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Program Models

Measuring the Costs of Police Services

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James L. Underwood
Acting Director

Measuring the Costs of Police Services

Program Models

by
Kent John Chabotar

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Program Models are a synthesis of research and evaluation findings, operational experience, and expert opinion in a criminal justice topic area. Each report presents a series of programmatic options and analyzes the advantages and disadvantages of each. The intent is to provide criminal justice administrators with the capability to make informed choices in planning, implementing, and improving efforts in a program area. The Models may also serve as the basis for training, testing and demonstration efforts.

The following individuals provided information
and assistance in the conduct of this study.

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Preface

Cost analysis is a common concern. To some extent, everyone does it. Families estimate the costs of their shelter, food, entertainment, and everything else they need and want. Government agencies, including criminal justice agencies, need to analyze their costs as well, perhaps on a larger scale but not necessarily any more systematically. Families, government agencies, and other institutions are concerned about costs because they confront a common dilemma: how to satisfy virtually unlimited demands for services with limited resources. Having to stay within a budget is a universal problem.

The 1980s are a period of growing financial stress for local governments. Confronted with declining tax revenues from depressed industries and persistent unemployment, many have had to slash budgets for basic services such as police and fire in order to make ends meet. Even in the more affluent states of the "Sunbelt," popular tax-cutting initiatives like California's Proposition 13 have forced many city and county governments to cut back, sometimes drastically, in police services and to become much more cost conscious about the services that remain. A few police departments seem to have escaped the budget crunch--Atlanta, Houston, and Miami are hiring new officers--but even they expect greater competition for existing resources from social service agencies threatened by federal aid reductions and additional pressures from the citizenry to justify the costs and results of their efforts.

Hence, it is no longer possible, as it was perhaps in the 1960s and 1970s when economic conditions were better and federal grants more plentiful, for police managers to honor most proposals for new programs and additional funds. If anything, they are being asked to provide a higher level of police service without raising costs or to provide the same level of service at reduced costs. Under such circumstances, decisions on whether or not to fund a given service will be based on how much it costs as well as on what it is supposed to accomplish. These and other considerations make it extremely important for police managers to have accurate and timely information on the historical and projected costs of police services. In fact, today's typical police manager is likely to experience a need for cost information in a variety of circumstances, e.g.:

- The city council asks for information about the long-term operating costs of patrol vehicles before allowing the police department to purchase them;

- To eliminate drunk and disorderly incidents in their neighborhood, a citizens' group petitions the town for a 24-hour foot patrol and the mayor wants to know how much such increased protection would cost;
- The budget bureau insists that the police department supplement its latest budget request with performance data about the cost per arrest, cost per call for service, and other unit costs;
- The police department intends to raise revenue by charging a modest fee for issuing certain permits and must set a fee that fairly reflects the cost they would incur in offering this service;
- The issue of whether the police department should buy or lease its patrol vehicles has to be resolved by comparing the full costs of both alternatives; and
- The chief of police has to know how much the city would save by contracting for space in the county prison instead of continuing to operate a city jail.

These are but a few of the demands for cost data being experienced by police managers. Unfortunately, most police agencies have difficulty in meeting these demands. It often happens that the police department's accounting system cannot provide the basic data needed for service cost analysis and managers have too many competing demands on their time to be able to collect the data on their own. Moreover, even if the accounting system is adequate and the time available, many managers just do not know how to estimate the real costs of the services for which they are responsible. The result is that police managers frequently lack the cost information they require for the efficient and effective administration of their units.

Measuring the Costs of Police Services is intended to address many of the technical and organizational problems that criminal justice agencies face in attempting to assess service costs. Several data sources were used in its development:

- An extensive search of the literature in police management, accounting, and information systems was conducted and revealed a limited but useful number of books, journal articles, and monographs. The results of this literature search are contained in an annotated bibliography in Appendix A.

- Over 50 cities, counties, and states participated in a national mail survey of existing police costing techniques, budgeting and accounting processes, uses of cost information in decision making, and capacities to measure the costs of police services. Appendix B presents the instrument used in this survey.
- Based on the results of the mail survey, four jurisdictions were chosen for on-site study in order to prepare in-depth case descriptions of the historical development, current status, and future prospects of their police costing systems. These case studies constitute the bulk of Chapters 6 and 7 but are cited throughout the Program Model.
- An Advisory Panel, whose membership included a city police inspector, county police administrator, and a state level auditor, reviewed the results of the survey and on-site study and provided substantive input to the design of the project and the content of this Program Model.

Measuring the Costs of Police Services presents simple costing procedures that are applicable to a broad spectrum of agencies with varying levels of knowledge, skills, and attitudes in cost analysis.* Furthermore, these procedures may be used with or without sophisticated data processing systems. In general, the procedures are meant not only to assist police managers in developing cost data, but also to become better consumers of the cost data generated by other agencies.

