportation Authority (UTMA) and the Federal Highway Administration (FHWA), as well as state transportation departments and local transportation authorities. The physical environment has itself become a critical political issue with departments ranging from the Department of Energy to the Environmental Protection Agency. Charity is now called public welfare and handled through the Federal Department of Health, and Human Services (HHS) and welfare departments in every state.

In the five years between 1974 and 1978, Congress adopted no fewer than 25 major pieces of regulatory legislation, many of which authorized or required major new regulatory bodies. Since 1959, the number of white collar government employees rose 44 percent (4). The areas of governmental concern have grown. Unfortunately, governmental efficiency and effectiveness have not always kept pace with bureacratic growth in numbers and power. Federal and State efforts to reduce governmental spending and employees are attempts to scale down the problem to manageable terms. At the same time, better management

techniques are needed for the public sector to help solve the problems of public sector proliferation and the need for better management.

Purpose and Objective

This report was prepared in response to a request by the Texas State Department of Highways and Public Transportation (SDHPT) for information regarding strategic planning methodologies and variables. The objective of this report is to provide an overview of strategic planning and its potential in the management of a state transportation agency such as the Texas SDHPT. The final report reviews the history of strategic management, private and public sector case studies, and performance measures. It includes background information on the administrative organization of the Texas SDHPT, the history and components of strategic management, as well as implementation and control measures.

SDHPT Background

The State Highway Department of Texas was first created when Governor James E. Ferguson signed House Bill 2 on April 4, 1917. Under this Bill the administrative control of the Department was vested in the State Highway Commission, which is composed of three gubernatorial appointees. The Commission was to formulate policies and plans for locating, constructing and maintaining a comprehensive system of state highways and public roads not only in cooperation with the counties but also under the direct supervision of the Highway Department. The Commission was also responsible for appointing

a State Highway Engineer to carry out the policies and direct the work of the Department.

When the Department was established, it consisted of the State Highway Engineer, a Chief Office Engineer, two Chief Clerks, and three Division Engineers-at-large. At the time that Chief Office Engineer was responsible for organizing the Engineering Department and preparing all forms and specifications. The three Division Engineers-at-large supervised field work in six geographic regions established by the Highway Commission.

Through the years the Department has undergone many changes in order to meet the changing transportation needs of the people of the state of Texas. The current (1981) organization of the State Department of Highways and Public Transportation (SDHPT) includes 14 Divisions in the main office, the State Engineer-Director, a Deputy State Engineer-Director, an Assistant State Engineer-Director, 24 geographic Districts, and the Houston Urban Project.

The reponsibilities of the Department have expanded to include: development of public transportation in Texas including provision of state funds to assist local governments in financing transportation capital improvements; the local sponsorship of the Gulf Intracoastal Waterway in cooperation with the U.S. Corps of Engineers; and the duty of assisting in prevention and cleanup of oil and other hazardous liquid spills in Texas coastal waters.

In 1975, in response to this trend of expanding responsibility, increasing costs, decreasing revenues and greater demands for

improving the existing highway system, the SDHPT adopted a system approach to highway planning which required a 20-year system plan. The Twenty Year Project Development Control Plan (PDCP) provided a framework for orderly, systematic planning, development, and control of construction projects by scheduling SDHPT's design and construction activities over varying time horizons, thereby optimizing the available manpower, materials, equipment and funds.

More recently the PDCP has been supplemented by the SDHPT's Operational Planning Study to give fuller definitions to the magnitude of the department's needs and requirements for the next 20 years.

STRATEGIC PLANNING AND MANAGEMENT

Definition and Purpose

Strategic planning is a comparatively new idea developed in private and public organizations within the past fifteen years to help in corporate decision making. (13). The eight step process for strategic planning is an adaptation of the basic planning process:

Basic Planning	Strategic Planning
Problem Identification	
Goal Formulation	
Data Gathering	Internal Analysis
Data Analysis	External Analysis
Alternative Formulation	Strategy Formulation
Alternative Selection	Strategy Evaluation
Implementation	
Review and Update	

The principal difference between the two processes is the scope of interest. The strategic planning process is centered around the issues, opportunities, ventures or threats that involve the individual organization with others. (15). Formally, strategy is the science or art of military command applied to management. It is the overall planning and conduct of the large-scale operations that must be faced in handling risk and uncertainty. Strategic planning concerns itself with the effects that present decisions will have on the organization in the future, taking into consideration the cause and effect relationship of those managerial decisions.

An effective strategic plan will be based on certain decisions

and assumptions, and will answer certain questions about the organization and its future. The following questions make up a preparation and effectiveness checklist for agency strategic planning:

1. What future is desired for the organization?
2. What unique resources and skills does the organization have, and will it have them in the future?
3. In what segment of the environment is the agency, and where will it be in the future?
4. What is the best avenue for achievement of objectives and goals?
5. What if the environment changes?
6. What is necessary for implementation?
7. After evaluation, what changes need to be made and how will they be made?

As a planning tool, strategic planning is a procedure for identifying future threats and opportunities, evaluating alternative courses of action, setting aims, defining strategies, and developing implementation plans. Because changes in the environment are continuous, strategic planning is not only an ongoing procedure, but an outlook for the future through which strategic plans, medium range programs and short range budget/operating plans are coordinated. Large organizations with several divisions need this coordination to keep the separate parts moving forward together smoothly. As Steiner stated in his Strategic Planning: "Strategic planning is the systematic and more or less formalized effort of a company to establish basic company purposes, objectives, policies, and strategies and to develop detailed plans to implement policies and strategies to achieve objectives and basic company purposes." (17).

As a technique for formulating possible future scenarios, strategic planning creates or identifies a series of key questions, ranks them, and answers them in order of importance to the organization. These questions may range from generalities about the company's main goals and purposes to more specific questions to identify major competitors or other opportunities or threats. Answering these questions requires a new set of decision-making tools:

1) Simulation of the future on paper where it is reversible;

2) A system approach for looking at sub-units together not in isolation;

3) Management objectives;

4) Self analysis of strengths and weaknesses;

5) A uniform framework for decision making throughout the company;

6) A base for other management measurement;

7) Standards for performance measurement;

8) Identification of issues of immediate or potential importance.

The essential elements in providing the necessary tools are much the same as they are in any planning process whether formal or informal:

1) setting goals and objectives;

2) assessing and forecasting the external environment, such as economic growth, inflation rates, changes in government regulation, and exchange rates;

3) designing and assessing alternative courses of action;

4) selecting the best course of action; and

5) evaluating the results.

Because every structure has a dynamic relationship with the rest of the world, this process must be continuously updated.

A Case Study: Department of Defense

One of the earliest public sector agencies to begin strategic planning was the Department of Defense. (7). In 1961, Secretary McNamara instituted the Planning, Programming and Budgeting System (PPBS) to provide a formal, systematic method for decision-making in resource allocation.

The three major operational areas of PPBS are structure, analysis, and information. The functions that come under structures are to define objectives, determine programs, assign program activities and establish the PPBS cycle. Analysis requires the development of cost/benefit measurement methods, identification and evaluation of alternatives, and development and application of criteria. The information aspect of the PPBS involves the use of existing reporting systems and the update of programs. (See Figure 1)

Since the DOD receives its policy guidance from the President and its monies through the Congress, it is involved in three operating cycles at any one time:

1) the current year operating budget;

2) preparation for next year's budget; and

3) long-range planning for the budget year after next.

The budgeting process is used as an implementation tool for program decisions which are based on program objectives, long-range programs, program cost, and analysis of program alternatives. The

Operational Areas	Major Features	Resulting Documents
Structure	Define Objective Determine Programs Assign Program Activities Establish PPBS Cycle	Multi-year Program and Financial Plan
Analysis	Develop cost/benefit methods Identify and evaluate Alternative Develop and apply Criteria	Alternative Program Memoranda Issue Papers Special Studies
Information	Use Existing Reporting System Update Programs	Accounting and Statistical Reports Program Changes Proposals

Figure 1. PPBS Features: Department of Defense

formal planning cycle is initiated by the President. The Office of the Joint Chiefs of Staff (JCS) is charged with strategic military planning for the Secretary of Defense through the Joint Strategic Planning System (JSPS). This is a part of PPBS and includes the following seven documents that are reviewed, updated and revised yearly:

JIEP--Joint Intelligence Estimate for Planning
JLREID--Joint Long Range Estimative Intelligence Document
JLRSS--Joint Long Range Strategic Study
JSOP--Joint Strategic Objective Plan
JFM--Joint Force Memorandum
JSCP--Joint Strategic Capabilities Plan
JRDOD--Joint Research and Development Objectives Document.

The first three documents--JIEP, JLREID, JLRSS--furnish background information for planning. The JSCP and the JSOP are the specific plans which are used to advise the President and Secretary of Defense on strategy for reaching national security objectives. Both are used to provide mid-range planning guidance, although the JSCP is a 2-year plan, and the JSOP is a 2-10 year plan. The Joint Force Memorandum (JFM) gives Joint Chiefs of Staff a more detailed account of capabilities, inherent risks, and major force issues requiring decisions during the current year. (Figure 2).

The effectiveness of the Joint Planning System is rooted in its capability to tie planning to fiscal responsibility and to provide a systematic approach for bringing decisions to the appropriate decisionmaker. It also forces people to consider the future and allows for integration of information from the field commands. Unfortunately, some serious weaknesses hamper the JSPS:

1. Advisory relationships among the services, and between the Office of the Secretary of Defense and the services

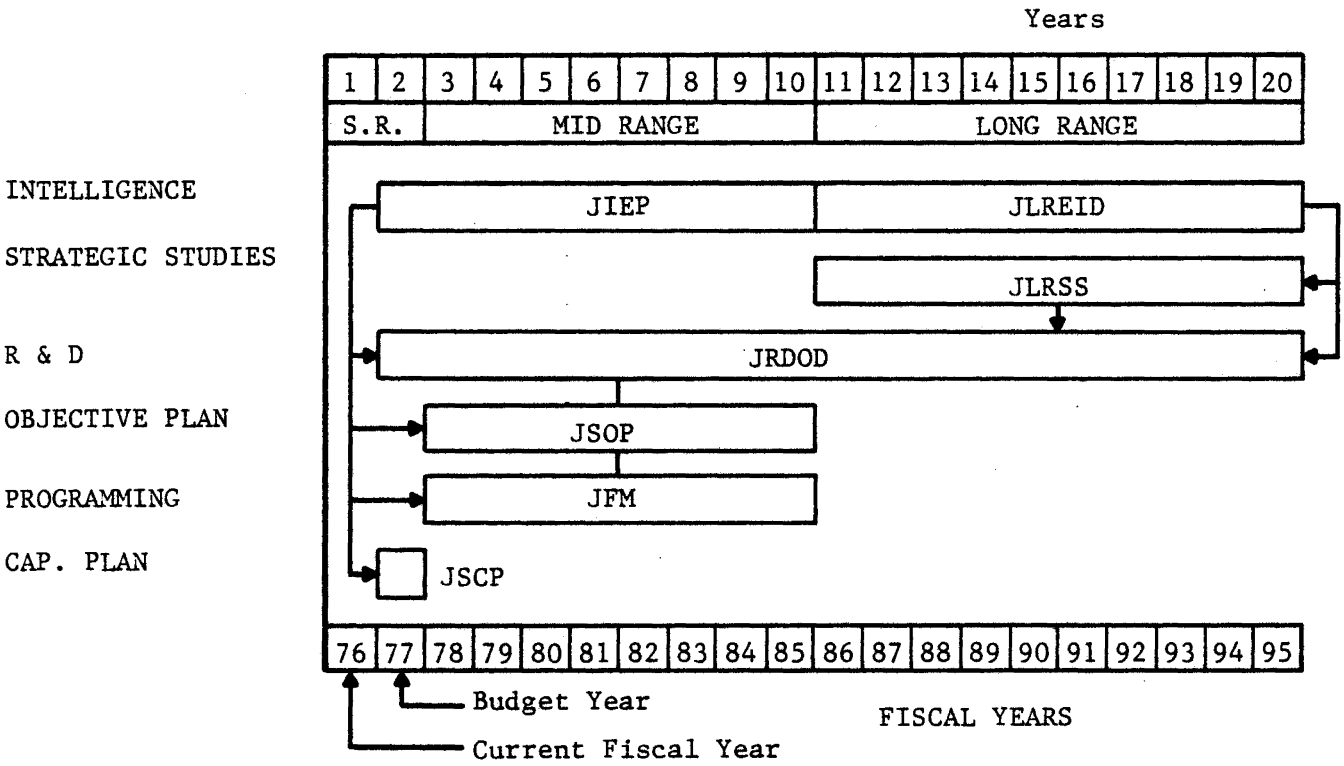


Figure 2. DOD Joint Strategic Planning System Document Interrelationships

cause inaccurate data to be provided in the attempt to justify funding;

