Guide to Cost-Based Decision-Making

Office of the State Auditor
Lawrence F. Alwin, CPA

August 1995

Report No. 95-139

Guide to Cost-Based Decision-Making
Report # 95-139
August 1995
Table of Contents

Introduction and Overview 1

Chapter 1 - Developing an Activity-Based Costing System 5

Chapter 2 - Planning and Budgeting 23

Chapter 3 - Monitoring for Efficiency, Quality, and Effectiveness 47

Chapter 4 - Pricing 75

Chapter 5 - Outsourcing and Consolidation Decisions 87

Appendices:

A - Conducting Random Moment Time Studies 103
B - Developing a Detailed Process Flowchart 107
C - Discount Rates 119
D - Glossary 123
E - Bibliography 129
F - Acknowledgments 137

Introduction and Overview

Introduction

The accompanying *Guide to Cost-Based Decision-Making* is designed to assist state agency management in developing more comprehensive cost accounting information. Such information should enhance the ability of decisionmakers to identify, analyze, and control the causes of costs, as well as establish links between cost information and program efficiency and effectiveness. The intended audience for the *Guide* includes state government decisionmakers at all levels, as well as the technical professionals responsible for providing information and developing and maintaining information systems.

While the relative costs and benefits of developing the information systems described in the *Guide* should be carefully considered, judicious implementation should help agencies move forward in their efforts to improve service quality and efficiency and to control and reduce costs.

The first chapter, "Developing an Activity-Based Costing System," lays a foundation for the remaining chapters. Activity-Based Costing (ABC) improves the link between services or products and their costs. Establishing an ABC system is an essential step for many state agencies because it can help them implement or improve initiatives such as planning, budgeting, performance measures, process improvement, service pricing, and reorganization or outsourcing.

The major value of activity-based cost methodology is its role in decision-making. Chapters Two through Five discuss approaches to providing activity-based cost information to decisionmakers for the following common situations:

- **How much will it cost to achieve our mission and goals?** Chapter 2, "Planning and Budgeting," points out the need to link strategic planning and budgeting activities. The activity-based costing methodology provides a way to establish the link.

- **Which activities have the greatest impact on service effectiveness, quality, and efficiency?** Day-to-day management of agencies is discussed in Chapter 3, "Efficiency, Quality, and Effectiveness." Using a step-by-step approach to Business Process Analysis, agencies can perform an initial assessment and monitor and improve key process activities that impact effectiveness, quality, and efficiency.

- **How much should we charge the public or another agency for this service?** Chapter 4, "Pricing," covers a range service or product pricing issues facing state agencies.

- **If we outsource or consolidate this service, will costs and quality decrease, remain the same, or increase?** Chapter 5, "Outsourcing," discusses the steps and

factors, including qualitative information, that agencies should consider in outsourcing or consolidating services.

The appendices provide information and tools to assist agencies in using the *Guide*, such as choosing an appropriate discount rate, flowcharting of service processes, and using random moment time studies.

What kind of knowledge and skills are needed to implement the *Guide*? To understand and implement the suggestions in this *Guide*, we suggest that the user have background or training in basic cost accounting and business process improvement methods. Chapter 2, "Planning and Budgeting," assumes the user has or has access to expertise in forecasting. Chapter 5, "Outsourcing and Consolidation Decisions," requires expertise in the development and use of qualitative data for the outsourcing decision.

Overview

The methods described in this *Guide* can assist agencies in the development of systematic approaches to cost reduction and cost control. The following overview provides a summary of the concepts and methods discussed in each chapter.

Chapter One, "Developing an Activity-Based Costing System," is a step-by-step guide to the development of a state-of-the-art costing system, ABC. This chapter begins with a discussion of the usefulness of such a system and the settings where ABC provides the most benefit and ends with hard lessons learned from its actual practice in state government. Using examples from the Department of Human Services' implementation of ABC, the chapter translates a method originated in a manufacturing environment into a governmental, service-centered organization. This section discusses the feasibility of the Uniform Statewide Accounting System (USAS) in capturing and maintaining data needed for this type of cost information and provides guidance for handling the cost allocation requirements of federal programs in an ABC setting.

Chapter Two, "Planning and Budgeting," joins these two areas of decision-making, beginning with a comprehensive overview of the two processes. The chapter's review of the planning and control cycle links an entity's strategic planning processes to its budgeting and day-to-day activities. It includes discussions of forecasting and the evaluation of opportunity costs, moving from forecasting to the development of financial statements and the Request for Legislative Appropriations. It culminates in a detailed example that follows the planning and budgeting of a human services program, from its assessment of several capital budgeting opportunities, forecast of service demand, linking of program goals to budgeted line items, through the development of the information provided in the Request for Legislative Appropriations. The chapter illustrates how information from an ABC system can assist in linking administrative costs and capital budgets to specific program goals.

Chapter Three, "Monitoring for Efficiency, Quality, and Effectiveness," overlays this wide topical area with a presentation of business process analysis. The section guides the reader through the initial assessment of the condition of processes, including a discussion of value-added analysis, on to the development and implementation of a plan for improvement, and concludes with guidelines for the ongoing monitoring of processes. Using a detailed case study from the Department of Human Services, it illustrates the problem-solving technique of process improvement.

This chapter also addresses topics such as reengineering, data presentation, and the creation of a customer-centered approach to services. Throughout the chapter are examples of the informational value of cost data, obtained from an ABC system, for the assessment and monitoring of process efficiency and quality. A discussion of the cost of quality and a step-by-step guide for benchmarking conclude this presentation of business process analysis. The implementation of methodologies presented in this chapter can provide the informational substance needed for sound reorganization decisions.

Chapter Four, "Pricing," discusses an issue of increasing interest to state agencies, transfer pricing. As consolidation of service delivery increases across state agencies, the need to develop a fair and equitable price for services heightens. The chapter discusses the costs to include in the development of a transfer price and the place of full-cost recovery in this setting. It moves on to a consideration of the employment of a charge reflecting actual costs versus a pre-determined flat fee to ensure coverage of fixed and variable costs, versus a fee for usage approach. The chapter also provides guidance on the development and use of standard costs for pricing and the place of process improvement initiatives in pricing.

The second half of this chapter presents an overview of rate setting in the insurance, utilities, nursing home, and toll road industries. It gleans common themes and best practices from each of these areas to guide those who may need to develop rates at some future point. The rate setting presentation is not intended as guidance to those well-versed in rate setting but rather as general information to those who may need to set rates in the future.

Chapter Five, "Outsourcing and Consolidation Decisions," begins with a discussion of what services are appropriate to consider for outsourcing, and offers criteria for determining core competencies. It moves into a detailed, step-by-step method for developing comparative cost data for use in the outsourcing decision. The chapter also presents a number of key qualitative issues to consider in the outsourcing decision, including vendor reliability, legal ramifications, impact on employees, and many others. Guidance on the contractual aspects of privatization gleaned from a number of authoritative sources in this area enhance the comprehensiveness of the outsourcing discussion. Throughout the chapter, case study examples taken from the recent outsourcing of the Department of Information Resources data center are used to illustrate critical steps in the analysis.

The chapter also presents a detailed review of accounting versus economic costs and emphasizes the importance of defining the elements of overhead related to the service under consideration. This definition is one of the key contributions of an Activity-Based Costing system to information crucial to this decision area. The chapter concludes with general criteria to guide decisionmakers when considering the alternative of consolidation of services.

The Council on Competitive Government has established a formal structure and guidelines for outsourcing Texas state government activities. The information in this chapter is intended to supplement the guidelines issued by the Council.

Chapter 1 Developing an Activity-Based Costing System

Government managers have traditionally had difficulty obtaining consistent and comparable information about the "true" cost of government services or products. Part of the problem is the inability to establish a rational cause and effect relationship between a particular service or product and the many types of direct and indirect costs. For example, the costs of many services such as purchasing, payment, revenue collection, human resources, management information, and reproduction and printing services are generally not linked to the specific service provided or the program served. Further, there generally is no attempt to derive a unit cost for such services.

Through the activity-based costing method of identifying and using multiple drivers of costs, an entity can better link actual costs to specific services. This is in contrast to the traditional use of few drivers, direct labor being the primary driver, whose ability to link costs incurred with services performed was often limited to none. Activity-Based Costing (ABC) facilitates the accumulation of this information, thus enhancing management capability for sound decision-making.

Introduction

Traditional cost accounting divides the cost of goods and services into three components: direct labor, direct materials, and overhead. The costs of the first two components are fairly simple to derive. Generally, overhead is allocated to products or services based upon the number of direct labor hours used, the total cost of labor, or the number of machine hours expended. Occasionally, square footage serves as the basis for allocation. Subsequent analysis of efficiency with respect to these different costs are generally analyzed as:

- materials price and quantity variances
- labor rates and efficiency variances
- overhead volume, efficiency, and spending variances

These variances compare actual costs incurred and quantities used with predetermined standard costs and quantities for given levels of output. As many private sector companies moved away from manufacturing into service industries, and as fixed costs such as overhead increasingly accounted for larger proportions of the total cost of goods and services, traditional cost accounting and variance analysis lost much of its usefulness.

During the past several years, many entities have developed and implemented an ABC system to enhance information for the following decision areas:

- planning to ensure that the entity meets its goals
- developing and monitoring budgets
- monitoring the efficiency, quality, and effectiveness of processes for continuous improvement
- pricing goods and services
- determining if consolidation or outsourcing of business activities is optimal

Figure 1

Entities benefitting most from implementing an ABC system are those with:

- a wide variety of products
- many different types of operating activities
- a high proportion of overhead costs to total costs
- unit prices that differ significantly from the competition

The development of an ABC system is generally performed by multi-functional teams. This ensures that all the activities involved in providing a service or producing a good are captured for costing purposes. With resources becoming increasingly scarce, entities need better information about the cost of their activities to optimize the use of resources. ABC provides a closer alignment between the services rendered and the cost of those services, with the benefits of ABC particularly salient with respect to the assignment of fixed costs.

When DHS initially costed the provision of Management Information system services to the Department of Protective and Regulatory Services, it used a combined headcount and utilization formula. This formula yielded an estimated $6.4 million cost for fiscal year 1995. When DHS costed those services using an ABC approach, the tab amounted to $7.8 million. This significant difference in cost underscores the need for better ways to match costs to services.

However, as with most new developments, there is a cost of switching to an ABC system. Before deciding to develop an ABC system, the costs of the implementation should be weighed against the benefits.

This Chapter Will Provide

- a step-by-step methodology for developing an ABC system
- guidance in avoiding the common pitfalls experienced in that development
- specific considerations in developing an ABC methodology as it relates to the five decision areas
- examples of the application of ABC at the Department of Human Services
- a discussion of the use of USAS in an ABC environment
- the implications of ABC for federal funding

We strongly recommend that the entity plan the entire ABC system before actually implementing any of it. Laying out the entire plan first allows the organization to

- Find any gaps in the plan or process activities.
- Identify unnecessary cost accumulations.
- Identify the accumulation of incorrect costs.
- Reflect upon other objectives the entity may wish to pursue but had not addressed in step one.
- Prioritize areas for implementation.

Our approach here follows that defined by quality management initiatives:

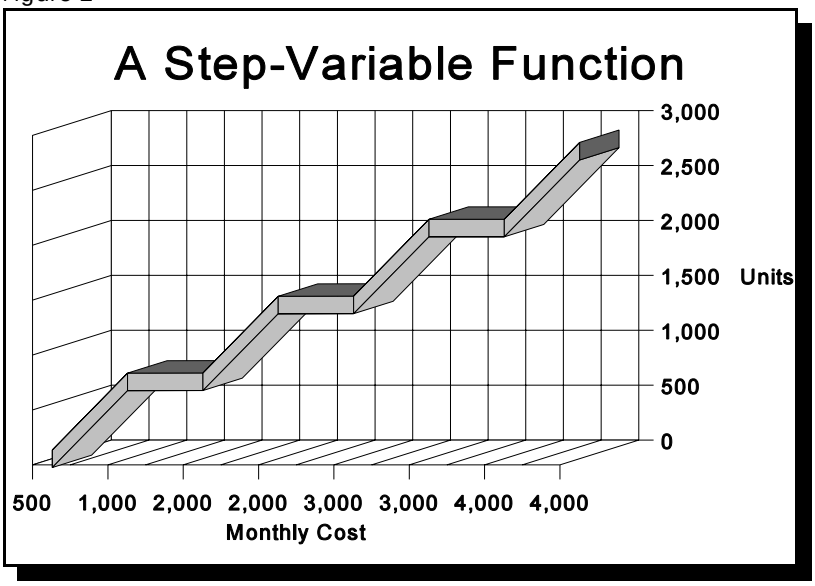
- plan
- do
- check
- act

First, *plan* the whole system. Then *do* it for a limited pilot area. Next, *check* to see that it meets the initial objectives and that all aspects are appropriately defined. Finally, *act* or implement for other identified areas.

Cost Functions

Before presenting the ABC methodology, a discussion of cost functions will provide a basis for evaluating a unit cost. For analysis purposes, costs are frequently divided into two basic types: fixed and variable. Variable costs are those that increase or decrease directly in relationship to the number of units produced, whether these are bars of soap manufactured, AFDC clients certified, or miles of highway constructed. Fixed costs are those that remain the same regardless of the number of units of output, at least within a certain range of production. This last qualifier is critical because over larger ranges of production, fixed costs may increase at several points, making such costs *step-variable*.

Figure 2



Often the unit cost of a product will be a mix of fixed and variable costs, with several costs fixed within different ranges. (See Figure 2.) For example, the cost to process a voucher may include a worker's salary that remains the same whether one or 700 vouchers are processed in a month. But once the monthly volume increases over 700 vouchers, a second worker is added. Two workers can handle up to 1,400 vouchers, so the total costs remains fixed between 701 and 1,400 vouchers, and so on.

The cost to process a voucher may also include the cost of mainframe computing. This cost, at least in part, may be fixed, whether one voucher is processed or 100,000. But a major upgrade to the system may be needed to process more than 100,000 vouchers in a given period of time.

Finally, the cost to process a voucher where the warrant must be mailed to the customer includes the cost of the paper on which the warrant is printed and the envelope and stamp for mailing. These costs are purely variable since they change depending directly upon the number of warrants printed.

It is critical to understand the function of each cost component of the total product cost. Without such analysis, one may be tempted to treat a unit cost as a purely variable cost, leading to erroneous decisions in budgeting, pricing, and process monitoring.

The importance of clearly defining the goals, scope, and objectives of developing an ABC system cannot be over-emphasized. If this step is skipped or performed in a superficial or haphazard manner, the costing system may provide insufficient or misleading information. For example, the cost to the Support Services Division of the Texas Department of Human Services (DHS) to process a travel voucher is significantly greater than the cost to process vouchers to reimburse nursing homes. Travel vouchers enter Fiscal Services in paper form, with a potentially large number of errors. Conversely, nursing home vouchers are submitted as pay tapes that require fewer edits and much less manual processing.

If DHS calculates only one unit cost to cover all vouchers processed, the nursing home vouchers will be overcosted while the travel vouchers are undercosted. This can have potentially serious ramifications, especially if service levels change. For example, suppose that the overall number of vouchers to be processed decreases, but there is also a significant shift between the number of undercosted and overcosted vouchers. Figure 3 illustrates the risks inherent in a "one size fits all" approach to costing services, and the benefits that more detailed ABC information can provide to decision-making.

Figure 3: Comparison of Budgeting Based Upon One Unit Cost Versus Two Subunit Costs

	Current	Projected
Number of nursing home vouchers	200,000	170,000
Number of travel vouchers	100,000	120,000
Total number of vouchers	300,000	290,000
Processing cost/travel voucher	$ 20	
Processing cost/nursing home voucher	$ 5	
Overall unit cost	$ 10	
Total cost using one unit cost value	**$3,000,000**	**$2,900,000**
Total cost to process travel vouchers	$2,000,000	$2,400,000
Total cost to process nursing home vouchers	$1,000,000	$ 850,000
Total cost using two unit cost values	**$3,000,000**	**$3,250,000**

Methodology

We will divide the ABC methodology into three stages:

- The *preparatory stage*, in which the plan for the ABC system is developed.
- *Stage one of the implementation*, in which the costs of resources associated with a given activity are identified and linked to that activity.
- *Stage two of the implementation*, in which the cost of each activity is linked to the product through the activity drivers.

Figure 4: Steps in Developing an ABC System

To develop an activity-based costing system:

Preparatory Stage

Step 1 Define the goal(s) of developing an ABC system.

Step 2 Define the products/services delivered.

Step 3 Identify the activities performed in delivering the product or service.

Stage One of Implementation

Step 1 Identify the resources used to support those activities, the drivers of those resources, and their associated costs.

Step 2 Link the resources to the activities by resource driver and by cost to find the total cost of each activity.

Stage Two of Implementation

Step 1 Identify the drivers of each activity, organizing the costs of activities into larger cost pools where the activity drivers are the same. Where subproducts are involved, find the unit cost of each activity. Multiply the unit cost times the number of driver units for each subproduct to get a total dollar value for the cost of activities by subproduct.

Step 2 If the goal is to price products, add the costs of the activities associated with each product to other product costs to derive a total cost of the product. Divide by the number of units produced to determine a unit cost of each product.

Preparatory Stage: Planning the ABC System

Step 1: Define the goals and scope of developing an ABC system.

The first step in the process of developing an ABC system is to define the goals, objectives, and scope of the system. These decisions will affect the level of detail required in the costing system.

Varying degrees of information are needed for the areas of application listed in the introduction to this section (planning, budgeting, efficiency/quality/effectiveness monitoring, pricing, consolidation, and privatization decisions). For example, product pricing decisions will require an additional ABC step over the development of an ABC system for the monitoring of efficiency. However, information needed to monitor process efficiency will generally require a more detailed definition of activities than would information purely for product pricing. Consolidation and

outsourcing decisions may require more detail than product pricing decisions but will also require information concerning the unit price.

The scope refers to:

- which products or services are to be costed
- the degree to which processes and their concomitant costs are to be assessed
- whether costs will be accumulated by product, program, customer, agency strategy, or something else

For example, the entity may wish to cost only specific services such as internal audit or financial reporting. The entity may wish to subdivide these into audit types such as federal compliance, financial, or performance audits. Financial reports may be subdivided into end-of-the-month financial statements, budget-to-actual statements, or the annual financial report. The entity may wish to capture such information by program because the reports vary so widely from program to program. If the goal is to provide unit cost information for developing the Request for Legislative Appropriations, the agency will need to capture cost information by strategy. Worksheet 1 on page 12 can assist in defining the scope and objectives of the ABC system development.

Agency General and Subsidiary Ledgers -- What Can USAS Do?

At this point, it is useful to gain an understanding of the entity's current costing system. This helps to identify the type of data that may already be available for use in the new system. Generally, systems gather information on the costs of travel, computers, supplies, salaries, and wages by individual payee, etc., **in the general ledger**. Many systems also accumulate this information by some form of cost center and/or by program. Familiarity with the organization's existing cost system will assist in an efficient ABC system development. Even if a secondary system (subsidiary ledger) is used to accumulate information for the ABC objectives, the cost data should still be reconcilable to the general ledger. After all, the general ledger is the accumulation of all expenditures.

The Uniform Statewide Accounting System (USAS) contains general ledger information for all state agencies and a wealth of information typically found in subsidiary ledgers. An agency interested in developing an ABC system should review the types and level of detail of cost information contained in USAS for its agency.

Because USAS contains information on an individual transaction basis, it can serve as general and subsidiary ledgers. However, transactions must be flagged by program if your organization wishes to capture costs by program, by transaction type if that is the detail desired for the ABC system, or by strategy if information on RLA performance is to be obtained from USAS. This can be very expensive and may not currently be possible in USAS. For example, at the present time, USAS cannot assign the cost of

an individual transaction to more than one federal program. In the case of an eligibility worker whose salary covers serving the eligibility requirements for multiple programs simultaneously, it would not be possible to accurately allocate the salary to several federal programs. However, USAS has been undergoing continual updating and revising, so this may be possible at some future date.

Most organizations are not going to need ABC information on a daily basis. Therefore, the added cost of feeding driver information into a system to interface with USAS may not be worth the trouble. Keeping information about process flows, activities, and resource and activity drivers in a secondary system and periodically loading information from the general and subsidiary ledgers to update unit costs should be adequate for most ABC purposes.

For example, an organization could keep the two spreadsheets given in Worksheets 3 and 4 in a secondary system and periodically load ledger data into the spreadsheets. This would allow the organization to update the information needed to compute unit cost and determine if the unit cost of individual activities or products has changed. How frequently this is done depends upon the purpose of accumulating ABC information in the first place. For pricing services to other state agencies (transfer pricing), quarterly information should generally be adequate. For monitoring activity efficiency, weekly or bi-weekly information may be needed. For initial budgeting purposes, annual re-assessments may be adequate. However, for budget monitoring, a monthly analysis may be necessary.

Step 2: Define the products/services delivered (or other groupings, as defined in step one).

If an objective of the ABC system is pricing goods or services, then the next step is to define the products or services delivered, to the degree determined in Step 1.

All services have products. However, while the identification of products from a manufacturing process is straightforward, finding the tangible output of a service is often more difficult. Chapter 3, Figure 23 lists the characteristics of an service product. Service products might include:

- a *check* to a foster home, nursing home, or AFDC client
- a *report*, oral or written, on the month's revenues and expenditures, strategic plan, Request for Legislative Appropriations (RLA), or audit results
- a *computer printout* analyzing department performance
- a *video tape* explaining the retooling/reengineering efforts of the Texas Department of Transportation
- a *computer disk* containing keyed data
- a *purchase order*
- a *permit* issued for a waste water treatment plant
- a *construction contract* awarded by the Texas Department of Transportation

- a *delivery* from the shipping department
- a *software package* from the MIS division (or anywhere else)

For example, the goal of the ABC system developed at the Texas Department of Human Services was to determine appropriate transfer prices to charge agencies for DHS support and MIS services. DHS decided to price its work based upon DHS organizational units. These costs included the activities of the accounts payable group, claims processing personnel, general ledger employees, and MIS data entry, among others. DHS also developed rates for disk storage, tape mounting, systems programming, and page printing. In all likelihood, the creation and payment of a voucher includes all of these activities. However, DHS did not combine the costs of these activities to derive a total unit cost of voucher payment, nor did DHS subdivide vouchers by each type such as regular travel, per diem travel, advanced travel, manual administrative, or off-line vouchers. Had the agencies serviced requested billing by product, DHS would have added a step to attach the cost of activities to specific products.

Worksheet 1

	Planning	Budgeting	Process Improvement	Pricing	Consolidation/ Outsourcing
Cost accumulation type (warrant issuance)	Planning for LAR by program	Operating budget by type of warrant	By types: Travel Manual admin	By each product type	None
Cost accumulation type 2					
Cost accumulation type n					

The Department of Human Services Support Services and Management Information System divisions provide many of these products to its internal programs, and to other agencies such as the Department of Protective and Regulatory Services, and the Department of Health. Were DHS intending to price these products by program and/or agency, DHS would need to capture information accordingly. In pricing the warrants issued by the DHS for purchases, the agency may subdivide those warrants into several categories:

- those initiated by a given DHS program
  - — those initiated in the State Office that represent cash purchases
  - — those initiated in the State Office that require financing
  - — those initiated in the DHS regions
- those initiated by the Department of Protective and Regulatory Services
- those initiated by the Department of Health

These also may have further subdivisions. Cash purchases may be subdivided into vouchers for the payment of furniture and equipment or other types of purchases. The decision to subdivide services is guided by whether or not those services will require different amounts of resources in a given activity to produce a single unit. At the state level, it takes more time to process a voucher that has been initiated at the State Office because the receiving document and invoice are accumulated and matched to the requisition order by the accounts payable workers in the State Office. For vouchers originating in the region, the regions have already performed these activities. Thus, the State Office accounts payable employees spend less time processing such vouchers. Therefore, one unit cost representing all the work performed by the accounts payable section would overcost some voucher groups and undercost others. In this case, the unit cost of region-initiated vouchers would be overstated while that for State Office-initiated vouchers would be understated, at least with respect to the work performed by accounts payable.

The alternative to subdividing services in this way is to capture costs for each component activity:

- accumulating the prerequisite paperwork and matching it to the automated purchase requisition
- manually developing a voucher when necessary
- authorizing the payment of the voucher

Identifying distinct activities is probably more efficient than dividing the analyses into so many different products. The products that will be costed here are warrants covering three types of vouchers: region-initiated, state-initiated but non-manual, and state-initiated and manual.

Worksheet 2

Product	Subdivision	Objective
Warrants paying purchase voucher	1. Region initiated 2. State-office initiated, non-manual 3. State-office initiated, manual	

Step 3: Identify the activities performed in delivering the product or service.

The successful development of an ABC system requires that the organization *flowchart all processes related to a product or service.* Flowcharting processes related to each end product can reveal non-value added activities such as expensive rework, redundancy, poorly sequenced activities, excessive inspection or authorization, and long queuing. The methodology of process analysis is more fully discussed in Chapter 3. Appendix B gives a step-by-step methodology for flowcharting processes.

To identify the activities involved in delivering a product or service, one can:

- Review related documentation of the processes.
- Interview key personnel.
- Observe the processes in action.

Observing the processes in action is the most reliable method of deriving the true activities because it reflects what is actually occurring in contrast with what should be occurring (documentation) or what people think is happening (interviews). However, interviews can enhance this by bringing to light exceptions to the process observed; reviewing documentation of planned processes can highlight gaps, control weaknesses, and inefficiencies in the actual system. The level of detail needed to define a process will depend upon the objective. As a general rule, less detail is needed for costing purposes than for management purposes. Some activities may be combined into cost pools in costing products. On the other hand, too little detail may result in underpricing some services at the expense of others.

In the case of purchase voucher processing at DHS, the normal flow of activities is given below.

Figure 5

Accounts Payable ➨	***Claims Processing*** ➨	***MIS*** ➨	***Comptroller*** ➨	***Warrant Distribution*** ➨	***DHS Mailroom***
Matches documents. Updates to payment status. Manually prepares vouchers when necessary.	Manually inputs batch numbers into system.	Updates financial accounting system. Prepares tape.	Issues warrants.	Distributes warrants.	Mails warrants.

In Figure 5, the accounts payable group performs three activities: matching the documents, typing vouchers that are not already in the automated system, and updating to payment status. The claims processing staff perform one activity: manually entering batch numbers into the automated system. The three activities of the accounts payable group should be kept separate since they are not performed for all vouchers. However, where several activities are performed for all products or services being costed and have identical drivers, these activities can be combined into cost pools for pricing and budgeting purposes. If the organization wishes to track the cost of each specific activity to monitor the efficiency/effectiveness of that activity, the activities should be costed separately.

Stage One of the Implementation: Linking the Resources to the Activities

Step 1: Identify the resources used to support those activities, the drivers of those resources, and their associated costs.

Resources include such things as employee time (both of workers and supervisors), supplies, equipment and furnishings, training and education of employees, fringe benefits of employees, equipment maintenance and repair, and vehicles. The general ledger contains information about the costs of these resources; however, in some instances, such as salaries and equipment costs, this information will be contained at too highly summarized a level. It, therefore, may be necessary to review subsidiary ledgers to find the costs of some of these resources. Some of these resources may be dedicated to a specific product. Where this is the case, the costs should be set aside and tagged for direct assignment to that product.

Where accounts are caused by the same phenomenon or event, such as hotel, airfare, and meals in travel, the costs should be combined. Costs should also be combined where the amounts are trivial.

There are three categories of resources. They include those that:

- can be assigned directly to the activity as direct charges
- can be assigned to an activity on a causal basis using resource drivers such as square footage or proportionate hours spent on a given activity
- must be allocated on a volume basis

Direct charges include labor dedicated to a specific activity, materials used only for one activity, and the like. The cost of resources dedicated to a *specific product* should be set aside and tagged for direct assignment to that product. However, to determine the full cost of an activity, such resources should be assigned to activities, but flagged for later assignment to specific products.

We recommend that general and administrative expenditures, such as the salaries of the commissioner level personnel, and their costs not be allocated to services. There is generally no way to associate their activities with specific services in any meaningful way.

Resource Drivers

For resources that are associated with more than one activity, it will be necessary to assign the relative values of the resources to the specific activities. To do this, the team must identify a basis for linking resources to activities, referred to as resource drivers. For human resources, the resource driver will typically be the amount of time spent on a given activity. Rent and utilities may already have been allocated to a department based upon square footage for example. The team may decide to assign

these costs to specific activities in that department based upon the number of people involved in a given activity. Typical resource drivers are square footage, kilowatt hours, headcounts, and man hours.

Employee Time

If the employees involved in a given activity are dedicated to that one activity, their salaries or wages can readily be assigned to that activity. But in many organizations, individual employees perform a variety of activities. If the costing plan has determined that these activities must be kept separate, individual activity costs must be calculated. Such costs are generally driven by the amount of time spent on the activity. How does an entity determine this relative time? There are several possibilities:

- Have the employees or their supervisors estimate it.
- Review time sheets where they exist on an activity basis.
- Perform a random moment time study.

Employee or Supervisor Estimates

Judgmental estimates of time are often highly inaccurate. They are subject to recency effects (a recent major problem takes on a heightened degree of importance and, therefore, greater time is assigned to it), poor memory, loss of information about lost time (breaks, interruptions, personal activities), and deliberate distortions to "look good."

Time Sheets

Programmers and auditors typically keep track of their time by activity. The accuracy of the time tracked can vary widely. If an entity has verified the time through periodic observations, particularly when the employee is not aware of the observation, it can probably rely on these numbers. Otherwise, time sheets may provide a highly distorted estimate of time spent on specific activities. Keeping accurate time sheets and verifying the accuracy of those time sheets is in itself very time consuming and, therefore, costly, particularly if employees experience a significant number of interruptions or must change activities frequently.

Random Moment Time Studies

These are periodic scientific studies of the relative amount of time spent on specific activities. They do not need to consume an inordinate amount of time to conduct and, when done correctly, they provide an organization with a highly accurate assessment of the proportion of time spent on various activities. However, as shifts in the relative amount of time spent on the various activities occur, they must be repeated. It is important to note that the sample size and time period covered by the random moment time study should be appropriate to the objective of the analysis. (The detailed methodology of Random Moment Time Studies is given in Appendix A.)

Step 2: Link the resource drivers and the cost of resources to the activities they support to derive the total cost of each activity.

Once data on the resource drivers and their costs have been accumulated, they should be assigned to the various activities. Two spreadsheets can be developed. One spreadsheet would allocate the amount of the resource used to a given activity, by driver; the second spreadsheet would convert that amount to dollars.

Worksheets 3 and 4 illustrate a way to link the cost of resources to activities. The example involves three activities of the DHS accounts payable group: matching documents for payment, manually preparing vouchers where necessary, and updating the payment status. The numbers that have been presented here are fictitious since DHS has not subdivided the activities of the accounts payable group in their pricing system.

In this example, the section employees spend varying amounts of time on each activity, as determined through a random moment time study. General ledger data automatically assigns rent and utility costs to the department engaging in the three activities based upon square footage. The department believes that the allocation of these costs to activities should be based upon the proportionate amount of time employees spend on a given activity. A subsidiary ledger directly identifies the equipment cost for a given department; the cost represents the periodic depreciation for that equipment. Another subsidiary account automatically assigns computer system costs to the department. The department believes that the computer system is used equally for each activity. Actual training costs are tracked by activity.