Thus, this Program Model should serve these purposes:

- To increase awareness of the uses of cost information in promoting the efficiency and effectiveness of criminal justice agencies;
- To improve understanding of methods to measure the full costs, both personnel and nonpersonnel, of selected police services;
- To present a practical and simple approach for identifying the services to be costed, personnel and nonpersonnel components of those services, and the unit costs of each component;

*Special emphasis on cost analysis in correctional agencies is provided in another Program Model. See: National Institute of Justice, Managing Correctional Resources: An Economic Analysis, by Billy L. Wayson, et al., of the Institute for Economic and Policy Studies, Inc. (Washington, D.C.: Government Printing Office, 1982).

- To compare the cost analysis experiences of criminal justice agencies in selected state and local jurisdictions; and
- To enhance the contribution of cost information to managerial decision making and accountability.

The basic approach of the Program Model to accomplishing these aims is to explain general accounting and cost analysis principles before employing these principles to cost specific police services. Organized into three parts with a total of seven chapters, the document begins in Part One by defining the purposes of cost information and introducing major costing terms and concepts. Part Two then details the fundamental steps involved in measuring the costs of police services and in installing a cost analysis system. The practical application of these steps is examined in Part Three through in-depth case studies of four jurisdictions which describe how their police departments estimate the cost of specific services, e.g., responses to bank alarms. Moreover, the case studies illustrate the types of community and government environments in which police costing takes place. Appendices are also provided which contain an annotated bibliography, glossary of terms, and other supplementary materials.

All this information seems most relevant to state and local jurisdictions since they are most in need of improved cost analysis capabilities. Within these jurisdictions, criminal justice agencies, and especially police departments, constitute the prime target audience. The broad perspectives and introductory terminology contained in Part One of the Program Model are most relevant for police chiefs, public safety directors, bureau heads, and other top managers who need cost information for making policy decisions--as well as operating managers (e.g., precinct and troop commanders) who can use cost data in monitoring the work of their personnel.

Police planners and analysts, who often handle the details of the department's fiscal management, need cost information in coordinating budget preparation and in evaluating the benefits and costs of proposed program alternatives. They should become familiar with the contents of Part One but will focus on the accounting principles and techniques presented in Part Two and on the case studies of actual costing systems included in Part Three.

Staff in central budgeting, finance, and auditing departments can utilize the Program Model either in reviewing the cost estimates generated by the police or in performing their own cost analyses. Mayors, city managers, and legislators are directed to Part Three of the document since it explores how their counterparts in other jurisdictions estimate the costs of one of the most significant items in their budgets--the police department.

PART ONE:
MEASURING THE COSTS OF POLICE SERVICES:
ITS ENVIRONMENT AND CHARACTERISTICS

Part One of this Program Model aims at placing the broad subject of cost analysis in the context of the typical police department: its mission and structure, analytical capabilities and problems, and information needs and resources. It draws on the literature and a compilation of field experiences to bridge the gap between costing principles and the organizational and political realities faced by most police departments. It is divided into Chapters 1 and 2.

Drawing extensively on a search of the literature and the results of the mail survey and field visits, Chapter 1 describes the current "state-of-the-art" in police costing. It attempts to document the uses of cost data in planning, budgeting, and the other functions of police management. It shows how each function can be executed more effectively by having reliable information on service costs. The chapter also acknowledges the problems that police departments have in measuring their costs and suggests why these problems exist.

Given this background information, Chapter 2 presents the basic terminology of cost analysis. It distinguishes between costs and expenditures, and defines the different types of cost: direct personnel costs, direct non-personnel costs, and indirect costs. It also shows the relevance of accounting terms such as cost centers and unit costs to the measurement of police service costs. Finally, this chapter examines the major issues in police costing that influence how and even whether cost analysis is undertaken, e.g., relating costs to efficiency and effectiveness, effects of inflation on cost estimates, and the appropriateness of intergovernmental cost comparisons.

Chapter 1: Perspectives on Police Costing

Outline

USES OF COST INFORMATION

- Planning
- Budgeting
- Controlling
- Evaluating
- Pricing
- Reporting

EXISTING PROBLEMS IN POLICE COSTING

- Unfamiliarity with Uses of Cost Information
- Undeveloped Costing Skills
- Inadequate Financial Information Systems
- Dispersion of Costing Responsibilities
- Incomplete Definitions of "Full Cost"

The Scottish Games is an annual event sponsored by the City of Alexandria, Virginia that attracts tourists from across the country to watch, and often to participate in, highland dancing, bagpipe playing, and other entertainment and cultural events. Until recently, the Alexandria Police Department could afford to absorb the costs of the services it rendered to the Games, e.g., crowd and traffic control. But with costs increasing and resources decreasing, the Police have started to measure these costs as a basis for billing the city departments that sponsor the Games, thereby not only conserving scarce resources but also recognizing the principle that those who benefit from a police service should sometimes be expected to pay for it.