2. Forecasts for out-years are frequently derived from straight-lining;

3. Poor coordination between the JSPS and the other elements of PPBS;

4. The budgeting process does not allow for lateral movement of monies between programs which would allow for contingency planning;

5. Information is not only inaccurate, but frequently out-of date, inaccessible or based on faulty assumptions;

6. No training is provided for people newly assigned to the PPBS of which JSPS is a part;

7. More emphasis is placed on budgeting than planning;

8. Many decisions are pushed to upper level management that could be made at lower levels; and

9. Decisions are frequently made before they reach the DOD.

A recurring theme in the deficiencies of the JSPS is the set of problems caused by poor information, internal and external power struggles, and the lack of sophistication in the planning part of the PPBS. It would seem that the decision making process within the Department of Defense should be revised to include shorter work cycles, more financial contingency planning, less frequent publication of some documents, more user input, and closer coordination. Establishment and communication of a firm set of values and goals throughout the organization with sufficient command support to assure implementation of them is also needed. (7).

A Case Study: Texas Instruments

An early proponent of strategic planning in the private sector, Texas Instruments (TI) is quite different--a high growth, technologically oriented corporation with diversified interests in industrial, government/military and consumer markets. (11). Operations are organized into four groups based, not on typical product lines or market, but on the basis of the function TI products and services have within a customer's processes or systems:

1. Materials Group - deals with products that would be raw materials for customer's production process;

2. Components Group - concerns products that are subassemblies in the customer's process or replaceable parts in equipment;

3. Equipment Group - produces machines that perform sensing or processing operations in the customer's service;

4. Services Group - provides systems support and services for a customer's operations. (Figure 3).

This structure requires frequent cooperative efforts among the four groups in the development and marketing of new services. The four principal groups are composed of major divisions and 77 Product Customer Centers (PCCs), which operate with their own short-term profit responsibility.

In order to manage rapid growth and innovation, TI developed a formal planning system--Objectives, Strategies, Tactics (OST). The system is based on a formal structure of hierarchical goals and takes the form of a statement of these goals at each of the appropriate levels of the organization. (Figure 4). The process begins with the corporate objective extending downward to business objectives,

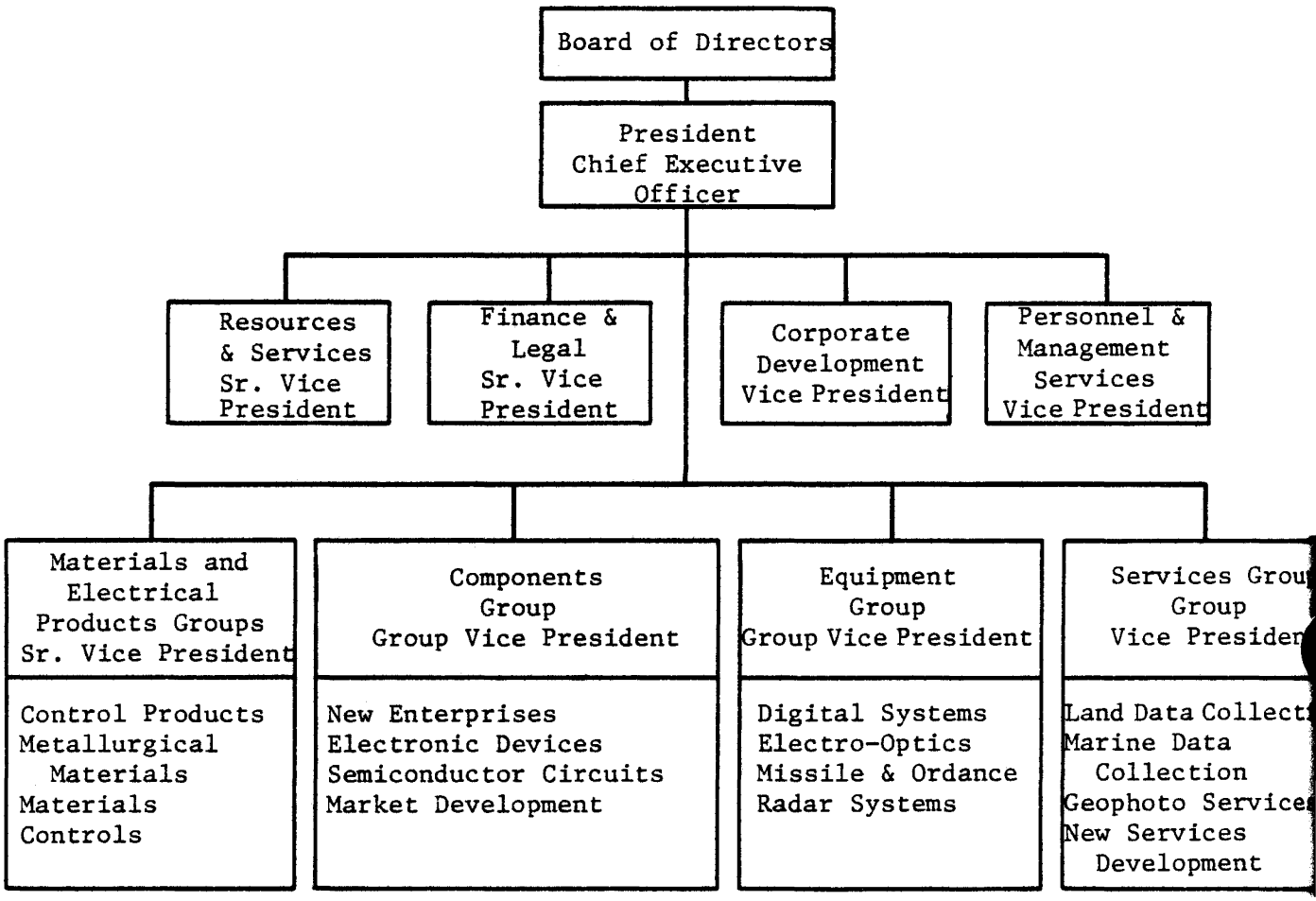


Figure 3. Organization Chart for Texas Instruments Incorporated.

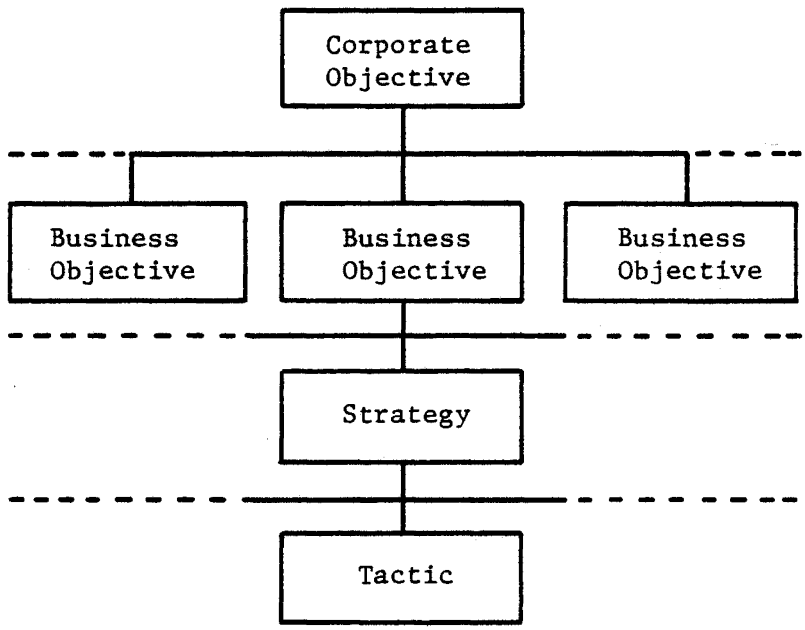


Figure 4. Texas Instruments: A Hierachy of Goals

strategies and finally tactics.

The corporate objective defines the reasons for the existence of TI and its economic purposes. Additionally, this objective encompasses direct product, market, and technical goals as well as TI's responsibilities to its employees, shareholders, and society in general. Business objectives consist of: 1) a business charter establishing boundaries, 2) an appraisal of perceived potential opportunities, 3) a study of technical and market trends, and 4) the overall competitive structure of industry serving the business. The next level in the hierarchy, the strategy statement, describes the business opportunity and environment to be pursued in support of the business objective. The final level in the goal hierarchy is the tactical action program, a detailed action plan of the steps for reaching the major long range checkpoints defined by the strategies. Figure 5 illustrates the chief differences in time frame, measurement and level of detail for each level in the OST system.

OST allows for planning, review, and control to cut across the operational and managerial structure of the four groups. Another advantage of this system is that management at every level is involved with both the strategic and operational modes. This aspect of OST, called "the two-hat" concept, allows for greater sensitivity in problem identification, objectivity in plan formulation and commitment to the overall plan. In order to further reinforce this dual strategy/ operations role played by management, incentive compensation systems were developed. Key personnel analysis provides a method for measuring each person's contribution to the firm for the purpose of

OST LEVEL	Critical Components		
	Measurement	Level of Detail	Time Frame
Corporate Objective	Financial	• Economic Purpose • Reason for Existence • Corporate Responsibilities	Continuing
Business Objective	• Profit • Sales • Share • Penetration	• Technical goals • Product Mix • Market Projection	Continuing
Strategy	• Progress Oriented • Milestones	• Quantitative Analyses • System and sub-system	5-10 years
Tactical Action Program	• Efficiency • Productivity	• Resource Allocation • Work Schedules • Personnel Responsibility	6-18 months

Figure 5. Components of OST Hierarchy: Texas Instruments

distributing bonus awards. The competitive environment that this creates is offset by a stock option earning per share plan that keeps everyone moving in the same direction while maintaining active internal competition.

To perpetuate OST as an integral dynamic process within TI, two operating committess were formed--the OST Committee and the Management Committee. The OST Committee, consisted of 13 members including the president and the four group vice-presidents, meets 18 times a year and rigorously examines at least one business objective at each meeting. Since each of the eight business objectives is reviewed at least once a year, and each of the TI managers has both strategic and operating responsibilities for at least one business objective, the OST process is a vital part of each manager's routine activities. The Management Committee has almost the same composition as the OST Committee, but it is charged with reviewing operational issues and allocating resources between strategic and operating modes.