The division of employee costs into salary expense and the expense of benefits is deliberate. If a state agency wishes to determine a transfer price for services to another state agency, it may be inappropriate to include the cost of benefits unless the agency actually pays for the cost of those benefits. For general revenue funded agencies, employee benefits are often not paid by the agency but are paid on a statewide basis. If the agency is considering privatizing those activities, the cost of benefits for general revenue funded agencies is relevant.

Worksheet 3: Assignment of resources to activities by amount of driver for the accounts payable group

Resource	Driver	Activity 1	Activity 2	Activity 3
Person 1 salary	% of time	40%	60%	0%
Person 2 benefits	% of time	40%	60%	0%
Person 2 salary	% of time	10%	50%	40%
Person 2 benefits	% of time	10%	50%	40%
Supervisor salary	% of time	30%	35%	35%
Supervisor benefits	% of time	30%	35%	35%
Equipment used	% used	20%	15%	65%
Rent and utilities	Employee time	27%	48%	25%
Training	Direct by activity			
MIS charges	Time used	1/3	1/3	1/3

Worksheet 4: Assignment of resource costs to activities

Resource	Cost	Activity 1	Activity 2	Activity 3
Person 1 salary	$ 25,000	$10,000	$15,000	$ 0
Person 2 salary	20,000	2,000	10,000	8,000
Person 1 benefits	8,000	3,200	4,800	0
Person 2 benefits	6,400	640	3,200	2,560
Supervisor salary	36,000	10,800	12,600	12,600
Supervisor benefits	11,520	3,456	4,032	4,032
Equipment used	45,000	9,000	6,750	29,250
Rent & utilities	2,000	3,240	5,760	3,000
Training	4,000	1,000	2,000	1,000
MIS charges	9,000	3,000	3,000	3,000
Total costs	**$176,920**	**$46,336**	**$67,142**	**$ 63,442**

Stage Two of the Implementation: Assigning the Costs of Activities to Products

Step 1: Identify the drivers of each activity that link the activity to the product. Where subproducts are involved, find the unit cost of each activity. Multiply the unit cost times the number of driver units for each subproduct to get a total dollar value for the cost of activities by subproduct.

An activity or cost driver is that which causes a change in the cost of an activity. The staff who are involved in the activity are the best source of this information. For example, the accounts payable group begins to process a voucher when it receives an invoice and related receiving document. The number of invoice/receiving document sets are the drivers.

Once the drivers of each activity have been identified, the team should find the number of times or the amount by which the drivers activated the process, e.g., the number of receiving documents, the number of purchase orders, the number of staff hours to program client software.

Suppose that the event that triggers the accumulation of costs for activity one, the matching of documents, is the number of invoices and receiving documents to be checked and matched. However, no automated system captures that information. Therefore, the next best activity driver, number of vouchers to be processed from those invoices and receiving documents, will be defined as the activity driver. For activity two, the driver of manual voucher processing is the number of vouchers that have to be filled in. Activity three is set in motion, and costs are accumulated whenever a voucher has to be sent on for payment. Therefore, the activity driver is the number of vouchers to be updated for payment.

	Activity 1	Activity 2	Activity 3
Total Cost	$46,336	67,142	63,442
Number of vouchers	12,000	10,000	45,000
Cost per transaction	$3.86	$6.71	$1.41

These activities did not have subproducts so it was not really necessary to compute a unit cost. An example of where a unit cost calculation would be important is with funds management activities. The funds management function is to draw down federal dollars to ensure continual funding of cash disbursements. Funds are often drawn for several programs at once. Therefore, the funds transfer voucher will include transfers of funds for more than one program; the journal entries into USAS and the Financial Management Information System (the agency's ledger system) will be for more than one program. In the case of the journal entries, the driver may be the number of lines of journal entries made. One program's set of entries may involve 10 lines, another program's two lines. If the products are to be segregated by type of program, it will be necessary to subdivide the cost of the journal entry activity into the various programs. The following example illustrates how this would be done:

1. Find the total cost of the activities for the given period and the number of driver units for each program or subproduct.

2. To get a unit driver cost, divide the total cost of the activities by the total number of driver units, adding over all programs or subproducts.

3. For each program or subproduct, multiply the number of driver units for that program or subproduct by the driver unit cost. This gives the total cost of that program or subproduct for the given activity.

In the funds management situation, suppose that the total cost of journal entry activity for a given period is $50,000 and that 2,000 entries were made, 500 of those for program A and 1,500 for program B. Then the cost per line entry is $50,000/2,000, or $25. Multiply the $25 line cost by the number of line entries to derive a total cost of this activity by program. Worksheet 5 gives the results.

Worksheet 5: Finding the costs of subproducts of an activity

Finding the drive unit cost of the activity.			
Total Cost of Activity	$50,000		
Number of Driver Units	2,000		
Driver Unit Cost	25		
Finding the total cost by subproduct or program			
	Number of Entries	**Unit Cost**	**Total Cost**
Program A	500	$25	$12,500
Program B	1,500	25	37,500
Total	2,000	$25	$50,000

These individual program costs for the journal entry activity are added to other costs of drawing funds to derive a total cost for drawing funds for each program.

Step 2: If the goal is to price products, add the costs for the activities associated with each product to other product costs. Divide by the total number of units produced to derive a total unit cost of the product.

If one voucher is issued per warrant and the activity driver for all three activities is the number of vouchers, the unit cost derived above actually represents the unit cost of that activity per warrant. If, however, two warrants were issued for every voucher, the total cost of each activity would have been divided by the number of warrants represented. So the cost of activity 1, $46,336, would have been divided by 24,000 warrants; the $67,142 cost of activity 2 would have been divided by 20,000; and the $63,442 cost of activity three would have been divided by 90,000. In actuality, the number of warrants issued per voucher varies. In this case, the cost to ascertain exactly the cost of individual warrants, with a dependency on the number of warrants issued for a given voucher, may be too great relative to the benefits. Since information is in the data base by voucher, the agency is probably better off assuming a one-to-one relationship between the number of vouchers and the number of warrants, and so price according to the number of vouchers.

The aim of this last step is to derive a total unit cost for each end product or service identified in step two. To do this:

- Take out the flowchart developed in Step 3.
- On a spreadsheet, list each product and the activities defined on the flowchart, adjusting for any activities that were combined for costing purposes.
- Write down the unit cost for each activity related to that product (total activity cost/total number of units produced). If the drivers were not the same across activities or if the relationship between the driver and the end product is not one-to-one, write down the total cost of each activity. Divide by the number of units of product made to get a product unit cost for activities.
- Find the unit cost of anything else that was used on a specific product, such as the unit cost of materials or any allocated overhead not previously identified.
- Add overall unit costs related to that product to get a total cost for each unit of that product.

In the DHS example, the earlier process analysis revealed three activities in accounts payable, one activity in claims processing, one activity performed by warrants distribution, two activities of the MIS group, one activity performed by the Comptroller's Office, and one activity performed by the mailroom. To derive a

complete unit cost for processing each type of voucher, the organization would have to calculate the unit cost for each of these activities.

For purposes of simplicity, we will assume that all activities related to voucher processing are captured in the three activities illustrated in this chapter. Once the costs of the activities have been calculated, any other costs related to specific types of vouchers, such as the cost of hard copies of vouchers, should be accumulated to derive the total cost. In this case, the cost per hard copy of a voucher, stamp, envelope, and label has been assessed. Worksheet 6 contains the results.

Note that region-initiated vouchers do not require the matching of documents at the state level (activity 1) nor do they require manual processing at the state level (activity 2). The only activity cost is incurred for activity 3, updating for payment, with a material unit cost of $0.75. Thus, the total state-level incurred cost of a region-initiated voucher would be $2.16. Also, in this example, because of the assumed one-to-one relationship between vouchers and warrants and because number of vouchers was the activity driver for all activities, unit cost per voucher is used for each activity instead of total cost in the next calculation.

Worksheet 6: Costing the Products

Type of Voucher	Activity 1	Activity 2	Activity 3		
Region-initiated voucher	--	--	X		
State-initiated, non-manual	X	--	X		
State-initiated, manual	X	X	X		

Type of Voucher	Activity 1	Activity 2	Activity 3	Materials	Unit Cost
Region-initiated voucher	$ 0	$ 0	$1.41	$ .75	$ 2.16
State-initiated, non-manual	3.86	0	1.41	.75	6.02
State-initiated, manual	3.86	6.71	1.41	.80	12.78

Observations

Had the three activities been combined as though their costs were the same, the cost per voucher would have come to $3.93 ($176,920/45,000). This means that the DHS regions would have picked up the tab for part of the cost of state-initiated vouchers. ABC can yield significantly different results from conventional methods of costing items.

For some purposes, the unit costs in worksheet 6 may not suffice. Were DHS interested in privatizing all of its voucher processing, including the work done in the regions, the unit costs incurred at the regional level must be determined. However, for the purpose of

assessing the regions for state-level incurred costs of services to regions, the current analysis is appropriate.

Finally, if the unit costs for all products or services are multiplied by the number of products produced or services performed, the total cost should equal the total of the costs derived from the general ledger. If not, some costs have either not been captured in the ABC system or have been counted more than once.

Federally Matched Funds and ABC

What are the implications of implementing an ABC system for maximizing federal funds? Currently, federal regulations do not require that administrative costs be derived using an ABC system. Many of these costs are allocated to programs based upon headcount or percentage of expenditures, as specified in the current approved Cost Allocation Plans. Because of the differences in federal matching rates by program and by category, the ability to re-assign costs to more direct categories and more accurately to specific programs may create an opportunity to justify enhanced matching rates. Were an agency to find that their ABC system does this, the agency could investigate changing the Cost Allocation Plan to reflect these results.

Figure 6

Considerations when developing and implementing an Activity-Based Costing System

- Prepare all groups for the transition, carefully explaining to them what the goal is, why it is being done, and providing an overview of the process.
- Lay out the entire ABC plan before acting.
- Identify all products of the entity first; then, document the processes that create that product.
- Flowchart the entire process related to a product or service. This avoids gaps in the costing system.
- Use information in existing systems as much as possible. This includes not only information in the general and subsidiary ledgers but information in other systems as well.
- Developing an ABC system takes time and is done in stages. Start its development before a crisis occurs, beginning at a crisis time gives inadequate lead time for development and implementation.
- Developing an ABC system is expensive. Project future needs for the information as much as possible so that the information is built into the system at the start. Otherwise, the system may need to be redone as new objectives emerge.

Chapter 2 Planning and Budgeting

Legislative actions during 1991 and 1993 significantly reformed Texas state government planning and budgeting systems. State agencies are now required to develop six-year strategic plans, which include mission, goals, objectives, strategies, and key performance measures. The new planning requirements include a six-year capital budget. Agencies must tie their plans to the statewide strategic plan jointly prepared and issued in January of even-numbered years by the Legislative Budget Board and Governor's Office of Budget and Planning. The state budgeting process requires that each agency's biennial appropriation request be based on its strategic plan. The General Appropriations Act passed by the Legislature and signed by the Governor now links the dollars budgeted to agency strategies and performance targets.

The information in this chapter is intended to supplement the detailed strategic planning and biennial budgeting guidelines issued by the Legislative Budget Board and Governor's Office of Budget and Planning. For an in-depth discussion of the State of Texas' Strategic Planning and Budgeting system, see *Detailed Instructions for Preparing and Submitting Requests for Legislative Appropriations* and related publications.

This chapter discusses the interrelated functions of planning and budgeting. The discussion begins with an examination of key, macro-level planning issues, framed within the context of the State of Texas' Strategic Planning and Budgeting system. In the section on budgeting, the discussion focuses upon more micro-level, operational issues, and demonstrates how an activity based costing system can enhance the quality of decision-making for planning, budgeting, and monitoring purposes. A hypothetical case study illustrates how activity-based costing information can enhance and integrate the components of planning and budgeting.

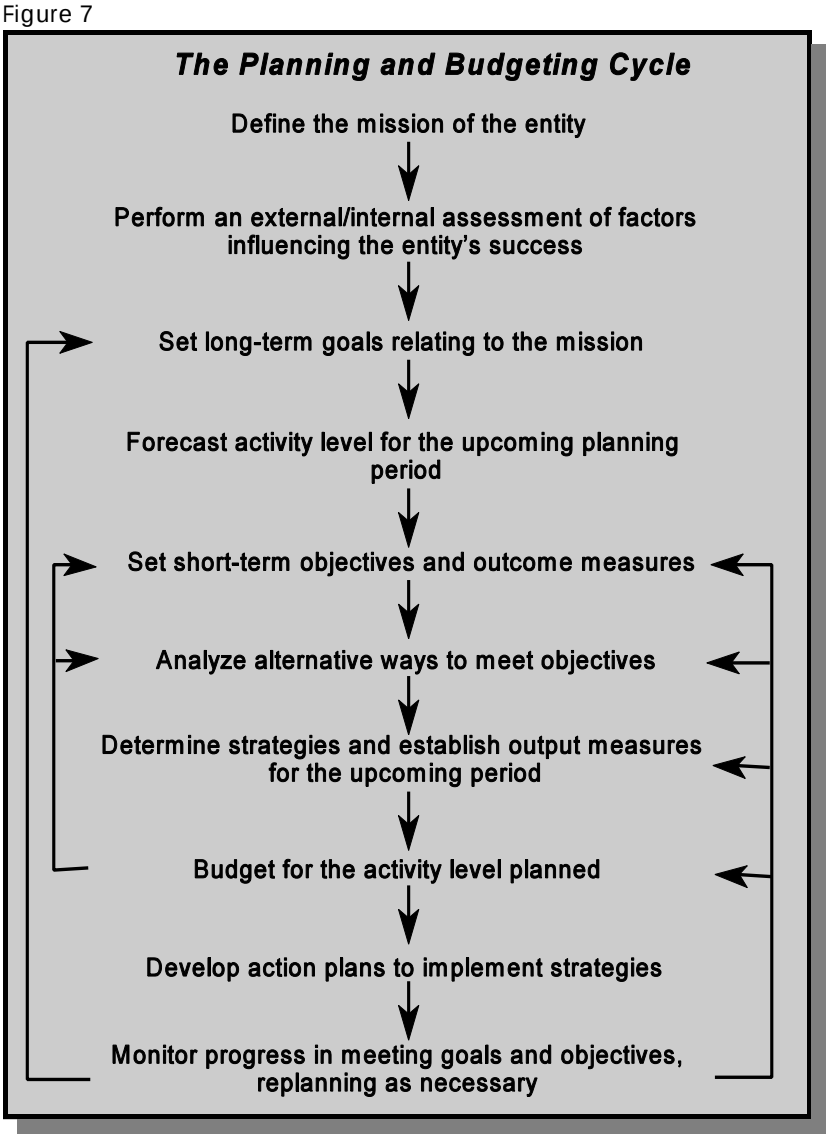
Planning: An Introduction

> This chapter will focus on the financial and non-financial customer-centered informational needs and the methodologies for integrating that information during the planning process. However, a brief introduction to the planning and budgeting cycle provides a framework for understanding the place of planning in the overall operations of an entity.

The Planning and Budgeting Cycle

> Agency strategic plans are translated into increasingly greater levels of detail as objectives, strategies, and associated performance measures are developed for divisions, departments, and sections. The steps involved in the planning and budgeting cycle are given in Figure 7 (on the following page). Unless the components of the plan are carefully specified, an agency cannot ensure the attainment of long-term goals in any meaningful way. Note that there are feedback loops between setting goals and objectives and monitoring implemented plans. This is an ongoing, continuous process. Sometimes strategies must be modified when expectations are not met. This may be because performance targets were unrealistic,

Figure 7



the strategies were ineffective, or budgeted resources were inadequate. It may be necessary to adjust all these components simultaneously. Throughout the year, as new initiatives are considered, the agency should determine the relationship between the initiatives and the goals and objectives contained in the strategic plan. This continuous monitoring of progress helps to ensure that the expected performance is met. Planning and budgeting activities require information on expected changes in the demand or need for government services. The next section, Forecasting, discusses a major tool for obtaining this type of information.

Forecasting

Just as private industry must project demand for each product and service for the next planning and budgeting period, so must governmental entities estimate the need for services when formulating plans. To develop the Texas Request for Legislative Appropriations, state agencies estimate the level of service to be delivered during the biennium. Between legislative sessions, agencies amend this forecast to derive the annual operating plan and budget.

Volumes have been written on forecasting techniques. This chapter does not purport to present an exhaustive review of these methods. However, some observations on the relative value of various methods and information that can enhance the forecast may prove of use to governmental entities.

Forecasting: Comparison of Deterministic with Probabilistic Events

Some public services are more deterministic than others; that is, the level of activity is reasonably certain. For example, much of the planning for new highways takes place

well in advance of the actual construction. This makes planning for the next year relatively straightforward even though unknown variables such as unusual weather patterns can affect the implementation of the plan.

Services that are impacted by people's behavior, such as applications and re-certification for AFDC, Food Stamps, and Medicaid are more difficult to estimate. Changes in program eligibility and participation requirements, in state population demographics, and the economy affect the projection of benefit expenditures as well as the level of direct and indirect staffing needed to service clients. Federal requirements in some programs to service all eligible people who apply for services prohibits a cap on budgeted dollars. In addition, block grants, or limitations on total federal dollars available, pose other difficult planning questions such as who gets served and who does not.

Unless the next period's level of activity is known with a high degree of certainty, agencies should plan and budget not only for expected volume but also for high and low ends of the projection. This is comparable to sensitivity analysis in the private sector. Commercial software packages have made budgeting for many projected levels of activity a relatively simple task.

Forecasting: The Tools

There are several general methods for forecasting service needs. This section will briefly describe each one and summarize the advantages and disadvantages of each.

Figure 8

There are five general forecasting methods:

- staff predictions
- market/demographic research
- statistical models: trend or time series analysis
- econometric models
- Delphi technique

Staff predictions

Although predictions based upon input from staff is the least rigorous of the methods, it oftentimes produces some of the best forecasts, particularly where services depend upon client behavior. In such instances, staff involved in the delivery of the service bring to the discussion stories of changes in the characteristics and perceptions of clients that can heavily impact future demand for services. This information can go well beyond anything that is measurable. For example, prior to the recent expansion of state prisons, convicted felons may have weighed a plea bargain offer of lengthy probation against the prospect of a shorter period of incarceration in an overcrowded criminal justice system. But these variables are not generally recorded or measured by an agency.

Market/demographic research

Current demographic information can be highly useful in forecasting activity in certain service areas. Geographic information regarding the distribution of age, income and poverty levels, educational levels, availability of housing, job market,

birth statistics, marriage and divorce data, and the like can assist in forecasting demand for services where client behavior is a major factor. However, it can be expensive to maintain current data for these factors. The cost of that information must be weighed against the benefits of more accurate predictions.

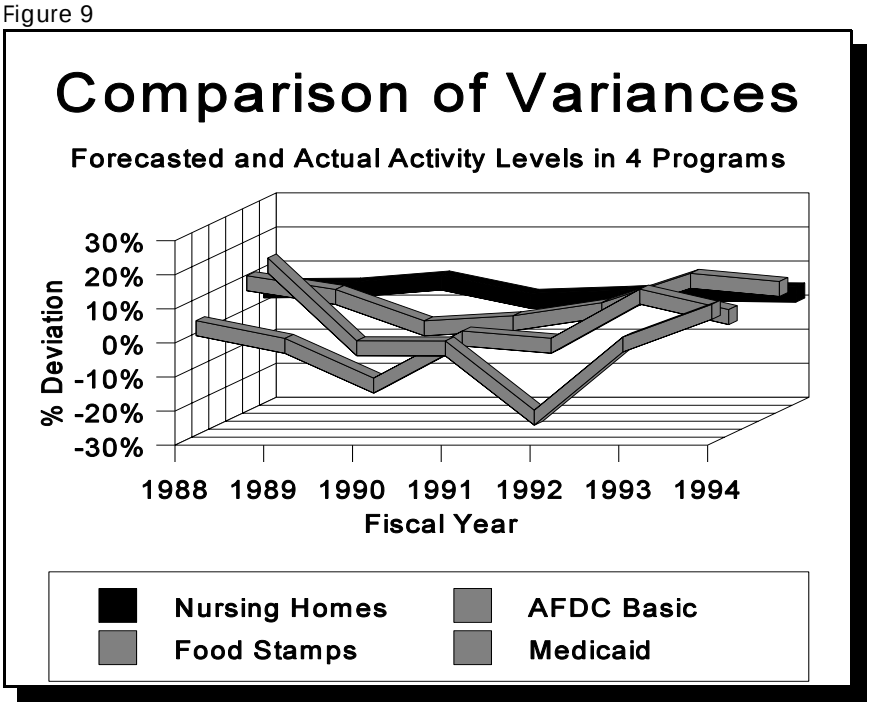
Statistical Models

Statistical models predict service demand for future periods based on historical data, that is, service demand in previous years. If the demand for services changes in a relatively constant manner, this type of model works well. For example, such a model is used to predict the demand for nursing home care. (See Figure 9.) The largest variance between predicted and actual demand was less than six percent from 1988 through 1994, with most variances at the three percent level or less. The actual number of people in nursing homes grew from 55,902 in 1988 to 65,417 in 1994, less than a 20 percent increase.

On the other hand, a time series model of Medicaid cases resulted in variances exceeding 22 percent twice during the same time period. For the Medicaid program, major changes in program eligibility requirements over the last several years have necessitated the use of an econometric model. The number of Medicaid cases grew from 21,911 in 1988 to 478,681 in 1994, or 2,200 percent.

The Food Stamp program is also sensitive to external events. Small shifts in the economy can cause large shifts in demand for food stamps. Although the variances between predicted and actual in this program were not as great as in the Medicaid program, they did exceed 10 percent for two of the seven years in the time span from 1988 through 1994. In that program, the number of people receiving food stamp benefits doubled in the seven-year period.

Figure 9



Note: Percentage deviation from what was forecast

Econometric Models

Like statistical models, econometric models use historical data, but also incorporate other variables as well. These can include general economic data, among other variables, when predicting the demand for AFDC grants or food stamps. Factoring in the effects of various events often leads to a more satisfactory, i.e. a more accurate, model. However, determining which factors correlate significantly with demand is challenging. For example, what predicts the demand for foster care? This is considerably more elusive than the demand for welfare benefits.

Delphi Technique

This is a method for achieving consensus or near consensus among experts working in a field. It generally involves several rounds of requesting opinions of these experts. These solicitations are made independently to ensure that the true opinions of each person are heard. After the initial round of questions, the responses are compiled and prioritized. The compilation is then returned to the individuals to ascertain the level of agreement. This can be repeated until a fairly high degree of consensus is reached.

Forecasting: Sensitivity Analysis

Once the initial forecast of service demand is complete, the agency may wish to perform a sensitivity or "what-if" analysis, incorporating its most optimistic and pessimistic expectations of what may occur. For example, suppose the agency is forecasting the demand for food stamps using demand figures from the past eight years. Assume that the need for food stamps is closely related to the unemployment rate. Let us also assume that the rate has been declining steadily since 1987. But suppose the agency has some evidence to suspect that the unemployment rate will increase during the coming fiscal year and, therefore, may increase the demand for food stamps. The agency may decide to create an upward outside estimate of demand that is higher than the estimate derived from its trend analysis. Thus, there would be the initial estimate with an upper bound. There may also be conflicting evidence indicating the possibility that the unemployment rate may decrease (e.g., new industries moving to key Texas regions). Therefore, the demand for food stamps may drop. This drop can be used as a lower bound on the initial estimate by developing worst and best case scenarios; the agency derives a sense of the play in the forecast that will eventually translate into the budgeted dollars.

Setting Short-term Goals and Value-Added Analysis of Processes

To set short-term goals, the agency should be aware of customer needs for each product or service. Knowledge of the product or service qualities of value to customers enables the agency to set meaningful performance standards regarding the timeliness, ease of use, reliability and completeness of the service, and acceptable cost

Figure 10

Value-Added Analysis and Planning

Value-added analysis can give direction in the planning phase through identification of:

- gaps in service
- redundant activities
- activities that do not enhance customer benefits
- avoidable rework

parameters. To develop a plan to meet these standards, agencies need to assess the capability of service delivery systems to fulfill the needs of customers. Value-added analysis can assist in such a review. This type of analysis identifies gaps in the service delivery system and activities that do not enhance customer benefits. Thus, value-added analysis addresses both the efficiency and effectiveness of the service delivery process. It is critical that agencies define measures and collect data to monitor how well service delivery processes are meeting customer needs, ensuring that process activities are linked to those needs. This allows the agency to set realistic expectations for each service it provides and to identify opportunities for improvement. The improvement may take place through small enhancements to the process, a complete reengineering of the process, or through alternative modes of service delivery, including privatization. See Chapter 3 for a more comprehensive discussion of these issues.

Opportunity Costs and Large Investments

To implement an agency's strategic plan, work groups may evaluate alternative ways of implementing strategies. For example, an agency may be responsible for getting needed equipment and materials to the regions. The agency may wish to evaluate whether it should maintain a central distribution location or employ several satellite distribution sites, strategically located to maximize its ability to service needs. For either scenario, the agency may also wish to determine if leasing a warehouse or purchasing one will be more cost-effective.

The question of location should consider customer needs, including:

- the timeliness with which equipment and materials can be delivered
- ease of use for customers to access the facility
- the reliability of the receipt and quality of the goods as requested under each alternative
- the completeness of services offered
- the relative cost of both the initial setup as well as the continued use of services under each option

Under either scenario, the relative ability to maintain control over goods and the dollars representing those goods is critical to ensure continued accountability for state and federal money.

Present Value Analysis

In evaluating alternatives, an agency may need to consider options whose costs/benefits extend for more than two years. In this case, an agency will need to perform a present value analysis. The calculations for a present value analysis are provided by many spreadsheet software packages. The user inputs the amounts of the payments, the timing of the payments, and the discount or interest rate. The computer program does the rest.

The choice of a rate at which to discount the cashflows over the several years of the project depends upon the decision at hand. A discussion of the appropriate rate to use for individual types of decisions (lease versus purchase, outsourcing versus maintaining in-house services, consolidations, and planning/budgeting) is given in Appendix D.

Payback Period Analysis

Another useful tool for comparing alternatives is the payback period. This analysis calculates the amount of time it takes to recover the initial outlay of cash from the investment. This assumes, of course, that the investment is generating a net increase in cash. This is not generally the case in government applications. However, government organizations can assess the relative benefits of a proposed investment by determining at what point in time cost savings or cost avoidance is achieved. For example, if $25,000 per year is expended to manually process information on clients, compare that with the amount of money required to automate processing. If $40,000 is needed to purchase computers, then the amount of time it takes to offset the outlay under current conditions is:

Investment/annual outlay under current conditions

= $40,000/$25,000
= 1.6 years

Thus, in 1.6 years, the organization will have expended the same amount of cash, whether it continued the existing manual process or invested in computers (assuming that the computers required no repairs and were maintenance-free during that time). The organization avoids the $25,000 annual cost incurred by manual processing after 1.6 years, except for adjustments for repairs, maintenance, and obsolescence.

Consideration of the payback period can be critical in buying high technology equipment such as computers. For example, an agency may consider upgrading from a 386 PC to a 486 PC. The agency should weigh the savings in personnel time through the upgrade against the additional expenditures on the 486 and consider the probability and timing of obsolescence of the new machines. It may be that the dollars representing the time saved through the upgrade will not offset the cost of the upgrade before the new machines become obsolete.

Figure 11

Qualities of value to customers related to the requisition and delivery of printed materials may include:

- the amount of lead time they believe is reasonable in requesting handbooks
- how quickly they expect to receive the handbooks once they have submitted a request (cycle time)
- the quality of the product they require
- other supplemental products or services the customers may need such as shrink-wrapping, boxing, and carrying the delivered handbooks into office areas rather than a simple delivery to a front or back door
- the ease of ordering new handbooks, including the ease of completing request forms

To give a more detailed illustration, the Texas Department of Human Services currently services its regional needs for administrative handbooks through a central printing, warehousing, and distribution system. TDHS might consider the feasibility of contracting the printing and delivery of handbooks on a just-in-time basis to reliable printing service contractors in the regions. The analysis of the relative benefits of the two options should begin with a poll of customers to determine customer needs. (These are defined in Figure 11.) Once the customers' needs are known, planners should collect data on the identified qualities on the service as currently delivered. This will provide baseline data for comparison with the service levels of private contractors. Additionally, information concerning the costs of both printing and delivery, the cost of enhancements to services, and other cost data should be compiled. Once this baseline information has been aggregated, the agency can identify potential private service contractors and gather this and other needed information related to the outsourcing under consideration. Such information may pertain to the dependability of each supplier in meeting various levels of orders on an ongoing basis and the feasibility of continually supplying outside contractors with the most updated handbook file. Chapter 5 discusses the outsourcing decision in detail.

Comparison of Non-Outsourcing Opportunities

Not all alternative opportunities involve the outsourcing of services. The decision may be to:

- Re-engineer a process.
- Improve a process incrementally.
- Buy or lease buildings or equipment.
- Fund an expansion through debt service or a cash investment.

For example, an agency might review whether to lease more of its computer equipment than to buy it. The analysis would weigh the quick obsolescence of equipment and the relative ease to procure the most updated equipment under a leasing agreement versus a purchase. It would also compare the costs under each scenario, including the dollars that might be available through federal sources versus state funding for each option. After factoring in the funding differences and adjusting for the differences in the timing of the payments under each scenario (present value analysis), the agency may conclude that it would be cheaper to lease than to buy. The

advantage of being able to replace outdated equipment more easily lease versus purchase option, through the leasing agreement combined with the lower cost of could very well make leasing computers more attractive.

An example of this type of analysis is provided in page 42. The example compares the costs of leasing computers with either purchasing computers or continuing manual processing of forms.

Budgeting: Introduction

Once the agency has set its goals and developed its plan for meeting those goals and incorporating forecasted demand, it must submit a Request for Legislative Appropriations for the resources needed to implement the plan. This does not mean that the plan cannot be changed. There is a constant interplay between the planned activities and the budgeting for those activities.

The Interplay Between Planning and Budgeting

During the budgeting process, it may become apparent that financial constraints will preclude the ability to cover all objectives in the plan to the extent initially desired. This may result in modifications to the plan, re-prioritization of strategies, or revising expectations for targeted performance. This give and take between the planning and budgeting components of the cycle may occur several times before the final plan and associated budget are adopted.

Zero-based or Incremental Budgeting and the Link to Performance-Based Budgeting

One of the first questions to be addressed in the compilation of the budget is how the budget numbers are to be derived. There are two basic ways to do this: zero-based and incremental budgeting. In a zero-based budgeting environment, one starts "from scratch" building up the budget, adding items and commensurate dollars to the budget as the forecasted needs and goals require. In contrast, incremental budgeting begins with the previous period's budget and then adds or subtracts based upon differences in needs and goals between the upcoming and previous budget periods.

The greatest advantage of zero-based budgeting is that it requires the preparer to re-justify budgeted dollars and so is more likely to ensure that the dollars are truly needed to meet planned goals and projected activity levels. Incremental budgeting, in contrast, can hide a lot of "fat," i.e. money not really needed to meet expectations. However, zero-based budgets are very expensive to develop, requiring much time and resources to determine appropriate workloads, materials costs, and the like.

In practice, most entities use a combination of the two approaches. For programs that have been around for a while, incremental budgeting may be sufficient. For new programs, zero-based budgeting is almost a necessity. However, the detailed review required in zero-based budgeting is useful even for long-standing programs to ensure that inefficiencies have not been impounded into the budgeted costs.