The City of Minneapolis, Minnesota recently consolidated its existing police precincts, based largely on a study of the potential cost savings. It was estimated that reducing the number of precincts from six to four would save over \$1.3 million per year, primarily from closing precinct station houses and from shifting uniformed staff no longer needed for administrative duties into patrol, investigations, and other field operations instead of hiring new personnel in these areas.

The issue of whether to buy or lease police vehicles bedevils many criminal justice agencies. The Phoenix Police Department analyzed the comparative costs of purchasing, renting, or leasing its unmarked police vehicles. It was determined that yearly leases were substantially less expensive than monthly rental, and became more economical than City-owned vehicles after four and one-half years (when the City-owned vehicles lost their resale value). This cost study, in addition to separate considerations of operational effectiveness, vehicle downtime, and vehicle anonymity, led to a recommendation to lease unmarked vehicles by the year and to make a commitment to continue with the leased vehicles for at least five years.

These are some of the ways that cost information has helped police departments to improve their productivity and effectiveness. The jurisdictions cited are analyzing the costs of their resources and services rather than merely accounting for the expenditures of their organizational units. They have used cost information in an effort to improve the objectivity of their management decision making and, ultimately, the quality of the decision and the efficacy of their services. To be sure, each jurisdiction recognizes the time demands and technical complexities of cost analysis, yet although none of them has a perfect system, each has made the judgment that the benefits justify the effort.

One purpose of Chapter 1 is to explore these potential uses of cost information in police management in more detail. It intends to demonstrate how cost information can help managers do a better job of planning, budgeting, controlling, evaluating, and pricing police services as well as reporting to external agencies. Another purpose of the chapter is to describe the problems confronted by police departments and managers as they endeavor to plan and do cost analysis.

Uses of Cost Information

Cost information is important in the management of any organization. Information about the cash value of the resources used in providing services is essential to planning, budgeting, controlling, and evaluating those services because every organization, whether governmental or business, has only limited resources at its disposal. Criminal justice agencies especially are beset with increasing fiscal constraints brought about by inflation, declining federal funding, and local taxpayer revolts.* Consequently, most management decisions about police services should involve comparisons of the costs incurred, or to be incurred, with the benefits received since the willingness to fund a given service should depend not only on its effectiveness but also on its economy and efficiency. In addition to cost information being used for internal management, external funding and policy making bodies like a city council or foundation use cost information in deciding on the allocation of funds to police and other criminal justice agencies.

At one end of a continuum, cost information can be a primary factor in reaching a decision, e.g., whether or not to purchase new patrol vehicles. That decision usually involves a comparison of the purchase price of new vehicles with the estimated costs of continued maintenance on the existing fleet. At the other end of the continuum, cost information is merely suggestive and therefore plays a secondary role because other factors must be considered.

*David Marc Kleinman, "Police and the Budget Crunch," Police Magazine (May, 1981), pp. 23-38.

Such instances may include choosing between one- or two-officer patrol units or deciding whether to adopt computer assisted dispatch. Cost information alone cannot measure what impact each alternative might have on the crime rate or other indicators of public safety.