In terms of planning cycle, the OST is the long range plan, with an annual budgeting and control plan which is a snapshot of one year of the long-range plan. Once the overall OST and operating expense budgets are set for the year, the detailed budgeting of future quarters begins. TI deals with the problem of interface in the planning/ budgeting link by starting with annual gross data 10 years out converting that to quarterly budgets for up to 10 quarters out and converting that to monthly forecasts for up to six months.

The main premise at TI is that long-range planning can be embedded within the primary operating organization without grafting elaborate methodology onto it. This has been implemented by creating the OST structure of goals, and superimposing it upon the existing organization. The process is formalized by an annual 3-day planning meeting each December at which each division manager, each PCC manager, each Objective Manager, and each Strategy Manager will speak. This helps keep the corporation knit together by keeping everyone up to date and working in the same direction.

Organization

Looking at these two examples (DOD and TI) of managerial practice, it is possible to see a wide variety in assignment of planning responsibility. The Department of Defense requires a highly-formalized system of joint responsiblity among the elected, appointed, and career professionals that comprise it. Because of this, the time necessary for the planning process is quite lengthy. This is necessitated by its function as a governmental organization that takes its authority from multiple sources. Texas Instruments is more able to streamline its planning procedures. Responsibility and authority flow from the CEO through the four group managers to the division managers and finally to the product customer center managers. Each of these managers is aware of the full planning process and participates actively in it. One of the chief drawbacks of the Department of Defense System is its piecemeal approach. There is little attempt to draw each manager into the goal formulation and

achievement process so that fragmentation and conflict are rife. One of the most important factors in a successful management system is the organization of the parts into a functioning whole.

As discussed previously, strategic planning is a specific method for making decisions in large organizations. Just as there are many kinds of organizations, there are many ways to organize and staff the strategic planning process. The responsibility can be assumed by top management or delegated to the general staff, a task force, a committee or line management. Optimum organization places the responsibility for plan development and plan implementation with the same group of people. Since line management is normally responsible for implementation, the ideal arrangement would be for line management to develop or be deeply involved in developing the initial plan. There are however, advantages and disadvantages to each method. If top management is not involved in the strategic planning process, important information regarding the external environment and organizational objectives is lost. Because of this, top management should always be involved with the process.

The chief drawbacks to strategic planning being a staff function are that management is removed from interacting in the planning process, and the responsibilities of developing and implementing the ultimate plan are thereby separated. Similar problems arise when a committee is responsible for developing the plan - the people who develop the plan may or may not have any influence on its implementation, and no one position has responsibility for the results of the plan. One compromise between the drawbacks of a committee or staff unit

having the responsibilities and those of the line unit or top management is the use of a task force of individuals selected from different divisions. Once an effective plan is developed and implemented the members of the task force return to their usual responsibilities. However, this does not provide for the ongoing part of the strategic planning process and serves mainly for the short range problems that arise.

Overall, the most effective organization for strategic planning is the use of both top and line management for developing, implementing and evaluating the final plan. The optimum planning methodology for the Texas State Department of Highways and Public Transportation (SDHPT) would be an iterative process which would include all its management levels. Although it would have to be started by top management, the follow through would have to come from every Division and District. Once the Commission and the Director have outlined the goals and objectives of the SDHPT, it is essential that management at every level from the resident and District engineers at each geographic location to the Division heads in Austin become involved. Once the overall goals and objectives are made clear, then each division and geographic location needs to have the opportunity to tell top management what it can do to help in meeting the Department's goals. Top management must then respond and make clear whether the section offers are acceptable. The process is iterative because the correspondence must continue until top management and each division and geographic location understand the mutual obligation, consequences and rewards of the final program. Another private sector firm,

Quaker Oats, has developed a process similar to this that might be adapted to the needs of the SDHPT.

A Case Study: Quaker Oats

When Quaker began long range planning in 1965, it was essentially the application of short range quantitative techniques to longer time frames. (11). The plans were primarily estimates of income and requirements of capital for the coming three years with emphasis on the first year--the last two years were little more than extrapolations of the first. Initially, both long and short-range planning were the responsibility of the director of corporate planning. But by mid-1968, responsibility for the annual two year plan was shifted to a newly formed department in the corporate controller's office: Profit, Planning, and Analysis (PP&A).

In 1969, the Vice President of Marketing Services, W. F. Guinne, was made Group Vice President of Corporate Development, and it was Guinne's belief that Quaker needed more strategic thinking in its plans. This would allow for more information regarding the rationale behind management's decisions and performance. In 1970, Guinne appointed Harry Ambrose Director of Long Range Planning, and Ambrose was instructed to work closely with PP&A in coordinating short and long term planning.

The expectations of Quaker's formal planning system are summarized below:

I. Purpose-

A. To develop agreement among divisional, group,

and corporate management on written goals and strategies based on projections of long term needs.

B. Identify future resource needs of skills, personnel, organization, finances, materials, etc., to allow for their development in an orderly manner.

II. The two-year planning effort was to remain substantially the same in concept, content and administration.

III. Time Frame and Content

A. The long range plan was to cover 5 years beginning after the current fiscal year, and to include the following-

1. Descriptions of current state of business and of each of its major functional areas;

2. Assumptions about future economy, social, and political environment, technological developments, and competition;

3. Recommended objectives;

4. Recommended strategies;

5. Identification of risks.

B. The plans were also to include a selected strategy with quantitative data defining the magnitude of growth, investments and risk. Alternative strategies were to be described along with the reason for selecting the recommended strategy. In the 5-year plan, greater emphasis was to be placed on written statements and recommendations. Data were provided to indicate the direction and magnitude of the strategies, rather than as an instrument for control or performance measurement.

IV. Responsibility for development

A. Divisional plans - Divisional vice presidents and/or general managers;

B. Group plans - group vice presidents;

C. Corporate plans - the president plus the two senior vice presidents.

V. Chain of Approval (Figure 6).

A. Group Management approves Division Plans.

B. The Planning Committee approves Group Plans.

C. The Executive Committee of the Board of Directors approves the consolidated corporate plan prepared by the planning committee (the CEO plus the 2 Sr. V.P.'s).

VI. Responsibility for Format and Administration (Figure 7).

Primary and collaborative responsibilities for the different planning efforts were assigned to the Long Range Planning Section and the PP&A section.

VII. Timing-For the first year both the two- and five-year plans were prepared concurrently from January through June and re-evaluated after year one.

VIII. Review

A. 5-year plan

1. Focus on the quality of current and previous analysis and conclusions, not numerical projections.

2. Reviewed by both the person who developed it and the person who approved it.

B. 2-year plan

1. Focus on achievement of plan goals.

2. Reviewed by the person responsible for running the area.

In his first year as Director of Long Range Planning, Ambrose wanted to accomplish a few limited objectives:

1. Establish the permanence and importance of long range planning.

2. Educate the participants in the rationale of long range planning.

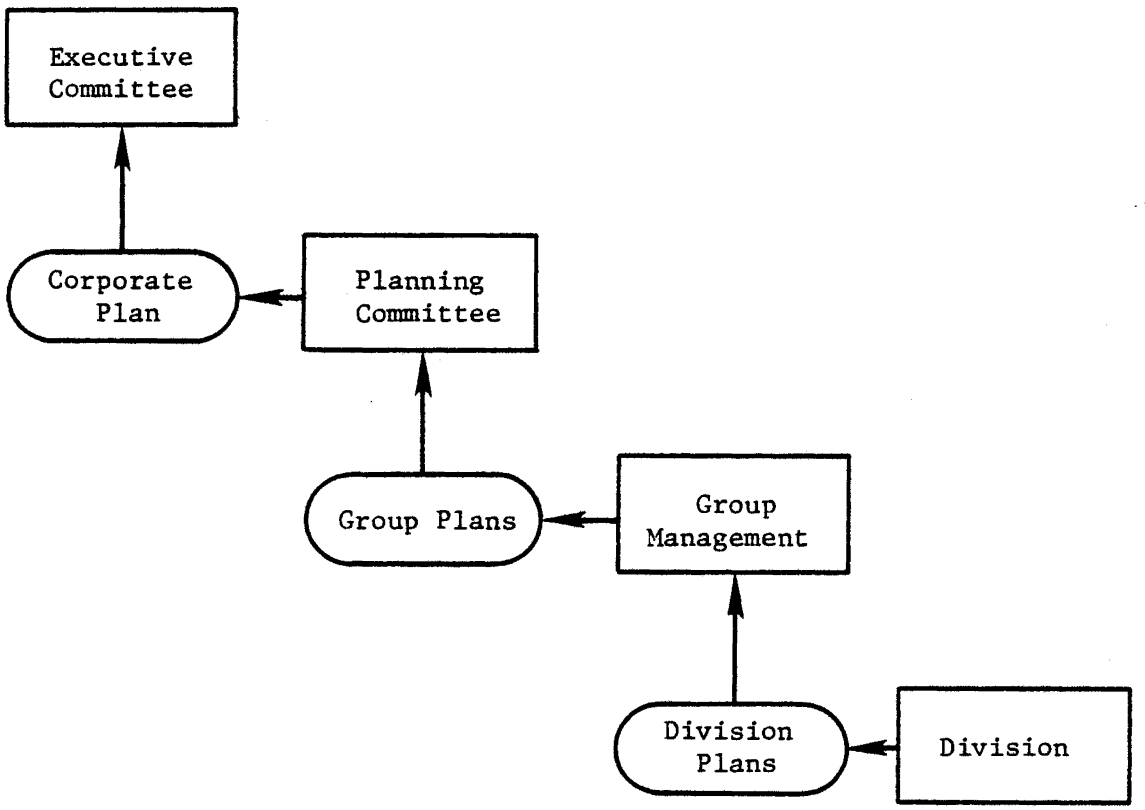


Figure 6. Quaker Oats Company Chain of Approval

Delineation of Responsibilities in Planning

	Two-Year		Five-Year	
	PP&A(1)	L-R P(2)	PP&A	L-R P
Develop manual	Primary	Collaborative	Collaborative	Primary
Develop financial format	Primary	None	Primary	Collaborative
Develop format for statement & recommendations	Primary	None	Collaborative	Primary
Provide financial back data	Primary	None	Primary	None
Coordinate planning	Primary	None	None	Primary
Consolidate into corporate figures	Primary	None	Primary	None
Critique plans	Primary	Collaborative	Collaborative	Primary
Identify deviations from plan	Primary	None	None	Primary

(1) PP&A-Profit Planning and Analysis under direction of Vice President-Controller.
(2) L-R P-Long-Range Planning.

Figure 7. Quaker Oats Company - Responsibility for Format and Administratio

3. Remove the notion that long range planning is simply an extrapolation of short term plans.

4. Establish a functional cooperative relationship with PP&A.

5. Develop the linkage between the long and short range plans.

Summary

Much of this could be directly adapted to existing SDHPT organization and practice. The purpose of the SDHPT's planning system could be taken almost verbatim:

A. To develop agreement among district, division and state management on written goals and strategies based on projections of long term needs.

B. Identify future resource needs of skills, personnel, organization, finances, materials, etc., to allow for their development in an orderly manner.

The time frame and content of the SDHPT planning process could be built around existing planning and binennial budgeting procedures to incorporate the 20-Year Project Plan, the 5-year letting plan, and the yearly advance letting forecast. Responsibility for plan development could rest on District Engineers for the district plans; Division Heads for division plans; and on the Engineer-Director, Assistant, Engineer-Director and Deputy Engineer-Director for department plans. The chain of approval would begin at the District level for District Plans and move upward to final approval by the Highway Commission.