By specifying expected performance levels in the budget, agencies can strengthen the link between the dollars spent and the attained performance. Theoretically, this should help to eliminate inefficiencies while enhancing the effectiveness of the service. In practice, however, unless the information on workload and cost per unit of performance is well-grounded and unless the measures represent a complete set of performance outcomes, it is hard to determine if the budgeted dollars really are needed to attain the goals or if the agency can realistically attain those goals with the budgeted dollars.

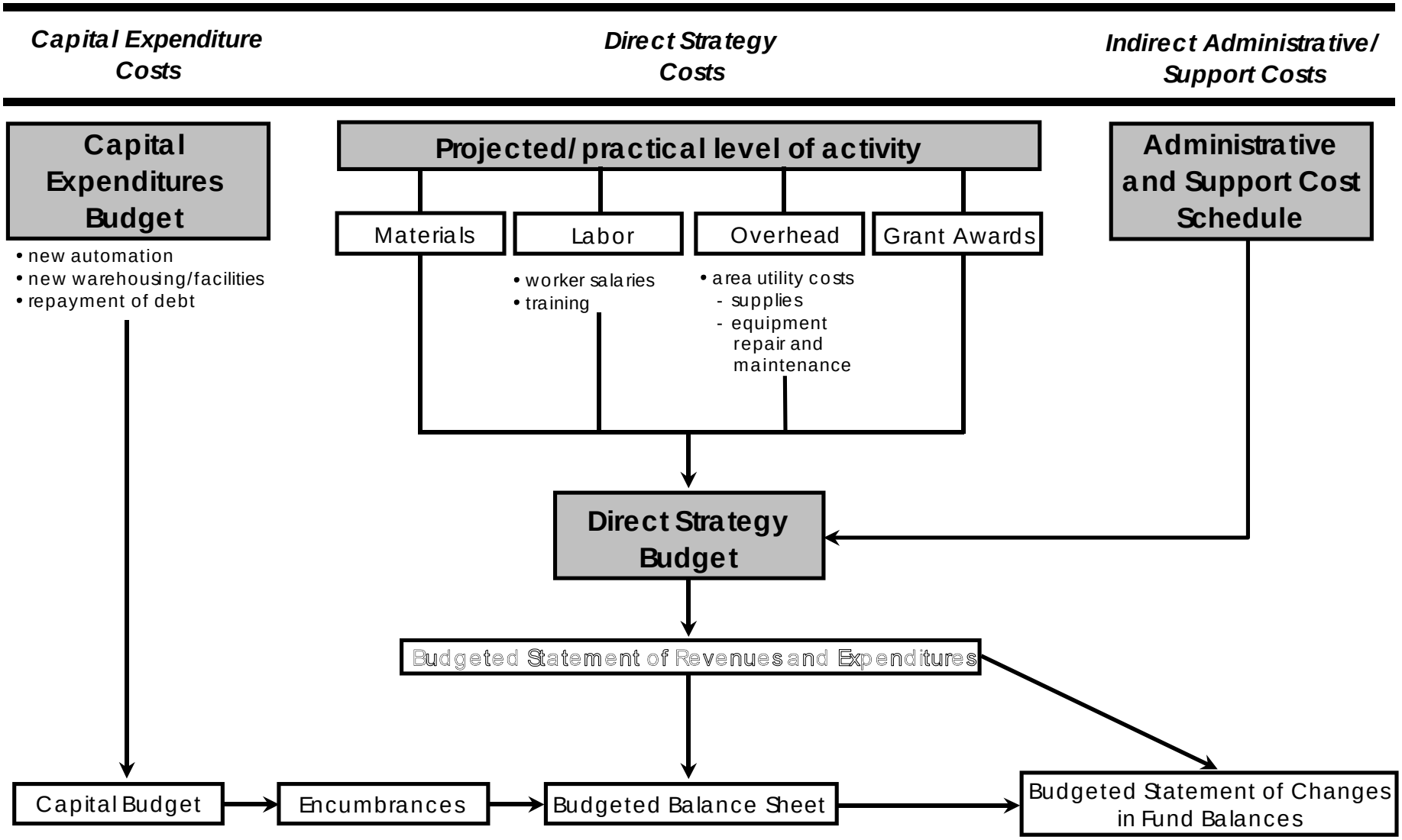
Bottom-up or Top-down?

The current instructions for requesting legislative appropriations require agencies to budget by strategies. Some agencies prepare this budget on a centralized basis and then, once the request is approved, prepare budgets at lower levels. This is the top-down approach. Other agencies request local levels to prepare their budgets, which are then rolled up to a state level and combined with the state office budget, or the bottom-up approach. Starting from the top and moving down is more likely to result in an integrated budget and assurance that the strategies have received adequate resources. However, early involvement of staff at the lower levels, while time-consuming, can achieve greater understanding and acceptance of the budget. The example in this chapter will illustrate a hybrid bottom-up, top-down approach.

The Master Budget Preparation Cycle

The preparation of the master budget begins with a forecast of activity and the capital expenditure plan. There are three budgetary components: capital expenditures, direct service, and administration. (See Figure 12.) Once the budgets for these three areas have been formulated, the agency can project Statement of Revenues and Expenditures, the Balance Sheet, and the Statement of Changes in Fund Balances.

Master Budget Components and Sequence



The Direct Strategy Budget

To derive the direct service budget, an agency will need to determine the amount of materials, labor, overhead, and grant awards that will be needed to execute the plan. With the forecasted level of activity, the agency is ready to allocate human resources and materials, where necessary, to each service. The entity can also determine the amount of overhead needed to carry out this level of service. The estimated costs of these three components more likely to be accurate if the agency has implemented an activity-based costing system because the cost of services has been tied closely to the delivery of those services. Information on workload capacity, vital to a sound estimate of the cost of labor at the projected level of activity, becomes more useful when derived from an ABC system. For example, suppose that one of the program strategies is to determine eligibility for Aid to Families with Dependent Children (AFDC). An eligibility worker typically determines eligibility for a number of programs simultaneously, including AFDC, Food Stamps, and Medicaid. An ABC system allows for that worker's time to be allocated in a meaningful way to each of the programs.

An accurate depiction of the total costs associated with a strategy must also include indirect administrative and support costs. For example, the state office provides training, handbooks, and computer support to eligibility workers. The state office processes the worker's paycheck, travel vouchers, and other benefits. What is the cost to the state office to provide these services? Without an ABC system, the total cost of the state office has to be allocated to each strategy based upon variables such as program headcount or strategy allocation as a proportion of total agency budget. An ABC system allows for an accurate assessment of the unit cost of each type of voucher or benefit type. By maintaining records on the origin of the submission of the voucher or benefit request, the cost of that support service can be appropriately assigned to the individual strategies. Therefore, the unit cost of labor, materials, and overhead to process a client for AFDC can be more suitably determined. This cost folds into the forecasted activity to derive a total cost to offer AFDC eligibility services for the forecasted level of activity.

Cost of Caseworker Labor

Looking more closely at the AFDC eligibility example, suppose that a random moment time study indicates that the average time eligibility workers spend on processing an AFDC client is 30 percent of total work time and that the worker, on average, processes approximately 10 clients per day or 2,300 per year. Suppose further that the average salary of an eligibility worker is $20,000 per year. Thus the labor cost to process one AFDC client is:

$$\$20{,}000 * .3 / 2300 = \$2.61.$$

If the total number of expected AFDC clients per month for the coming year is 800,000, then the total expected annual cost of caseworker labor related to servicing them is $2.61*12*800,000, or $25,056,000.

A Word of Caution about Output Measures and the Setting of Standard Costs

Standard costs and process capability studies: Suitable performance targets should grow out of a study of the process' capability. The arbitrary setting of performance standards, particularly where expected outputs are too high, will lead to loss of quality or accuracy. In the caseworker situation, the increased error rate brought on by expectations of outputs that exceed process capability can lead to federal sanctions against the program, that is, millions of dollars of penalties due to the excessive error rate. Evaluating individual employees with such expectations can only aggravate the problem and result in low worker morale and high employee turnover.

Note that even when the output standards measure are based upon a process capability study, they still incorporate the existing inefficiencies embedded in the process. By determining a realistic efficiency/effectiveness capability level of a process, the entity can devise a performance standard and unit cost to serve as a surrogate for a standard cost. This standard cost can be used for planning and budgeting for future periods. However, inefficient processes must be changed for the standard to be a meaningful budgeting and monitoring tool. The monitoring of actual to standard will then incorporate a review of changes made to the process to increase its efficiency without loss of quality. (Chapter 3 discusses how to determine a process' capability, make changes, and monitor process changes.)

Labor hour determination: A second caveat regards the use of labor hour information. The caseworker example assumed an eight-hour actual work day. It did not include time out for sick leave, vacations, holidays, etc. The use of headcounts as a substitute for actual time worked may result in a distorted estimate of unit cost and can lead to poor budget figures. This is particularly true if part-time workers are used or extensive overtime is accumulated.

Aggregation of activities: Finally, output measures aggregated at too high a level of processes/products can distort actual workloads. For example, certain types of vouchers at DHS, such as travel vouchers and community care vouchers, are very labor intensive. Other types of vouchers are almost completely automated and require little manual processing. A single output measure developed over all these vouchers provides little useful information. Attempts to use such a measure in budgeting can lead to erroneous decisions. If the number of travel vouchers submitted is increasing relative to the number of automated vouchers, too little budget may be allocated to the payment process, resulting in backlogs and overtime.

Other Costs

The cost of the supervisor's salary is allocated in the same manner as that of the worker. What about the cost of materials? The cost of forms completed by the client and the worker should be factored into the estimate of the cost of materials. Each

eligibility worker also receives an initial handbook of rules for determining eligibility status as well as quarterly revisions to the rules. The handbooks and revisions are developed, printed, warehoused, and shipped by the state office. If the state office is using an ABC system, the agency will know the cost of each handbook and revisions and the demand for them. This overhead cost can then be assigned to the appropriate strategy.

These are only a few of the costs associated with eligibility determination. Tracing the total costs attributable to a particular program or service is a significant task initially. However, once the system is developed, it results in a more accurate annual budget, at least for the direct service component.

The Administrative Budget

If the agency is using an ABC system, the remaining cost to be assigned to the administrative needs category is significantly less than before. This greatly simplifies the development of the administrative budget. This budget consists primarily of the cost of the top management of the entity.

The Capital Expenditure Budget

By this point, the development of the capital expenditure budget should be a relatively straightforward task. During the planning stages, the agency weighs several alternative methods for accommodating its capital expenditure needs, choosing the one(s) that optimized the overall expected benefit to the agency. The costs of the chosen opportunities are then entered into the development of the capital budget, including any costs to be incurred in the upcoming year that originated in earlier years. Note that these are cash costs, not allocations of cash outlays in previous years.

Revenue Estimates

By the time the agency is ready to develop an operating budget, the amount of funds appropriated by the Legislature is known. For federal programs dealing with clients, once the client demand estimate is determined, the agency can extend the amount of revenue expected from the Federal Government. For federal programs not dealing with clients, the federal revenue dollars are generally already known. Once appropriations across funds and agencies have been finalized, an agency can also estimate the amount of interfund transfers.

The Development of Financial Statements

Once the three budgets and revenue estimates have been developed, the budget representative can put together an expected Statement of Revenues and Expenditures. To develop the Balance Sheet and the Statement of Changes in Fund Balances, the agency must also project the amount of encumbered funds at the end of the next fiscal year. These serve as offsets to cash balances on the balance sheet and indicate some degree of restriction on that cash.

A Simple Program Example of the Planning and Budgeting Phases

This section will provide a fictitious example of how the planning and budgeting process would proceed. The details have been greatly simplified to facilitate the presentation.

The Help-the-Teen Program, begun 18 months ago, offers free counseling services to troubled teens throughout Major Metro. "Troubled" is defined as

- recent attempted suicide
- suddenly failing one or more classes by a student whose academic record was previously acceptable
- hostile school behavior
- depression as defined by the DSM-IV scale
- taking or selling hard drugs

The goal of the program is to enhance troubled teens' coping skills. The two objectives that relate to that goal are: to strengthen the troubled teen's link with a social community and to provide teens with individualized approaches to dealing with problems. The strategy selected meet the first objective is to organize and conduct group field trips. The strategy to address the second objective is to hold weekly one-hour one-on-one counseling sessions between the teen and a licensed and experienced counselor.

The program is staffed by six counselors who work out of five small leased offices. Each counselor handles all phone calls and paperwork. Sometimes the counselor has to travel to the location of the troubled teen and is reimbursed for per diem travel expenses. Counselors submit travel vouchers once a month for reimbursement. Once a week, the counselor takes a group of troubled teens on a field trip, which may be to a movie, a museum, a party, or a picnic. The average size of the group attending the field trip is 10.

The program is administered by the Texas Department of Helpers. The Texas Department of Helpers hires the counselors, liaisons with local schools to keep them informed of the Help-the-Teen program, and pays counselor salaries, travel expenses, facility and equipment costs, and legitimate recreational costs. The state office manager overseeing the program spends approximately 25 percent of her time on the

program. She has no secretary. Currently, the counselors are processing all paperwork manually but the state office is considering the purchase of computer equipment for each office. All expenses are paid from state funds.

The state office has been using an activity-based costing system and has determined the cost to do the following:

- process a per diem travel voucher ($15)
- process various monthly bills, i.e. rent, purchase of supplies, utilities, reimbursement for field trips ($12)
- process a monthly paycheck ($5)
- service employee benefits ($10)
- hire a counselor ($300)
- accumulate and report information on the program ($500/month)
- develop and disseminate posters ($40/poster)
- develop and deliver forms ($1/form)
- provide legal services ($70/hour)

The Planning Phase

The group reviews data on the number of teens using the service over the past 18 months. They note that there have been significant month-to-month increases as teens have become aware of the program and informed their friends. They also note that the number of schools referring teens has tripled since the program's inception. Reviewing the demographics of the schools, they estimate that two of the counselors will not be able to service all requests during the coming year and that a second counselor will be needed in each facility. However, no one is sure that the State will fund the increase in service level. Also, one of the facilities does not have a second office to accommodate an extra counselor. The planning group is considering outsourcing to a private counseling group for the work of a second counselor rather than opening up a new facility.

Sixth Office

The group has put out bids to contract with a private counseling facility. All bidders have agreed to provide the same service as is currently provided by the Help-the-Teen counselors. Presented on the following page is a comparison of costs for opening a sixth location versus contracting with the lowest bid by a reputable private counseling group. The vendor has agreed to provide travel for its counselor as necessary and to include it as part of the bid price. The cost of field trips will be reimbursable from the state office on a monthly basis. A two-year contract will be signed with the vendor.

Figure 13 Comparison of Monthly Costs

Location/Expense	Sixth Office	Private Contractor
Rent	$1,000	
Utilities	200	
Supplies	100	
Counselor's Salary	3,750	
Fringe Benefits	1,200	
Contracted Monthly Charge	none	$5,500
Cost to Monitor Contract	none	300
State Office Costs*	169	95
Total	**$6,419**	**$5,895**
Winner		**at $70,704/yr saving $6,288/year**

Figure 14 *State Office Annual Direct Support Costs for the Extra Location and Private Vendor (reference-above table)

	Extra Location	Private Vendor
Travel voucher processing (12 * $15)	$ 180	$ 0
Paycheck processing ($5 * 12)	60	0
Hiring a new counselor	300	0
Legal services	1,000	1,000
Administrative voucher processing		
12 utility bills, 12 rent payments, 4 supply		
purchases, 1 insurance, 12 trips/12 trips	$ 492	$ 144
Total annual state office expenses	**$2,032**	**$1,144**
Monthly amount	**169**	**95**

With an annual savings of $6,288, the option to go with the private vendor is the better choice.

Computers

The group has priced the purchase versus the lease of computers for each facility. Counselors estimate that they will be able to service two extra teens each day if they have computers to facilitate paperwork. Currently, they can each service one teen per

hour, on average. If computerized, all forms would be electronically transmitted from the state office, saving printing and distribution charges of paper forms but incurring electronic processing charges or online support. Each counselor completes about 30 forms per week.

Figure 15 Comparison of the annual costs of leasing or purchasing five computers with the annual cost of continued manual processing per site. (Note: analysis is for next three years; discounted at an annualized rate of 8 percent, compounded annually.)

OPTION/EXPENSE	Lease computer equipment	Purchase computer equipment	Continue manual operations
Lease/purchase	$ 3,500	$ 7,500 (immediate outlay only)	none
Counselor time	none	none	$ 65,368[1]
Software	$ 250	$ 250	none
Online support	$ 500	$ 500	none
Paper forms	none	none	$ 9,870[2]
Software development	$10,000 (immediate outlay only)	$10,000 (immediate outlay only)	none
Software training	$ 250 (immediate outlay only)	$ 250 (immediate outlay only)	
Total present value of three year cashflow	**$22,203**	**$19,683**	**$193,896**
Winner		**saving $174,213 over the three-year period**	

1. Six in-house people at a $45,000 salary, each working 1900 hours per year, spending two extra hours a day for 230 work days to manually process paperwork (versus a computerized process): (***$45000 /1900) hourly rate*2 hours a day*230 days*6 counselors = $65,368***

2. Seven counselors to be provided with 30 forms a week for 47 weeks, at $1 per form: ***47 weeks * 30 forms * $1 per form * 7 counselors = $9,870***

Field trips

During the past year, the counselors each had a budget of $1,500 for field trips. All had depleted funds before the end of the fiscal year. Until recently, they had not collected information on the cost of each type of field trip. They decide to review their recently acquired information.

The average costs of the four types of field trips is provided in Figure 16.

Figure 16

Entertainment/ Expense	Party	Movie	Picnic	Museum
Transportation	$ 0	$10	$ 0	$20
Tickets	$ 0	$ 1 (per person)	$ 0	$ 2 (per person)
Food & Decorations	$ 4 (per person)	$ 0	$ 3 (per person)	$ 0
Total for 11 people	**$44**	**$21**	**$33**	**$42**

Because feedback from field trip participants has been consistently positive, the counselors decide that this is a function that should be maintained. After reviewing the above costs, the group decides that most of the field trips will be divided between going to movies and having picnics. Although the movie is the least expensive, it does not afford teens much opportunity to socialize; thus, the emphasis will be on the picnics. The group concludes that they will aim for four parties, four museum trips, 12 movies, and 27 picnics for each location. The total cost per location will be $1,487 and $10,409 for seven counselors.

Training

The group, in conjunction with the legal department, has also renegotiated contracts on office rental for the coming fiscal year, subject to approval of funds by the Legislature. The counselors have expressed a need for further training to deal more effectively with the teens and have identified a one-week training program in the local area. The cost is $500 per person. They believe that this training will enable them to meet the higher performance goals they have set for the next year, relative to their performance over the last 18 months.

The Budgeting Phase

As you can already see, some preliminary budget work was performed during the planning stage in order to weigh the relative benefits of various options. This section pulls together the special project results described in the planning section with the continuing operations plan and shows the development of the master budget. Information on estimated monthly operating costs for the five locations is presented in Figures 17 and 18. The cost of the new computers and the private vendor will be kept separate.

Figure 17

Location/ Expense	North 2 counselors	South	East	West	Downtown
Rent	$ 750	$ 850	$ 550	$ 800	$ 450
Utilities	150	175	125	175	100
Counselor's Salary	7,500	3,750	3,750	3,750	3,750
Fringe Benefits	2,400	1,200	1,200	1,200	1,200
Travel	50	50	50	50	50
Supplies/ Insurance	200	100	100	100	100
Total monthly costs	**$ 11,050**	**$ 6,125**	**$ 5,775**	**$ 6,075**	**$ 5,650**
Monthly costs less fringe benefits	**$ 8,650**	**$ 4,925**	**$ 4,575**	**$ 4,875**	**$ 4,450**
Total costs for the year (no fringes)	**$103,800**	**$59,100**	**$54,900**	**$58,500**	**$53,400**

With the information regarding the purchase of computers, the contracting with a private firm for counseling services, training costs, basic operating costs, and field trip costs, the agency is now ready to compile the budget for submission to the Legislature.

Figure 18

State Office Direct Support Costs for the Six In-House Counselors	
Travel Voucher Processing (6 * 12 * $15)	$ 900
Paycheck Processing ($5 * 6 * 12)	360
Hiring 2 Counselors (1 new, 1 turnover)	600
Reporting	7,200
Posters (30 schools * 4 posters * $40)	4,800
Legal Services	3,000
Administrative Voucher Processing	2,684
Manager Salary and Expenses (60,000 * .15)	15,000
Total State Office Expenses	**$34,544**

Figure 19 Budget for Submission to the Legislature

A. Goal: The goal of the program is to enhance the coping skills of troubled teens.	
A.1 Objective 1 To strengthen the troubled teen's link with a social community	
A.1.1 Strategy Organize and effect group field trips	$ 10,409
A.2 Objective 2 To provide teens with individualized approaches to dealing with problems	
A.2.1 Strategy Hold weekly one-hourone-on-one counseling sessions between the teen and a licensed and experienced counselor	$403,760
Administrative costs to meet goal	$ 35,688
Capital budgeting requirements to meet goal	$ 17,500

Note: The $10,409 for strategy A.1.1 was calculated on page 41.

The $403,760 for Strategy A.2.1 is the sum of the total costs in Figure 17 plus the $70,704 for the private contractor in Figure 13 less the $1,144 in costs to the state office reported in Figure 14. It also includes the cost of software, online support, and software training calculated in Figure 15 for the computer equipment purchase option ($1,000). Finally, the $3,500 cost of the training has been added to this amount. Although some of the costs assigned to this strategy are costs shared by Strategy A.1.1, we do not believe that a further breakout of the costs is necessary. Strategy A.1.1 would have little effect without Strategy A.2.1.

The administrative costs of $35,688 included the $34,544 calculated in Figure 18 and the $1,144 in State costs for the private contractor.

The $17,500 for capital budgeting purposes is for the purchase of computer equipment reported in Figure 15 less the cost of software, online support, and software training ($1,000).

Discussion

Because this budget was subject to approval by the Legislature and because the program is totally state-funded, the example did not encompass estimates of revenues or the budgeted financial statements. Once funding has been approved, the agency could prepare these reports.

Zero-based Budgeting/Forecasting

This example primarily used the zero-based budgeting strategy to develop the budget. The group computed the cost of each type of field trip, decided upon the mix, and then developed the budget for this strategy from that information. The group also let the forecast of service demand drive the development of the budget for the second strategy. The forecast was derived using a combination of trend analysis and staff expertise. The state office direct costs were calculated according to how much state office service would be required to meet the current year's support needs, not last year's amount (incremental budgeting).

Bottom-up or Top Down

The planning and budgeting process involved an interplay between a bottom-up and top-down approach. The group first agreed that the goals, objectives, strategies, performance measures, and expected performance were appropriate (top-down). Together, the group weighed opportunity costs. However, once the forecasts of activity level was completed, the development of the costs of continuing basic operations was done on a site-by-site basis (bottom-up). Further, this entire process involved all program personnel. Obviously, this is not realistic with large programs. But even large programs can profit from including representatives from the various staff levels throughout the planning and budgeting process.

Overhead

With an ABC system, it is not necessary to divide costs into direct materials, labor, and overhead, although it is useful to keep these categories in mind. This helps to ensure that all costs have been captured. Since overhead becomes directly tied to the objectives and goals, it is not subject to an arbitrary allocation. The $35,688 of administrative costs are now directly linked to the program goal and so more accurately reflect the true program administrative costs. Although state office still has some unassigned costs of administration (salaries of the highest level management in the organization), the amount unassigned will be significantly less than before the implementation of an ABC system. Finally, the capital budgeting needs are also tied to the goals of the program rather than kept as a separate cost or assigned to goals on some arbitrary basis such as headcount or dollars.

Opportunity Costs and Value-added Analysis

The use of an ABC system also facilitates the consideration of alternative strategies. In the budgeting component related to the field trips, data related to the cost of each trip allowed the program to make sound decisions about which alternatives added the most value relative to the cost. Amassing data on the cost of the continued manual processing of forms versus computerization also allowed the program to choose the

most cost effective way to deal with paperwork. Comparisons of the cost of adding a new facility with the outsourcing for a seventh counselor led to a sound and economical decision.

Sensitivity Analysis

Armed with this information, the agency is ready to assist the Legislature in sensitivity analysis, that is, in "what-if" determinations. What if the program were to close down the South location, not add the second counselor to the North location, not add the seventh counselor, add one more location, etc? With the already-developed spreadsheets, cost information is easily accessed on the computer.

Attainment of Goals

Finally, planning and budgeting that is supported by an ABC system yields more accurate information concerning the true cost of meeting specific program goals and objectives and thus enhances and strengthens the entity's (and therefore the State's) ability to meet those goals.

Budget Monitoring in an ABC Environment

In the above example, the expected unit cost to process a travel voucher was $15. However, the capability of the process used in paying for travel vouchers indicated that the volume from which that expected unit cost was derived could vary such that the unit driver cost would fall between $12 and $18, even with the cost of resources controlled and no variation in the number of full-time equivalent employees engaged in the task. Further, given the current market conditions, the hourly rate paid for temporary workers could vary from the expected amount by $1 in each direction. Actual volume also fluctuates more widely such that at times the process is not capable of handling the excess volume. Traditional variance analysis is not meaningful in this environment.

The development of non-financial as well as financial measures, tied to goals, objectives, and strategies, and measures growing out of process capability studies provides better means of monitoring deviations from the "budgeted" amounts. The ease of obtaining information in a computerized environment has obviated the need for a few simple and easily derived measures such as those used in traditional variance analysis. Perhaps the use of "targeted" costs and performance numbers should replace the term "budget."

This page intentionally left blank.

Chapter 3 Monitoring for Efficiency, Quality, and Effectiveness

Figure 20

Business Process Analysis can:

- Assist in the initial assessment of conditions by providing a process framework.
- Help management to identify processes needing improvement, transformation, or elimination.
- Provide information about the relative potential dollars to be saved by undertaking various improvement projects, enabling management to prioritize projects for improvement, reengineering, or outsourcing.

The following chapter describes a methodology called "business process analysis" which can help management make critical decisions in an era of tight budgetary constraints. Such decisions and their implementation can significantly streamline processes and reduce costs while enhancing the quality of service provided.

Business process analysis provides an analytical framework to accomplish several management objectives. In the initial assessment phase, it provides management with an inventory of existing systems, service products, customer requirements, and a baseline of current performance. While completion of this high-level assessment can serve as an end unto itself, it also provides the foundation for an activity-based costing system. The usefulness of business process analysis in the assessment and continuous monitoring of the efficiency, quality, and effectiveness of services and their processes is described in Figure 20.

Information garnered through the initial assessment should enable management to make informed choices about whether to undertake a complete reengineering of existing processes, or to proceed with more incremental continuous improvement projects. In the latter case, the assessment should provide sufficient guidance to logically prioritize improvement initiatives. The assessment should also provide information on whether to pursue other feasibility studies such as consolidation and outsourcing.

Figure 21

The three phases to Business Process Analysis are:

- Conduct an initial assessment of current conditions.
- Identify and implement improvement opportunities and strategies.
- Monitor ongoing process performance.

Due to its fundamental process orientation, business process analysis represents a significant shift from traditional methods to improve efficiency, quality, and effectiveness. Traditionally, management of operations and improvement initiatives occur within the departmental framework depicted on an organization chart. The daily work of any large organization, however, is accomplished by numerous cross-functional work processes that cut horizontally across the organization. Improvement efforts confined to a departmental perspective carry an inherently high risk of suboptimal results due to their compartmentalized focus. For example, an administrative support division, in an

effort to streamline and increase efficiency, might decide to eliminate certain activities, only to pass these functions on to a line/operations department, ultimately increasing cycle time and cost and reducing effectiveness. While the administrative support division may appear more efficient, the overall performance of the organization may decline.

A process orientation helps to overcome such barriers by focusing upon the work itself, rather than on the hierarchy and organizational structure for managing the work. A process view helps to link the work flow to the customer as it crosses departments. Viewing the organization as a system of multiple, extended processes rather than a collection of individual departments facilitates organization-wide improvement in terms of efficiency and effectiveness and service to the customer, in addition to the potential reduction of total cost.

Phase One: Conduct Organizational Assessment

The initial assessment phase essentially provides a “snapshot" of existing operations. It answers the questions: "What do we do as an organization?" “Who do we do it for?” “How do we do it?”. The essential elements of the assessment, in approximate sequential order are given in Figure 22.

Figure 22

To conduct an assessment of condition, perform the following steps:

Step 1	Identify the core, macro-level business processes
Step 2	Identify the organization’s primary service products
Step 3	Identify the subprocesses which produce those products
Step 4	Identify the subprocess activities directly related to the products in question
Step 5	Identify and differentiate the customers of the products
Step 6	Determine key customer requirements related to the products
Step 7	Evaluate current process performance and ability to meet customer requirements

An existing organization may have some or all of these components and data elements in place. Depending upon the rigor of previous analyses, however, the assessment may reveal gaps or omissions in existing management systems. Even in well developed management systems, changes in the operating environment or in customer requirements necessitate a periodic re-examination of these key components.

There is some flexibility in the sequential order in which the assessment proceeds. While identification of the core processes is always a first step, the sequence of identifying products and linking them to specific subprocesses may vary depending upon the organization. It is, of course, necessary that customer requirements be determined prior to setting performance measures, analyzing process capability, or baselining current performance.

Prior to beginning the assessment, agencies should consider designating a *process owner* to oversee and coordinate not only the assessment phase, but also the subsequent phases of improvement and

monitoring. Process owners are responsible for ensuring that those charged with carrying out each phase of business process analysis have the necessary time, resources, and training to successfully complete the objectives. A process owner should ideally have a vested interest in the success of the initiative and possess sufficient credibility and authority within the organization to remove barriers or obstacles, particularly when processes cross functional or divisional boundaries.

Step 1: Identify Core Processes

It is important to distinguish between core strategic competencies and core business processes. Core strategic competencies are those things that are delivered to the external customer or end user of the agency's products or services. Core business processes are those activities that are essential to run the business such as purchasing, payments, etc. While there are core business processes within each of the strategic competencies, strategic competencies generally refer to the operations side of the organization, as opposed to administrative support processes. For example, the core strategic competencies of the Department of Human Services, prior to the passage of House Bill 7, included eligibility certification, grant payments, child and adult protective services, and employment, long-term care, and family violence services. Child and adult protective services were moved to the Department of Protective and Regulatory Services. With the imminent transfer of employment services to a workforce training agency, the core strategic competencies of DHS are now eligibility certification, grant payments, long-term care, and family violence services. While business process analysis is equally applicable to areas of strategic competencies or support services, the distinction between these areas is important to bear in mind when considering outsourcing decisions.

To identify an organization's most critical core business processes, top management should establish an inventory that includes only those processes that are necessary to run the organization. While the number and type of core processes identified will vary depending upon the nature of the organization's work and the organizational level performing this analysis, there are some processes common to almost all public sector agencies. For example, typical core processes within a support services department might include: purchasing, payments, hiring/training, and warehousing/ distribution. For an mis division, core processes may encompass: data processing, lan functions, telecommunications processes, applications development and distribution, disaster recovery, and engineering and system integration processes.