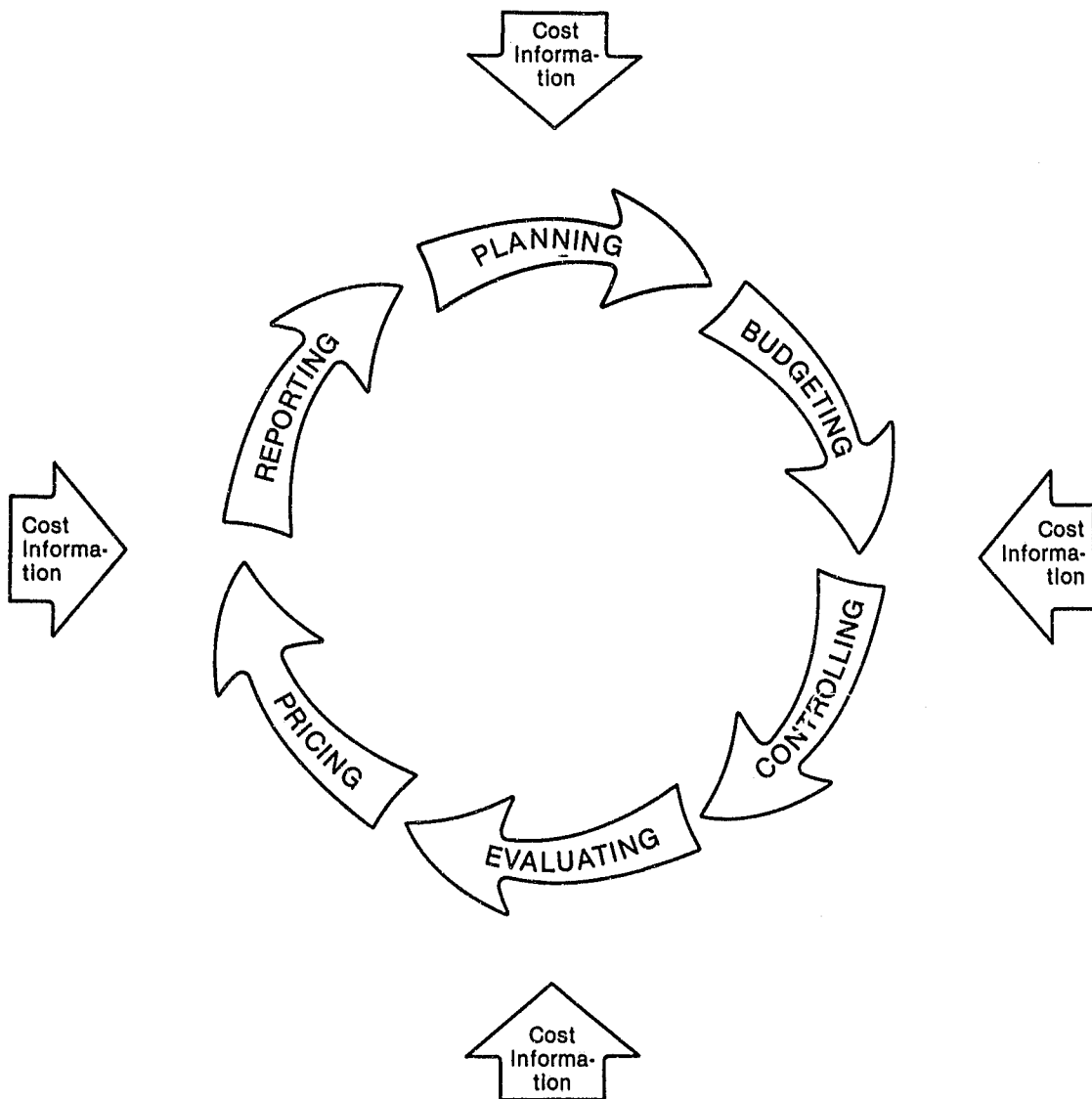
Thus, there are many purposes for determining cost information to satisfy both internal and external requirements and to play either a primary or secondary role in decision making. Certainly no police department can function effectively without accurate and current information on the costs, both historical and projected, of its operations and services. It is critical to understand the specific uses of cost information in order to demonstrate its central role in every aspect of modern management. These uses are illustrated in Exhibit 1.1 and discussed below.

1. Planning. Managers need cost information in order to plan. About 27% of the jurisdictions in the mail survey acknowledged that cost information expedited their planning activities, including the formulation of programmatic objectives, an examination of alternative strategies to meet these objectives, and the selection of the strategy that makes the best use of available resources.* One way that planning depends on cost information is in appraising the feasibility of proposed objectives. Each objective should have a "price tag," i.e., a clear statement of the costs that the department will incur in attempting to attain it. The Minneapolis Police Department has costed its objectives in this manner, as evidenced in Exhibit 1.2 which lists the department's objectives in the investigations area and how much each will cost to accomplish. Such a list can be very helpful in determining whether any objectives, although in line with the departmental mission and directed at genuine law enforcement needs, may just be too costly for the department to achieve with existing resources.

Another way that planning uses cost information is in selecting among alternative strategies to meet each objective since the final selection should

*In interpreting the survey results with respect to this and other uses of cost information by police departments, it should be noted that some respondents confused "expenditures" with "costs." As will be discussed in Chapter 2, the terms are not synonymous. Expenditures represent current cash outlay while costs include not only cash outlay but also the cash value of any resource used in providing a service which is not paid for in cash at the time the service is rendered, e.g., the costs of buildings and equipment which might have been purchased many years ago but which are still being used to deliver, and should still be considered a cost of, a given service. Based on independent evaluations of sample "cost" analyses provided by the surveyed jurisdictions, it is evident that about a third of the respondents replied to the survey items in terms of expenditures rather than costs. The implication of this confusion is that the conduct of true cost analyses and the use of cost information is somewhat less prevalent than the raw survey data would suggest.

Exhibit 1.1
USES OF COST INFORMATION



Adapted from: Robert N. Anthony and Regina Herzlinger, *Management Control in Nonprofit Organizations* (Homewood, Illinois: Irwin, 1975), p. 29.