A further refinement in the chain of approval is the concept of cluster planning based on the distinctive competence of the firm or agency. The cluster level of planning lies below the corporate (in this case, Department) level and above the divisions. The divisions

are clustered or segmented according to the specific services that each one offers. Although this will be discussed in detail in a latter section of this report, the main clusters of the Texas SDHPT are Construction and Maintenance, Operations, and Administrative Support.

Responsibility for format and administration might be handled jointly between top management and the planning division with the Engineer-Director and his staff assuming the role of the Long Range Planning Section (as at Quaker Oats), and the Planning Division assuming the role of the Profit Planning and Analysis Section (see Figure 7). Timing and review could be coordinated with the existing planning procedures to complement and aid them.

STRATEGIC PLANNING PROCESS

As illustrated in the forgoing case studies, the form and process of strategic planning and management vary widely in response to the needs of each organization. The purpose remains primarily the same....coordinated integration of the parts of the organization to address the risks and uncertainties of the future by taking informed positive action in the present. The Department of Defense attempts to do this through a highly formalized system of reports, which are primarily prepared by and administered from the top down. At TI and Quaker Oats, the approach is more from the bottom up with active participation in planning at all levels.

The process of planning is intimately connected with organizational structure; and whether "form follows function" or "function follows form," it is enough to say that they are, at least, interactive. Ideally, the planning process involves the identification and development of goals, assessment of the internal and external environments, formulation of objectives and strategies, and plan implementation, control and revision. Although goal development is the initial step in any planning process, it is seldom a clearcut or isolated step. Within each level of the organization, the perceived goals will affect and be affected by each step in the planning process. Perceived goals will affect the selection of variables for environmental analysis, and the results from the analysis will influence further goal refinement. Strategic planning is an iterative process requiring feedback and adjustment during each step and at each level.

Goal Development

A goal may be defined as a desired idea, action, or state of being. As such, it may be as broad as "better roads" or as specific as to increase revenue for the SDHPT. Goals may be set from a consensus of employees at all levels, by top management, by external forces, or by a combination of these. Texas Instruments operates under a hierarchy of goals beginning with the overall corporate objective and extending down to business objectives, strategies, and finally a set of tactical action programs (11). Quinn in his article, "Strategic Goals: Process and Politics," states that some managers prefer to reveal only a few broad goals rather than a complete goal package, because of the need to maintain flexibility and openmindedness. The few goals that are announced tend to help build a consensus and are broad enough to allow new opportunities and options to be explored in fulfilling them. (14).

In terms of Management by Objectives (MBO), a system of planning and review depends upon goals stated in specific operationally measurable terms (16). The MBO goal setting mechanism requires clear articulation of expectations from both the subordinate and the superior. To prepare for a goal setting meeting, the subordinate describes the objectives of his superior; determines the content of his own goals and the measures and levels to be sought; develops an action plan; and prepares his statement for his superior. The superior, in turn, develops goals he wants accomplished during the period being planned. In a joint goal setting meeting, agreement is reached on the subordinate's expected performance, and after the agreed time has elapsed, an evaluation meeting is held. Goal setting

in this manner can be a cumbersome task, but it is one means of actively involving every level in the goal development process.

Recently, the SDHPT Commission has adopted the following missions statements:

- To formulate plans and policies for the location, construction, and maintenance of a safe and comprehansive transportation network of state highways and public roads.
- To encourage, foster, and assist political subdivisions of the State in the development of intracity and intercity public and mass transportation.
- To administer and coordinate maintenance and operation matters concerning the Gulf Intracoastal Waterway for the State.
- To administer a continuing system for the recording of titles and registration of motor vehicles for the State.
- To educate the general public on the state transportation philosophy with emphasis on the acceptable balance between the environment and highway activities.
- To recruit, staff, train, and operate the Department in an efficient and effective manner while remaining responsive to the needs of the general public of Texas.
- To conduct continued research and development efforts designed to improve the construction and maintenance of the state transportation network.

Also, other goals or missions, probably exist in any established agency in the minds of the public, top management, and line management as well. Articulating and coordinating these perceived goals may lead to a more cohesive planning effort. Also, it may reveal areas of conflict that need greater attention. As was stated in an earlier section of this paper, many of the goals for the Texas SDHPT are mandated by the State Legislature or Constitution; but it might be useful for those mandates to be carefully studied and coordinated with other Department goals to clarify the present purpose and direction of the agency. One way of

achieving this would be at a general meeting of SDHPT officials much like the yearly meetings of the Texas Instrument's Division, Product Center, Objective and Strategy Managers. If goals are to be developed and pursued at each level of the agency, this would allow for the exchange of ideas and information, for consensus building and for a more cohesive planning process.

As goals of the Department are being established, it is important to incorporate as much information as possible regarding the internal and external environments. Although environmental analysis conceptually follows goal development, the input from the analysis can be invaluable in fine-tuning and giving direction to the goal development process.

Environmental Analysis

The two main tasks in preparing for strategic planning are development of clear analyses of internal and external factors. There are several decisions or assumptions that need to be made in the beginning of the process to help narrow the strategic possiblities:

1) Stakeholder identifications;
2) Stakeholder rank;
3) Stakeholder objectives;
4) Priority and stability objectives;
5) Results of change.

Once these initial decisions and assumptions are made, the strategic planning team is ready to go on the rigorous self-analysis of its skills and resources in meeting customers and competition.

Stakeholder Analysis

One of the most difficult tasks is identifying the stakeholder groups, their interest and their influence. A general list for the Texas SDHPT would include stakeholders in federal, state, county, and city government as well as non-governmental public entities, see Figure 8. Some of the stakeholders at the federal level are the U.S. Department of Transportation with special emphasis on UMTA and FHWA, the Department of the Interior, U.S. Army Corps of Engineers, Environmental Protection Agency and the Federal Aviation Administration. State level stakeholders are the Governor, Legislature, State Highway and Public Transportation Commission, the Department of Public Safety, and the SDHPT employees. At the local level, the county judge and commissioners, the Mayor or City Manager and the Council, the county and city engineer, and any regional planning council may all be considered stakeholders. The general public stakeholders such as taxpayers, various types of roadway users, general contractors, highway products and material suppliers, and the many special interest groups may also represent powerful influences.

After the stakeholders are identified, it may be useful to develop several scenarios in which the groups are assigned various amounts of influence and importance. For instance with the decrease in federal aid, it would be enlightening to develop scenarios in which varying levels of funding from federal, state and local levels were examined. Other scenarios might be developed around the changing status of energy, environmental and other economic stakeholders.

Federal

U.S. DOT
Dept. of Interior
U.S. Army Corps of Engineers
Environmental Protection Agency
Federal Aviation Administration

State

Governor
Legislature
Commission
Dept. of Public Safety
Employees - SDHPT
Other State Agencies

County and Regional

Judge and Commissioners
County Engineer
MPO
Transit Authorities
Councils of Governments
Port Authorities

City/Local

Mayor/Manager-Council
City and Traffic Engineer
MPO
Transit Providers

General Public

Taxpayers

Texas Motor Transport Association (TMTA)
Roadway Users
General Contractors
Highway Products Groups
Material Suppliers
Industry
GIWW User Groups

Texas Good Road and Transportation Association
Automobile Industry
Environmentalists
Agriculture
Commerce
Intercity Bus Industry

Figure 8. Texas SDHPT Stakeholders

Once the stakeholders analysis is complete and the initial decisions regarding their rank and objectives have been made, it is essential to go on to a more specific analysis of the organization's internal strengths and weaknesses.

Internal Analysis

The self-analysis is an assessment of the organization's past and present performance and its present position in the specified market. The aim in this process is to identify those skills and resources that are unique to the organization and will give it a competitive advantage. Examples of these are human and financial resources, physical assets, and intangible resources such as research and development capabilities. Once a realistic self-analysis is complete, the organization is in a position to identify the competition and measure their performance against the competitor's performance in the recent past and present. An example of an industry that neglected this important aspect is the railroad industry. Had they assessed their position within the entire transportation industry several decades ago, they would have recognized the importance of competition among the railroad firms. Taking a hard realistic look at resources, strengths, weaknesses, and competitive advantages usually indicates what can and cannot be done.

In analyzing case studies from both private and public sector organizations, it was possible to categorize several discrete sets of variables for the SDHPT analytical process. Internal variables fell into

three broad classifications which were further subdivided into 14 areas of inquiry (See Figure 9).

Each of these areas can be further subdivided into specific considerations. Organizational variables include agency size and structure, procedures for accounting, planning, marketing, production, hiring, and firing; as well as, personnel age and expertise, forecasting techniques, data sources, computer resources, and other pertinent data about structure and past performance. Political considerations include the degree of centralization, procedures for daily and specialized communications, goal and objective formulation, strategy types, and such economics/operations considerations as resource allocation, efficiency and availability, scheduling, project mix and budgeting procedures.

The results of the internal analysis can then be used in conjunction with the stakeholder scenarios to further refine goals, objectives, and strategies in light of the Department's abilities and limitations.

External Analysis

Once the internal self-analysis is complete, it is time to give careful consideration to the organization's position in relationship to its external environment. This analysis assists in setting goals in each of these essential areas:

1. Economic
2. Social
3. Political
4. Technological

ORGANIZATIONAL

- ORGANIZATION HISTORY (PAST PERFORMANCE)
- ADMINISTRATION
- PERSONNEL
- OPERATIONS/PRODUCTION
- INFORMATION MANAGEMENT AND AVAILABILITY

POLITICAL

- MANAGEMENT STYLE
- STATUS OF PLANNING
- GOALS AND OBJECTIVES
- INTERNAL POLITICAL HISTORY

ECONOMIC/OPERATIONS

- BUDGET DISTRIBUTION AND RESOURCES
- PROJECTS--EXISTING AND COMMITTED
- PROJECTS--FORECAST OR EXPECTED
- RESOURCE/NEED DISCREPANCY
- TECHNOLOGICAL CAPABILITIES

Figure 9. Internal Analysis Variables

The economic environment includes such elements as the GNP, interest rates, inflation, employment, factory outputs and other factors that not only affect the firm but the buying power of the consumer. The impact from these elements is exemplified by the effect of the energy crisis on state gas tax revenues. As fuel prices increased and vehicles became more fuel efficient less gas was consumed and less tax revenue was realized there by decreasing available funds while construction and maintenance costs were increasing.

In order for management to formulate a successful strategy, social indicators must be developed to aid in predicting the social dimensions of the external environment. Social indicators that are commonly used include population characteristics, family values, attitudes toward products, and toward work and management. In the past, social attitudes and values were fairly stable. Today, however, those values are more likely to change, are different from group to group, and require careful attention. One change is the attitude and relationship of the employee to the employer. Today, workers have a wider spectrum of interests outside work; it may not be the principal source of emotional, intellectual, or even economic gratification as it once was. There is increased interest in the four-day work week, increased insistence that firms assume a greater portion of the burden of improving social conditions, and a general increase in criticism of large business organizations by the public as well as the employees. For the Texas SDHPT, it was possible to identify three broad categories of external variables. Each of these three broad categories was then separated into five different areas of inquiry (See Figure 10) which can be further specified. For instance, under the political heading, considerations include the prevailing

POLITICAL

- NATIONAL
- STATE
- INDUSTRY
- PUBLIC RELATIONS
- LOBBYING

SOCIAL

- PRODUCT DESIRABILITY
- PRODUCT MARKET EVOLUTION
- WORK AND BUSINESS ATTITUDES
- DEMOGRAPHIC TRENDS
- DEMOGRAPHIC CHARACTERISTICS

ECONOMIC

- NATIONAL
- STATE
- INDUSTRY
- FUNDING SOURCES
- TECHNOLOGY

Figure 10. External Variables

philosophic atmosphere in local, state and federal government, the separate and combined effects of the three branches of government, the effects of specific agencies and people, existing conditions in industry, and interest groups on the public sector. Variables under the social heading include demographic trends and characteristics with emphasis on population shifts, manpower sources, age/sex distribution, rural vs. urban voting strength, auto ownership, transit ridership, labor force, and union vs. non-union statistics. Every category can be tailored to satisfy the needs or the organization under study, but these listed give a fairly comprehensive framework.