The level of aggregation in defining core processes depends upon the purpose. In general, the more massive the change that the organization is contemplating, the higher the level of aggregation of processes. However, the initial higher level aggregation does not preclude the identification of subprocesses; in fact, it provides a structure for integrating those subprocesses. For example, an organization may want to review its procurement function, not simply the way it does its purchasing, delivery, warehousing, or payment processes. So order fulfillment is the macro-process and purchasing, delivery, warehousing, and payment are subprocesses.

However, after defining macro-processes and their subprocesses, the entity may decide to focus on improving one or two of the subprocesses. Having the larger framework in which to view the analysis enables the entity to ensure that one process is not changed to the detriment of another.

Step 2: Identify Primary Service Products

Figure 23

A service product:

- is countable
- occurs in discrete units
- is deliverable
- can be made plural

Upon identification of the core processes, an inventory of the end products produced by core processes is in order. Every process has an end product that is delivered to the customer. (See page 12 for a sample list.) Failure to identify products of service organizations has led entities to mistakenly identify activities of the processes as products. Guidelines for distinguishing products from the processes and activities which produced them are given in Figure 23. Products are deliverables. They are countable, occur in discrete units, and can be made plural (Lawton, 1993, page 7). The service products of a human resources division, for example, might include job classifications, employment advertisements, personnel policies, and training manuals.

Defining Process Boundaries

Defining products narrows the scope of the analysis to focus upon the process which produced the output in question. Defining the product should help to establish clear beginning and end points around the process. While defining the process boundaries may sound simple, it entails a number of considerations. For example, the Fiscal Division of the Department of Human Services processes thousands of travel vouchers each month. The end product of the voucher processing is ultimately a warrant issued by the Comptroller's Office. For caseworkers, the extended reimbursement process begins at the regional level, initiated by the person submitting the claim. There are a number of subprocesses and activities at the regional level which may occur before the voucher reaches the state office. For the purposes of the Fiscal Services Division, however, it may choose to limit its analysis to the process boundaries from when the voucher is received at state office to when a pay tape is sent to the Comptroller's Office. In that case, the outputs of the regional processes and activities become the inputs to the state office processing. Similarly, the pay tape from state office becomes the input to the Comptroller's Office.

Step 3: Identify Subprocesses

While payments may be defined as a core process of the organization, there are a number of types of payments (products), just as there are a number of subprocesses involved in producing a payment. Flowcharting the processes and activities associated with each type of voucher provides a clearer picture of the amount of resources consumed by product type. It also clarifies how the work is organized and carried out.

Figure 24

There are several types of flowcharts:

- top-down
- work-flow
- deployment
- data flow
- decision

There are a number of different types of flowcharts that can be used to map the process. (See Figure 24.) Top-down flowcharts provide a picture of the major steps in a process, focusing upon only those steps absolutely necessary to carry out the work. Top-down flowcharts omit rework and inspection. By omitting the complexity that has accumulated in a process over time, the top-down flowchart enables management to focus on how the process should ideally operate. This prevents the analysis from becoming mired in the complexity of the process and facilitates the identification of problem areas. Detailed flowcharts use standard flowcharting symbols to describe most or all of the process steps and activities in a process. They are particularly useful to identify process loops denoting rework and decision points where a good product is inspected and/or separated from a product that does not meet specifications. Each of these flowcharts can facilitate identification of non-value adding work in the process, or identify suboptimal sequencing of work flow. There are a number of other types of charts that can be employed to track product work flow, estimate queuing and storage time, identify process responsibilities, etc. (See the Bibliography for references that provide a more complete discussion of these techniques.)

In the example of voucher processing, if the process boundaries of voucher processing were limited to the state office, there are still a number of subprocesses involved in the issuance of a warrant. Initially, a voucher is received in the state office mailroom. It is then sent to the Fiscal Services Warrant and Distribution Section for sorting, to the Travel Unit for auditing and corrections, and to the Micrographics Unit for filming and storage before being entered onto a pay tape for the Comptroller.

Within each of these subprocesses, there are a number of intermediate work products created and activities performed. A simplified overview of the processing of regular travel vouchers is provided in the form of a top-down flowchart on the following page:

Figure 25

Subprocess	Distribution	Claims Processing	Claims Corrections	Micrographics	FMIS Production Control
Activities	1.1 Sort vouchers by type, agency, & region	2.1 Auditor picks up batch and manually logs out	3.1 Fixes correctable errors	4.1 Prepares for filming	5.1 Match to HRMIS for SS# & BJN
	1.2 Fill out flash card with date, batch #, and number of vouchers	2.2 Audits voucher		4.2 Batch # logged on Micro Control Log	5.2 Post to FMIS
	1.3 Stamp batch # on voucher	2.3 Auditor enters data into AEIS for all vouchers		4.3 Vouchers and batch cards filmed	5.3 Prepare pay tape
	1.4 Send batches to Claims Processing	2.4 Walks to Remote Job Entry and manually logs type, # of documents, date and operator identification #		4.4 Enters roll and frame # for each batch into AEIS	5.4 Send pay tape to Distribution
	1.5 Enter batch # and number of claims on manual log				

Step Four: Identify Subprocess Activities

Identification of subprocess activities can serve several purposes. Initially, if an organization is developing an activity-based costing system, this information will allow the organization to determine which activities and associated costs are directly attributable to each product, as discussed in detail in Chapter 1. Secondly, identification of subprocess activities also lays the groundwork for the process value analysis component of Step 6 of the assessment. The identification and flowcharting of subprocesses (Step 3) and subprocess activities (Step 4) can also provide valuable information as management formulates improvement strategies and initiatives.

Step 5: Identify and Differentiate the Customers

Issues of efficiency, quality, and effectiveness need to be addressed within the context of customer requirements. A structured analysis of efficiency, quality, and/or effectiveness must begin and end with the end user of the good or service in question.

Every organization must ask what does the customer wants, and how the organization knows this.

The Regulatory Environment

In the public sector, agencies must conform to requirements set by legislation, regulations, and policy guidance established for the product or service. While laws and regulations establish the parameters within which an agency operates, it is incumbent upon all public sector organizations to move beyond mere compliance into vigorously meeting the needs of the end users of its services in the most efficient and cost effective way. The interplay between the elements of efficiency, quality, and effectiveness must be balanced and considered as a whole. It is possible, for example, to produce a good or service in a very efficient manner, yet not deliver what the customer wants or needs. Therefore, a recommended, structured approach to analyze efficiency, quality, and effectiveness begins with identifying customers and ascertaining their wants and needs.

The Place of Performance Measurement

Traditionally, the service nature of most government functions makes meaningful measurement of performance difficult. Service typically refers to activities and focuses upon how an organization delivers. Much more important to the customer, however, is "what" is delivered. The recipient of a tax refund, for example, likely cares preciously little as to how the refund is processed. However, receipt of the refund check itself, in an accurate and timely manner, is of paramount importance. Because the products of service organizations are tangible and concrete, they provide an excellent mechanism to manage and measure for efficiency, quality, and effectiveness.

Classes of Customers

Although defining service products allows an organization to identify its customers, it is important to differentiate between types of customers. A valuable contribution of quality management initiatives is the distinction between external and internal customers. While the needs of the external customer should ideally drive and define how the processes of the producing organization are structured, the internal/external customer distinction does not provide sufficient guidance in defining roles and responsibilities or prioritizing among competing or conflicting demands of different types of customers. For example, many products delivered by support service departments may not have a direct external customer. In this case, the internal/external distinction is largely irrelevant. Further, when internal support functions such as purchasing and data processing interact, it is not always necessarily clear as to who is the customer of whom.

One solution to remedy the internal/external customer dichotomy is to utilize the service product to define the relationship between types of customers. Lawton's (1993, pages 4-14) classification of customers resolves the ambiguity of the

Figure 26

Classes of customers include:

- end users
- brokers
- fixers

internal/external customer concept by focusing upon each customer's respective role with a given product.

- End User: End users are the ones who actually use the product to achieve a desired result or outcome. In the Department of Human Services, the end users of the Fiscal Division's travel voucher processing are the employees who receive a warrant as reimbursement for travel-related expenses.

- Brokers: Brokers bring the end users and the producers of a product closer together. A broker's function is to make a product more accessible to the end user. Brokers may function as an agent of either the end user or the producer of the product. The Child Care Management System (CCMS), for example, serves as a broker between families (end users) of subsidized day care and the day care centers/producers of child care services. In the process of issuing travel warrants, the mailroom and distribution units within the Fiscal Division act as brokers between the person submitting a travel voucher and the Comptroller's Office which issues the warrant or direct deposit.

- Fixers: Fixers repair, correct, modify, or adjust the product for the end user. The Claims Corrections unit in the DHS Fiscal Division performs the role of fixers by correcting voucher errors in order for the claims to be paid.

It is important to note that individuals or work groups may function as end users, brokers, or fixers. The respective role depends upon the relationship to the product in question. The roles of end user, broker, and fixer apply to both internally and externally consumed products. Although persons or work groups may function in one or more of these roles depending upon the product in question, the needs of the end user should always take precedence over the needs of brokers and fixers.

Comparison of the Relative Importance of Customers

The distinction between end user and broker is particularly significant. Although the broker's role is supposed to make a product more accessible to the end user, frequently the broker's own requirements may conflict with or impede meeting the needs of the end user. For example, the "one stop shopping" concept advanced in the health and human services area of state government represents recognition of the inadvertent barriers which the brokers of these services may place between clients and the actual producers of goods and services.

Step 6: Ascertain Customer Needs

Since customer requirements establish the criteria for value added analysis and evaluation of process performance, customer research provides the foundation for

measuring and monitoring efficiency, quality, and effectiveness. Customer needs can by identified through such techniques as:

- interviews
- focus groups
- surveys
- observation
- being a customer yourself

In determining customer needs, care should be exercised to ensure that a representative sample of customers is achieved. In addition, since customer requirements change over time, regular, periodic feedback must be obtained. The organization should never simply assume that it knows what its customers want, or that the absence of complaints indicates customer satisfaction. Some customers may have trouble defining exactly what it is they want, simply because they have never seen it. Further, customer expectations may have been diminished by historically low levels of quality, efficiency, and effectiveness.

After customer feedback is obtained, the organization needs to translate the "voice of the customer" into measurable specifications. For example, customers of a job training program might say that the training should be "easy to get to," " affordable," "convenient," "provide marketable skills." (See Figure 27) Upon determining customer needs, it is useful to group these requirements into categories. Some common categories might include: timeliness, ease of use, completeness, and certainty. Further investigation might enable management to translate these requirements into the following specification:

Figure 27

Product Attribute Categories	Voice of Customer	Translation	Unit of Measure
Ease of Use	Easy to Get to	Accessible Public Transportation	Number of Bus Changes/Transfers Miles to Training Class
Timeliness	Convenient Schedule	Evening Classes for Working Clients	6:30 p.m. to 9:00 p.m.
Certainty	Affordable Tuition	Less Than x% of Average Performance	"X" $ per Semester
Certainty	Marketable Skills	Training Corresponds to Needs of Local Employers	Number of Nurse's Aids Positions with Entry Wage $7.00/hr.

Once customer requirements are determined and categorized, management should have sufficient information to assess how well current operations meet these needs. Management can prioritize to focus upon the customer's most important requirements first. In terms of the job training example above, affordable tuition and marketable skills might take precedence over issues of transportation and class schedules. In addition, some customer requirements may be negotiable to some extent.

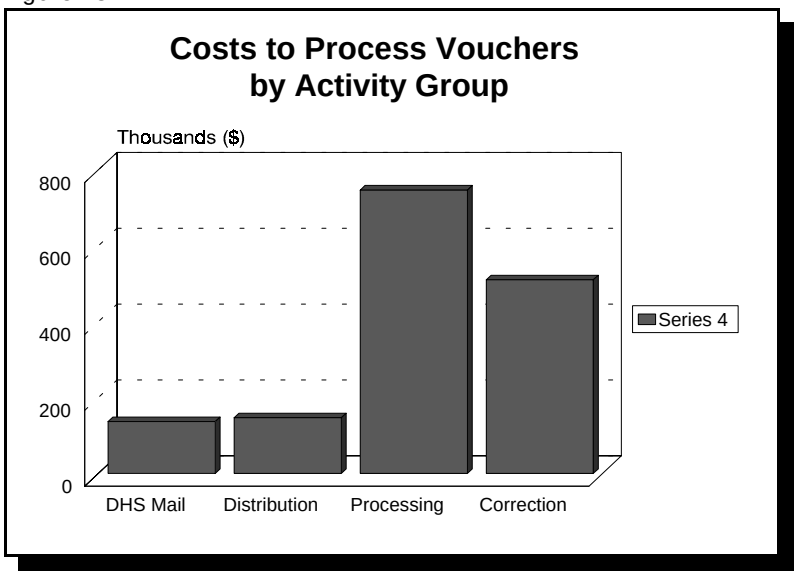
Step 7: Evaluate Current Process Performance and Ability to Meet Customer Requirements

Since it is unlikely that an organization can undertake an in-depth evaluation of all processes simultaneously, it is important to prioritize which areas to analyze first. In many cases, management may already know areas that need immediate improvement based upon customer feedback or complaints. In other cases, management may be driven by more general improvement objectives such as reducing processing time or error rates. In the latter case, priority might be placed upon processes that:

- are cross functional
- have multiple layers of approval
- have long cycle times
- exhibit a high degree of complexity or multiple process loops
- exhibit one or more of these characteristics and consume a large portion of the entity's resources

The flowcharting of processes earlier in the assessment phase often provides indicators of these conditions. Additionally, if the entity has developed an activity-based costing system, it will be able to associate the cost of each type of service to that service accurately. For example, the Department of Human Services budgeted over half a million dollars to correct vouchers during fiscal year 1994 (not including corrections of food stamp submission errors). This is a significant amount of money in itself as well as relative to funds spent on other parts of the voucher process. The following is a partial set of costs to process vouchers at the TDHS, displayed by a bar chart.

Figure 28



Activity	Cost
DHS Mail	$136,402
Distribution	$146,217
Processing	$746,469
Correction	$509,721

Were DHS to subdivide these costs by type of voucher, management would have a better indication of where the bulk of these correction costs are incurred.

Process Value Analysis

After a process has been selected for study, a process value analysis can aid management to assess the efficiency and effectiveness of the area under study. Process value analysis builds upon the identification of customer requirements conducted earlier in the assessment phase. Value is defined in terms of the end user's requirements for the product of the process in question. Value added activities are those that must be performed to meet customer requirements. Non-value added activities are those which do not contribute to meeting customer requirements and could be eliminated without deterioration in the functionality of the product or service.

Figure 29

The essential steps of process value analysis are:

- Flowchart the process steps and activities.
- Determine the cycle time for each process step.
- Clculate the cycle time efficiency.
- Make a value added assessment.

In making a value added assessment, it is important to note that a third category may be necessary. Business value added activities may represent a significant amount of resources and time, yet, from the end user's perspective, may not add value. Business value added activities are those which may be required by either the agency for general management purposes or by an external regulatory body. For example, the Federal Government might require an agency to keep original paper copies of invoices even though duplicate microfilmed copies are maintained in separate locations.

Figure 29 lists the essential steps of process value analysis. The next section discusses these steps in greater depth.

Flowchart the Process Steps and Activities

While the flowcharting conducted earlier in the assessment phase is a useful starting point, it may be necessary to conduct a walkthrough of the process both to verify what is documented as well as to collect additional detail on activities performed. Appendix B defines a common method for creating detailed process flowcharts and provides an application of the methodology. Chapter 1, page 13 explains the three main methods for determining the steps in the process: reviewing existing process documentation, interviewing those involved in the process, observing the process (walkthrough).

Calculate Cycle Time

When the process is thoroughly documented, the next step is to determine the best and worst case cycle times for the products and the average cycle time. If this data does not exist, a checksheet can be used to track work products through the process to

calculate cycle time. The cycle time study must be structured to capture not only the time spent performing essential work on the product, but also the time that the product spends being queued, moved, or stored. (For useful methods to chart these data elements, see Bruno, Harrington, and Lawton.)

Calculate Cycle Time Efficiency, Assessing Added Value

Cycle time efficiency is calculated by dividing the total time spent actually working on the product by the total cycle time, which includes non-processing time spent in queue, movement, and storage. At this *level* of analysis, time spent working on the product essentially equates to value-added time, while non-processing time represents non-value added time. It is not unusual for management to discover that value added time constitutes less than five percent of the total cycle time for a given product. Harrington (1991, page 140) notes typical reasons for the disparity between value-added and non-value added time:

- Processes break down and are patched up as the organization grows, creating greater complexity in operations.
- Management reacts to errors by instituting additional controls and inspection steps rather than changing the process. These controls often remain even when the process is corrected.
- Employees lack adequate knowledge of customer requirements.
- An excessive amount of time is devoted to internal maintenance activities such as expediting, coordinating, and record keeping rather than redesigning the process.

As explained at the beginning of this section, value-added analysis goes beyond determining value-added time. If the entity has identified the qualities customers value, including regulatory customers, it can then identify which process activities actually add value to the end product. For example, if a customer wants to receive a handbook in which the print has been sharply reproduced, then the function of the handbook reproduction process related to this quality is the setting up and running of the copies. If the customer also wants the information in the handbook to be accurate, then the handbook design, research, writing, and reviewing activities are linked to this quality. Sometimes it is useful to assign primary and secondary responsibilities for qualities to the various activities and those who perform them.

Figure 30 Handbook development and reproduction process

Quality/ Activity	Define and design the specs.	Do back-ground research.	Write the handbook.	Review the handbook.	Revise the handbook.	Edit the handbook.	Reproduce the handbook.
Copy quality is easy to read							XX
Information is accurate	XX	XX	XX	XX	XX		

There may be activities that neither the end user nor the regulatory customer care about and that do not affect the product in a way that is of value to either group. Such activities should be scrutinized for elimination.

Once the activities have been categorized into value-added and non-value-added time, it is also possible to correlate cycle time with the costs incurred for a particular process. A cost-cycle time chart (see Harrington 1991, page 129) provides a graphic illustration that facilitates identification of where the greatest costs are incurred in a process, including where the greatest amounts of time are spent where no value-added activity is performed. This information should guide the improvement objectives and strategies discussed in the following sections.

Phase Two: Improvement Strategies

Upon completion of the initial assessment phase, management should have sufficient information to effectively target and prioritize optimum improvement strategies. Development of a business plan can be a very effective vehicle for focusing an agency's resources upon the most important areas for improvement. Framed within the context of customer requirements and available resources, business planning leads management to consider the benefits and tradeoffs between various improvement opportunities. Business plans, developed within the broader framework of the agency's strategic plan, should detail what the organization can reasonably expect to accomplish over the next one to two years with given resources. The plan should also outline improvement strategies, timelines, and responsibilities.

Figure 31

Improvement Strategies may involve:

- reengineering pursuits
- incremental improvement activities
- outsourcing

The information that emerges from the assessment phase provides key inputs to the business plan. Generally, an extremely low ratio of value-added to non-value-added cycle time may indicate a need for a radical overhaul of the existing process. A decision to reengineer the current process may also be indicated if benchmarking reveals opportunities through new technology or methods that significantly supersede current practices. (See page 72 for a discussion of benchmarking.)

Because these decisions may result in a significant reduction in the number of employees required to perform the work, they are appropriately made by top management. Alternatively, continuous improvement projects, staffed by teams of employees who work in the process under study, may be pursued to streamline and improve the performance of existing processes. Finally, management may decide to explore outsourcing opportunities, determining that no amount of reengineering or improvement will make the entity competitive with outside providers of comparable services.

Regardless as to the type of improvement initiative chosen, it is critical for management to address the impact that these activities may have on employees' job security. If fewer employees will be required to do the work, management should clearly communicate how this situation will be dealt with, whether through attrition, retraining and reassignment, reduction in force, etc. Without such a clearly stated, formal policy, it is likely that the improvement strategy will be met with a high degree of fear, apprehension, and, possibly, resistance.

Reengineering versus Continuous Improvement

A critical distinction between reengineering and continuous improvement lies in the scope of the change involved. Reengineering initiatives generally involves major changes to core processes. For example, after benchmarking with competitors, the Ford Motor Company found an enormous disparity in the number of employees in its accounts payable department when compared to competitors (Champy, 1993, page 40). Effecting a major change in accounts payable, however, was not feasible without redesigning other related, interdependent processes. Ford's reengineering initiative, then, focused upon restructuring the entire macro-level procurement process, which included the subprocesses of accounts payable, purchasing, and receiving.

In its analysis, Ford discovered that the vast majority of employee time in accounts payable was spent reconciling those relatively few situations wherein purchasing documents, receiving documents, and invoices did not match. Ford automated the purchase order requisition and empowered receiving clerks to reject incorrect shipments at the loading dock. This eliminated the need to obtain invoices from suppliers. The change also eliminated the need to reconcile purchasing documents, receiving documents, and invoices. When a shipment was accepted, the receiving clerk simply entered this information into the on-line data base, which automatically triggered issuance of a check to the vendor. Under the reengineered process, Ford reduced the number of employees in accounts payable from 500 to 125.

Ford's initiative underscores the magnitude of change inherent in a reengineering effort. It did not simply automate an existing process. It altered the fundamental conceptual premise from "We pay when we *receive the invoice*" to "We pay when we *accept the goods*" (Champy, 1993, p. 43). The end result was a restructuring of the three subprocesses that supported the core process of procurement.

Continuous Improvement Initiatives

Continuous improvement is an appropriate strategy to employ when the need for a total reengineering effort is not indicated. It is also a complementary strategy to sustain the gains achieved by a reengineering effort and improve upon those efforts. This section discusses a structured approach to process improvement that utilizes teams of employees to gather and analyze data related to the process under study. It uses illustrations, where appropriate, from a process improvement team at the Department of Human Services.

Improvement teams leverage the knowledge of employees who are familiar with the daily operations of the process in question. The goal of the problem-solving process is to identify the root causes of problems rather than simply treating symptoms. The essence of this methodology is the collection and analysis of data to determine the root causes of problems. This replaces educated guess work and assumptions with a more scientific, fact-based approach to problem analysis.

Although the following discussion focuses upon the technical aspects of the problem-solving approach, it should be noted that using teams also requires a great deal of attention to the "human side" of process improvement. Project teams also require training in team building and group dynamics, in addition to technical skills, in order to successfully complete their task. Figure 32 lists the six steps in improving processes.

The Six-Step Problem-Solving Process

Figure 32

The essential steps in process improvement are:

Step 1 Identify and select the problem to be analyzed.

Step 2 Collect and analyze data related to the problem.

Step 3 Generate potential solutions to the problem.

Step 4 Select and plan potential solutions.

Step 5 Implement the solution, on a trial basis if possible.

Step 6 Evaluate the effectiveness of the solution.

Step 1: Identify and Select the Problem

Identification of problems emerge from the initial assessment. The primary outputs of a project team in Step 1 are a succinct statement of the problem and a quantifiable objective of a desired future state. The problem statement should focus only upon the condition and should not include possible causes. It should quantify the problem to the extent possible. The objective should link directly to the problem statement and should also attempt to quantify the improvements desired.

Projects should be tightly focused upon core business issues that are important to an agency's customers and top management. Projects should be

manageable in scope. Generally, a project team should be able to complete its objective within three to six months. Teams should also have a mechanism to address and resolve any issues related to the original scope of the project.

Travel Vouchers - The Fiscal Management Services Division of the Department of Human Services processes travel vouchers for its own employees, as well as for the Department of Protective and Regulatory Services and the Council on Early Childhood Intervention. From fiscal year 1991 to fiscal year 1994, the volume of regular travel vouchers processed annually rose from 92,599 to 120,125. This increase in workload, coupled with difficulties associated with implementation of the Uniform Statewide Accounting System (USAS) and more stringent travel regulations gradually resulted in a growing backlog in the Travel Unit. This resulted in longer processing times at state office and increasing complaints from staff who depended upon timely reimbursement. At the initiation of the project, the average processing time for vouchers in the state office ranged from two to three weeks, depending upon variable volume. Management of the Support Services Division selected travel voucher processing as a pilot project to test the applicability of the problem solving process.

At the Texas Department of Human Services, customer feedback already established cycle time as the central problem for the project. On an overview level, there are three components of the total process cycle time. Initially, there are the activities performed at the regional level before the voucher arrives at the state office. Secondly, there are the processes and activities within Fiscal Services at the state office. Finally, there is the processing performed by the Comptroller's Office up to and including issuance of a warrant or direct deposit into the employee's bank account.

Although reducing cycle time was essentially a "given" objective, the team still had to define the scope of the project. Although voucher processing frequently is initiated at the regional level, the team decided to limit this study to state office processing. There were several reasons for this decision. One, it made the project manageable in scope. Two, although limited studies and anecdotal evidence indicated that a significant amount of cycle time was due to long queuing of vouchers at the regional level, the data available on this component of cycle time was generally considered unreliable. For example, the date for tracking voucher processing initiated at the regional level is when the employee signs it. However, vouchers could easily sit on a supervisor's desk for days, or be queued for word processing for some time. Each of these factors were essentially beyond the control of Fiscal Services to change. Thus, the process boundaries were from receipt of the voucher in the mailroom to when fiscal services sent a pay tape to the Comptroller's Office.

Step 2: Collect and Analyze Data Related to the Problem

Flowcharting the process is an essential step for meaningful analysis. Constructing a flowchart helps to ensure that all team members have a common understanding of the process under study. A properly constructed flowchart should not only identify redundancies and unnecessary work, but also indicate when and where the process gets off track. This helps to inform the team as to the data needed for meaningful analysis.

The data collection phase is critical not only to verify the problem, but also to identify root causes of the problem. Using data to determine why a process is experiencing long cycle times or inability to meet other customer expectations enhances the likelihood that the solution implemented by the entity will indeed address and correct the problem in a way that leads to increased customer satisfaction. Failure to properly collect and analyze data impedes identification of root causes of problems and can result in merely treating symptoms of those causes.

Figure 33

Data and/or process relationships can be displayed as:

process relationships
- flowcharts
- cause and effect diagrams

data
- bar charts
- pareto charts
- histograms, run charts
- process control charts
- stem and leaf plots
- scatter diagrams

Figure 33 provides suggested ways of displaying data and/or process relationships that facilitate analysis and interpretation of the data gathered. Which method of data display to use is driven by the type of data under consideration and the objective in gathering the data.

Process capability analysis allows an entity to answer such questions as:

- Is the process stable so that any degree of quality assurance can be given to the customer?
- Is it possible to deliver the product to the customer within the period of time promised, given the current system?
- Can the system provide the quality of product for which it has contracted?

Process capability is discussed in more detail on page 70.

Travel Vouchers - The first step of the project team was to flowchart the process from when the voucher was received in the Voucher Warrant and Distribution section to when a pay tape was sent to the Comptroller's Office. The team utilized a top-down flow chart to document the process steps and activities associated with each step of the process. The flowchart documented

up to 18 separate steps which a voucher could go through before being sent to the Comptroller's Office for payment. (See Appendix B.) The flowchart revealed not only opportunities to streamline the current operation, but also pointed to other potential root causes that contributed to delays in processing vouchers in the state office.

At DHS, the first thing the team noted was the large number of loops in the process. Although the Distribution unit received the vouchers and sent them to the Comptroller's Office for processing, it also handled the vouchers each time that Claims Processing, Claims Corrections, and Micrographics worked on the vouchers. If a voucher had errors, the number of times that it cycled through these units and back through Distribution increased accordingly. In addition, each time a voucher was passed from one work area to another, this was recorded on both a manual log and automated data base. While the number of loops represented an opportunity to streamline the process, it also raised questions about the impact that vouchers with errors had on cycle time. The following discussion shows how the DHS team addressed these problems in two studies: the errored voucher study and the multiple submissions study.

The Errored Voucher Study - In order to quantify the impact of errored vouchers on processing time, the team devised a checksheet to track the number of vouchers in error. A blank travel voucher was modified and distributed to employees to record how many times they had to stop fix errors on travel vouchers. When discussing which employees should participate in the study, it became apparent that vouchers were corrected not just by auditors and claims corrections personnel, but also by other staff such as data entry operators when they entered social security numbers and performed other tasks.

After a pilot test, the checksheets were used over a two-week period to gather data on the incidence of incorrect vouchers. The checksheet not only recorded the number of vouchers in error, but also captured data on the type of error, as well as stratifying error rates by agency and region. The team discovered that over one third of all vouchers had to be reworked before being paid, which consumed a significant amount of resources as well as contributing to the backlog and increased cycle time. Data on the most common types of errors was also recorded.

In conjunction with the error study, the team also conducted a survey of regional travel coordinators. Although the travel coordinators were supposedly responsible for disseminating information about state and agency travel rules, the survey results indicated that very few had received any formal training on travel regulations and that there was no policy document for the coordinators to reference when responding to regional employee inquiries about allowable expenses.

The Multiple Submissions Study - Another study was conducted to determine the impact on workload of employees submitting more than one voucher per month. Although agency policy required employees to submit only one voucher per month, anecdotal evidence suggested that this policy was not being followed in many cases. A computer program was run to verify this hypothesis. The data revealed that over a five-month period from August 1994 through December 1994, roughly 25 percent of all vouchers submitted represented multiple submissions by individual employees during the same month. Further, the majority of these multiple submissions were for amounts under $300; and a significant number were under $100, with some for as little as $1.27.

Step 3: Generate Potential Solutions

After the data collection and analysis phase, it is useful to revisit the problem statement and desired future state formulated in Step 1. The key causes of problems identified through the data analysis should guide the team in generating possible solutions. Structured brainstorming techniques may be useful to help generate as many potential solutions as possible. Solutions may include changes related to materials, methods, design, and technology.

Travel Vouchers: Streamlining the Process - At DHS, based upon the data collected, the team identified three major problem areas. Initially, the flowchart indicated an opportunity to streamline the existing process. Streamlining alternatives, however, were constrained and had to address the second major problem area, the large percentage of vouchers with errors which required rework. Vouchers with errors presented a particularly difficult problem since Fiscal Services had little control over the quality of incoming vouchers, essentially the inputs to its process. Finally, there was the issue of multiple submissions by individual employees in the same month. Given the existing backlog, the project team initially focused upon ways to increase the process efficiency and reduce the incoming volume of vouchers. Improving the quality of the incoming vouchers, while very significant, was determined to be an issue that would require a longer term solution.

Although the process loops represented an obvious improvement opportunity, the team was constrained by an automated data system predicated upon the "batch" system. In essence, after vouchers were sorted by agency and region, they were then grouped into batches of 30 and assigned a batch number. The batch number served two principal functions. First, it indicated when the voucher was received, which provided management with information to track processing time. Second, the batch number also tracked or located documents, for vouchers either being processed or in storage after payment.

The major problem with the batch system, however, occurred when a voucher was in error. Because vouchers were batched prior to auditing, incorrect vouchers had to be pulled and rebatched since the automated system would reject them if entered after the rest of the good vouchers in the batch were processed. This system edit was designed to prevent assignment of duplicate batch numbers.

A second issue considered was other duplication of effort associated with the fact that after batched vouchers were audited, microfilmed, and readied for payment, they had to be rebatched with a Comptroller's batch number. The logical solution to this redundancy was to use the Comptroller's batch number initially in place of the DHS batch number. This solution proved unfeasible, however, due to the constraints of DHS's automated systems.

After much consultation with MIS personnel, it became apparent that any redesign of voucher processing would have to work within the constraints of the existing information systems. Since a great deal of rework was due to the fact that vouchers were batched prior to auditing, the team examined the possibility of reversing the sequence of these steps. The main issues with this option were tracking the date of receipt and location of a voucher, since the initial batching provided both of these data elements.