Exhibit 1.2

ATTACHING COSTS TO OBJECTIVES
Minneapolis Police Department

INVESTIGATION - GENERAL

To provide professional investigative activity to maximize successful prosecution of law violators.

SPECIFIC OBJECTIVES:

1. To improve the clearance rate for murder by 5% in 1980 at a cost of \$113,000.
2. To improve the clearance rate for burglary by 3% in 1980 at a cost of \$404,000 (in addition to Precinct - Patrol costs).
3. To improve the clearance rate for auto theft by 3% in 1980 at a cost of \$105,000.
4. To maintain 1979 clearance rate for juvenile crimes at a cost of \$1,270,000.
5. To maintain 1979 clearance rate for family violence at a cost of \$340,000.
6. To maintain 1979 clearance rate for larceny at a cost of \$230,000.
7. To maintain 1979 clearance rate for robbery at a cost of \$580,000.
8. To maintain 1979 clearance rate for assault at a cost of \$400,000.

be based not only on the strategy's expected performance but also on its estimated costs. If, for example, a police department is considering upgrading its communications equipment in order to meet the objective of a lower response time to calls for emergency service, then at some point it has to compare the costs of the equipment proffered by competing manufacturers. These costs will include not only the equipment's purchase price and operating expense but also the costs of the additional manpower, physical space, and support services that the equipment will require. Further, an attempt must be made to assess the trade-offs between this and other alternatives for attaining the same ends. For example, after appraising the relative costs and results of various staffing arrangements for police communications, the City of Rochester, New York decided to replace uniformed officers with civilian personnel.

2. Budgeting. Budgeting is another management function that depends on reliable cost information. It can be defined as the process of allocating resources to responsibility centers, which are frequently organizational units, for the purpose of achieving organizational objectives. Although objectives and plans can be admirable statements of organizational intentions, they cannot command attention or effort until human and financial resources are allocated to the units responsible for carrying them out. Budgets are usually prepared on an annual basis and express the aims of management in concrete, financial terms. Yet, without reliable information on the historical and projected costs of the resources being budgeted (e.g., personnel salaries, equipment), budgets can be very unrealistic and result in substantial cost overruns or underruns. The need for cost information is particularly true for projects requiring budgetary allocations over several years; executives and legislators demand estimates for the project's total costs before appropriating initial or continuing funds. For example, a project to develop a new management information system may only require a small budget allocation for system design during the first year but will need increasingly larger amounts of money during succeeding years to purchase computer hardware, train staff, and generally to support the system's operation. In the mail survey, approximately 21% of the jurisdictions stated that they attempt to estimate some costs 3-5 years in advance. One city--Sunnyvale, California--produces exceptionally long-term cost projections of 10 years for each city service as depicted in Exhibit 1.3.

3. Controlling. This is the process by which managers monitor the execution of plans and the expenditure of budgeted resources. Often misunderstood as the use of coercion or force, controlling really involves the systematic collection of information on the extent to which organizational activities conform to management's expectations and whether those activities are having the desired results. Cost information can strengthen management control by insuring that resources are used for the purposes and in the amounts originally budgeted and in uncovering why differences from the budget or the plan may exist.* Several jurisdictions reported in the mail survey that one of

*Robert N. Anthony, Planning and Control Systems (Boston: Harvard Business School, 1965), pp. 16-18.

Exhibit 1.3

RESOURCE ALLOCATION PLAN
Sunnyvale, California
FY 1980

Program Number and Title: 411 Police Services

Program Mission: To provide a safe and secure environment for people and property through the provision of effective police services.

Fiscal Year	Work Hours	Total Cost
Actual		
1974-75	161,198	\$2,026,681
1975-76	174,555	2,604,858
1976-77	174,585	2,733,216
1977-78	182,954	3,337,176
Estimated		
1978-79	192,739	3,887,861
Proposed		
1979-80	192,164	\$3,922,193
Projected		
1980-81	192,164	\$4,217,726
1981-82	192,164	4,535,150
1982-83	192,164	4,874,466
1983-84	192,164	5,239,321
1984-85	192,164	5,593,230
1985-86	192,164	5,969,031
1986-87	192,164	6,370,372
1987-88	192,164	6,800,901
1988-89	192,164	7,260,619

the "early warning" indicators that they use to diagnose management problems is an analysis of budgeted versus actual costs. For example, managers in Sunnyvale are allowed up to a 30% variance between budgeted and actual costs in any single reporting period, provided that actual costs for the entire fiscal year match the budget. Significant variances identified in the control process may lead management to improve performance or reduce costs by reorganizing the agency's structure or staff, altering its priorities, instituting stricter purchasing or reporting procedures, or taking any number of corrective actions. It is important when using cost information in controlling to examine the factors affecting the costs of police services before taking action prematurely or in the wrong area. For example, cost overruns typically blamed on organizational or personnel failures may also be due to economic conditions or other circumstances that could not be foreseen during the planning and budgeting processes.