The critical areas of politics and technology cannot be overemphasized. Because political forces can influence strategy formulation and selection in so many diversified ways, it is essential to identify the source of the political force, how the force will be exerted and what results can be expected.

The technological environment is critical because of the ramifications of rapid change. When one stops to think that most of the products consumed today were discovered or developed in the last hundred years, the importance of this element is apparent. Advances in technology have been changing men's lives throughout human history, but never so rapidly as now. It is essential to have a thorough understanding of one's immediate and potential technological capabilities as well as those of his competitors.

Once all of these elements have been identified and the organization's position in relation to each of them is analyzed, the planning team has a common base of knowledge from which to work. The completion of the analysis of external variables provides the final refinements to the

scenarios that began developing during the stakeholder and internal analysis. Unfortunately, it is seldom possible to construct a complete base of knowledge that includes all characteristics of the environment; it is very important to have a reliable mix of individuals organizing the strategic plan. It is at this point that the previous discussion of organizational structure again becomes important. If the process does not include senior management, then valuable external information, understanding of goals, and the impetus of the program is lost. If the process does not include line management, then implementation and control of the plan will suffer. The aggregate of individual perceptions, interpretations, assumptions and efforts makes it possible to create a dependable and workable set of objectives that will be capable of covering any major area of conflict. (15).

Objectives and Strategy Formulation

The next step in organizing a strategic plan is the formulation of organizational objectives and strategies to achieve them. It is important that the objectives be realistic and fairly comprehensive in order to serve their appropriate functions:

1. To provide a standard measure of progress;
2. To be specific and measurable;
3. To unify long and short range planning;
4. To help identify the most efficient placement and utilization of resources;

5. To be acceptable to the staff;

6. To be flexible enough to be applicable to unforeseen circumstances, and firm enough to assure direction;

7. To be motivating and challenging, but realistic enough to be obtainable; and

8. To be set at least in part by the people who will have to implement them. (17).

The objectives form the network of subgoals that allow each part of the agency to function separately while maintaining integration and coordination with Department goals. Once the planning team has completed the process of self assessment and external evaluation and has formulated these objectives, it is time to start narrowing the field of possible strategies to the most appropriate ones. Once a strategy is developed, it should specify the individuals responsible for executing the plan, the resources required, a time period sufficient for completion, measurements for progress, and as much execution detail as possible. (20). Before plan implementation, however, the full spectrum of strategies should be examined for internal and environmental consistency, congruence with available resources, satisfactory degree of risk, appropriate time horizon, and workability. (18). If these six criteria are met, the set of strategies is much more likely to succeed. However, the meeting of these criteria may be more difficult in a heavily constrained environment such as that of the Texas SDHPT. Many of their responsibilities are set by the legislature while others are set by the Highway Commission in response to the needs of the people of Texas. Out of these responsibilities grow the goals, objectives and strategies of the SDHPT. Those set by the legislature include:

1. Construction and maintenance supervision of roads;

2. Making surveys, plans and specifications for all highway improvements;

3. Advertising and attracting traffic to Texas highways;

4. Encouraging the development of public and mass transportation in Texas and providing state funds to aid local governments in financing transportation capital improvements;

5. Local sponsorship of the Gulf Intracoastal Waterway in cooperation with the U.S. Army Corps of Engineers;

6. Prevention and cleanup of oil and other hazardous liquid spills in Texas coastal waters; and,

7. Administration of the Texas Traffic Safety Act of 1967.

The overall goal of the State Highway and Public Transportation Commission is to oversee the location, construction and maintenance of a comprehensive system of state highways and public roads in cooperation with counties or under direct supervision and control of the SDHPT.

Additionally, from the previously mentioned mission statements, the Commission has adopted ten goals to be implemented:

- To provide a safe and efficient highway transportation network for the people and communities of Texas.

- To provide assistance to the political subdivisions of the State for improving their public transportation network.

- To improve and expand the roadway roadside parks program and tourist services.

- To provide a statewide traffic safety program beneficial to the general public of Texas.

- To provide liaison and coordination for the efficient maintenance and operation of the intracoast waterway system.

- To provide efficient services associated with the state vehicle title and registration operations.

- To develop a department strategic planning document concerning the long range goals of the state transportation network.
- To educate the general public of Texas on the mission and services of the Department.
- To improve management and administration of all Department resources.
- To provide research and development efforts designed to improve maintenance operations of the state transportation network.

Implementation and Control

The final part of the strategic planning process can be the most difficult and challenging process of all. The implementation and control of the plan are complex, dynamic tasks that involve the entire organization. In a small organization, the problems may be easily manageable, but the larger and more diversified it becomes, the larger and more complex the implementation process becomes. (20).

Each part of the plan requires a detailed strategy which must be carefully scrutinized before it is placed into operation. The strategy should, at least, specify the process, and the staff necessary to achieving the goal. Figure 11 illustrates the process and staff used by the Florida DOT to support top management decision-making. (4). The process is initiated and coordinated by the Executive Committee. Unit heads identify needs, develop needs analysis, present alternatives and recommendations to the Executive Committee, implement the final plans, and provide feedbacks and adjustment to the process as necessary. The overall strategic planning/decision-making process appears in Figure 12. The responsibility for the DOT Planning process ultimately rests with the

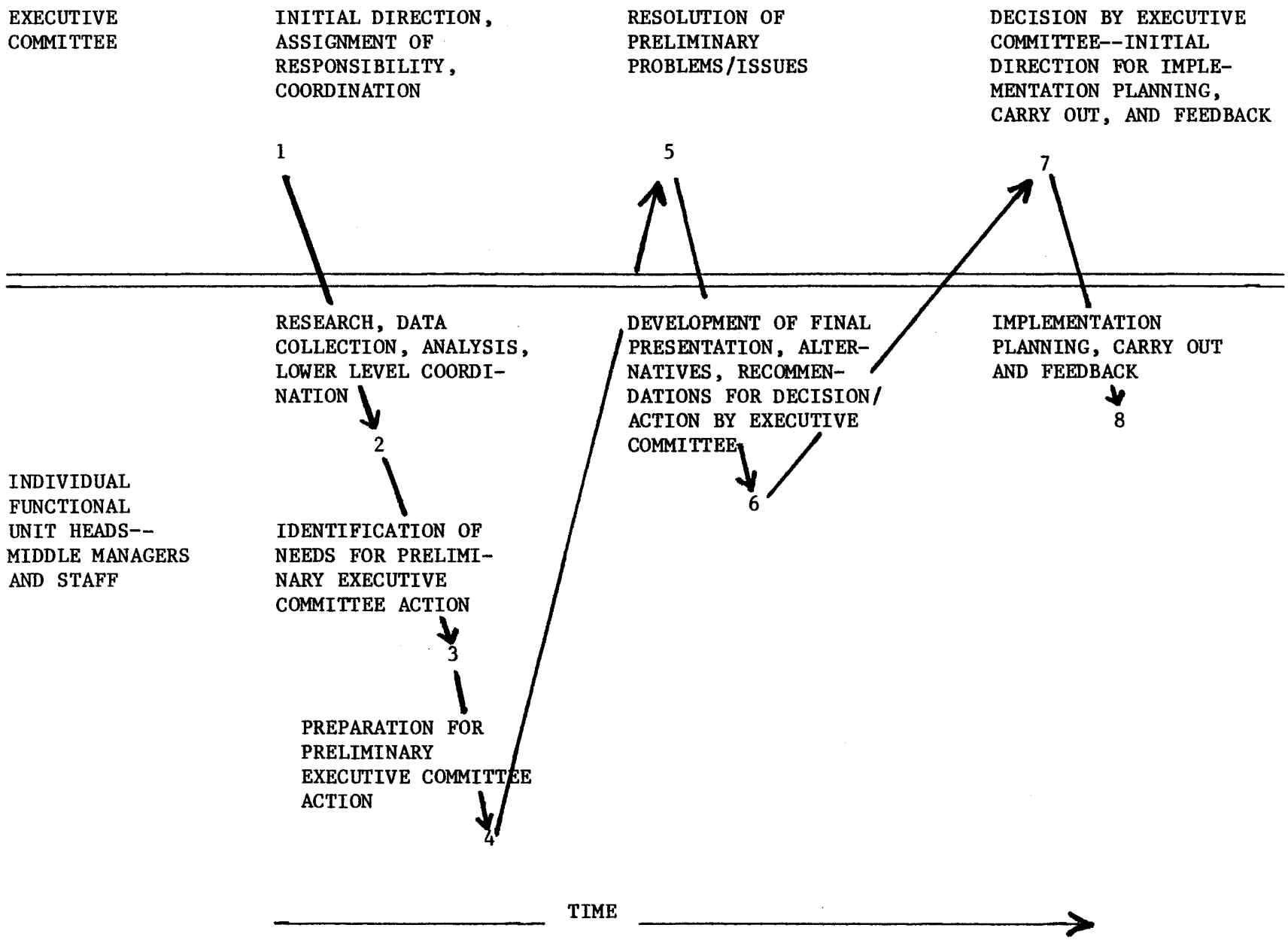


Figure 11. General Process for Staff Work to Support Top Management Decision-Making: Florida DOT