The solution proposed was relatively simple, yet had dramatic implications for how vouchers were processed.

- Each voucher would be manually date stamped on receipt.
- Auditors would be assigned to specific regions and would be solely responsible for auditing, correcting, and responding to inquires about the status of vouchers from that region.
- Vouchers would be audited before batching.
- A minor change to the automated systems would enable the auditor to enter the receipt date of the voucher after auditing instead of having the automated system automatically assign the date.

Reducing Multiple Submissions - Although the agency policy had been for employees to submit vouchers once a month, the team discovered that this policy had not carried forward into the current administrative handbook. In addition, there was no agency policy on how frequently employees could submit claims under $50. Finally, the team had also discovered instances wherein some employees submitted multiple claims covering a time period of a year or more, which also unnecessarily spiked the workload.

While these issues appeared fairly straightforward matters of re-instituting or creating new policies, the team was concerned about employees who incurred significant travel expenses. Anecdotal evidence suggested that some employees could not afford to perform their duties without submitting claims on a more frequent basis, even when the backlog of claims was cleared. This

concern led to modification of the proposed policy on multiple submissions in the same month to allow an employee to file a claim anytime the amount exceeded $300. The proposed recommendations therefore were:

- Claims for under $50 could not be submitted until they were at least three months old.
- Employees could submit a voucher only once a month, unless it was in excess of $300.
- Claims for over $50 must be submitted within 60 days of the date of travel.

Step 4: Select and Plan the Solution

In Step 4, the team chooses a solution or set of solutions that address the most significant causes of the problem. If there are costs associated with implementing a solution, these must be weighed carefully against anticipated benefits. It is also important to obtain "buy-in" or commitment from those affected by or involved with implementation of the solution.

In planning the implementation, it is important to identify potential obstacles and to develop contingency plans in order to minimize risk. Tasks and responsibilities should be clearly assigned. It is also important to determine how the solution will be monitored and evaluated.

Travel Vouchers - While the policy recommendations were fairly straightforward, there were a number of considerations involved in implementing the proposal to streamline vouchers processing. Two primary issues were identified. Initially, the proposed system would consolidate tasks that were previously specialized functions. Auditors would be responsible for correcting vouchers, performing data entry functions, and responding to inquiries about the status of claims. This consolidation of activities, combined with the fact that vouchers would be audited before batching, eliminated a significant number of process steps and the number of times that vouchers were passed from one work unit to another.

To implement the proposed plan would require a number of steps. Auditors would require training on how to perform corrections, how to perform data entry and access the automated system to look up the payment status of vouchers, and how to deal with unhappy customers on the phone. The team also identified the need to standardize procedures for all regional auditors. This would permit a substitute auditor to fill in when a regional auditor was absent and prevent region-specific backlogs from developing. The new responsibilities would also necessitate job classification audits.

A second, related planning issue dealt with how much effort or work should be performed to correct a voucher before it was returned to the sender. This issue had significant workload ramifications, given the high number of

errored vouchers. It was also a major customer service issue, since returning a voucher adds to the time an employee has to wait before being reimbursed. In addition, one of the team's objectives was to establish consistent, even service expectations since the function of corrections would be performed by numerous individuals instead of the corrections specialists.

Based upon the data collected on the number of vouchers with errors, it is also considering various ways to educate its customers on the most common mistakes made in filling out travel vouchers and what the customer can do to help ensure the fastest possible turnaround time on payments.

While the project team has essentially finalized the basic framework of its proposed recommendations, a number of details have yet to be finalized before Fiscal Services proceeds with implementation. In addition, the policy recommendations will be reviewed by state office and regional staff for comment and possible modification.

Step 5: Implement the Solution, on a Trial Basis If Possible

The implementation of the solution is best performed on a small scale at first. After all, it may not work and, were there a massive implementation, potentially large amounts of resources would have been spent in the process. Not only would the entity sustain a loss of resources, but workers may become upset at the failure and respond more negatively to the next solution as well as the next project. Pilot testing a solution is a relatively safe way to deal with change.

Travel Vouchers - Although the travel voucher processing team has yet to implement its proposals, it currently plans to phase in the new process, starting with a pilot involving one or two auditors. Use of a pilot is generally a preferred implementation strategy, since it not only permits a gradual transition from the old to the new way of doing business, but also permits identification and resolution of problems before full scale implementation.

Step 6: Evaluate the Effectiveness of the Solution

Often there are more effects than anticipated in implementing large-scale improvement plans. These should be carefully monitored and recorded. Certainly, the solution should be monitored for how well the intended effects are achieved.

Travel Vouchers - During the course of the project, the team identified key performance indicators to monitor the efficiency and effectiveness of the new system. Minor programming changes to the automated information system were requested and granted to track more specific data on workload and process cycle time. A number of these data elements were previously either tracked manually or were difficult to extract from existing automated reports.

The team also created a new field in the automated system to capture the number of vouchers that were returned to the sender. This information was previously maintained on a manual basis and kept for only a short time.

Phase Three: Monitoring Ongoing Process Performance

The elements of efficiency, quality, and effectiveness all have direct or indirect cost implications. The level of detail which performance measures should include depends largely upon the level of management. From the perspective of top management, one essential component of a measurement system should include data related to poor-quality costs. For lower level process managers who set performance standards and objectives, indicators of process capability are essential to effectively monitor operations. General guidelines for these two key areas are offered below, starting with process capability.

Process Capability

It is common for middle- and lower-level managers to establish work standards related to workload and efficiency. Usually, these standards are based upon judgment or historical performance data. For example, an auditor might be required to process 70 vouchers per day. While the amount of work processed is certainly a key performance indicator, it does not provide adequate information to effectively manage a process, nor does it provide sufficient information about when management should take action to correct a perceived problem. At least two additional components are needed to complement the information on output volume. These interrelated components are the variability of the process itself and the quality of both the inputs and outputs of the process.

Before setting a performance expectation for either individuals or a work unit, it is essential for management to understand the capability of the process as it currently exists. Process capability measures are set initially in terms of what is important to the end user. In the foregoing discussion of travel vouchers, for example, the customers' most important requirement dealt with timeliness of payment, or cycle time. Internally, management might also be concerned with accuracy of the auditing. Each of these performance indicators can be tracked over time to determine the average cycle time and the average number of errors made in auditing a claim. Management should also note that these two requirements are interrelated. The challenge to management comes in knowing when to take corrective action and when to simply leave the process alone.

The criteria for taking these actions lies in whether the process under study is a stable one. Process stability can be determined through use of a control chart. A control chart assists management in identifying whether the cause of the variation is due to occasional problems that arise due to specific circumstances, or whether the variation observed is part of the normal range of variation that is inherent in the process all of

the time. It is critical to note that performance standards should be set only after process stability has been established and should allow for normal variation around the process average.

With respect to monitoring work output standards, an example of occasional variation might be a new auditor who fails to meet the established quotas due to inexperience and/or a lack of training. In this case, management intervention to provide training is appropriate. On the other hand, **if** the process is determined to be stable **and** the normal range of variation is plus or minus 10 percent of the work standard, auditors who process from between 63 to 77 vouchers per day are simply performing within the capability of the process that management has put into place. This amount of variation is to be expected, and a 10 percent deviation above or below the work standard indicates no need for management intervention. In this situation, the only way to improve performance is to change the process itself rather than attempt to get employees to exceed the work standard.

It should be apparent from the discussion of the travel voucher improvement project that the quality of the inputs to a process can have a significant impact upon efficiency. The fact that over one third of all vouchers processed required rework significantly impeded overall processing time. Similarly, the quality of auditing performed could also dramatically affect the output levels if viewed solely in terms of that single control standard. Had auditors simply rejected every voucher with errors, they could likely have significantly increased their output albeit with a dramatic impact on the level of service provided to customers. These types of considerations underscore the need for a complete set of performance indicators to enable management to effectively monitor the process and prioritize improvement initiatives.

Costs of Poor Quality

One of top management's key functions after completing the business process analysis is to continually monitor performance measures that are linked to customer requirements. One set of measures that contributes to accomplishment of this responsibility is developing a set of poor-quality cost measures. Poor-quality cost measures permit management to monitor data related to four main areas:

- Prevention costs: the costs incurred to ensure activities are performed according to customer requirements such as training, process capability studies, etc.
- Appraisal costs: the costs incurred to evaluate output such as inspection of outgoing product, maintenance of equipment, design reviews, audits, etc.
- Internal failure costs: the costs incurred to rework, expedite, or reprocess work that does not meet customer requirements before it is delivered to the end user.
- External failure costs: the costs incurred to repair or rework products after they are delivered to the end user.

With the exception of the prevention category, all of the costs listed above are properly classified as avoidable costs. While the specific units of measurement established for these categories will vary according to the nature of the organization's

work and the requirements of the end users of its products, one of management's primary business goals should be to continually reduce these costs. The monitoring of poor-quality costs should also guide ongoing efforts to target and improve specific processes based upon feedback from these data.

Benchmarking

Benchmarking compares one's own performance with that of other service providers. The performance measures that form the basis of the comparison should be those that reflect qualities customers value, including unit and total cost measures (benchmarking performance). Once the best-in-class providers have been identified, an entity will want to look beyond the measures to the processes that are resulting in such superior performance (benchmarking processes). This type of comparative analysis is useful at all stages of business process analysis to give perspective during the initial assessment of conditions, provide guidance for improvement initiatives, and help management ensure that its processes align with best practices.

Figure 34

Steps in benchmarking products and their processes:

Step 1 Choose the product/process to be benchmarked.

Step 2 Assess the current condition.

Step 3 Identify benchmarking partner(s).

Step 4 Gather data, including information about the partner(s)' processes as well as other performance measures and levels.

Step 5 Compare your entity's performance and process with that of the benchmarking partner(s).

Step 6 Devise an improvement plan including anticipated performance results.

Step 7 Communicate the results to management and other key people associated with the process.

Step 8 Implement the plan.

Step 9 Monitor the progress made in implementation and achievement of goals.

Step 10 Revise as necessary.

Suggested steps in performing a benchmarking a study are given in Figure 34 although each entity can tailor the steps to meet its unique needs. The following discussion will describe some of those in greater detail. It is not meant to be an exhaustive presentation of benchmarking. For further information, several references are listed in the Appendix D.

Step 1: Choose the Product/Process to Be Benchmarked

This is not as simple as it appears. Often entities bite off more than can reasonably be handled at one time or choose topics that are too ill-defined to be beneficial. For example, were DHS to initiate a benchmarking project to

have the best payment process over all types of payments, success would be doubtful. This project is too broad in scope and vaguely defined. Focusing just on the cycle time and accuracy of the travel payment process at the state level for its benchmarking study would more likely produce useful results.

Step 2: Assess the Current Condition

Before beginning the benchmarking process, the entity should perform a thorough assessment of the condition as it relates to the process/product to be benchmarked. This means that:

- The specific products are identified.
- The customers and their needs have been evaluated.
- The process for producing each product is well-documented.
- Measures that link process activities with customer needs have been formulated, with baseline data collected.

Step 3: Identify the Benchmarking Partner(s)

Once the assessment of the condition and the collection of baseline data has been completed, the benchmarking team identifies the benchmark partner(s). Partners do not necessarily have to be in the business of performing the service under study. For example, most businesses as well as government entities pay bills. They don't usually perform this service to the public for a fee. It is in support of the larger strategic operations of the entity. However, some entities may be doing it very well.

Partners preferably are entities that perform the service in an outstanding fashion. Research in libraries for high-performers in that service area, tips from others who have heard of the high-performing entity (including your customers), and lists of entities who win awards like the Malcolm Baldrige National Award are all sources of information about high performers. Telephone interviews with management of potential partners can assist in developing a valid and reliable list of candidates.

Once you have identified several such service providers, request to visit their location and observe their process. Some will deny your request, for various reasons, but it is very possible that you will find providers who are willing to cooperate.

Step 4: Gather Data about the Partner's Process as Well as Other Performance Measures and Levels

During the site visit, the visitors need to determine the process used by the provider in delivering the service in question. Questionnaires prepared ahead of time will ensure that all important areas have been covered, through observation of the process and

through interviews. The team should also gather any other performance measures and data on such performance that the provider is willing to share.

Step 5: Compare Your Entity's Performance and Process with the Benchmarking Partner's

This is a very careful and detailed comparison not only of performance indicators, including cost data, but also of each provider's processes with your own. There are many tools for doing this analysis (see Camp, 1995, pages 133-159; Bogan and English, pages 57-66.) Such an analysis will not only give information on what performance the entity needs to improve but how to do it and the resources required to effect the solution.

The remaining steps are similar to those followed in continuous improvement initiatives. The key is that benchmarking, as with continuous improvement, is a continuous process. If real benefit is to be derived from benchmarking, it should be performed on an ongoing basis. This enables the entity to stay the best in its class, that is, within the limits of the resources provided to it.

This page intentionally left blank.

Chapter 4 Pricing

Pricing in the private sector is predicated not only on market saturation levels, competitive stance, and customers' perceived value of the good or service, but also on recoupment of costs incurred in producing goods and delivering services and of some profit margin above costs. However, instances do exist where private sector companies consider accepting orders that compensate the firm for less than the full cost of a product, compensating perhaps for all variable and some portion of fixed costs.

Although the profit motive, competitive stance, and market saturation levels are not considerations with government entities, customer satisfaction and the recoupment of costs is of concern where agencies provide services to others. Additionally, most state agencies engage the services of outside entities to some degree, whether it be for the services of another state agency, a local entity, or a private vendor. Where private vendors are involved, a just amount of reimbursement may include some allotment of profit. Quality of service underlies all such exchanges.

Figure 35

Reimbursement rates are set through:

- contract bidding mechanisms
- regulated rate agreements

Reimbursement rates can be set through contract bidding mechanisms or through regulated rate agreements. Many agencies contract for services with private vendors through a competitive bidding process. The accepted contract price is offered by the bidder and agreed to by the funding party. For example, through the competitive bidding process, the Texas Department of Transportation contracts with private highway construction firms to construct new roadways and bridges and to repair existing systems; the contract price is offered by the several vendors bidding on the job and reviewed and selected by the Texas Department of Transportation on a contract-by-contract basis.

The setting of rates through rate agreements involves a complex set of considerations. There is no one methodology that works for all industries or even for all services within an industry. This chapter takes a look at several rate-setting mechanisms currently in use and discusses the advantages and limitations of each in their various contexts, including references to the efficiency and effectiveness of the services provided. The presentation addresses the fluidity of the unit price concept, reinforcing the assertion that there is no such thing as a single unit price. The chapter first discusses the contributions of an ABC system in setting a suitable transfer price for agency-to-agency services.

Transfer Prices

This section is not intended to be a definitive statement on the policies that should drive transfer prices. It is written to provide guidance to agencies about the issues

involved in developing transfer prices and the advantages and limitations of various methods of pricing.

Context of Application

Agencies have historically contracted to provide services to each other, at least to a limited degree. However, in recent years the extent of such service exchanges has increased significantly, due partly to legislative action. When House Bill 7 created the Texas Department of Protective and Regulatory Services, many services previously performed by the Texas Department of Human Services were turned over to the newly created agency. However, many of the support functions, including information systems, fiscal, human resources, and printing services were provided to the new agency by DHS.

During the 74th legislative session, legislators considered mandating the consolidation of administrative services over the 14 health and human service agencies. In 1994, the Council on Competitive Government mandated the consolidation of the 33 print shops in Travis County into nine. The nine print shops have continued to provide print services to the 33 agencies. Because their funding comes directly from the agencies served, the print shops developed a transfer price to charge each agency for those services.

The Management Information Services Division of the Texas Department of Human Services has considered charging agency programs for the use of its services. Although that plan has not been implemented, the MIS Division did derive unit costs for its various services in the event that such rate charging were approved. Such information provides the MIS Division with a vehicle for comparing the cost of its services with that of outside vendors of similar services and has resulted in increased efforts toward a more efficient, quality service delivery. It has also resulted in a suitable transfer price for services provided to the Department of Protective and Regulatory Services.

The State Auditor's Office charges agencies for its statewide financial audit and opinion audits of agency services. To do this, the SAO has developed an hourly rate for its services.

The Issues

The trend toward greater consolidation of services increases the importance of developing appropriate transfer prices today. This section addresses the following questions about transfer pricing:

Cost/Price Composition

- What costs should be included in the calculation of transfer prices?

- How does and agency treat the cost of long-term investments such as printing equipment for pricing purposes?
- How should an agency/university treat the cost of fringe benefits and common costs?
- Should an agency charge for the full cost of its services to another agency?
- Are collecting and remitting costs paid by other agencies, such as payroll matching, cost beneficial and good policy?

Coverage of Fixed Costs over Ranges in Volume of Demand: Flat Fee Versus Usage Pricing

- How are fixed costs treated in pricing since there is no profit margin to bear fluctuations in volume of demand?
- Should the agency set charges for various ranges of service demand?
- Should an agency charge on the basis of usage during a given period, a flat fee, or a base charge with some charge for actual usage?
- How often should an agency revise its transfer price? Can or should an agency charge on the basis of a predetermined fee or on actual costs incurred?

Standard Costs

- Is it appropriate for an agency to pass on the cost of inefficiencies in its operations to other agencies or groups?
- Should a standard cost, referenced on the private marketplace, set the transfer price?

Partial Services

- How should an agency treat partial services, that is, situations where the agency provides only part of the service while another entity provides the remainder?

Cost/Price Composition

If the agency has implemented an ABC system, then determining the full cost of a product or service will be straightforward. It will be the unit cost of each service identified in Chapter 1. The only questionable inclusion will be that of overhead. In private industry, these costs must be assigned to products for pricing purposes so that the company can ensure that it recoups all of its costs. This assignment is done based upon some type of volume allocation such as the number of units of product produced or service provided. However, in state agencies, it is probably best not to charge agencies for those remaining overhead costs that an agency is not able to allocate meaningfully, such as the cost of high state-level officials in the agency. This does assume, though, that the agency will be compensated through legislative appropriations for such unallocated cost. If this is not the case, then the agency should choose some basis such as relative dollars spent on the service or the number of employees engaged in providing that service for the allocation of common costs.

For long-term investments, such as equipment or buildings, the costs are allocated to activities over the useful life of the investments (depreciation). Because state agencies are generally not allowed to accumulate funds over several fiscal periods, the question of the appropriateness of charging for such investments is valid. This issue may need to be addressed by the Legislature. By charging for such investments, and especially by charging for the replacement rather than the historical costs of these items, an agency will have the means to replace equipment when needed, thus ensuring ongoing quality of service in this area at a minimum. However, until the Legislature approves such a revolving fund, it is probably inappropriate for an agency to charge another for these costs.

Finally, costs that the agency itself has not incurred, such as the cost of employee fringe benefits paid at the state level, should not be passed on to other agencies in a transfer price. Transfer prices should include only costs incurred by the providing agency itself. However, if the provider agency is not receiving federal reimbursement for such costs but the receiving agency could receive such reimbursement, the provider agency should notify the receiving agency of the total of such costs.

Coverage of Fixed Costs as Volume of Demand Varies: Flat Fee versus Usage Pricing

For the provider, being able to charge based upon actual costs incurred during a particular period is ideal. However, most customers are not willing to accept such terms. The provider, then, must develop some pre-service price to charge customers.

The computation of a unit cost of a service often misleads people into thinking that the cost is completely variable, changing directly with the number of units of service delivered. Because unit costs are typically comprised of many larger fixed costs, this is not a correct assumption. (See Chapter 1.) Private companies price for an expected range of volume of demand, making sure that the price charged at the low end of the expected demand covers fixed costs. Private industry also has a profit-margin built into its price, thus cushioning the negative effects of an overestimation of demand on the coverage of fixed costs.

Although state entities do not incorporate profit margins into their prices, they can try to cover fixed costs by estimating a unit cost based upon the low end of the expected demand. They can also build into their contracts a clause that allows them to recoup added costs within some limits. Finally, they can have a price that includes a base fee for service plus a unit cost based upon usage. The base fee can be used to cover a large portion of the fixed costs, with the variable unit price possibly covering costs that are fixed over only a short range of volume and, of course, costs that are truly variable.

Finally, the agency can build into its contract a clause that lists prices over wide ranges of volume. For example, if the total demand for a service is between 100 and 200, there is one unit price; between 201 and 300, another unit price; etc.

Quarterly revisions of transfer prices also help an agency to recoup costs that were higher than expected and not recouped during the previous quarter. The converse also holds. Quarterly revisions allow agencies to pass on cost savings to customers during the next quarter when such savings have been achieved, either through the impact of volume or through efficiency initiatives.

Standard Costs

In practice, both public and private entities do pass on the cost of inefficiencies to customers where the market will bear such costs. However, in the private sector, there are generally a number of vendors willing to provide any given service. The savvy shopper will find the one offering the lowest price for a specific level of quality desired.

In the public arena, such comparative prices have not generally been available. Even when services appear to be the same, e.g., payment processing, they may not be. Payment processing in government settings may require a processing department to check payment requests against federal and state regulations. This can be a considerably more costly service than writing checks from a list of payees and the amounts owed them.

We encourage state agencies to benchmark services with outsider service providers, including other state entities, to the extent possible. Ongoing analysis of the efficiency, quality, and effectiveness of service processes as presented in Chapter 3 will raise the consciousness of the agency as to its opportunities for improvement, motivating personnel to find and implement improvement strategies. The accumulation of process cost data that excludes inefficiencies can provide a standard cost for agencies to price services and to plan and budget for upcoming fiscal periods. Of course, such a policy will mandate improvements to processes; otherwise, the services will be underpriced and underfunded.

Partial Services

If an interagency contract requires an array of services from several of the provider agency's divisions, the provider agency should segregate or limit its costs to avoid double billing for the same activities. For example, the Department of Human Services Support Services Division provides many services to the Department of Protective and Regulatory Services (PRS). Many of these services involve the participation of the Management Information Systems Division. The two divisions identify their services in such a way that the cost of a specific service cannot be traced from the beginning to the end of the process. In this case, the two divisions should charge PRS separately, but take care not to double charge for services. If the Support Services Division uses MIS services to perform a function for PRS and allocates those MIS costs to the support service activities, then MIS' charging PRS for its services may result in charging PRS twice for the same delivery. Preferably, the process

related to a service is identified from its inception to its completion and one charge is defined for the full service. (See Chapter 1 for an example of this.)

Rate Setting Applications and Methodology

This section presents several issues considered in setting rates for four major industries: nursing homes, utilities, insurance, and road transportation. A general description of the issues involved in the setting of rates and the methodologies currently in use will provide a framework for some generalized observations about rate setting. The areas of interest surrounding the establishment of rates concern cost determination, measurement, allowability, forecasting, quality and efficiency relationships to price, and capitalization incentives. After following a brief description of the rate setting methodologies currently in use by each industry, each of these topics will be discussed.

Figure 36

The issues surrounding the establishment of rates involve:

- **Costs**
  - identification of all related costs
  - allowable costs and the recoupment of expenditures
  - measurement of costs
  - use of historical data
- **Forecasts of**
  - service demand
  - demand elasticity
  - expected payouts
- **Quality and Price**
  - timeliness, safety, and related costs
  - audit issues
- **Efficiency and Price**
- **Capital investment**
  - effect of depreciation and other policies

Methodologies by Industry

Nursing Homes

The Texas Department of Human Services sets reimbursement rates for nursing home care according to the Texas Index for Level of Effort (TILE), a case mix payment system, wherein a patient is categorized into one of eleven types representing the level of care needed. Generic classifications of client needs, resulting in a flat reimbursement rate for each TILE, represent an effort to contain costs. In Texas, the number of people needing nursing home care for the following year can be predicted with a high degree of certainty. That, coupled with caps on the amount to be paid per individual per diem as represented by the TILE system, allows the State a considerable degree of control over expenditures.

The use of the TILE System is an improvement over the old system of reimbursement for only two levels of care and, as such, contains some accommodation for quality of care. However, there is still no assurance that quality is provided, only that it is needed, nor is there an incorporation of efficiency issues into this methodology.

The other major type of reimbursement of nursing home care is referred to as facility specific. In this case, each nursing home is visited to review the quality of services. The facility is then reimbursed for its out-of-pocket costs according to the results of

the review. While this methodology does build the costs of the quality of care into it, the cost to audit and handle appeals is substantial.

Utilities

The natural gas industry incurs costs at three points in the process of performing full customer service: the production of gas from the well, the transportation of gas through the pipelines, and the distribution of gas to end users. The electricity utility service, like the natural gas industry, incurs costs from three events: the generation of electricity from power plants, transmission of power to the locality of use, and its distribution to the end user. Costs for each part of the service are tracked and rates are proposed based upon those costs, related safety costs, and environmental protection costs, in addition to a profit margin.

Figure 37

Utility rate structures divide according to:

- peak period usage
- fixed cost versus variable rate costing
- charges to other utility companies for use of transmission lines

Utility rate structures can be divided into three categories: peak period usage, fixed cost versus variable rate costing, and charges to other utility companies for use of transmission lines.

In the first case, peak period usage, customers are charged more for using the service during periods of higher demand than they are during periods of lower demand. The rationale is that a large part of the capital investment of a utility is expended to meet the needs during the peak-load period. During off-peak periods, the equipment lays idle.

In the second case, customers are offered the option to have traditional service and pay cost-based rates or interruptible service priced at market-based rates. Some local distribution companies providing utility service opt for contracts that risk an interruption in service and that, therefore, contain variable rates as long as the amount of the periodic payment is fixed. This allows utilities to obtain financing for projects.

In the last case, the charges to other electric utility companies for the use of transmission lines (wheeling), the rate is affected by the consideration of embedded cost versus opportunity cost recoupment. Recent regulation under consideration has sought to prohibit the utility company owning the transmission lines from recouping any costs beyond its embedded costs, that is, the costs incurred to put the lines in place and keep them in service. This means that the owner could not recoup any costs of foregone opportunities. The regulation also proposed to make the offer of wheeling services mandatory, such that a utility company could not turn down the request for use of transmission lines by another utility company.

Insurance

The insurance industry offers an array of indemnification services: life and health, property, and liability (marine, casualty, automobile, general liability, burglary and theft, workers' compensation, glass, boiler and machinery, nuclear, crop-hail, title,

Figure 38

Insurance modeling involves:

- probability distributions
- cost data
- many events associated with the probability of a claim

credit, and fidelity and surety bonds). The basic methodology used to determine the expected payoff, including both the likelihood that a payoff will need to be made and the amount of the payoff, is through the use of probability distribution models. The parameters in the models are defined using historical data on variables that correlate to the probability of an event. For example, by applying linear and non-linear modeling techniques, actuaries can associate age, gender, and previous medical history with the probability of incurring various types of cancer and associated hospitalization and mortality. Cost estimates associated with these probabilities are derived from adjusted current cost data.

Recently, the insurance industry was deregulated for most services, with the exception of auto and homeowner coverage. Free competition is determining rates more than any regulatory oversight.

Toll roads

The determination of appropriate tolls in generating revenue incorporates information related to the construction costs, maintenance, repair, and other support services into an estimate of the elasticity of demand for road use. The latter often involves models that estimate the amount of time it takes to get to one's destination using the toll road versus an alternate route, the cost of that time differential, the change in general traffic level in the area, the effect of the economy on the use of toll roads, and the impact of various ways of collecting tolls (automatic vehicle identification, toll booths, types of payment services within the toll booth setting). These methods often differentiate between rural and urban toll roads and classifications of vehicles, allowing for differences in road damage due to the weight of the vehicle using the toll road.

Figure 39

Demand elasticity studies for toll roads consider the effects on toll road demand and price of:

- the availability of alternative routes
- the costs associated with longer travel times on alternative routes
- the different ways of collecting tolls
- urban versus rural toll roads
- vehicle classification

The initial decision to construct a toll road versus one paid for entirely through public funds involves not only the actual costs but the amount of road that can be constructed using the alternative funding mechanisms. Pay-as-you-go or toll roads often limit the length of road that can be built at a time because of the cost burden placed upon the users.

The Issues

Several areas of concern common to the four industries discussed were defined at the outset of this chapter. This section describes how these issues are addressed in the four application areas and the advantages and limitations to each solution.

Costs

The determination of the actual costs of a *toll road* is fairly straightforward. It includes construction costs, maintenance costs, interest payments, debt expenditures, administrative overhead, police patrol costs, salaries, depreciation costs, insurance, toll collection costs, and service area maintenance costs (Dedeitch, 1993, p. 22). All costs are part of the consideration in determining a proper toll to charge users.

Although the correct allocation of administrative overhead costs may be problematic where more than one project is involved, the majority of the costs are readily associated with specific highway projects. An ABC system can facilitate the identification of any costs not immediately ascribable to a specific project.

For *nursing homes and foster care*, the issue is one of dividing administrative and other support costs between private and publicly funded patients. Are more resources devoted to private patients because these patients are directly paying for services? The proper assignment of such costs is problematic unless an ABC system is in place.

Nursing home rates in Texas are based on costs from past years, adjusted for inflation. However, certain costs are excluded, such as the costs of certain luxury cars, board members' travel to meetings, salary payments to those closely related to the owners, certain salary amounts viewed as excessive, and the like. These exclusions are the constant target of criticism from the nursing home industry but are designed to protect the taxpayer from inordinately compensating providers for their services.

Because, for the most part, *insurance rates* are subject to free competition, determination of costs associated with particular services is not of great concern to the regulators. However, as with any private company, accurate association of the costs of a service with the specific service can be of great importance to the individual insurance firms. Failure to identify such a relationship can result in the charging of rates that either rob the company of potential profit because they are too low or that eliminate the company from the market because they are too high. Although actuaries base their estimates on historical data, they build in inflation and other factors to control for the potential inapplicability of past costs to future payouts.

Utility rates are approved based upon some profit above base or embedded costs. There are special rules for the treatment of contributions, dues, advertising expenses, abandoned plant property, and deferred income taxes. Rules such as those governing appropriate rates on retail wheeling in electric utility services are subject to ongoing challenge and criticism from the utility industry. Rates of return on investments allowed by regulators undergo significant and often ongoing negotiation.

Forecasts

Significant forecasting is performed for all four industries. For *toll roads*, efforts center around the elasticity of demand as rates are varied. Models incorporate information regarding the costs of using alternative routes versus toll roads, and some stratify by class of vehicles. However, for the most part, the toll road industry uses fairly simplistic modeling techniques, with little adjustment for intervening variables.

Forecasts of those requiring *nursing home* care in Texas focus on the number who will need care by TILE and the associated costs. Because of the relative stability of the population with respect to those requiring such care, forecasts can be fairly accurate using simple models.

Perhaps the *insurance industry* has the most difficult task in predicting of the four industries in this study. While the forecasting of life and health needs can often be done with a fair degree of accuracy, the prediction of property and casualty payouts are less amenable to accurate predictions. Because of this, the insurance industry makes use of more complex modeling and methodologies in developing forecasted activity and payout.

Predictions in *utility* usage focus on peak versus off-peak period usage and demand elasticity as unit prices increase. This latter was particularly salient during the period of rapidly increasing fuel prices in the 1970s. However, most models depend heavily upon plots of historical data and simple ascriptions of probabilities from that data. Although there have been some attempts to stratify by commercial versus residential usage, little subcategorization of demand for utility service has been employed.

Quality and Price/Efficiency and Price

The earlier description of the determination of nursing home rates in general and in Texas in particular depicted two basic approaches to rate setting in this area: cost containment and facility-specific reimbursement methods. Cost containment methods set flat rates of reimbursement without respect to the actual costs a given nursing home will incur in the rate year. Facility-specific reimbursement methods reward each facility on the basis of a review of the specific facility's performance. The latter method results in much higher costs to the funding entity but can correctly address issues of quality and efficiency. Cost containment methods have the potential of rewarding substandard service without penalizing inefficient operations. However, the total costs to the funding entity are more predictable.