4. Evaluating. Evaluation is an examination of the degree to which the police department has achieved its objectives and the degree to which, and the ways in which, its programs and resources contributed to organizational effectiveness. According to 36% of the jurisdictions surveyed, cost information is one of the main factors that they consider in evaluating performance. For example, the St. Louis County Police Department did a study of its use of helicopters in patrol operations which concluded that the helicopters were not making a sufficient contribution to patrol effectiveness to justify the high cost and that alternative methods of travel and surveillance should be developed. A similar helicopter cost study by the Norfolk, Virginia Police Department reached the same conclusion. Fairfax County, Virginia offers another example of how cost information contributes to evaluation: an analysis of the costs and performance of its full size patrol vehicles led to a decision to reduce operating costs by switching to smaller, more economical vehicles. It is interesting to note that not only are police departments using cost information to evaluate their programs, but a few are also adding "cost consciousness" and the "ability to control operating costs" to the list of criteria considered in managerial performance appraisals.

5. Pricing. Another potential use of cost information relates to the buying and selling of police services. Many police departments have discovered the advantages of selling services instead of giving them away while other departments have opted for buying services rather than offering them on their own. Determining an appropriate fee or price for services is an issue in 31% of the jurisdictions that responded to the mail survey when the police department either: (1) supplies field patrol, criminal investigations, or other services on a contract basis to a department in a neighboring jurisdiction, or (2) offers certain services to its own citizens such as bicycle licenses, bank escorts, or crowd control at sporting events. The Alexandria, Virginia Police Department has used cost information to set fees for taxi licenses and solicitors' permits while the San Diego Police Department regularly updates its cost information to set new fees for issuing bicycle and taxi licenses. The police department providing the service wants to insure that the fees charged recover the full costs of the service while those

receiving the service need assurance that the fees charged are fair and equitable. Furthermore, cost information can be important to a police department considering the purchase of a given police service. For example, the City of Des Moines, Iowa decided to pay to house female prisoners in the county's detention facilities after determining that such an arrangement would be less expensive than continuing to use a city facility.

6. Reporting. Cost information is used by federal, state, and local bodies responsible for appropriating public funds. Regulations governing federal grants require statements of estimated costs--and sometimes evidence of cost sharing--before the funds are released. Cost reporting continues at regular intervals during the life of the grant. In fact, the Michigan State Police and other jurisdictions disclosed on the mail survey that the reporting requirements of federal grants, rather than pressure from internal factors, had done the most to upgrade their cost analysis capabilities. Cost information is also needed to establish indirect cost rates which are used to repay the grant recipient for administrative and overhead costs incurred as a result of the activities supported by the grant. Finally, cost information is increasingly being reported in order to reimburse local police departments for expenses incurred in responding to civil disturbances, disasters, and other extraordinary events at the behest of federal or state governments. In this regard, the San Diego Police Department has performed cost analyses to obtain reimbursements for its work at the site of a fatal crash of a commercial airliner and for its help in handling a major strike in a neighboring jurisdiction. On the other hand, the Arkansas State Police laments that it lacked a fully operational costing system to use in billing the federal government for the costs of deploying a sizeable number of state troopers to deal with a riot at Fort Chafee, a federal military installation temporarily housing Cuban refugees. Too many of the state's costs had to be recalled from memory or individual receipts rather than simply retrieved from a cost analysis system that would have recorded each cost as it was incurred.

Existing Problems in Police Costing

Unfortunately, the significant uses and benefits of cost information have not been realized in many police departments. Substantially more attention has been paid to measuring and delivering the service than to estimating its cost. Almost all criminal justice agencies routinely monitor and regularly report on the local crime rate, crimes cleared by arrest or conviction, response times to calls for emergency service, and other statistics. Almost none accurately and regularly track the costs of patrol, investigations, and the other police services required to maintain favorable crime statistics and a safe environment. Game contends that: ". . . an understanding of the aggregate problems of police costs, and of the relationships between crime rates and police dollars, provides a vital background for the more policy specific cost studies that one hopes will advance evaluation, which is still

better developed on the benefit side" than on the cost side.* The national mail survey of police departments reinforced this observation by revealing that over 55% of those surveyed rated their cost analysis capabilities as either fair or poor.

What is lacking in how police departments cost their services? The mail survey, and other data sources, disclosed that existing cost analysis systems in many police departments have three major shortcomings:

- overemphasis on cash expenditures in identifying costs and insufficient attention to the fact that costs can be incurred even when no cash is expended, e.g., the costs of "wear and tear" on buildings and equipment used by police;
- allocation of cost information by organization unit rather than by specific service so that it is far easier to determine who is responsible for the cost than for what service it was incurred; and
- slow and cumbersome reporting methods that provide cost information to managers in a format too complicated to use, at a level too general to comprehend, and at a time too late to influence decision making.