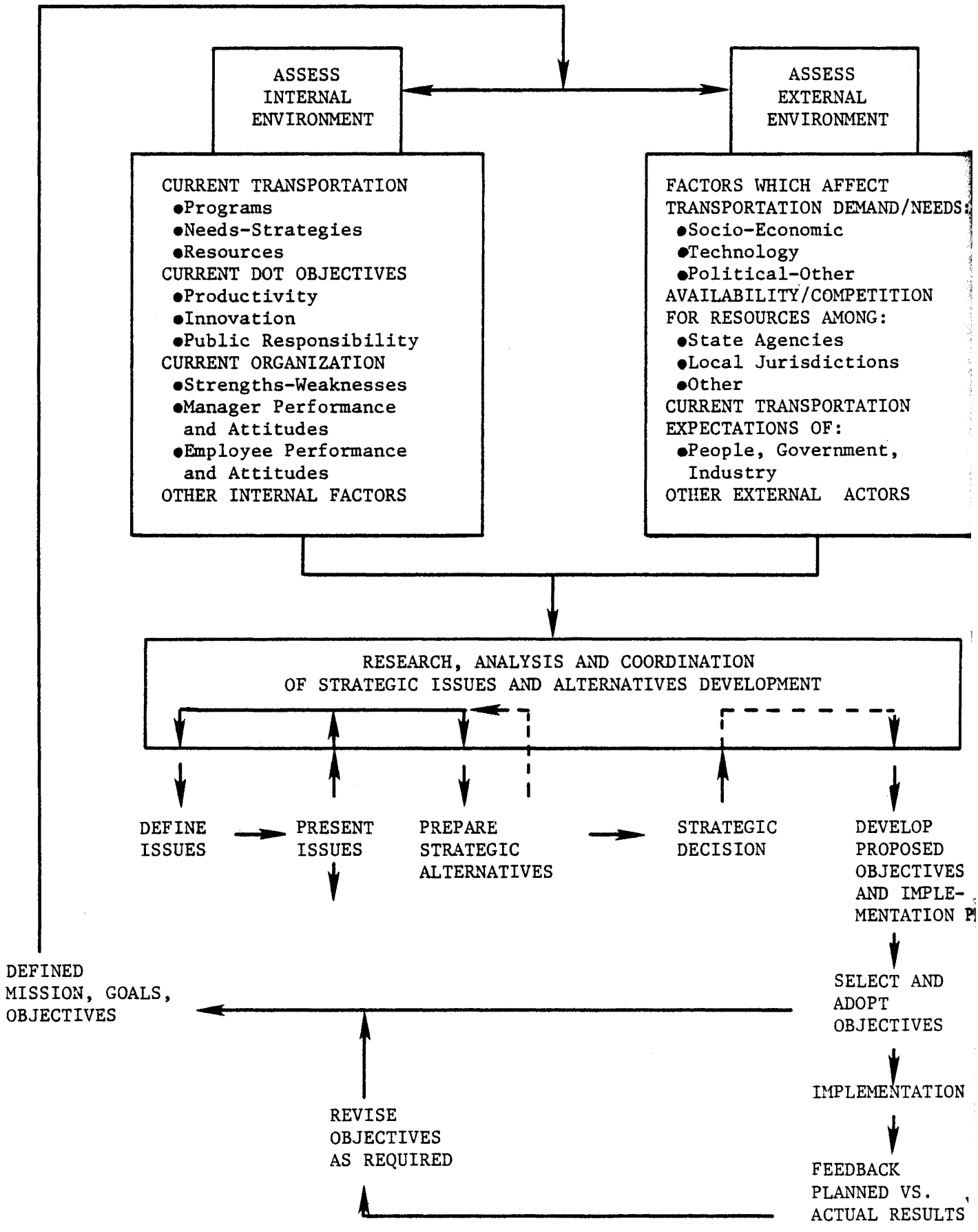


Figure 12. Florida DOT: Strategic Planning/Management Process

people's representatives in the legislature, but the daily operations are entrusted to the middle and line managers of the DOT. Figure 13 is a schematic of the Basis Mission, Goals, Objectives, Structure, and Definitions of the Florida DOT from the broad sweeping terms of the state legislature to the formulation of individual policy, and the gathering of information for the ongoing control of a specific activity.

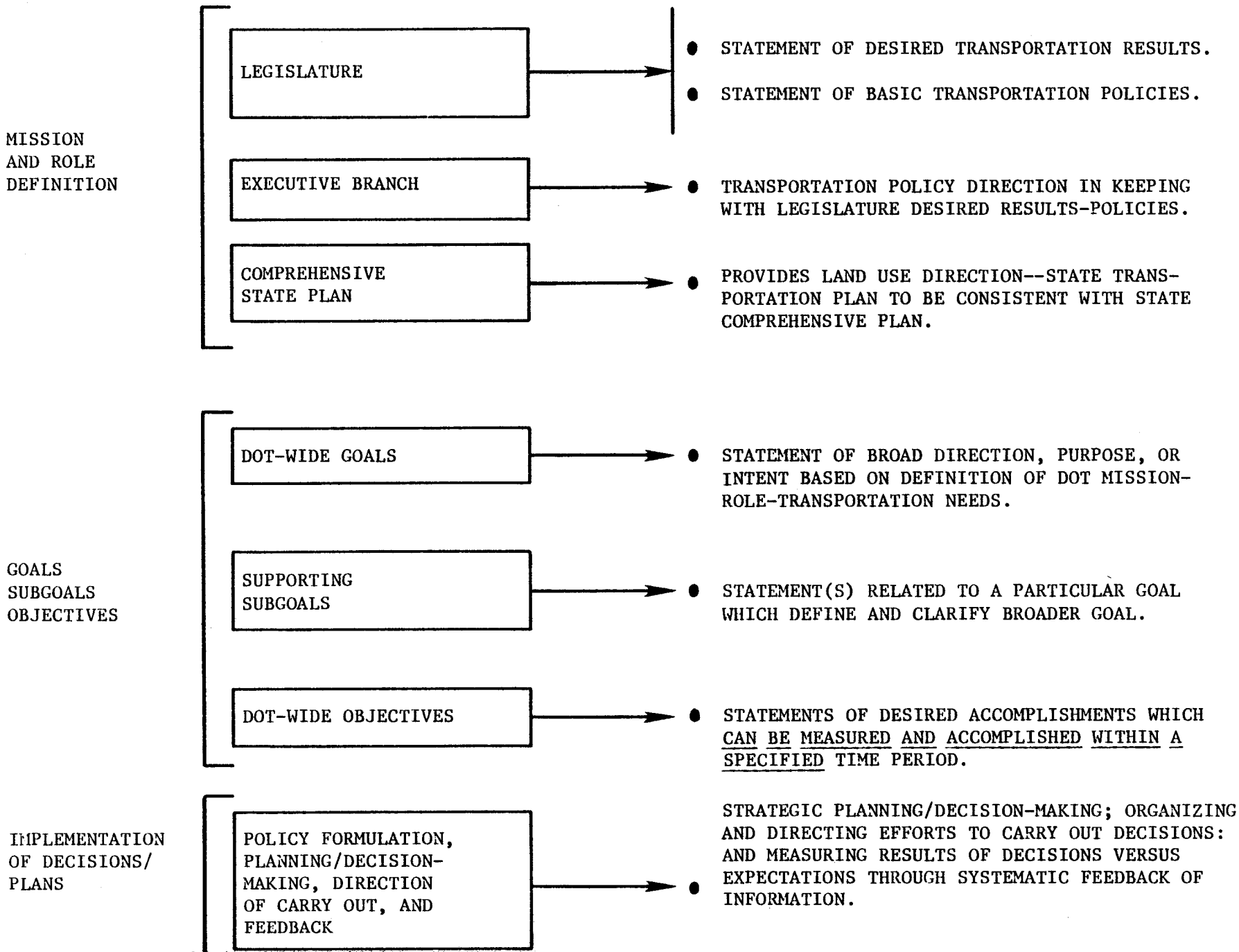
The final requirement for the successful implementation of a strategic plan is the method for controlling and adjusting the plan. Instigating and monitoring implementation require performance measures for every strategy in the plan. Without control, there is no way of determining plan effectiveness or necessary changes. If there are no carefully articulated qualitative or quantitative measures, the program may be unreponsive to changes in the internal or external environment. Performance measures provide a means for tracking both efficiency and efficacy.

Quantitative

Some of the more common quantitative performance measures are market share, profitability, productivity, value added, level-of-service, and plan-budget comparison. Qualitative performance measures include personal evaluation of internal conditions, public perception, level of service, and comparison of plan development to existing conditions.

In a government agency, market share and profitability are not directly applicable, although with study, adaptations may be found. However, productivity, value added and plan-budget comparison can be used

BASIC MISSION -- GOALS -- OBJECTIVES -- STRUCTURE -- DEFINITIONS



in both public and private groups. In the 1973 Summary Report from the Joint Federal Productivity Project, productivity measures are defined as score-keeping techniques that show what has happened expressed as resources expended per unit of final output. (8). Classic examples of this are number of units per man-hour, cost in constant dollars, and cost in current dollars. Some of the problems with these measurements are the lack of quality control, inconsistent definitions, data collection and manipulation procedures, and overlapping functions within a given productivity area. The first difficulty can be overcome by using a combination of quantitative and qualitative measures. The remaining two may be resolved by developing and implementing a set of measurements throughout the system.

In a study of transportation productivity measures, Winnie and Hatry (8) suggest seven areas for which measures of effectiveness might be developed:

1. Accessibility and Convenience;
2. Travel Time;
3. Comfort;
4. Safety;
5. Minimum cost to users;
6. Maintenance of Environmental Quality;
7. General Public Satisfaction.

This list illustrates the consideration of both quantitative and qualitative measures, the possible conflict between such areas as safety and travel time, and the difficulty in reducing services such as comfort and convenience into measurable input/output values.

Another type of quantitative performance measure is Gale's concept of value added per employee (5). Although this has not been adapted for public sector use, it could be done by comparing state or local level agencies with similar size, structure and purpose. Gale suggests comparing an organization's fixed investment per employee to that of similar groups. The process consists of calculating the dollar amount of plant and equipment per employee and comparing that ratio to similar organizations. The deviation can be considered a measure of operating effectiveness; unfortunately, it is a gross measurement and may not be capable of revealing what factors are significantly affecting an agency's effectiveness.

Another example of quantitative methods of measurement is the level-of-service (LOS) scale such as is used by the SDHPT to measure roadway LOS. A more recent use of this concept is in determining maintenance priorities. Maintenance levels-of-service are defined as threshold conditions for which maintenance is required. At the request of the National Cooperative Highway Research Program (NCHRP), Woodward-Clyde Consultants completed a study in Louisiana to establish maintenance levels-of-service. (10). According to the study in Louisiana, it is feasible to use this method to select level-of-service for highway maintenance to maximize user benefit given available resources.

The final quantitative performance measure, plan-budget comparison, is nothing more than the comparison of projected to actual figures. If the overall planning process is closely tied to the budgeting process, it will afford the opportunity to assess the success of the initial plan in terms of meeting objectives, budgetary constraints, and resource

allocations. It is a useful exercise, but it must be remembered that it is limited because neither the plan nor the budget may reflect important environmental changes.

Qualitative Measures

It has already been noted in the discussion of productivity that both quantitative and qualitative measures need to be used in order to achieve a true measurement of both efficiency and effectiveness. At the Smithsonian, institutional control is achieved primarily by relying on subjective evaluation methods. (21). In 1968-69, the Smithsonian conducted a year-long investigation of visitors to the National Museum of Natural History and the National Museum of History and Technology. Nearly 5000 visitor surveys were collected and summarized to provide a profile of the Smithsonian visitor which could be useful in directing marketing and expansion services. Methods of internal control include personal conferences, direct physical contact with each bureau, the number and amount of bureau grants and donations, and responses to questionnaires, meetings, memos. Other measures include numbers of visitors in total, and to each bureau or activity separately, and the number of research publications produced annually; however, primary emphasis is placed on internal subjective evaluation.

Another source of both quantitative and qualitative performance measures is from the internal and external environmental analysis. The variables that are important in making goals and projections can be used to check on progress toward those goals. Other sources include the

budgeting and accounting procedures, routine informational reports, and other existing data gathering activities. For the SDHPT, such reports include the quarterly Highway Cost Index and the data used in the Highway Economic Evaluation Model (HEEM), as well as the 20-year system plan, the five year letting plan, and the yearly advanced letting schedule.

One method for developing a coordinated set of control measures for the Texas SDHPT plan is the use of productivity measures in each of its functional areas. Historical study of previous ratios could provide valuable insight into the present relationships between the number of manhours expended in construction, maintenance and operations in rural and urban settings and in terms of total number of taxpayers, vehicles, and road-miles built or maintained. This could also be done with constant or current dollars to illustrate economic, as well as, labor efficiency.

The SDHPT budgetary process yields information that can be used in identifying performance indicators and measures. This information is presented in final form in the biennial budget estimates prepared for legislative and executive review.

Finally, any one of these or several other measures could be used at a micro-level within the Department to monitor individual, district, or division performance. Without this kind of control, it is difficult to tell how successful each part of the plan is, what parts of it need adjustment, and whether the plan is furthering the achievement of agency goals.