For *toll roads*, quality is controlled through national standards mandated for acceptable highway construction although there is still considerable variation in the quality of the materials used. Where inferior materials are used or substandard construction work performed, a road will need significant amounts of repairs. For toll roads, these costs are passed on to the user. However, where alternative routes exist, the market will only bear a certain amount of costs. Therefore, it is incumbent upon those responsible for the construction and maintenance of toll roads to ensure that

they are built in an efficient and effective manner. Issues of efficiency and quality have not, to date, been directly addressed in the determination of tolls.

In the *utility* industry, quality focuses on the surety of the utility service and the safety of service delivery. Variable rates, contingent upon the customer's willingness to accept the risk of a possible interruption of services, do exist. Safety is heavily regulated although there is some dispute over the ability to recoup the costs of cleanup from past practices and even though such practices were in line with regulations (Bright, Stanley, 1992, p. 83).

Quality in the *insurance* industry refers to the timeliness and ease of receipt of services including payoffs. Because of the competitive nature of the industry, customers often are willing to pay more to a company whose reputation for payoff is hassle-free and reliable. Therefore, quality becomes embedded in the rates customers are willing to pay.

Capitalization

For the nursing home industry, the method allowed in depreciating the costs of facilities and equipment will affect the home's willingness to expand or modernize. Depreciation methods in Texas are conservative. However, in recent years they have aligned more closely with Internal Revenue Service regulations than previously.

Because *utility rates* are based on embedded costs (capitalized expenditures are a significant component) allowances for capitalized costs are critical. Current policies tend to encourage investment in capital over labor even when labor is the more efficient way to perform the service. However, some competing regulations, such as those surrounding retail wheeling, can discourage capitalization. The link between capitalization and allowable rates has been a point of discussion for years.

In the *insurance* industry, the closest phenomenon to capitalization is the provision of reserves to cover future claims. How much reserve is adequate has been a source of constant dispute. A rash of failures of insurance companies or of a few large companies generally results in higher mandated reserves.

Conclusion

Some general observations and recommendations can be gleaned from these reviews of how each industry addresses the issues of costs, forecasting, quality and efficiency in rates, and capitalization incentives.

Rate setting should seek to identify costs in such a manner that:

- only costs truly related to the service delivery are compensated

- costs that unduly compensate owners or workers and purchases of luxury items should not be allowed
- all legitimate costs related to the service delivery are compensated, provided they represent a targeted level of service quality without undue waste

Forecasting methods should:

- be only as sophisticated as the situation warrants
- incorporate the effects of variables that could change the outcome being predicted
- accommodate the elasticity of demand
- allow for various rate structure classes, where feasible

Quality and efficiency of service should be:

- incorporated into the rates either through mandated standards of quality or through individual provider service reviews
- can be determined through technical studies of what constitutes a practical level of quality and efficiency

Capitalization concerns should address:

- the incentives to invest in facilities and equipment as needed
- the disincentives to invest in facilities and equipment when not needed

There is no one magic rate, even within an industry. Too many related factors prohibit the determination of a rate from being absolute or definitive. As with all phenomena dealing with people, the rate setting mechanisms and methodologies must be ever responsive to changing needs. These are a few guidelines for setting rates that may assist an agency in determining equitable reimbursements on an ongoing basis.

Chapter 5 Outsourcing and Consolidation Decision

Public expectations for more efficient government along with smaller or no-growth budgets have compelled responsible leaders to explore more cost-effective ways of delivering government services. One option is to contract with private vendors (outsource) to provide services that were previously performed by government employees. The Council on Competitive Government has established a formal structure and guidelines for outsourcing Texas state government activities. The following information is intended to supplement the guidelines issued by the Council.

Figure 40

Outsourcing decisions must include consideration of:

- economic impact
- vendor service reliability and quality
- legal ramifications
- impact on strategic operations
- sociological factors

How does management determine what are the important factors—economic, strategic, legal, sociological—to consider in outsourcing? How should those factors be weighed? Are there some services that should not be outsourced at all or that need special contract provisions if outsourced? Do the factors change according to the type of service being considered for outsourcing?

This Chapter Will Provide a Guide for

- determining what should or should not be outsourced
- starting the outsourcing analysis
- identifying and comparing the costs of in-house services with the costs of outsourcing
- how an activity-based costing system can assist in this decision
- considering the qualitative aspects related to outsourcing
- contracting with vendors
- deciding if a consolidation of in-house service providers is optimal

What to Outsource

Comparing the costs of in-house services with that of outside suppliers can provide important information to the agency even apart from the privatization decision. It might indicate that an agency could improve the efficiency of its service delivery, for example. But how should an agency define candidates for outsourcing? There are various ways to do this. An agency can consider outsourcing specific activities, functions, product or service lines, or the entire spectrum of agency services. For example, one can outsource an entire MIS shop or the data center function of the MIS group. The payment process can be outsourced or all fiscal operations.

Before choosing a candidate for potential outsourcing, the agency should identify its strategic functions. In general, an entity would not want to privatize its strategic

functions because in privatization, the entity loses some control over that part of its operation. To lose control over strategic functions could jeopardize the mission of the entity and the successful delivery of services.

But what are strategic functions? There are various definitions--core activities, core businesses, activities that are vital to day-to-day decision making. Quinn and Hilmer suggest several criteria for determining the strategic functions or core competencies of an entity. Although the criteria are clearly oriented toward for-profit operations, they nevertheless can inform government entities. The authors, through an analysis of successful and unsuccessful businesses, suggest that core competencies are:

- skill or knowledge sets, not products or functions: know-how not know-what
- flexible, long-term platforms--capable of adaptation or evolution
- limited in number, that is, not usually more than five
- unique sources of leverage in the value chain
- areas where the entity can dominate
- elements important to customers in the long run
- embedded in the organization's systems, not in individual people

Source: (Strategic Outsourcing, *Sloan Management Review*, Summer 1994, pp. 43-55)

Figure 41

An agency is lacking in core competencies if it finds that it:

- does not have strong special skills or knowledge sets
- cannot be flexible to meet the ever changing demands of its customers
- is spread too thin, doing too many things, and so probably doing nothing well
- has nothing that it can do better than most
- is not able to meet customers' needs over the long run
- is primarily dependent on a few skilled people

If an agency finds that it has no core competencies, every function has the potential for outsourcing. Even if an agency is able to identify core competencies, it is still useful to consider outsourcing functions which are not core but consume the agency's time and resources. Privatization may not only save money but might also allow the agency to focus on its core competencies so that it can stay the best at what it does.

One more word about outsourcing and strategic functions: there are some support services that may not be core competencies by themselves but that nevertheless are so closely linked to the organization's core competencies that loss of control over them could jeopardize the effective continuation of the core service areas. Many functions are also very difficult to retrieve in-house once they have been outsourced.

For these reasons, outsourcing of such functions should receive careful consideration and probably special contract provisions if outsourced. The outsourcing of MIS shops, in particular, has been a popular move in recent years. Some of these have

been successful; others much less successful. Some have been outsourced to save money, some to increase quality of services, and some to gain an immediate influx of cash. The issues surrounding MIS outsourcing decisions are complex. The authors suggest that an agency read some of the many excellent articles on the topic. We have listed several in the bibliography.

Starting the Outsourcing Analysis

Before running to the ledgers, it is crucial that the organization define exactly what service or services it wants to consider for outsourcing. This detailed definition will be useful for developing the Requests for Information and the Requests for Proposals, as applicable. It will also figure in the development of the contract with the chosen vendor, not only in specifying what services are included in the contract but also in suggesting ways to monitor performance under the contract. Furthermore, by carefully defining the service(s) to be outsourced, the entity can decide if it is worth going through the remaining analysis. Outsourcing analyses are time-consuming and expensive. If the cost of the service under consideration is small relative to the investment in the outsourcing analysis, the entity may choose not to pursue consideration of this area for privatization.

Figure 42

To identify and compare the costs of in-house services with the costs of outsourcing, perform the following steps:

Step 1 Identify all direct and indirect costs associated with the services to be outsourced.

Step 2 Construct a spreadsheet to cover the years planned for outsourcing.

Step 3 On a separate spreadsheet, list the current and at least one previous year's costs. From these historical costs, from an analysis of planned expenditures found in the Request for Legislative Appropriations, and from other in-house analyses of specific needs, project for future years. Put those projected figures onto the outsourcing analysis spreadsheet. Document all assumptions made regarding expenditures in future years.

Step 4 Determine which costs are avoidable and relevant. Transfer these costs to another spreadsheet.

Step 5 Identify the costs and revenues if the service is outsourced. The main service cost can be obtained from vendor bids or published prices, where available. List any additional costs, including the cost of monitoring the contract.

Step 6 Find the present value of each set of costs, and total the costs for the two decisions, outsourcing versus continued in-house provision of services.

Identifying Comparative Costs

Step 1: Identify all direct and indirect costs associated with the services to be outsourced.

Determining all applicable costs is not as simple as it sounds. Some hard lessons have been learned by the private sector. This section discusses the complexity of the tasks and offers some guidance in identifying relevant costs.

Figure 43

Direct costs may include:

- wages and salaries associated with those people directly performing the service
- other compensation
- longevity and hazardous duty pay
- compensatory pay, overtime pay, and other emoluments and allowances
- fringe Benefits
- employee retirement contributions
- government-paid portion of employee's Social Security
- government's portion of employee's health insurance
- workers' compensation insurance
- unemployment compensation
- annual leave
- materials directly used and traceable to the provision of the specific service
- rental, lease, or mortgage payment on the buildings where the service is provided
- rental, lease, or note payment on equipment used to provide the service
- maintenance and repair of buildings and equipment
- telecommunications
- utilities
- other costs such as training, travel, postage, uniforms, employee parking, professional fees, and other contracted services

(Taken from *Least Cost Review Program*, Texas State Auditor's Office, Report No. 94-116)

Relevant Costs in the Private Sector

Years ago when companies started moving their operations overseas, the expectation was that the overseas manufacturing of products would greatly increase profitability. Given the tax structures and wage scales of underdeveloped countries, some companies believed they could not help but reduce their costs. When these expected profits did not materialize, management began to question what had gone wrong.

After investigation, companies found that their overhead, and especially their fixed overhead, comprised a significant portion of their total cost. In deciding to transfer operations to other countries, overhead costs had been allocated to the product lines under consideration. The assumption was that these costs would disappear once the product lines were relocated. This did not happen. The expenditures remained virtually unchanged.

Examination of the components of the allocated overhead revealed that it included the salaries of accounting personnel, corporate headquarters costs, office space, and similar types of expenses. These functions were not dissolved because one business segment was transferred. Additionally, many of the overhead costs were more closely linked to other product lines with less volume, such as those related to customizing products. The method of allocation had caused the costs to be allocated to the larger volume products even though these costs were actually incurred because of the lower volume product lines.

Companies re-examined their methods of allocating overhead costs and the components of overhead to determine

which of these costs were really relevant to the decision at hand, i.e., which costs could be linked to the products under consideration and were avoidable should specific business segments be relocated.

Government and Total Cost/Relevant Cost Analysis

In contrast to the private sector, public entities have not generally concerned themselves with identifying the total cost of providing a unit of some type of service. Budgets are often approved by line item—salaries, capital investments, rent, utilities. The Council on Competitive Government recommends that agencies first identify the total costs of the service under consideration for privatization. This is a good idea because it ensures that no cost is overlooked.

Accounting Versus Economic Costs Considerations: the Cashflow Emphasis

Before listing the types of costs to consider, a word about Generally Accepted Accounting Principles (GAAP) Costs versus Cashflows is in order. The decision to outsource operations is, among others, an economic one. Which option will be better in terms of the economic well-being of the State? Another way to express this is to ask where the State will end up with more cash overall--through the continued in-house provision of the service or through the outsourcing of the services. This question is not a trivial one because we tend to include in total costs certain non-cash items such as the depreciation of equipment and buildings. Although in the aggregate, depreciation does represent all the money paid out for those assets, it does not align on a one-on-one with the payment of cash for those assets. Equipment purchased for cash five years ago may still be in use and, for accounting purposes, may yet be undergoing depreciation. That depreciation charge will probably also constitute part of the rates charged for services to other entities, where such service provision exists. However, money put out five years ago is a sunk cost, not a cost today. The continued recognition of depreciation charges for that equipment or building does not represent a current cash outlay so neither depreciation charges nor service rates provide reliable cashflow information for the outsourcing decision. *For outsourcing decision analysis, only costs reflecting actual cash spent or received should be included and they should be included, for the period in which the cash changes hands.*

The assignment of costs to equipment should then be in terms of dollars actually to be paid out in a given year, such as an outright cash purchase or payment on a note to finance a purchase during the time period covered by the proposed outsourcing. It should also include cash received on the sale of equipment.

Elements of Total Cost

Total cost can be divided into costs that are directly associated with the delivery of the service being considered for outsourcing (*direct costs*) and costs that are associated with the delivery of several services, including the one being considered for

outsourcing (*indirect costs*). A list of charges that are generally attributable to a specific service is given in Figure 43 on page 90. It should be noted that not all of these types of costs are necessarily associated directly with only one service. Each category must be reviewed to determine this.

Indirect costs, those not directly linked to a single service, encompass a wide array of costs found in the general and subsidiary ledgers. They can include administrative costs to perform the cost accounting function, receiving department salaries, salaries of stockroom personnel, security guard's salaries, computer rental, and many more. ABC systems assist entities in linking many of these costs to services. (See Chapter 1.)

Step 2: Construct a spreadsheet to cover the years planned to outsource the activity.

The spreadsheet given in Figure 46 (page 102) lists the years planned for the outsourcing across the top of the page. The categories of direct and indirect costs are listed down the lefthand column. In this example, the outsourcing analysis for the data center of the Department of Information Resources is given for the planned period from fiscal years 1995 through 1999. Categories of costs are listed by direct and indirect costs. Initially, the Department of Information Resources primarily based the allocation of indirect costs on headcounts. But for outsourcing decisions, more detail and the involvement of agency management is critical in determining which costs can will be avoided. Costing services using an activity-based costing system can significantly facilitate the identification of avoidable indirect costs.

How many years should services be outsourced? There is no hard and fast rule, but generally, the outsourcing should be considered permanent when:

- the function is capital intensive, as in automation services
- the function requires a high degree of specialized skills from a large number of people

The financial and human resource investment necessary to retrieve outsourced operations may be prohibitive. Therefore, it is best to view the privatization as permanent. However, permanent outsourcing puts the agency at the mercy of the marketplace of the future. To attenuate the uncertainty associated with outsourcing, the agency can include a clause in the contract that allows the agency to repurchase the equipment sold to a vendor in a privatization initiative. The clause should carefully define both the extent of the buyback and the amount to be paid for it.

Finally, replacing the skills of highly experienced and knowledgeable people could take years. This factor should receive careful consideration when an agency is considering outsourcing one of its functions.

Step 3: On a separate spreadsheet, list the current and at least one previous year's costs. From these costs, from an analysis of planned expenditures found in the Request for Legislative Appropriations, and from other in-house analyses of specific needs, project for future years. Put those projected figures onto the outsourcing analysis spreadsheet. Document all assumptions made regarding expenditures in future years.

DIR data center costs for fiscal years 1993 and 1994 are given in Figure 45. For the most part, the current direct costs were readily identifiable because the DIR data center was self-contained. Utility costs were allocated on the basis of square footage.

The spreadsheet given in Figure 46 shows DIR's estimated in-house and outsourcing costs for fiscal years 1995 through 1999. These estimates were derived from the historical costs listed in Figure 45, the current biennium's Request for Legislative Appropriations and the recently submitted 1996-1997 Request for Legislative Appropriations, adjustments for inflation, and an assessment of specific needs such as a follow-up benchmarking study, new software, programmers' training requirements, and the like.

Step 4: Determine which costs are avoidable and relevant. Transfer these costs to another spreadsheet.

Figure 44

Relevant costs:

- are avoidable upon outsourcing
- are those the entity plans to eliminate if the service is outsourced
- represent actual cashflows
- are expressed in today's dollars

Avoidable and Relevant Costs

Avoidable costs are costs the entity believes it no longer will incur if the service line is outsourced. In the case of direct costs, it is the sum of all costs listed. For indirect costs, it is a different story. In the example of companies transferring product manufacturing overseas, the failure of an entity to define and accurately link the specific elements of overhead to products can result in very costly decisions.

The private sector's response to this error was to develop a costing system that better aligned the activities involved in the process of producing individual types of goods with the cost of those activities, or activity-based costing. This approach to costing goods and services informs the outsourcing decision by indicating which costs are truly avoidable if the product development or service delivery is performed by vendors outside the company or agency. For example, it is generally not possible to link statewide overhead costs to any particular service performed by an agency. For this reason, it is highly improbable that a component of overhead will disappear if the service is outsourced. Statewide overhead is, therefore, an unavoidable and irrelevant cost. For agencywide or divisional overhead, allocation on the basis of headcount or

full-time equivalent employees may be too ambiguous for the outsourcing decision. These costs should be better defined and correlated to specific services.

Finally, even if a cost is classified as avoidable, this does not mean that management will choose to avoid it. For example, a service delivery group may occupy 25 percent of total building space. When outsourced, management may decide to spread the remaining operations over that area instead of subleasing the space. It might not have planned to lease more space. Note that the entity will not be saving the money it currently pays for leasing that 25 percent. Economically, the State is not better off upon outsourcing, as far as the leased space is concerned. Therefore, although the cost of the floor space is avoidable, it is not a relevant cost for the outsourcing decision.

Step 5: Identify the costs and revenues if the service is outsourced; the main service cost can be obtained from vendor bids or published prices, where available. List any additional costs, including the cost of monitoring the contract.

The costs accumulated in steps 1 through 4 represent the costs of continuing operations in-house. Under an outsourcing scenario, the costs to consider should include the cost to administer the contracts, the vendor's estimated charges, and the cost to convert to an outsourced service. There can be others, depending upon the terms of the agreement. Any revenues received during the outsourcing period should also be considered. For example, if the vendor is going to pay rent for the use of state premises or if state-owned equipment will be sold due to the privatization, the cash to be received is included in the outsourcing analysis at this point.

This process takes a great deal of thought on the part of all involved in the initiative since individual circumstances will contain different costs. The cost of monitoring the contract (contract administration) is easily overlooked. DIR found a large county that had outsourced its data center and identified the amount paid to the contract monitor. That amount was used as the estimate of the cost of overseeing the contract for the DIR data center privatization.

Step 6: Find the present value of each set of costs and total the costs for the two decisions, outsourcing versus continued in-house provision of services.

Finally, all cashflows should be expressed in today's dollars, that is, present-valued. This is because a dollar received next year is worth less than a dollar received today. It is important that all dollars be placed on the same footing. Most spreadsheet packages will do the analysis. The user provides information concerning the following:

- dollars involved
- time periods of those dollars
- discount

(See Appendix C for a discussion of the discount rate.)

Step 7: The alternative with the lower total present value is the better choice with respect to this cost analysis.

In the DIR example, the last line, "In-House Less Outsource" (Figure 46), indicates that the present value of the vendor's bids cannot exceed $8,226,456. Of course, this assumes that all in-house costs listed are deemed relevant. However, common sense here is important. Remember that all these numbers are estimates. Practically speaking, the vendor bids should be significantly below the costs of continuing to provide the in-house services. What is "significantly below"? There is no hard and fast rule, but at least five to ten percent below is a good rule of thumb.

For more details on outsourcing data analysis techniques, such as example spreadsheets and cost allocation methods, see the State Auditor's publication, *Least Cost Review Program, Building Public-Private Partnerships in Texas,* SAO Report No. 94-116, and the Council on Competitive Government's June 1994 *Cost Methodology*. *Caution: The example spreadsheets in these documents contain rows labeled "depreciation;" please remember to use expected future cash outlays, not depreciation in developing estimations of future cost.*

Qualitative Considerations

In an outsourcing decision, issues go well beyond the numbers just discussed. Even though the numbers may favor privatization, consideration of other factors may preclude privatization. These qualitative aspects should be reviewed and scaled. The scaling can be done according to the perceived risk of each quality. For example, the potential for legal problems can be ranked from 1 to 7, with 7 representing the greatest potential for legal problems, 1 the least. Subcategories within categories, for example, the several aspects listed under vendor considerations, can also be scaled and then assigned weights according to the relative important of that aspect. Thus, ease of service from the vendor may be only half as important as the other aspects so the scaled score for ease of service would be multiplied by .5 while all other scores would be multiplied by 1. The sum of all scores would be the achieved score for that vendor. In this manner, vendors could be compared with each other.

But who assigns the scores and the weights? Preferably, several service experts are involved in this task and initially assign weights and scores independently of each other. This enhances the objectivity of the process. Consensus could be achieved

through discussion or, more scientifically, through the use of the Delphi method of achieving agreement.

Legal Aspects

These will include restrictions of federal, state, and local governments on the privatization of that service. The entity must also assess its continuing legal liability related to the service even though it has been privatized. Here are some considerations:

- If federal funds are involved, who will pay penalties if the administration of the service is not in accordance with federal guidelines--the private vendor or the government entity? Who is responsible for the continual assessment of compliance? For example, the Department of Human Services has outsourced the electronics benefit transfers of food stamp grants. If some recipients of benefits are not eligible for food stamps but receive them anyway, who pays the federal penalties, the private vendor or the Department of Human Services?

- If the contractor provides the services on your grounds, who is responsible for employee or customer accidents on the premises, the contractor or the entity?

Vendor Quality and Reliability

Choosing a vendor is not simply a matter of which bid is the lowest. There are several characteristics to consider in determining which vendor will be awarded the contract. You will need to assign some type of weights to these categories if you feel that they are not all of the same degree of importance to you.

- *Reliability of service*: The vendor can be relied upon to deliver the service in a timely manner.

- *Quality of service*: The vendor consistently provides the quality of service specified in the contract. Related to this is whether or not the vendor understands your business. Does the vendor have qualified personnel to respond to your needs? What is the vendor's turnover rate of such personnel? Does the vendor have enough personnel to meet your needs?

- *Security provisions*: The vendor can provide you with the level of security you need. If the vendor is handling your data, can the vendor ensure the security of that data to the level of your requirements?

- *Conflict of interests*: The vendor does not have other business interests or priorities that may conflict with yours. Don't be naive. The vendor is in

business to enhance his/her economic well-being. This may mean that cutting corners to keep costs down may result in lower quality of services to you. Be sure to specify the quality of service in the contract.

- *Financial stability*: Does the vendor have enough backup cashflow to keep him/her from becoming insolvent on you? Does the vendor have adequate insurance?

- *Reputation*: Does the vendor have a good reputation for delivering quality and timely services?

- *Ease of service*: Are the vendor's representatives friendly, courteous, knowledgeable, and responsive? Is the vendor in a convenient location for you to do business with him/her?

Sociological Issues

These issues revolve around the impact of the outsourcing on the employees who will no longer be working for your agency, the employees remaining in your agency, and the community who is monitoring your decisions. This can affect your entity's credibility and productivity. Employees who still have their jobs may wonder if their functions will be the next target for outsourcing and so may spend time and energy on this concern rather than on the work to be done. Citizen groups who get wind of your plan may try to thwart your efforts, costing your entity much time and energy.

Contracting with Vendors

If your entity has decided to privatize some aspect of its operations, there are several guidelines that will help to protect your entity's interest.

- *Discard the vendor's standard contract.* The vendor's contract will protect the vendor's best interests. Your entity needs a contract that also protects yours.

- *Do not sign incomplete contracts.* What is not written down never happened (and probably won't happen). If the written contract does not specify that the vendor will perform a specific service, you won't be able to enforce performance in that area.

- *Hire outsourcing experts.* Many of the services being outsourced, such as Information Systems, require a high degree of technical expertise. Outsourcing itself can require significant expertise to negotiate and write a quality contract. Most entities do not have these expertises in-house.

- *Measure every critical aspect of service.* This is the time preceding the outsourcing. Measuring and documenting the entire spectrum of services the in-

house personnel are providing and how much and how well the services are provided is critical to negotiations with an outside vendor. Without this baseline information, key services can be overlooked in the contract specifications.

- *Develop service level measures and reports*. This will help the agency monitor the services of the vendor and ensure that the vendor performs to satisfaction.

- *Specify escalation procedures*. That is, specify what happens when there is a problem with the service. How does the problem get resolved?

- *Include cash penalties for nonperformance*. The rationale for this is self-evident.

- *Determine growth rates and charges for changes in business.* This means that the contract should specify a range in the volume of business that the contract covers and what happens when the volume goes outside that range. It should also specify what happens in the event that the entity meets with some unforeseen disaster.

- *Appoint someone to manage the contract.*

- *Include a termination clause.*

- *Watch out for change-of-character clauses.* This relates to charges for any changes in functionality. For example, this can include specifications regarding extra charges for adding users to a Local Area Network.

- *Take care of your people*. For those in-house people who were providing the service before the outsourcing, try to get the vendor to hire some or all of them. Don't leave them out in the cold if it can be avoided.

(from "The Information Systems Outsourcing Bandwagon," *Sloan Management Review*, Fall 1993, pp, 73-85.)

In its *Least Cost Review Program* manual, the Texas State Auditor's Office makes similar recommendations to the above. The manual also recommends that the contract specify:

- key required personnel
- security responsibilities of both the government and the provider
- government-furnished property and services
- applicable statutes, regulations, technical orders, specifications, and manuals

Finally, be sure to include a clause to allow the agency to audit the vendor for services related to the contract.

The Consolidation Alternative

The continuation of in-house service provision or outsourcing does not represent the spectrum of options available to an agency. Reviewing how in-house services can be made more efficient may be the best starting point. It is less disruptive than outsourcing or consolidation and may result in a highly cost-effective service delivery. Assuming that an agency has already taken steps to be as efficient as possible, the agency may wish to look at consolidating its service efforts with those provided by another agency or government entity.

The cost analysis for consolidation decisions is similar to that for privatization. The basic question is what costs can and will be eliminated if several providers of the same service merge. The comparison of capacity levels of a merged service comes to the forefront in a consolidation because of its implications for future potentially large investments in fixed assets, such as buildings and equipment, unless the consolidation is carefully handled. Where individually-operated facilities may have the capacity to handle 20 percent or more increases in volume, merged facilities may soon find themselves running out of capacity. Equipment discarded upon consolidation may need to be replaced if the facility grows too rapidly. Additionally, unless all costs are captured in the initial analysis, a merged entity may find itself subject to new and unforeseen costs. One such cost is that of transportation between the consolidated facility and the agencies it serves.

The steps to follow in analyzing the value of consolidation are the same as those for outsourcing. For Step 5, “Determining the costs and revenues if the service is outsourced,” substitute the word “consolidated” for “outsourced.”

The following questions are common in consolidation decision-making:

- How are the rent and utilities treated for leftover floor space? If the agencies intend to spread out existing operations, then rent and utility costs are probably not relevant to the decision. If there is an expected decrease in rent and/or utility cost due to the consolidation, the expected decrease is a relevant cost.

- Several agencies will have unused or leftover equipment, how is it factored into the decision? The equipment could be sold, with the sale proceeds reducing the cost of the consolidation option. If the equipment is placed in storage or left idle, it is not relevant to the decision.

- Is depreciation an appropriate cost in a consolidation scenario? No, like the outsourcing decision, consolidation relates to an economic decision, which means determining the benefit to the state in terms of total future cashflows.

- Can we base our decision on only one year of data? No, because major shifts in service demand or equipment requirements usually happen over many years. Thus, basing the decision on only one year of data could result in an incorrect decision.

Conclusion

Amassing the kind of information needed to make sound economic decisions, whether for the increased efficiency within existing operations, the consolidation of several service providers, or the outsourcing of services, takes considerable time and care. The required level of detail and rigor of analysis increases in proportion to the scope of the decision area and amount of resources under consideration. All of the decisions are about cashflow, not accounting numbers. Generally, these decisions are long-term and are not easily reversible. However, good management requires that entities continually assess if there are more economical ways of performing its functions. The assessment of alternatives involves both qualitative and quantitative aspects to ensure that the whole impact of each alternative has been captured. There is no crystal ball. An entity can minimize its risk by careful analyses as suggested in this guide; however, no amount of analysis will replace sound judgment.

Figure 45

Actual Costs
Department of Information Resources Data Center
FY 1993 and FY 1994

	FY 93	FY 94
DIRECT COSTS:		
Salaries and Wages	$411,935	$478,703
Other Compensation	3,020	3,840
Fringe Benefits	132,643	154,142
Supplies and Materials	69,770	81,030
Rental/Lease:		
Equipment	9,781	33
Building	--	--
Repairs and Maintenance:		
Equipment		9,539
Computer	216,958	130,512
Software	198,423	222,926
Building	18,949	18,949
Telecommunications:		
GSC/SW Direct	38,920	40,631
Utilities	17,266	17,266
Other Direct Costs:		
Training	4,528	10,818
Travel	6,463	8,412
Professional Fees	31,884	48,732
Furniture	1,588	4,001
Other Oper. Expenses	33,479	27,788
Cost of Upgrade:		
Hardware	728,452	548,641
Software	29,350	87,583
TOTAL DIRECT COSTS:	$1,953,409	$1,893,546
INDIRECT COSTS:		
Divisional Indirect	$62,356	$74,002
Agency-wide Indirect	100,672	346,002
State Indirect	$22,304	$129,070
TOTAL INDIRECT COSTS:	$185,332	$549,074
TOTAL IN-HOUSE COSTS:	**$2,138,741**	**$2,442,620**

Figure 46

Estimated Costs
Department of Information Resources Data Center
FY 1995 through FY 1999

	PRESENT VALUE	FY 95	FY 96	FY 97	FY 98	FY 99
DIRECT COSTS:						
Salaries and Wages	$2,082,849	$479,146	$490,645	$502,420	$514,479	$526,826
Other Compensation	17,095	3,932	4,027	4,124	4,223	4,324
Fringe Benefits	670,677	154,285	157,988	161,779	165,662	169,638
Supplies and Materials	53,373	11,809	12,335	12,887	13,466	14,075
Rental/Lease:						
Equipment	8,311	2,000	2,000	2,000	2,000	2,000
Building	---	---	---	---	---	---
Repairs and Maintenance:						
Equipment	63,218	13,850	14,543	15,270	16,033	16,835
Computer	837,309	162,233	187,096	212,364	222,982	234,131
Software	1,003,793	219,916	230,912	242,458	254,580	267,310
Building	78,742	18,948	18,948	18,948	18,948	18,948
Telecommunications:						
GSC/SW Direct	176,745	38,722	40,658	42,691	44,826	47,067
Utilities	71,586	17,226	17,226	17,226	17,226	17,226
Other Direct Costs:						
Training	164,320	36,000	37,800	39,690	41,675	43,758
Travel	136,933	30,000	31,500	33,075	34,729	36,465
Professional Fees	105,913	17,000	57,000	17,000	17,000	17,000
Furniture	8,311	2,000	2,000	2,000	2,000	2,000
Other Oper. Expenses	127,462	27,925	29,321	30,787	32,327	33,943
Cost of Upgrade:						
Hardware	369,226	188,000	35,000	145,000	35,000	20,000
Software	306,418	257,925	70,040	3,000	0	0
TOTAL DIRECT COSTS:	**$6,282,280**	**$1,680,917**	**$1,439,039**	**$1,502,720**	**$1,437,155**	**$1,471,546**
INDIRECT COSTS:						
Divisional Indirect	$417,772	$95,165	$97,938	$100,802	$103,760	$106,816
Agency-wide Indirect	1,536,675	369,777	369,777	369,777	369,777	369,777
State Indirect	581,049	137,939	137,939	137,939	137,939	137,939
TOTAL INDIRECT COSTS:	**$2,535,496**	**$602,881**	**$605,654**	**$608,518**	**$611,476**	**$614,532**
TOTAL IN-HOUSE COSTS:	**$8,817,776**	**$2,283,798**	**$2,044,693**	**$2,111,238**	**$2,048,631**	**$2,086,078**
OUTSOURCE COSTS:						
Contract Price						
Contract Administration	$376,365	$86,580	$88,658	$90,786	$92,965	$95,196
Proceeds From Sale of Equip.	(591,051)	(629,469)	0	0	0	0
DROC Bldg. Maintenance	141,960	32,798	33,491	34,218	34,981	35,783
Mgmt. of DROC	82,997	19,093	19,551	20,021	20,501	20,993
TOTAL OUTSOURCE COSTS:	**$10,271**	**($490,998)**	**$141,700**	**$145,025**	**$148,447**	**$151,972**

In-House less Outsource **$8,807,505**

Vendor bids significantly less than this amount would make outsourcing an attractive alternative.