Why do police departments have so much difficulty in measuring their costs? There are several factors that inhibit the ability of criminal justice agencies to identify precisely and regularly the costs of their services. These problems include:

1. Unfamiliarity with uses of cost information. Many police managers do not realize how much their decision making would be facilitated by using cost information. They tend to make decisions on personnel deployments or equipment utilization based on crime patterns and other operations data and overlook the cost implications of those decisions, except perhaps when budgets are being prepared. One reason why so many managers are unaware of the benefits of cost information is that financial details bore or confuse them. Another reason is that many line police managers are not, and do not view themselves as, responsible for financial management. It falls to the finance department or budget bureau to account for the funds used and to keep the police department going. Such perspectives mask the real contributions that cost data can make to the work of police managers, including closer

*Kingsley W. Game, "Police Policy Evaluation: A Bibliographic Essay," in Ralph Baker and Fred A. Meyer, Jr. (eds.) Evaluating Alternative Law Enforcement Policies (Lexington, Massachusetts: Lexington Books, 1979), p. 8.

monitoring of line operations, better justifications for budgetary requests, and more effective evaluation of alternative services or service levels.

2. Undeveloped costing skills. Until recently, public safety was such a high budgetary priority in most jurisdictions that police departments were encouraged to concentrate their efforts on reducing crime rather than on controlling costs. Indeed, for years public safety advocates have decried critics of public safety expenditures as insensitive to the value of life and have downplayed any attempts to assign costs to the public safety function. Consequently, skills in cost finding and analysis did not receive much emphasis in administrative assignments or in training/education for police. Yet, as rising costs and inadequate revenues have tightened governmental budgets, and police departments have come under increasing pressure to economize, the lack of these costing skills has become more apparent. In the mail survey, 80% of the jurisdictions admitted that they had a need or a significant need for a "handbook that would explain how to measure the costs of police services."

3. Inadequate financial information systems. Many police departments use manual systems for recording crime statistics and financial transactions. Although these systems are fairly easy to install and use for costing purposes, the information that they supply is often inaccurate due to human error in recording receipts and expenditures, obsolete because of long delays between the occurrence and reporting of financial transactions, and ineffectual since the data cannot be easily reported at intervals or in formats that meet the needs of individual managers. As one city budget director remarked on the mail survey: "In most cases the cost data exist somewhere in the police department but we have a hard time pulling the data out of the many documents and files in which they are buried, or verifying their accuracy."

Even in the growing number of police departments with automated data processing systems (91% in the mail survey), serious problems are evident. First, the computers are often controlled by a central data processing staff for the entire jurisdiction and not by the police department; this lack of control and expertise limits the availability of information and its usefulness for public safety decision making. Second, the available computing capacity can be easily consumed by payroll processing and other routine financial transactions, leaving little if any time for special analyses of service costs. Third, even if the computing time is available, the software or programming skills may not be available to perform the desired level of cost analysis. Fourth, the computerized system may not be programmed to provide cost data at a level that managers need. An administrative analyst who responded to the mail survey remarked that in his city, "when specific data are requested for budgetary or other purposes, police department staff must undertake an extensive manual data gathering process which is slow and cumbersome." Finally, automated systems can be as unproductive as the manual systems when the

computers are given incomplete or inaccurate data to process or when managers do not know how to make accurate cost analyses and comparisons.

4. Dispersion of costing responsibilities. Responsibilities for police financial management are invariably shared among the police department and other public agencies. The police department may determine its personnel and equipment needs but revenues and budgets related to those needs may be under the control of one or more other departments in the jurisdiction. This problem is exemplified in San Diego where the Police Department must deal with two separate offices for financial management information: the City's Financial Management Department formulates budgetary recommendations while the Auditing Department accounts for budgetary expenditures. It is difficult to coordinate the efforts of these various departments in costing a specific police service since the police department is most familiar with what has to be costed while the other departments know how to cost it.

In addition, the dispersion of responsibilities promotes an adversarial relationship between police managers and fiscal officers in these other departments that impedes cost analysis. Fiscal officers are viewed as being basically uncooperative and overly concerned with bookkeeping detail while police managers are thought not to appreciate the jurisdiction's financial limitations and the need to follow proper accounting procedures. On the mail survey, words like "wasteful" and "extravagant" were used by a few fiscal officers to describe police officials in their jurisdictions while one police chief labelled his city's finance department as "unimaginative penny pinchers."