RECOMMENDATIONS

Methodologies and Variables

As it presently exists, the Texas SDHPT strategic plan incorporates the work of Camillus in conjunction with the National League for Nursing using the PLATO approach to design. (3). PLATO is an acronym for process, linkages, administration, timing, and output. The process is based around the opportunities and issues provided by the external environment and competition, and the capabilities and limitations of the internal environment and past performance. Linkages involve the structure, content, and timing of the process in and between the parts of the organization. Administration is the delineation of the system manager's role options, and time involves the planning horizon, frequency, span and sequence of outputs. The outputs of the process are the objectives, strategy, policies, resources and assumptions. Each of these is incorporated into an analytical framework to provide the ongoing planning function (See Figure 14).

Although the plan itself contains all the classical elements of strategic planning, it does not provide the mechanisms for implementing and or controlling the plan. The final section of this report is a synthesis of theoretical and case study methodologies and variables and the SDHPT's plan presented as a workshop for the development of a functioning strategic planning process.

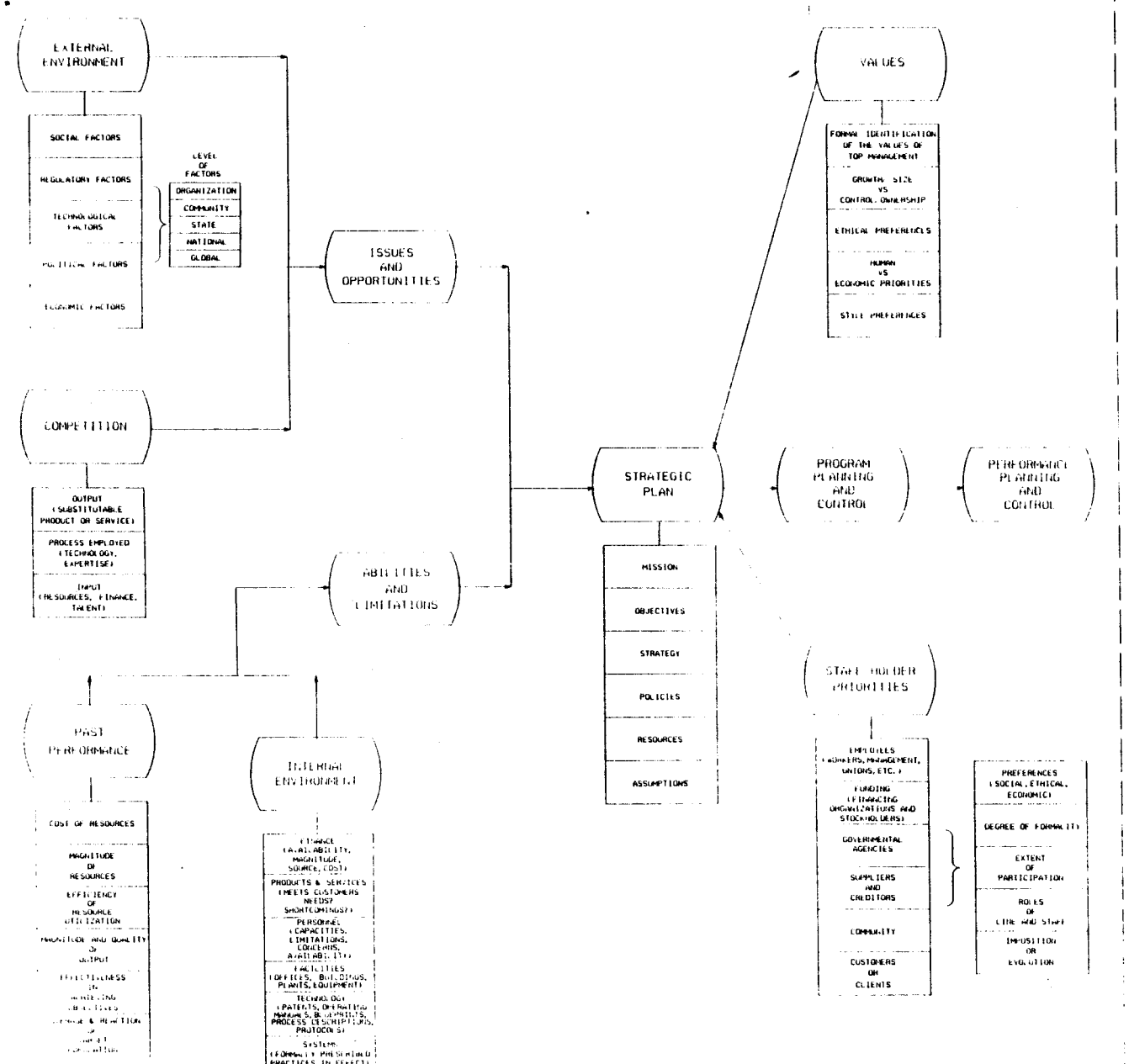
To facilitate goal development it is essential to determine what businesses the agency is in. One method for achieving this is segmentation of the agency into strategic activity units (SAU) that reflect distinct

Figure 14. TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

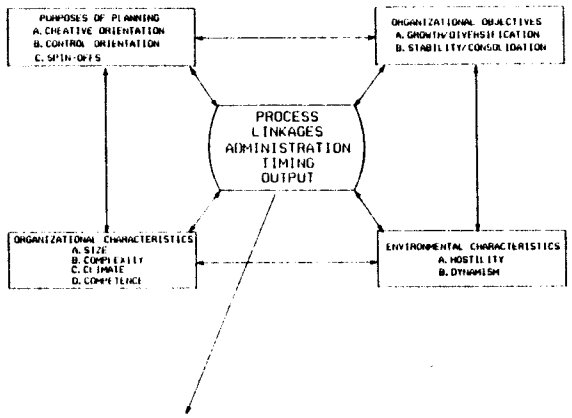
STRATEGIC PLAN

1983-1993

ANALYTICAL FRAMEWORK

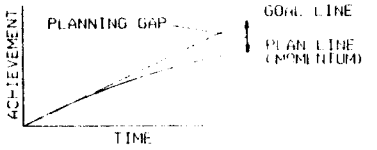


DESIGN



PLATO

1. PROCESS
   - A. WHO DOES WHAT
   - B. WHEN
   - C. SEE ANTALYTICAL FRAMEWORK
2. LINKAGES
   - A. TO WHAT DEGREE WILL STRATEGIC PLANNING AFFECT OPERATIONAL PLANNING AND HOW DETAILED SHOULD THE STRATEGIC PLAN BE?



3. ADMINISTRATION
   - A. PLANNING MANAGER (ACTIVE IMPLEMENTATION OF PLAN)
   - B. COORDINATOR (ASSURES SCHEDULES ARE MET, ASSIST IN PLANNING)
   - C. INTEGRATOR (INTEGRATES TOP AND MIDDLE MANAGEMENT)
   - D. FORECASTER (TECHNICAL OR ACADEMICALLY ORIENTED SKILLS)
   - E. CONSULTANT (DOES NOT INITIATE ACTION, INFORMATION ONLY)
   - F. INSTIGATOR (INITIATES CHANGE)
4. TIMING
   - A. HORIZON (HOW FAR INTO FUTURE)
   - B. TIME SPAN (HOW LONG TO PERFECT PLAN)
   - C. FREQUENCY (HOW OFTEN UPDATED OR REACCOMPLISHED)
   - D. SEQUENCE OF OPERATIONAL AND STRATEGIC PLAN (HOW STRATEGIC PLAN RELATES TO OPERATIONAL PLAN AND WHICH COMES FIRST)
5. OUTPUT
   - A. MISSION
   - B. OBJECTIVES
   - C. STRATEGY
   - D. POLICIES
   - E. RESOURCES

products or services offered to an identifiable group of customers in competition with a specific set of competitors. For the Texas SDHPT, the strategic activities could be conceptualized in several ways. As it is organized presently, the units are Administration and Operations, but this does not fully reflect the distinct services offered by the SDHPT. The following functional classification would allow for a more representative segmentation of the Department's businesses:

SAU 1 Pre-Construction
- D-10 Planning
- D-5 Bridges
- D-8 Highway Design
- D-15 Right of Way

SAU 2 Construction and Maintenance
- D-6 Construction
- D-9 Materials and Tests
- D-18 Safety & Maintenance Operations

SAU 3 Administrative Support
- D-3 Finance
- D-13 Human Resources
- D-20 Insurance
- D-19 Automation
- D-4 Equipment & Procurement
- D-16 Travel & Information
- D-12 Motor Vehicle

Once the actual planning has begun, this segmentation creates natural groupings for the discussion of shared resources and concerns, for data gathering and evaluation, and for the development of objectives, strategies and tactical action programs. Once the strategic activity units are identified, it is possible to involve representatives of each group in the identification and articulation of the agency's long-term mission (what businesses we are in now, and what we would like to be in for the long run), and determination of the driving force and strategic thrusts for the agency and each of the SAU's. Although the first three steps of

this process constitute the goal development part of the planning process, it is not possible to wait until it is over to start the environmental analysis. The gathering of data needs to be instituted as soon as top management has segmented functions into SAU's. A central information center will facilitate the analysis function, but the information must be readily available to each of the managers in the separate SAU's as the planning process moves from the theoretical statement of mission to the operational action programs. Once the long term mission and driving force are identified and understood, the division heads that make-up each SAU must begin refining those agency level plans into achievable strategies and action programs. It is at this point that the internal and external analysis become important inputs into the planning system. Each SAU group must meet and determine shared resources and concerns. If the division heads have not previously been able to specify important environmental analysis variables, it is their task to do so now. Three lists of variable categories from a previous section of this report can function as a starting point for this part of the planning process (Figures 15, 16, and 17).

Identification of stakeholders, their priorities, and internal and external variables will delineate much of the necessary information for the environmental analysis. However, these lists of variables should not be allowed to constrain free-thinking in the determination of information needs. They are provided as a guide for creating the most complete and efficient environmental analysis possible.

Another concept that can be of use at this time is that of "driving force." In their book Top Management Strategy, Tregoe and Zimmerman

Federal

U.S. DOT
Dept. of Interior
U.S. Army Corps of Engineers
Environmental Protection Agency
Federal Aviation Administration

State

Governor
Legislature
Commission
Dept. of Public Safety
Employees - SDHPT
Other State Agencies

County and Regional

Judge and Commissioners
County Engineer
MPO
Transit Authorities
Councils of Governments
Port Authorities

City/Local

Mayor/Manager - Council
City and Traffic Engineer
MPO
Transit Providers

General Public

Taxpayers

Texas Motor Transport Association (TMTA)
Roadway Users
General Contractors
Highway Products Groups
Material Suppliers
Industry
GIWW User Groups

Texas Good Road and Transportation Association
Automobile Industry
Environmentalists
Agriculture
Commerce
Intercity Bus Industry

Figure 15. Texas SDHPT Stakeholders

ORGANIZATIONAL

- ORGANIZATIONAL HISTORY (PAST PERFORMANCE)
- ADMINISTRATION
- PERSONNEL
- OPERATIONS/PRODUCTION
- INFORMATION MANAGEMENT AND AVAILABILITY

POLITICAL

- MANAGEMENT STYLE
- STATUS OF PLANNING
- GOALS AND OBJECTIVES
- INTERNAL POLITICAL HISTORY

ECONOMIC/OPERATIONS

- BUDGET DISTRIBUTION AND RESOURCES
- PROJECTS--EXISTING AND COMMITTED
- PROJECTS--FORECAST OR EXPECTED
- RESOURCE/NEED DISCREPANCY
- TECHNOLOGICAL CAPABILITIES

Figure 16. Internal Analysis Variables

POLITICAL

- NATIONAL
- STATE
- INDUSTRY
- PUBLIC RELATIONS
- LOBBYING

SOCIAL

- PRODUCT DESIRABILITY
- PRODUCT MARKET EVOLUTION
- WORK AND BUSINESS ATTITUDES
- DEMOGRAPHIC TRENDS
- DEMOGRAPHIC CHARACTERISTICS

ECONOMIC

- NATIONAL
- STATE
- INDUSTRY
- FUNDING SOURCES
- TECHNOLOGY

Figure 17. External Variables

identify driving force as "the primary determiner of the scope of future products and markets." (19). According to Tregoe and Zimmerman, the driving force may fall under one of nine categories:

1) Products offered
2) Market Needs
3) Technology
4) Production Capability
5) Method of Sale
6) Method of Distribution
7) Natural Resource
8) Size/Growth
9) Return/Profit

Once the agency has determined its long term mission, driving force is a useful concept for defining the issues that drive and change the mission of the agency, as well as its individual SAU's.