This page intentionally left blank.

Appendix A:

Conducting Random Moment Time Studies

Random moment time studies can provide reliable information about the relative amount of time workers spend on various categories of activities. This section presents a methodology for performing such studies.

Figure 47

The six steps in doing a random moment time study are:

Step 1 Decide the types of workers you wish to determine categories of activities.

Step 2 Determine the categories of activities for each type of worker.

Step 3 Devise a sampling plan.

Step 4 Decide upon the timings.

Step 5 Perform the study.

Step 6 Tally the results.

There are six steps in performing a random moment time study:

Step 1: Decide the types of workers you wish to determine categories of activities. For example, if you are looking at workers who process vouchers, you may wish to subdivide them into supervisory, clerical, and professional categories:

- those engaged in the distribution of vouchers, batches, mail, etc., are classified as clerical
- those who do not do the actual processing of the vouchers but oversee it are supervisors
- those who perform the actual processing are professional workers

Step 2: Determine the categories of activities for each type of worker. For example, a professional voucher worker may answer telephone calls, enter data, review the voucher for errors, check for information in data bases, and the like. The larger the number of categories, the more precise you get about types of activities. However, to get precise estimates for a large number of categories, more time spots will have to be recorded. In general, the greater the precision, the higher the cost. Be sure that the categories are:

- mutually exclusive: activities fitting into one category will not fit into another
- exhaustive: the categories capture the total of all activities performed by the workers

Step 3: Devise a sampling plan. If your agency has regions or districts, you may want to sample by region or district (stratified). Then, you may take a random sample of workers of a given type.

Step 4: Decide upon the timings. Decide upon a time period for recording activities, e.g., two weeks, three weeks, one month. Then you will decide for how many random moments on average each day you wish to record information (for example,

20 in a day on average). You will also decide upon an acceptable range of variation around the average number of random samples required each day. For example, if the average number of samples is 20, this might vary by as much as eight per day. Thus, on any given day, you would be drawing between the three week time period. How many is enough? The larger the number of observations, the better, especially if there are numerous categories of activities. There are many tables that provide sample sizes for various levels of precision.

Step 5: Perform the study, recording the worker's name, class, date, time of the observation, and category of activity. There are random moment generating clocks that will beep according to these specifications. When the beeper sounds, an independent observer approaches the worker and determines with the worker the category which best fits what the worker is doing at that moment. A sample timesheet is given in Figure 48.

Step 6: Tally the results by worker type and by category, with confidence intervals based upon the data obtained from the study.

Example

Step 1: Decide the types of workers you wish to determine categories of activities. Let us assume that, from our earlier example of voucher processing, we choose the workers who actually process the vouchers, i.e., the professional but non-management workers.

Step 2: Determine the categories of activities for each type of worker. Let us assume that a professional voucher worker performs the following (activities):

1. answers telephone calls
2. responds to other inquiries
3. batches the vouchers
4. enters the data
5. reviews the vouchers for errors
6. reviews automated error reports
7. corrects any correctable errors
8. takes breaks and engages miscellaneous non-tasks related activities (waiting, chatting, etc.)
9. is on leave

You may wish to put these into categories such as actual voucher processing, related tasks such as telephone inquiries, or lost time (leave, breaks, etc.). In this example, we will monitor them without such categorization.

Step 3: Devise the sampling plan. Suppose that all professional voucher workers are in one office. There are 100 of them. You decide to take a random sample of 20 of them.

Step 4: Decide upon the timings. You decide to record their activities on a random basis for the next three weeks. You want to take 20 observations per day on average, but it could vary between 12 and 28. So, the total expected number of observations for the 20 people over three weeks will be

20 people * 20 observations * 15 days = 6,000

Step 5: Perform the study. Assign an independent observer for each worker. Get your timesheets ready and set your clocks. Go. Figure 48 gives a sample time sheet.

Figure 48

Name _____ **Classification**_____ **Date** _____

Time	Activity Type
8:15	1
8:43	8
9:02	7
9:14	7
10:23	4
11:01	6

Step 6: Tally the results. You add together the results for each category over the 300 timesheets ***(20 workers * 15 days* 1 timesheet each day)***. Figure 49 reports the results.

Figure 49

CATEGORY	FREQUENCY	PERCENT OF TIME
Answering phone calls	1,800	30.0
Responding to other inquiries	600	10.0
Batching vouchers	300	5.0
Entering data	600	10.0
Reviewing vouchers for errors	600	10.0
Reviewing automated error reports	300	5.0
Correcting errors	1,100	18.3
Taking breaks	375	6.3
On leave	325	5.4

To obtain a 95 percent confidence interval for each category, use the following formula:
p +/- 1.96 * p*(1-p)/n.

In this example, the number of observations, or n, is 6,000. So, the confidence interval for answering phone calls, p = **.30,*is*.3 +/−1.96√(.3)∗(1−.3)/6,000**, making the estimated proportion of the time spent on phone calls between .288 and .312.

The calculation of confidence intervals for the other categories is similar.

Since there was only one worker type whose activities were reviewed, the study is complete.

With the results, you can determine how much it costs your agency to perform the various activities. For example, if the total salary and other assignable costs represented by the 100 workers is $2,000,000 per year, then it is costing your agency 30 percent of that amount, or $600,000 per year to answer phone calls. You may want to speed up voucher processing to cut down on the number of phone calls if indeed the slow cycle time is the primary reason for the phone calls.

If slow cycle time for processing vouchers is the primary reason for the large number of phone calls, the activity data can also provide clues on where to begin investigating the causes for slow turnaround time.

Appendix B:

Developing a Detailed Process Flowchart

Process flowcharts can assist in the determination of the steps taken in producing a good or service. They can also identify areas where waste in the process is occurring. The following presentation explains how to develop a detailed process flowchart.

Process flowcharts should be developed by cross-functional teams, representing each part of the process. This ensures that all relevant activities have been captured as well as the correct sequencing of those activities.

There are five steps in developing and analyzing a process flowchart:

Step 1: List the organizational areas involved in the process, in the order of their initial involvement, across the top of the page. This includes activities performed by groups outside of your immediate section, department, division, and agency.

Step 2: Below each organizational area, horizontally list the major blocks of activities performed by the organizational areas that distinguish among products.

Step 3: Ask workers who perform specific activities to list the tasks for his or her activity set. How much detail is a matter of discretion, but "I walk to the file cabinet" will give too much unnecessary detail. Show the handoff from one worker to another as activity sets change.

Step 4: Put the activities of the process into pictorial form, using the following symbols and those illustrated in Figure 50:

- *rectangles* to denote actions taken in the process
- *diamonds* to denote decision points "Is it correct?" "Are there sufficient funds to cover this?"
- *oblongs* to denote starting and ending points in the process
- *arrows* to show the progression of tasks and activities to denote that:
  - a paper document was used, sent, or received
  - information was used or written to a computer disk
  - information was used or written to a magnetic tape

Step 5: Analyze the flowchart for evidence of non-value added activities or gaps in the process:

- *Rework:* Something is being redone because it was not done right at an earlier time. Things could undergo rework several times.
- *Redundancy:* The same thing is being done twice for no apparent reason.

- *Gaps:* Something that should have been done during the process but was not covered by the system devised. (Sometimes it may accidentally get done.)

- *Steps out of sequence:* Procedures that, if performed earlier in the process, could at times have save some of the steps in the process from needing to be done.

- *Queues:* You generally find time spent in queuing where documents are handed from one group to another. This time spent in queuing increases the cycle time, so look for places where handoffs occur, as in the exchange across organizational areas. Assess the amount of time spent in queuing to determine how much time it is adding to the overall cycle processing time.

- *Excessive inspection:* Quality should be built into the original process for developing the product, not through inspection after the fact. Check to see how many times the product is inspected for errors and estimate the amount of time spent doing so. Look for opportunities to improve the process at the front end (e.g., retraining for the original producers) that could cut down on inspection time.

Example:

We have attached a hypothetical travel voucher process to illustrate the steps involved in developing a detailed process flowchart. (See flowchart in Figure 51 on page 114).

Step 1: List the organizational areas involved in the process, in the order of their initial involvement, across the top of the page. This includes activities performed by groups outside of your immediate section, department, division, and agency. Travel vouchers flow through the mailroom, claims distribution unit, claims processing unit, claims correction unit, micrographics, information storage and retrieval unit, MIS production control, and the Comptroller's Office.

Step 2: Below each organizational area, horizontally list the major blocks of activities performed by the organizational areas that distinguish among products. This example does not make such subdivisions. However, were the claims processing workers performing an audit of some types of travel vouchers but not of others, this audit activity could be listed separately from the remaining activities performed by this unit.

Step 3: Ask workers who perform specific activities to list the tasks for his or her activity set. How much detail is a matter of discretion but "I walk to the file cabinet" will give too much unnecessary detail. Show the handoff from one worker to another as activity sets change. The tasks are presented on the flowchart in sequence, with the first set of tasks being the mailroom, fiscal claims the next set of tasks, etc. Note that the sequence is defined, beginning from the top of the paper and moving across and down as applicable.

Step 4: Put the activities of the fiscal process into pictorial form. Actions are listed as rectangles. For example, in the claims distribution unit, activity block, five actions are performed: sort by type, sort by region, sort by agency, attach and complete the batch card, and log batch number information.

Most of the decision points ask if the information is "Correct." These are in diamonds.

The major part of the process ends in the mailroom where the warrants are mailed out to the payees. The symbol used here is an oblong marked "End."

Paper documents, such as vouchers, are designated as prescribed above.

Magnetic tapes are the circle with the hook at the end. Note the microfilm tapes.

Hard disks, such as entry to the AE system, are noted as cylinders.

Step 5: Analyze the flowchart for evidence of non-value added activities or gaps in the process:

Queues and redundancy: The process loops around the claims distribution unit many times, signaling that a large number of unnecessary steps is occurring.

The travel vouchers are physically moving from hand to hand very often, triggering the probability of queues and lengthened cycle times.

Excessive inspection: There are multiple decision points that ask if the voucher information is correct, indicating excessive post-facto inspection.

Steps out of sequence: Incorrect vouchers are kept in batches during steps 2, 3, and 4, although incorrect vouchers were identified in step 2. Waiting to pull out the vouchers until step 5 indicates a step out of sequence and causes delays in processing of good vouchers.

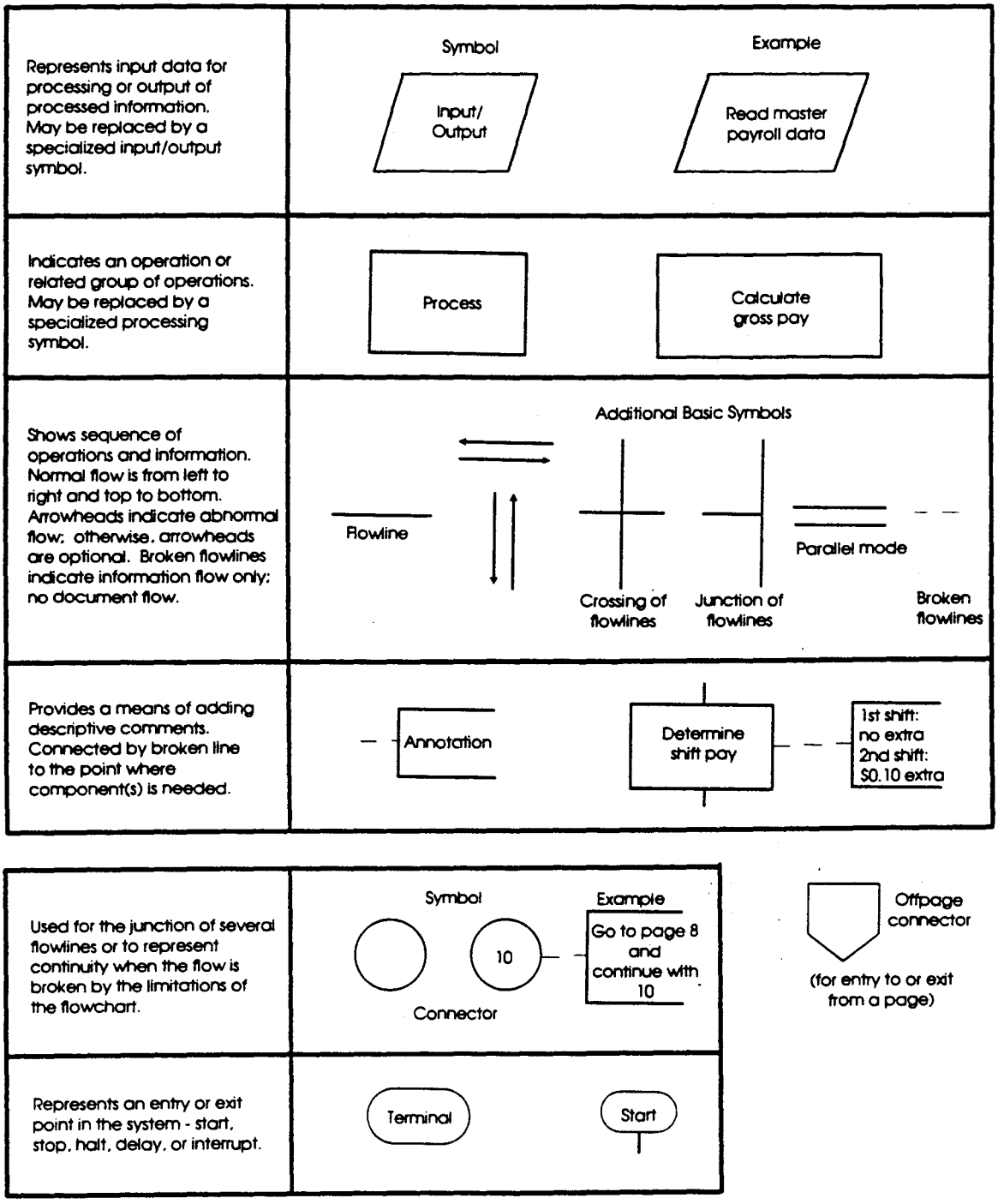
AE checks again HRIS information occur late in the sequence. A reject from that system causes the processing of the vouchers to start over in a number of ways. Doing these checks earlier in the process could decrease handling and, therefore, cycle time.

Redundancy: Many vouchers are rebatched several times indicating redundancy. Information is entered both to manual and automated logs, further indications of redundancy. Finally, microfilm makes two tapes of the vouchers, the Comptroller's Office makes another. Are three tapes necessary?

Figure 50

PROCESS FLOWCHARTS

Flowchart symbols for basic modules and illustrated payroll examples



PROCESS FLOWCHARTS, continued

Processing flowchart symbols and illustrated payroll examples

	Symbol	Example
References a set of program steps specified elsewhere or another set of flowcharts.	Predefined Process	Find hourly rate from payroll look-up table
Indicates off-line process performed by off-line equipment not under the direct control of the central processing unit of the computer system.	Auxiliary operation	Sort current payroll earnings cards
Represents a manual procedure or a procedure using equipment that operates at the speed of a human being.	Manual Operation	Comparison of weekly payroll departmental totals
Used to denote a decision point where two or more alternative paths are possible.	Decision	Yes / Shift code: 1st shift / No

Additional Processing Symbols

Merge
Combine two or more sets of items into one set.

Collate
Form two or more sets of items from two or more sets.

Extract
Remove one or more sets of items from a set.

Sort
Arrange into a particular sequence.

Preparation
Preparation procedures prior to processing.

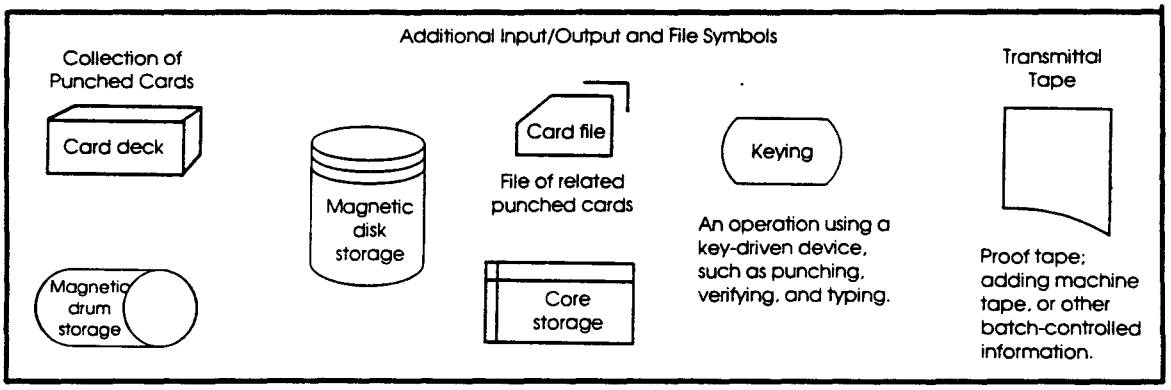
PROCESS FLOWCHARTS, concluded

Flowchart symbols for input/output files and illustrated payroll examples

	Symbol	Example
Represents a punched card-input/output data.	Punched Card	Current payroll earnings card
Used for punched paper tape-input/output data.	Punched Tape	Weekly hours worked tape
Indicates an input/output document.	Document	Prior week year-to-date payroll register
Represents magnetic tape-input/output data.	Magnetic Tape	Master payroll data file
Provides a means for entering input manually at the time of processing from on-line keyboards, console switches, etc.	Manual Input	Enter current payroll data via typewriter

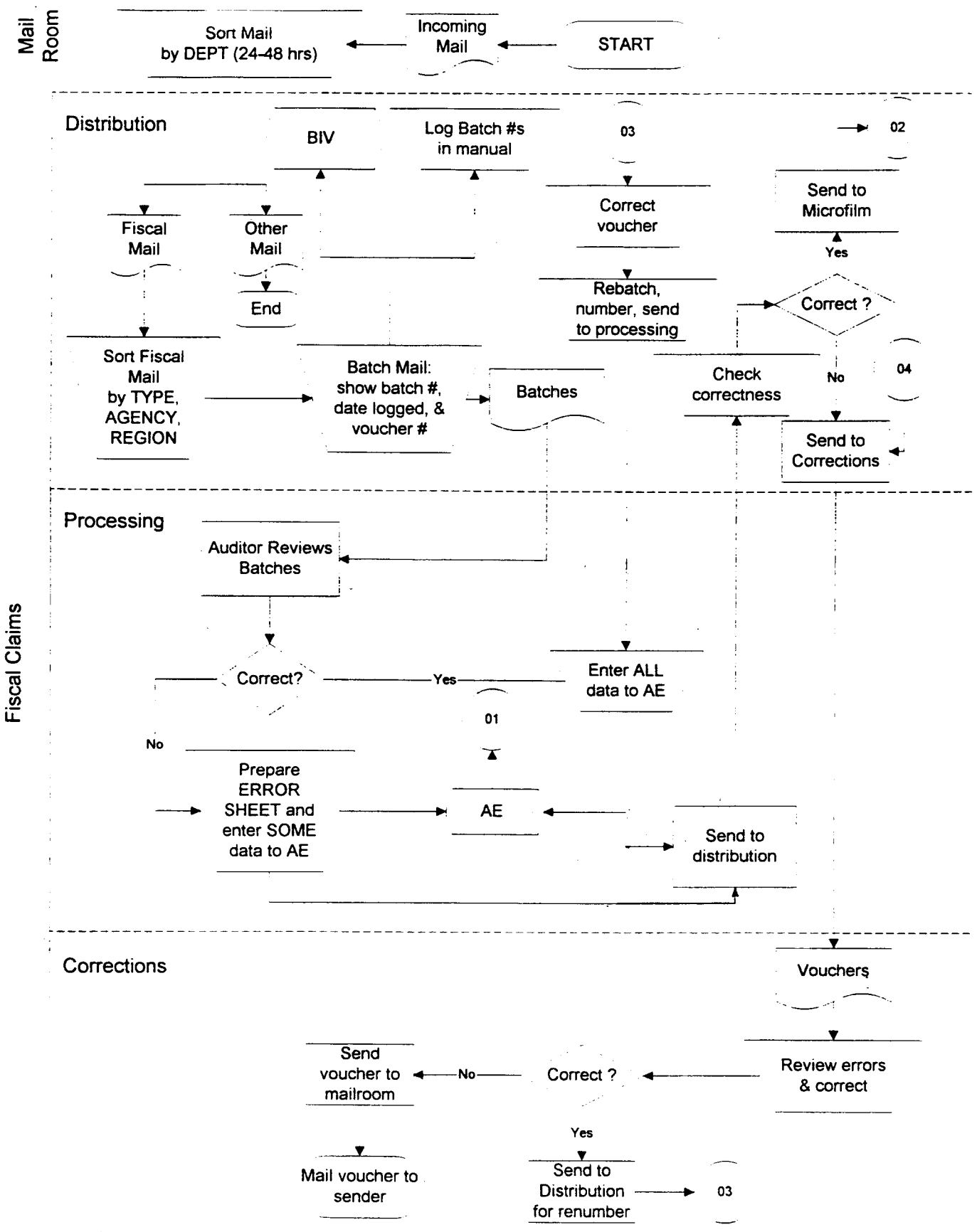
	Symbol	Example
Displays output information at the time of processing by means of on-line indicators, video devices, console typewriters, etc.	Display	Display correct payroll number for operator
Represents information transmitted automatically from one location to another. An open arrowhead can indicate flow direction.		Communication link
Used for input/output information stored in direct access storage (disk, drum, etc.)	On-line storage	Master payroll file
Represents any information storage off line (regardless of medium) that is not directly accessible by the computer.	Off-line storage	Payroll master name and address card file

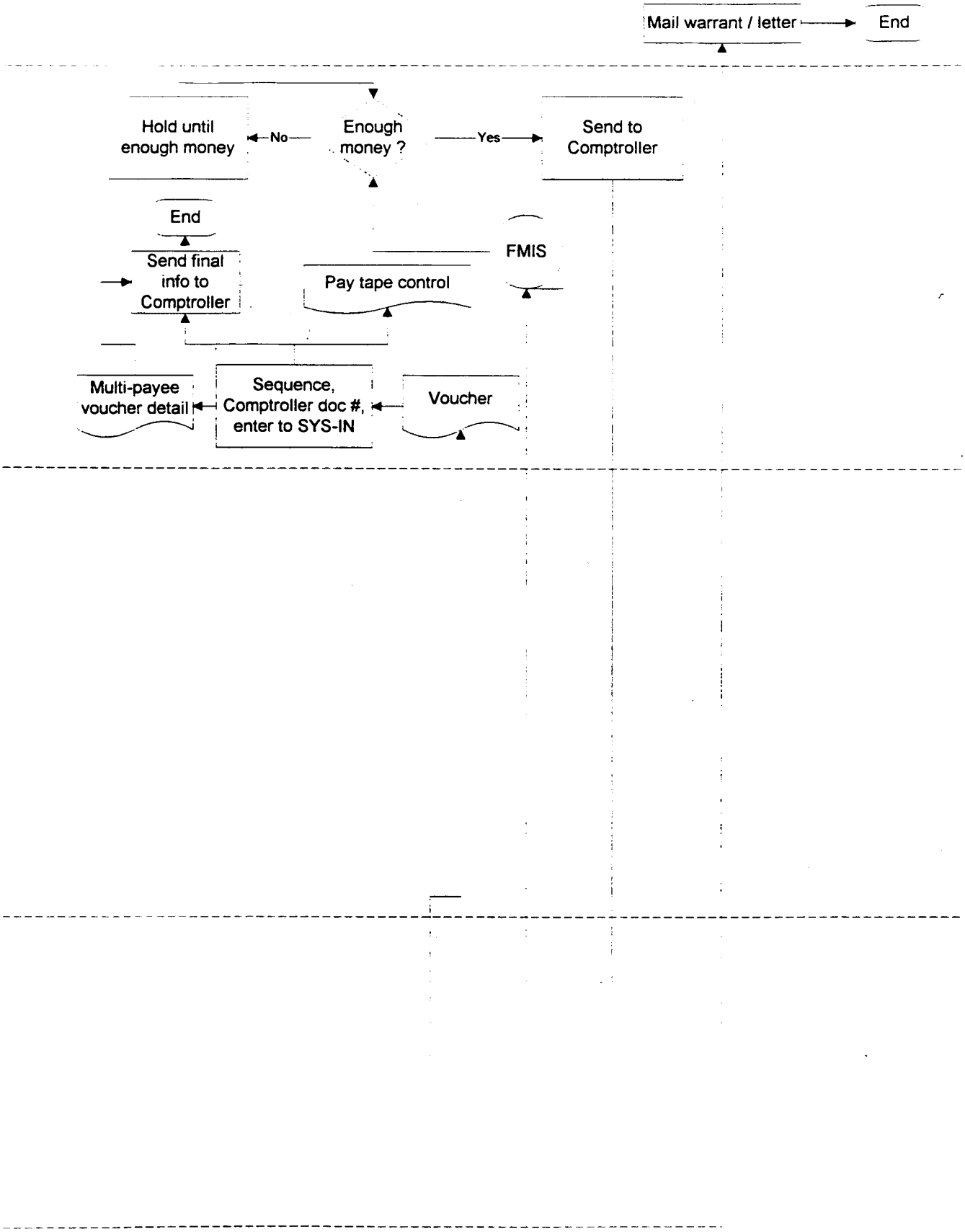
Additional Input/Output and File Symbols

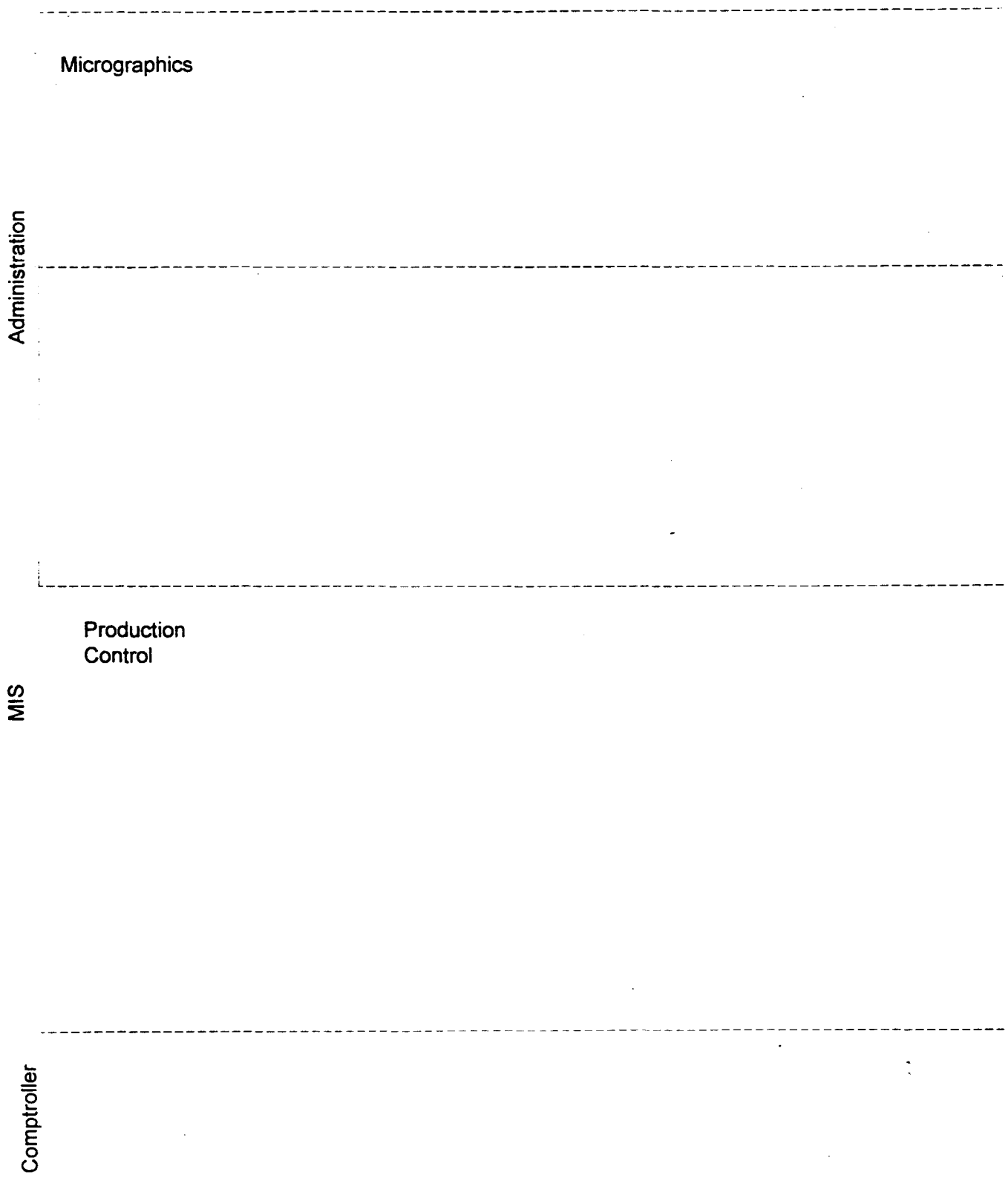


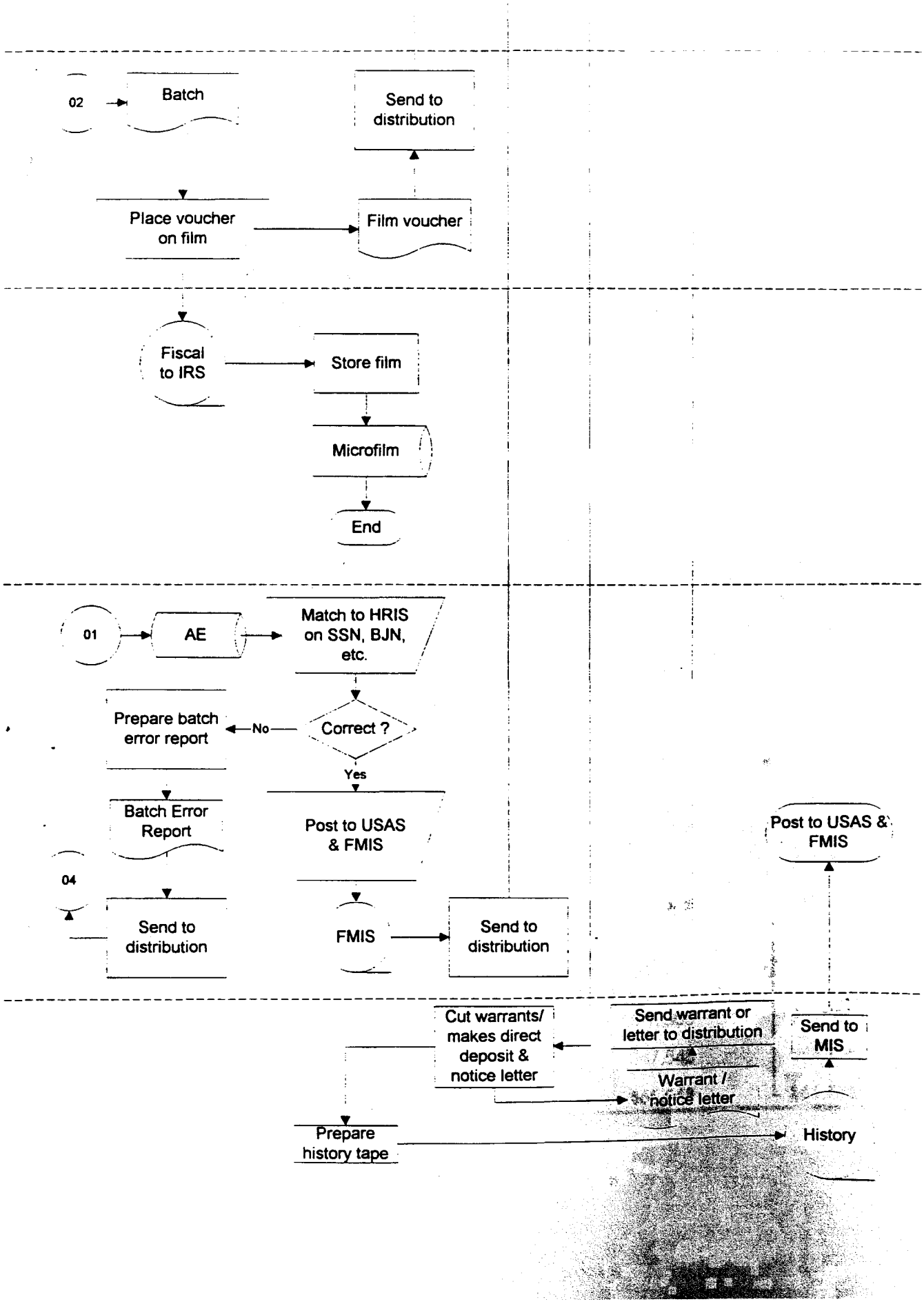
Flowchart

Figure 51









This page intentionally left blank.