After the Department and each of the SAU's have sufficiently identified information and analytical needs, the long term mission and its driving force, it is time to begin defining the strategic thrusts for the next three to five years. It can and should be done in terms of the agency and each of its SAU's. The strategic thrusts should contain specific and meaningful planning challenges for each of the business units that can be turned into action programs for each division and district.

As an example of the process to this point, a sample mission statement, the driving force for the agency and each SAU, and the attendant strategic thrusts have been prepared:

I. SDHPT Mission Statement - The mission of the Texas State Department of Highways and Public Transportation is to facilitate the movement of people and goods in the state of Texas in a safe and orderly manner

through the construction, maintenance and operation of highways, bridges, waterways and public transportation.

II. SDHPT Driving Force - The driving force of the Texas SDHPT and each of its strategic businesses is market need (i.e. the transportation needs of the people of Texas).

III. SDHPT Strategic Thrusts - Strategic thrusts for the Texas SDHPT for the next 3-5 years include:

1) Satisfying Transportation Needs
2) Developing Revenue Sources (to meet the needs)
3) Developing/Discovering Technology (to streamline operations)
4) Dealing with Waterways, and Public Transportation, and other auxiliary operations.

	SAU 1 Operations	SAU 2 Construction and Maintenance	SAU 3 Administrative Support
Satisfying Needs	1	2	2
Developing Revenue	3	3	1
Developing Technology	1	1	3
Waterways & Public Transportation	3	1	2

Priority Assignment

1. Primary 2. Secondary 3. Minor

Other strategic thrusts might be new service development, lowering production costs, increasing quality, and greater decentralization.

Once the strategic thrusts have been identified, the division heads may begin to formulate a set of action programs for their respective SAU's. These programs should be in response to the strategic thrusts, internal abilities and limitations, and external issues and opportunities. Each program should specify its priority, total cost, manpower requirements, completion schedule, and the manager accountable for its execution (See Figure 18). As examples, action programs for SAU 2 might include an inventory of existing roadmiles with volume capacity ratios and condition ratings to determine the need for construction of new highways or reconstruction of existing highways. Further, SAU 1 might develop a tactical action program to streamline maintenance operations through improved equipment or techniques. There are many ways to respond to strategic thrusts and these depend on the imagination of the managers as much as internal abilities/limitations, and external issues/opportunities of the SAU.

The final part of the process, control and review, must be built in to each action program. Each program must specify the criteria and standards by which it will be judged. Periodic regular meetings of the division heads within each SAU should be scheduled to consider each of the strategic thrusts and the action programs attached to it. If responsibility and the means of control are made clear and enforced, the strategic plan will be an active part of the SDHPT.

STRATEGIC ACTIVITY UNIT: _____

PROGRAM DESCRIPTION	PRIORITY*	$ COST	MANPOWER REQUIREMENTS	SCHEDULED COMPLETION	RESPONSIBILITY
1.					
2.					
3.					
4.					

* Categorize priorities in accordance with the following:
A - Absolute 1st priority - postponement will significantly hurt our position
B - Highly Desirable - postponement will adversely affect our position
C - Desirable - if funds were to be available to enhance our position.

Figure 18. Specific Strategic Programs

Once the goals are developed, the environmental analysis is complete, and strategies have been developed and implemented, there has to be a monitoring/review process that is responsive to changes in the plan, the environment, or the goals of the organization. If the organization is truly moving toward a strategic plan and all parts of management are involved in the planning process and familiar with the plan, it is much more likely to be responsive. However, a formal review process is a necessary back-up to the informal responsiveness that develops when the plan is widely understood and supported. One way of accomplishing this is to schedule regular meetings of the Strategic Activity Units to review progress on the activity decision packages and the continued appropriateness of existing strategies. One or more of these meetings could also include development of new activity packages. A yearly meeting of all District and Division Heads with the executive staff would also facilitate the transition of the agency from Forecast-Based Planning to Strategic Management.

The most important part of the Department's transition centers around the need to involve all parts of the organization in setting and achieving goals. If the entire organization is motivated in the same direction in executing the activity decision packages in coordinated strategies then the Texas SDHPT will maximize its goal achievement in providing Texas with a safe, efficient, cost-effective transportation system.

Summary

Each of these procedures and programs forms a part of what is the SDHPT management system. What is lacking in this system is a means of

tying all parts of the system together. One way of accomplishing this synthesis would be an organizational and planning structure that would more closely match the budget format.

In their article. "Strategic Management for Competitive Advantage". Gluck, Kaufman, and Walleck describe four evolutionary phases of strategic managment: 1) Basic Financial Planning; 2) Forecast-Based Planning; 3) Externally Oriented Planning; and 4) Strategic Management. (6). Basic Financial Planning is characterized by annual budgets, a functional focus, and the overriding goal of meeting the budget. Phase Two (Forecast-Based Planning) will incorporate a multi-year budget, gap-analysis, static present-based resource allocation, and the need to predict the future. The Change from Phase One to Phase Two is usually a result of increasing internal and external complexity. Because of the complexity of the external and internal environment, most planning today is in Phase Two.

Phase Three focuses more on the external environment and manipulation of it to the agency's advantage. Externally oriented planning requires a thorough situation analysis, evaluation of strategic alternatives and a dynamic or "change" approach to resource allocation. The goal for phase three planning is to think strategically. The final phase, Strategic Management, is characterized by a strategic thinking capability throughout the agency. The purpose of the system is to create the future using a well-defined strategic framework that involves the total agency. In another article, Mintzberg traces management evolution through three phases. (12). Although Mintzberg's focus is somewhat different, he, too, traces the evolution of management from a single source of authority to shared authority; from reaction to proaction; and from piecemeal to coor-

dinated planning. Mintzberg's initial phase, the entrepreneurial firm, closely parallels the financial planning phase outlined by Gluck, et al. The focus is immediate and intense, the goals straightforward, and the planning fairly simple. Mintzberg's second phase, adaptive planning moves away from the single entrepreneur carrying all authority. As the environment becomes more complex, authority is delegated, the future is surveyed; multiple goals are developed; and the focus is on both the present and the future. Mintzberg's final evolution is the planning stage in which a strategic framework is developed to support a coordinated integrative and manipulative management system much like the Strategic Management of Gluck's Phase Four. The underlying assumption of both of these is that surveying the environment and predicting significant changes are not only possible, but allow the firm to progress toward its goals. Even when radical changes occur that have not been foreseen, the existence of the planning mechanism and a planning data base can be helpful in meeting the unforeseen situation.

Conclusions

Throughout this report, it has been the authors' intention to provide information and insight in terms of strategic management research, generally, and the Texas SDHPT, specifically. Some basic assumptions of strategic management are:

1) Management must create, facilitate and maintain the interface between internal and external environments;

2) The future can and should be planned for;

3) The environment can and should be interacted with and manipulated;

4) Management can and should be proactive in interacting with the environment in planning the future and monitoring progress toward the future.

Before a strategic management system can be successful, these assumptions must be understood and accepted throughout the organization. If management isolates planning from operations, implementation becomes impossible. If there is no interface between line personnel and top management's perception of the external environment, the plan will be misunderstood. And without understanding, there will be inadequate cooperation or cohesion.

It is essential to discover in what ways the internal and external environments can be controlled to produce the desired effects. Once management has identified suitable areas for improvement, then the possibilities for affecting the environment and the future increase. Strategic management is one way of doing that. Through a conscious effort to develop goals and strategies, aided by a thorough internal and external analysis, the organization can derive the necessary information and understanding to develop an ongoing plan by which to guide the organization from the daily decisions of the operations people to the less frequent but equally important decisions of higher level management.

One of the chief tasks of the Texas SDHPT in creating a strategic management system is to develop this internal cohesion and cooperation. One way of doing this is to build a set of goals that will act as a bond from the District level to the Engineer-Director's Office and the Commission. If everyone is working toward a common set of goals with a clear understanding of their importance and their intent, then turf protection, empire

building, and their attendant conflicts will be minimized. If employees feel that they have some control over the environment and the future (both individually and as an organization), they will be more cooperative and dedicated. If they are also made to feel that their opinions and skills are valuable parts of the organization, then management's job will be simplified somewhat.

One means of creating the management/operations, internal/external interface involves two changes in current SDHPT practice:

1) Planning and budgeting must be more closely tied; and

2) Top and line management must be involved at all levels of planning.

Both of these needs can be met with the creation of Strategic Activity Units (SAU's) based on the present budgeting format of activity decision packages. The Engineer-Director could head the combined Strategic Activity Unit of Construction and Maintenance. The Assistant Engineer-Director could head Highway Operations, and the Deputy Engineer-Director could head Administration and Support. This would allow for input from and to the budget at every level from District to Commission. The final outcome would be a far more cohesive, accessible system for administering and maintaining transportation in Texas.

Further Research

Over the last two decades research in strategic management has intensified in public and private agencies. This report is in response to an agency-specific request for information to aid in creating, implementing, and assessing a strategic management system. This report does

not include much data on current practice in similar transportation agencies. A further source of valuable information would be a questionnaire/interview survey of comparable state transportation agencies to determine the content, process, and success of their management systems. Examples of such agencies that have struggled with the problems of management are Departments of Transportation in California, Florida and Ontario, and the Port Authority of New York and New Jersey. With these agencies as points of departure, it would be possible to prepare questionnaires to elicit data on development processes, start-up time, content, implementation procedures, performance measures, and finally both subjective and objective evaluations of the success of their efforts.

As an outgrowth of this, or as a separate study, it would be possible to develop specific performance measures tailored to the Texas SDHPT. If the first study was completed, the cumulative data on performance measures in other states would be invaluable in the development of performance measures for Texas. It would allow for rapid development of controls, which could then be tested using historical data from other states, as well as Texas, for statistical significance. Once the measurements were in place, it would be necessary to monitor their effectiveness over time.

A final area in management that requires significant additional research is that of communication. It has been said that the communication aspect of management is the most important, but like the weather..."everyone talks about it, but no one does anything about it." A good management system requires a serious dedication to understanding both formal and informal communication, and the difference in communication on an abstract level, and information flows on a physical level. Both are quite important.

There are two approaches to studying and developing a Strategic Management Communication System:

1. Development, Implementation and Testing of a communication system for a specific agency; and,
2. Surveying existing communication systems in agencies of comparable size, structure and purpose.

Clearly, the latter study would provide pertinent data for the development of a specific system, but each study could be performed separately for their individual values.

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