Appendix C:

Discount Rates

The question of which is the appropriate rate for discounting cashflows is best answered as "*That depends*." The rate will vary according to the decision at hand. The Government Accounting Office (GAO) issued a paper reviewing the relative values of using the shadow price of capital, a weighted average discount rate, a market-based rate, and the current Treasury rate, amongst others (GAO/OCE,1991). Except for performing impact analysis where there is a significant stream of revenue benefits to weigh against costs or for some applications that involve a large risk of loss, the weighted average discount rate and the current incremental borrowing rate (comparable to the current Treasury rate) should suffice for most state government applications. The following section begins with a discussion of sensitivity analysis, illustrating the change in decision due purely to the use of different interest rates. The presentation moves into an example of the calculation of the weighted average discount rate. Finally, this appendix provides guidance for the appropriate discount rate to be used for the major decision areas: planning, budgeting, and outsourcing.

Sensitivity Analysis

The choice of interest rates can result in widely differing decisions, especially where an influx of revenues is involved. Even when only cash outflows are considered, the discount rate can impact the decision. For example, suppose that an agency is considering the purchase of equipment with a useful life of five years, involving an initial outlay of $37,000, with four $9,000 yearly payments beginning in one year. In contrast, the agency can lease the equipment at $15,000 per year, beginning one year from now, with $18,000 due immediately. Present value analysis under the two scenarios leads to very different decisions depending upon whether a 7 percent, 10 percent, or 14 percent interest rate is used.

Figure 52

OPTION	7%	10%	14%
PURCHASE			
Present value of immediate payment	$37,000	$37,000	$37,000
Present value of next four payments	$30,485	$28,529	$26,223
Total present value	**$67.485**	**$65,529**	**$63,223**
LEASE			
Present value of immediate payment	$18,000	$18,000	$18,000
Present value of next four payments	$50,808	$47,548	$43,706
Total present value	**$68,808**	**$65,548**	**$61,706**

Note that when a 7 percent discount rate is used, the decision would favor purchasing the equipment. Under a 10 percent discount rate, the agency would be indifferent as to purchasing versus leasing. Using a 14 percent discount rate, the agency would tend to lease rather than buy. We recommend that the entity perform this type of analysis whenever making decisions with major economic impacts. Although in the above examples the differences either way were less than $2,000, the potential difference in many instances is much greater. Particularly when an agency or university is considering outsourcing services, the impact upon workers can be high. Responsible management of such a decision mandates a careful sensitivity analysis to ensure that the decision is based upon a true and significant economic gain for the State.

Figure 53

To derive the weighted average discount rate:

Step 1 List the market value of each debt instrument.

Step 2 Find the total market value of the debt by adding over the individual values listed in step one.

Step 3 Calculate the ratio of the debt represented by each instrument to the total value found in step two.

Step 4 List the yield rate of the debt.

Step 5 Multiply each ratio calculated in step three by the yield rate for that instrument listed in step four. This gives the weighted average cost of each debt instrument.

Step 6 Add the weighted average costs over all debt instruments calculated in step five. This represents the Weighted Average Discount Rate for further analysis.

Weighted Average Discount Rate

The weighted average discount rate is a weighted average of all indebtedness held by the organization at a given point in time. It is comparable to a company's Weighted Average Cost of Capital (WACC). The difference is that companies also carry equity issues such as common and preferred stock. This is not applicable to state agency situations. The steps for calculating the weighted average discount rate are given in Figure 53.

To illustrate a simple computation of the weighted average discount rate, consider Texas Small University. TSU has four bond issuances outstanding. The market values and yield rates on each are given in Figure 54 along with the computation of the Weighted Average Discount Rate, 8.85.

Planning/Budgeting

For lease/purchase or budgeting decisions, the use of the entity's incremental borrowing rate, that is the rate the entity would have to pay to borrow more money, should suffice. This borrowing rate should be based upon a loan of duration comparable to the project under consideration. If an agency has little or no experience in borrowing, as is the case with most agencies, the State's incremental borrowing rate can be used. To obtain information about this rate, an agency can call the Revenue Estimation department, Comptroller's Office.

Outsourcing

For outsourcing decisions, use of a market-based rate, such as the prime rate, may be optimal. The rationale behind the use of a market-based rate is to simulate the return expected by a vendor. Some applications, such as those related to student loans, may require an adjustment due to the riskiness of the project. Many services that state agencies are considering for outsourcing do not have comparable services in the private sector. In this case, the use of the State's incremental borrowing rate and/or a Weighted Average Discount Rate may suffice.

Figure 54

Bond (1)	Market Values (2)	Percent of Total (3)	Yield (4)	Weighted Average Cost of Debt (5) = 3 x 4
A	$ 50,000	12.5	8	1.00
B	$ 70,000	17.5	10	1.75
C	$120,000	30.0	11	3.30
D	$160,000	40.0	7	2.80
Total	**$400,000**	**100.0**		**8.85**

Summary

This appendix provided a brief overview of the discount rate issue. A more exhaustive review of various rates is provided in a booklet titled *Discount Rate Policy*, published by the U.S. General Accounting Office/Office of the Chief Economist, 1991.

This page intentionally left blank.

Appendix D:

Glossary

Activity—The actual work task or step performed in producing and delivering products and services. An aggregation of actions performed within an organization that is useful for purposes of activity-based costing.

Activity Analysis—The identification and description of activities in an organization. Activity analysis involves determining what activities are done within a department, how many people perform the activities, how much time they spend performing the activities, what resources are required to perform the activities, what operational data best reflect the performance of the activities, and what customer value the activity has for the organization. Activity analysis is accomplished with interviews, questionnaires, observation, and review of physical records of work. It is the foundation for agency process value analysis, which is key to overall review of program delivery.

Activity-Based Costing—A cost accounting method that measures the cost and performance of process-related activities and cost objects. It assigns a cost to cost objects, such as products or customers, based on their use of activities. It recognizes the causal relationship of cost drivers to activities.

Actual Cost—An amount determined on the basis of cost incurred, including standard cost properly adjusted for applicable variance.

Avoidable Cost—A cost that the state would not incur if the activity were not performed.

Common Cost—The cost of resources employed jointly in the production of two or more outputs; the cost cannot be directly traced to any one of those outputs.

Controllable Cost—A cost that can be influenced by the action of the responsible manager. The term always refers to a specified manager since all costs are controllable by someone.

Cost Accounting Practice—Any disclosed or established accounting method or technique which is measurement of cost, assignment of cost to accounting periods, and assignment of cost to cost objects.

Cost Allocation—A method of assigning costs to activities, outputs, or other cost objects. The method of assigning costs must associate cause and effect and be verifiable. The allocation base used to assign a cost to objects is not necessarily the cause of the cost. For example, assigning the cost of power to machine activities by machine hours is an allocation because machine hours are an indirect measure of power consumption.

Cost Assignment—A process that identifies costs with activities, outputs, or other cost objects. In a broad sense, costs can be assigned to processes, activities,

organizational divisions, products, and services. There are three methods of cost assignment: (a) directly tracing costs wherever economically feasible, (b) cause-and-effect, and (c) allocating costs on a reasonable and consistent basis.

Cost Driver—Any factor that causes a change in the cost of an activity or output. For example, the quality of parts received by an activity or the degree of complexity of tax returns to be reviewed by IRS.

Cost Finding—Cost finding techniques produce cost data by analytical or sampling methods outside the regular cost accumulation and reporting of the managerial cost accounting system. Cost finding techniques are appropriate on an exception basis for certain kinds of costs, such as indirect costs, items with costs below set thresholds within programs, or for some programs in their entirety. Cost finding techniques support the overall managerial cost accounting system and represent non-recurring analysis of specific costs.

Cost Object (also referred to as Cost Objective)—An activity, output, or item whose cost is to be measured. In a broad sense, a cost object can be an organizational division, a function, task, product, service, or customer.

Differential Cost—The cost difference expected if one course of action is adopted instead of others.

Direct Cost—The cost of resources directly consumed by an activity. Direct costs are assigned to activities by direct tracing of units of resources consumed by individual activities. A cost that is specifically identified with a single cost object.

Estimated Cost—The process of projecting a future result in terms of cost, based on information available at the time. Estimated costs, rather than actual costs, are sometimes the basis for credits to work-in-process accounts and debits to finished goods inventory.

Fixed Cost—A cost or expense that does not vary in the period under consideration with the volume of activity. Fixed cost information is useful for cost savings by adjusting existing capacity or by eliminating idle facilities. Also called Non-Variable Cost or Constant Cost.

Full-Absorption Costing—A method of costing that assigns (absorbs) all labor, material, and service/manufacturing facilities and support costs to products or other cost objects. The costs assigned include those that do and do not vary with the level of activity performed.

Full Cost—The sum of all costs required by a cost object, including the costs of activities performed by other entities regardless of funding sources.

Incremental Cost—The increase or decrease in total costs that would result from a decision to increase or decrease output level, to add a service or task, or to change any

portion of operations. This information helps in making decisions such as to contract work out; undertake a project; or increase, decrease, modify, or eliminate an activity or product.

Indirect Cost—Costs that cannot be identified specifically with or traced to a given cost object in an economically feasible way. Indirect costs can usually be classified into two categories: overhead and general and administrative costs. Overhead is the indirect cost that is avoidable and reasonably identifiable to a specific activity or product. General and administrative are the non-overhead indirect costs.

Inter-Entity—Between or among different federal reporting entities. It commonly refers to activities or costs between two or more agencies, departments, or bureaus.

Job Order Costing—A method of cost accounting that accumulates costs for individual jobs or lots. A job may be a service or manufactured item, such as the repair of equipment or the treatment of a patient in a hospital.

Managerial Cost Accounting System—The organization and procedures, whether automated or not and whether part of the general ledger or stand-alone, that accumulates and reports cost and performance data from various agency feeder systems. The accumulated and reported data enables management and other interested parties to measure and make decisions about the agency's/segment's ability to improve operations, safeguard assets, control its resources, and determine if mission objectives are being met.

Opportunity Cost—The value of the alternatives foregone by adopting a particular strategy or employing resources in a specific manner. Also called Alternative Cost or Economic Cost.

Outputs—Any product or service generated from the consumption of resources. It can include information or paper work generated by the completion of the tasks of an activity.

Performance Measurement—A means of evaluating efficiency, effectiveness, and results. A balanced performance measurement scorecard includes financial and nonfinancial measures focusing on quality, cycle time, and cost. Performance measurement should include program accomplishments in terms of outputs (quantity of products or services provided, e.g., how many items efficiently produced?) and outcomes (results of providing outputs, e.g., are outputs effectively meeting intended agency mission objectives?). See Statement of Federal Financial Accounting Concepts No. 1, *Objectives of Federal Financial Reporting*, page 65.

Process—The organized method of converting inputs (people, equipment, methods, materials, and environment) to outputs (products or services). The natural aggregation of work activities and tasks performed for program delivery.

Process Costing—A method of cost accounting that first collects costs by processes and then allocates the total costs of each process to each unit of output flowing through it during an accounting period.

Process Value Analysis—Tools and techniques for studying processes through customer value analysis. Its objective is to identify opportunities for lasting improvement in the performance of an organization. It provides an in-depth review of work activities and tasks, through activity analysis, which aggregate to form processes for agency program delivery. In addition to activity-based costing, quality and cycle time factors are studied for a complete analysis of performance measurement. Each activity within the process is analyzed, including whether or not the activity adds value for the customer.

Product—Any discrete, traceable, or measurable good or service provided to a customer. Often goods are referred to as tangible products, and services are referred to as intangible products. A good or service is the product of a process resulting from the consumption of resources.

Responsibility Center—An organizational unit headed by a manager or a group of managers who are responsible for its activities. Responsibility centers can be measured as revenue centers (accountable for revenue/sales only), cost centers (accountable for costs/expenses only), profit centers (accountable for revenues and costs), or investment centers (accountable for investments, revenues, and costs).

Responsibility Segment—A significant organizational, operational, functional, or process component which has the following characteristics: (a) its manager reports to the entity's top management; (b) it is responsible for carrying out a mission, performing a line of activities or services, or producing one or a group of products; and (c) for financial reporting and cost management purposes, its resources and results of operations can be clearly distinguished, physically and optionally, from those of other segments of the entity.

Service—An intangible product or task rendered directly to a customer.

Standard Costing—A costing method that attaches costs to cost objects based on reasonable estimates or cost studies and by means of budgeted rates rather than according to actual costs incurred. The anticipated cost of producing a unit of output. A predetermined cost to be assigned to products produced. Standard cost implies a norm, or what costs should be. Standard costing may be based on either absorption or direct costing principles and may apply either to all or some cost elements.

Support Costs—Costs of activities not directly associated with production. Typical examples are the costs of automation support, communications, postage, process engineering, and purchasing.

Traceability—The ability to assign a cost directly to a specific activity or cost object by identifying or observing specific resources consumed by the activity or cost object.

Uncontrollable Cost—The cost over which a responsible manager has no influence.

Value-Added Activity—An activity that is judged to contribute to customer value or satisfy an organizational need. The attribute "value-added" reflects a belief that the activity cannot be eliminated without reducing the quantity, responsiveness, or quality of output required by a customer or organization. Value-added activities should physically change the product or service in a manner that meets customer expectations.

Variable Cost—A cost that varies with changes in the level of an activity when other factors are held constant. The cost of material handling to an activity, for example, varies according to the number of material deliveries and pickups to and from that activity.

Variance—The amount, rate, extent, or degree of change, or the divergence from a desired characteristic or state.

Source

Definitions derived from the exposure draft: *Managerial Cost Accounting Standards for the Federal Government*, October 7, 1994, Federal Accounting Standards Advisory Board.

This page intentionally left blank.

Appendix E:

Bibliography

Activity-Based Costing

Aiyathurai, G., W.W. Cooper, and K.K. Sinha. "Note on Activity Accounting." *Accounting Horizons*, December 1991, pp. 60-67.

Arney, Dave and R.P. Sorice. "Activity-Based Costing." *Credit World*, July/August 1994, pp. 17-19.

Brewer, Peter C., et al. "Managing Uncertainty." *Management Accounting*, October 1993.

Compton, Ted R. "Using Activity-based Costing in Your Organization--Part 1." *Journal of Systems Management*, March 1994, pp. 32-39.

Compton, Ted R. "Using Activity-based Costing in Your Organization--Part 2." *Journal of Systems Management*, April 1994, pp. 36-39.

Cooper, Robin and Robert S. Kaplan. *The Design of Cost Management Systems: Text, Cases, and Readings*. Englewood Cliffs: Prentice Hall, 1991.

Estrin, R. L., C.M.A., et al. *Is ABC Suitable for Your Company? Management Accounting*, April 1994.

Federal Accounting Standards Board. *Managerial Cost Accounting Standards for the Federal Government: Statement of Recommended Accounting Standards.* Exposure Draft, October 7, 1994.

Godfrey, James T. and David J. Harr, "The Total Unit Cost Approach to Government Financial Management." *Government Accountants Journal*, Winter 1992.

Hobdy, Terrence, et al. "Activity-Based Management at AT&T." *Management Accounting*, April 1994.

Jayson, Susan. "Fax Survey Results: ABC Is Worth the Investment." *Management Accounting*, April 1994.

King, Alfred M. "Risky Business: Is Cost Accounting a Threat to Our National Security?" *Management Accounting*, October 1993.

Kirk, Brian. *Can Not-For-Profits Learn from For-Profits?* KPMG Peat Marwick, October 1990.

Lawson, Raef A. "Activity-Based Costing Systems for Hospital Management" *CMA Magazine*, June 1994, pp. 31-35.

Mak, Y.T. and M.L. Roush. "Commentary: Flexible Budgeting and Variance Analysis in an Activity- Based Costing Environment." *Accounting Horizons*, 8, 2, June 1994, pp. 93-103.

Malcom, Robert E. "Overhead Control Implications of Activity Costing" *Accounting Horizons*, December 1991, pp. 69-78.

Norkiewicz, Angela. "Nine Steps to Implementing ABC." *Management Accounting*, April 1994.

Pattison, Diane D. and Carrie Gavan Arendt. "Activity-Based Costing: It Doesn't Work All the Time." *Management Accounting*, April 1994.

Porter, Thomas J. and J.G. Kehoe. "Using Activity-Based Costing and Value Analysis to Take the Pain Out of Downsizing at a Naval Shipyard." *National Productivity Review*, Winter 1993/1994, pp. 115-125.

Rotch, William, et al. *Cases in Management Accounting and Control Systems.* Engelwood Cliffs: Prentice Hall, 1990.

Rotch, William, et al. *Instructor's Manual to Cases in Management Accounting and Control Systems.* Engelwood Cliffs: Prentice Hall, 1990.

Smith, Malcolm, F.C.P.A. "Managing Your ABC System." *Management Accounting*, April 1994.

Sprohge, Hans and Paul H. Stein, CPA. "Government Contractors: Target Your Accounting Systems for Profits." *Management Accounting*, January 1994.

Thomas, Michael F. and James T. Mackey, C.M.A. "Activity-Based Cost Variances for Just-In-Times." *Management Accounting*, April 1994.

Quality/Continuous Improvement/Reengineering/Benchmarking

Berry, T.H. *Managing the Total Quality Transformation*. San Francisco, CA: McGraw-Hill, 1991.

Bogan, Christopher E. and Michael J. English, *Benchmarking for Best Practices; Winning Through Innovation and Adaptation*, N.Y., N.Y.: McGraw-Hill, 1994.

Bruno, Gerard. *The Process Analysis Workbook for Government: How to Achieve More wth Less.* Milwaukee, WI: A.S.Q.C. Quality Press, 1995.

Camp, Robert C., *Business Process Benchmarking: Finding and Implementing Best Practices*, Milwaukee, WI: A.S.Q.C. Quality Press, 1995.

Champy, James and Michael Hammer. Reengineering the Corporation. New York, NY: Harper Collins Publishers, Inc., 1993.

Clemmer, Jim. "Process Reengineering and Process Improvement: Not an Either/Or Choice" *CMA Magazine*, June 1994, pp. 36-39.

Fellers, Gary. *The Deming Vision: SPC/TQM for Administrators*. Milwaukee, WI: ASQC Quality Press, 1992.

Garrett, J. Gordon. "Reengineering, Outsourcing and All That" *Business Quarterly*, Spring 1994, pp. 116-125.

Greising, David. "Quality: How to Make It Pay." *Business Week*, August 8, 1994.

Griffith, John R., D.G. Smith, and J.R.C. Wheeler. "Continuous Improvement of Strategic Information Systems: Concepts and Issues" *Health Care Management Review*, 19, 2, 1994, pp. 43-52.

Harrington, H. James. *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness.* New York, NY: McGraw-Hill, 1991.

Hunt, V. Daniel. *Reengineering: Leveraging the Power of Integrated Product Development*. Essex Junction, VT: Oliver Wight, 1993.

Joiner, Brian L., *Fourth Generation Management: The New Business Consciousness.* New York: McGraw-Hill, Inc., 1994.

Juran, J.M. *Juran on Quality by Design.* Toronto: Maxwell Macmillan Canada, 1992.

_____. *Managerial Breakthrough*. New York: McGraw-Hill, 1995.

Juran, J.M. and F.M. Gryna. *Quality Planning and Analysis.* New York: McGraw-Hill, 1993.

Keegan, Daniel and Robert G. Eiler. "Let's Reengineer Cost Accounting." *Management Accounting*, August 1994.

Lawton, Robin L. *Creating a Customer-Centered Culture: Leadership in Quality, Innovation, and Speed.* Milwaukee, WI: ASQC Quality Press, 1993.

Mears, Patrick. *Quality Improvement Tools & Techniques*. San Francisco, CA: McGraw-Hill, 1995.

Montgomery, D.C. *Introduction to Statistical Quality Control.* New York, NY: John Wiley & Sons, 1985.

Ostrenga, Michael, et al. *The Ernst and Young Guide to Total Cost Management.* New York: John Wiley & Sons, 1992.

Pitman, Ben. "Retooling: New Skills & Structures for Changing Workplace Technology." *Journal of Systems Management*, April 1994, p. 40.

Rosenstein, Alan H. "Cost-effective Health Care: Tools for Improvement" *Health Care Management Review*, 19, 2, 1994, pp. 53-61.

Schnitt, David L. "Reengineering the Organization Using Information Technology," *Journal of Systems Management*, January 1993, pp. 14-20, 41.

Scholtes, Peter, et al. *The Team Handbook.* Madison, WI: Joiner Associates Inc., 1988.

Seybold, Patricia B. "Closing the Gap to Save Your Business." *Computerworld*, February 21, 1994, p. 35.

Shea, John E. and Llene K. Kleinsorge. *TQM: Are Cost Accountants Meeting the Challenge?* Management Accounting, April 1994.

Townsend, P.L. and J.E. Gebhardt. *Commit to Quality*. New York, NY: John Wiley & Sons, 1990.

Walton, Mary. *The Deming Management Method*. New York: Putnam, 1986.

_____. *Deming Management at Work.* New York: Putnam, 1991.

Outsourcing

Booker, Ellis. "Outsourcing Personnel Pays Off." *Computerworld*, February 28, 1994, p. 74.

Chi, Keon S. *Privatization and Contracting for State Services: A Guide.* Lexington, KY: The Council of State Government, 1988.

Drtina, Ralph E. "The Outsourcing Decision." *Management Accounting*, March 1994.

Ernst and Young, *Privatization: Investing in State-Owned Enterprises Around the World*, New York: John Wiley & Sons, 1994.

General Accounting Office, *Discount Rate Policy*, GAO/OCE-17.1.1, May 1991.

Goldsmith, Robin F. "Confidently Outsourcing Software Development" *Journal of Systems Management*, March 1994, pp.12-17.

Goldstein, Phillip J., D.E. Kempner, and S.C. Rush. *Contract Management or Self-Operation: A Decision-Making Guide for Higher Education*. Alexandria, VA: The Association of Higher Education Facilities Officers, 1993.

Grover, Varun and J.T.C. Teng. "The Decision to Outsource Information Systems Functions*" Journal of Systems Management*, November 1993, pp. 34-38.

Halper, Mark. "ISSC Grabs Another Railway in Amtrak Outsourcing Deal." *Computerworld*, May 9, 1994, p. 68.

Lacity, Mary C. and R. Hirschheim. "The Information Systems Outsourcing Bandwagon." *Sloan Management Review*, Fall 1993, pp.73-85.

Lacity, Mary C. and R. Hirschheim. "Implementing Information Systems Outsourcing: Key Issues and Experiences of an Early Adopter." *Journal of General Management*, 19, 1, Autumn 1993, pp. 17-29.

Laribee, Janet F. and L. Michaels-Barr. "Dealing with Personnel Concerns in Outsourcing." *Journal of Systems Management*, January 1994, pp. 6-12.

Lowell, Mark. "Managing Your Outsourcing Vendor in the Financial Services Industry." *Journal of Systems Management*, May 1992, pp. 23-27.

Minoli, Daniel. *Analyzing Outsourcing: Reengineering Information and Communications Systems*. San Francisco, CA: McGraw-Hill, Inc., 1995.

Quinn, James B. and F.G. Hilmer. "Strategic Outsourcing." *Sloan Management Review*, Summer 1994, pp. 43-55.

Savas, E.S. *Privatization: The Key to Better Government.* Chatham, NJ: Chatham House Publishers, 1987.

Scrupski, Susan. "Who Needs This Headache?" *Datamation*, July 15, 1994, p. 30.

State of Texas. State Auditor's Office. *Guide to Implement the Competitive Cost Review Program.* SAO Report Number 93-013. October 1992.

Tomasko, Robert M.. *Downsizing; Reshaping the Corporation for the Future.* New York: AMACOM, 1987.

Pricing and Rate Setting

Bayless, Charles E., "Transmission Pricing: Striking a Balance." *Public Utilities Fortnightly*, October 15, 1992.

Bhatt, Kiran, et al, *Congressional Intent and Road User Payments*, Washington, D.C.: Urban Institute, March 1977.

Bright, Stanley J., "Coal Tar Cleanup Demands Rate Incentives." *Public Utilities Fortnightly*, October 1, 1992.

Burkhart, Lori A., "Real-Time Pricing -- Allowing Customers to Respond." *Public Utilities Fortnightly*, October 15, 1992.

Crew, Michael A. (editor), *Competition and the Regulation of Utilities*, Boston: Kluwer Academic Publishers, 1991.

_____. *Issues in Public-Utility Pricing and Regulation*, Lexington, Mass., Lexington Books, 1980.

Dedeitch, Borivoje Peter. *Reliability of Toll Road Revenue Forecasts for Selected Toll Roads in the United States*, Thesis, University of Texas at Austin, 1993.

Dorkey, Frank C. and Gregg A. Jarrell. "Calculating Proper Transfer Prices." *Public Utilities Fortnightly*, January 1, 1991.

Erickson, Edward W. "Deregulation and Natural Gas Supply and Demand," in *Analyzing the Impact of Regulatory Change in Public Utilities* (Michael A. Crew, editor), Lexington, MA: Lexington Books, 1985.

Gregorius, F.K., "Disability Insurance in the Netherlands." *Insurance: Mathematics and Economics* 13 (1993): pp. 101-116.

Griffith, David M. and Associates, Ltd. *Assessment of the State's Indirect Cost Recovery Program*. January 1989.

Hertzman, Eugene, "Summary of Talk on 'Work of the CMI PHI Subcommittee'", *Insurance: Mathematics and Economics* 13 (1993): pp. 117-122.

Hillman, Jordan Jay, "Oil Pipeline Rates: A Case for Yardstick Regulation," in *Competition and the Regulation of Utilities* (Michael A. Crew, editor), Boston: Kluwer Academic Publishers, 1991.

Itteilag, Richard L., "An Analysis of Actual and Forecasted Conservation in the Residential Gas Space Heating Market," in *Analyzing the Impact of Regulatory Change in Public Sector Utilities*, (Michael A. Crew, editor), Lexington, MA: Lexington Books, 1985.

Jones, Clive Vaughan, *Financial Analysis of Infrastructure Debt: The Case of Water and Power Investments*, Westport, CT: Quorum Books, 1991.

National Association of Regulatory Utility Commissioners. *Utility Regulatory Policy in the United States and Canada*, Compilation 1993-1994.

Kirby, Ronald. *Road User Charges -- Some Practical Considerations*, Washington, D.C.: Urban Institute, March 1974.

Mackay, Graham, "Permanent Health Insurance: Overviews and Market Considerations in the UK." *Insurance: Mathematics and Economics* 13 (1993): pp. 123-130.

Nunnikhoven, Thomas S. "Finding the Optimal Allocation for a Health-Care Reimbursement Account." *Insurance: Mathematics and Economics* 11 (1992): pp. 223-235.

Spiewak, Scott, "Rate Swap, Anyone?" *Fortnightly*, October 1, 1993.

Vandedbroek, Martina, "Bonus -- Malus System or Partial Coverage to Oppose Moral Hazard Problems?" *Insurance: Mathematics and Economics* 13 (1993): pp. 1-5.

Zajac, Edward E., *Fairness or Efficiency: An Introduction to Public Utilities Pricing*, Cambridge, MA: Ballinger Publishing Company, 1978.

Planning and Budgeting

Shank, John K. and Vijay Govindarajan. *Strategic Cost Analysis: The Evolution from Managerial to Strategic Accounting.* Homewood, IL: Irwin, 1989.

State of Texas. State Auditor's Office. *Department of Human Services: Budgeting/Forecasting Audit.* SAO Report Number 1-076. March 1991.

General

Edmonds, Cindy D. "Running a City on a Shoestring." *Management Accounting*, January 1994.

State of Texas. Legislative Budget Board, Task Force. *Internal Task Force Report on Program and Cost Accounting.* March 9, 1990.

This page intentionally left blank.

Appendix F:

Acknowledgments

Acknowledgments

The following State Auditor's Office employees were responsible for researching and writing this guide:

- Dr. Joyce Keller, Project Manager
- John Young
- Thomas W. Ng
- Bruce Truitt
- Bill Addison
- Sheila Shung
- Barnie Gilmore, CPA, Manager
- Craig Kinton, CPA, Director

The State Auditor's Office expresses special thanks to the following state agency personnel who contributed information for the guide or provided editorial comments:

- Dr. Michael Granof, Dr. Urton Anderson, and Don Reeves, The University of Texas at Austin, Business School Accounting Department
- Cathy Davis, Department of Human Services
- Chris Cook and Leslie Cathey, Comptroller of Public Accounts
- John Barton, Legislative Budget Board
- Bill Campbell, Joel Davis, and Susan Armstrong, Texas Department of Transportation
- Don McPhee, Attorney General's Office
- Bill Campbell, Texas Natural Resource Conservation Commission