Finally, this dispersion also creates problems when the police departments feel that their management needs are not being met by the cost information generated for them by the auditing or finance departments. A fiscal specialist in one police department complained on the mail survey that his city's "financial management system, which is controlled by the city's accountants, was not designed to provide management information to managers within the city. It is, in fact, primarily an accounting device." He observed that managers have had to "rig" the system to "provide some semblance of cost accounting information so that managers can relate budget dollars to performance requirements."

5. Incomplete definitions of "full cost." The mail survey suggests that when asked to estimate the financial resources required to deliver a given service, police departments usually report only the costs directly attributable to the service and neglect indirect costs. For example, the accounting system used by the Arkansas State Police considers the full cost of a patrol unit to include vehicle expense, police officer's salary and benefits, and equipment but overlooks the real but indirect costs to patrol of the personnel department that hired the officer, the payroll office that pays him,

or the communications unit that links him with headquarters. A county administrator remarked 'that the neglect of indirect costs in his jurisdiction means that "we consistently underestimate the total costs of our activities and get into trouble when a new program or service consumes far more resources than we had originally projected based on direct costs alone."

* * *

Thus, police managers confront a multitude of problems in attempting to estimate service costs, some of which are organizational or technical while others relate to the knowledge and attitudes of the managers themselves. Yet, in addition to relating problems, Chapter 1 has also described the uses of cost information in helping managers make better planning, budgeting, and other decisions. Other parts of this Program Model will suggest how to alleviate existing problems in police costing thereby enabling police agencies to realize the many benefits of cost analysis. This begins with an exposition of the fundamental considerations in measuring police costs in Chapter 2.

Chapter 2: Fundamental Considerations in Measuring Police Costs

Outline

COSTING TERMS

Definition of Cost

Types of Cost

Cost Centers and Production Units

Unit Costs

COSTING ISSUES

Efficiency and Effectiveness

Development and Operating Costs

Fixed and Variable Costs

Cash and Accrual Accounting

Inflation

Intergovernmental Comparisons
of Cost Information

For cost information to be useful, it is essential that the fundamentals of determining and using costs be understood. Chapter 2 introduces basic accounting terminology pertinent to the measurement of police costs, e.g., direct and indirect costs. It also covers some of the important philosophical and technical issues in cost analysis, e.g., how to handle inflation. It is a fairly technical chapter which establishes a common framework for subsequent explanations of how to define and measure specific police costs.

Costing Terms

Practitioners and academicians in the accounting field have developed a terminology that construes how cost information is defined, collected, and used. These concepts and classifications are important not only to the analyst who generates cost information but also to the manager who uses it. In this section, we define the term "cost," explore the types of cost, and present salient issues in police costing. These and other terms are defined in the glossary contained in Appendix C.

Definition of Cost

Cost analysis, the principal concern of this Program Model, can be broadly defined as the process of determining the cost of a product or service. But what is a "cost"? A cost is the cash value of the resources used in making the product or delivering the service. One of the most common errors made in management is to confuse costs with expenditures and thus erroneously consider total or per unit costs to be equivalent to total or per unit expenditures for a product or service. Expenditure records specify the amount of funds spent on the resources that a police department needs to operate, e.g., personnel time, equipment, travel, etc. The result is essentially a record of input that typically does not contain information on the services actually rendered to the public or the total resources used in doing so. Expenditure records are not, nor are they intended to be, accurate in terms of total service costs:

- Expenditures are cash outlays whereas costs include not only cash disbursements but also the cash value of all resources used to provide the service. For example, the costs of a community relations project would include not only cash outlay for salaries, materials, and travel but also the cash value of the time that community leaders might contribute without charge to the project.*
- Expenditures include only those cash disbursements that are directly traceable to the organizational unit or activity that incurred them. Costs include both direct costs that can be readily identified with a specific unit or activity and indirect costs that are not as readily identified because they are jointly incurred by many units and activities. For example, it is difficult to identify with a particular service the indirect costs of lighting and heating a building in which many services are rendered.
- Expenditures are typically reported by organizational unit or by type of expenditure (e.g., salaries). Costs can be reported by the organizational unit that incurred them or by the service that the unit rendered.
- Expenditures are recorded when a resource is purchased but costs are recorded only when that resource is used

*Such contributions of time and other resources can be considered as "in-kind" costs of the project. A cost analyst may seek to differentiate between in-kind costs and the costs charged against the project budget, especially when the project is funded by a grant from the federal government or other agency, in order to uncover the often substantial local contributions entailed in accepting outside grants.

or "consumed" in delivering a service. Costs in one fiscal year will be all resources consumed that year whether payment is made during that year, in previous years, or in future years. For example, a police department might spend \$5,000 to purchase 100 tires in 1978 which would be entered in full as an expenditure for that year. If only 50% of the tires were used in 1978 and the other 50% in 1979, then the cost of those tires would be \$2,500 in 1978 and \$2,500 in 1979.

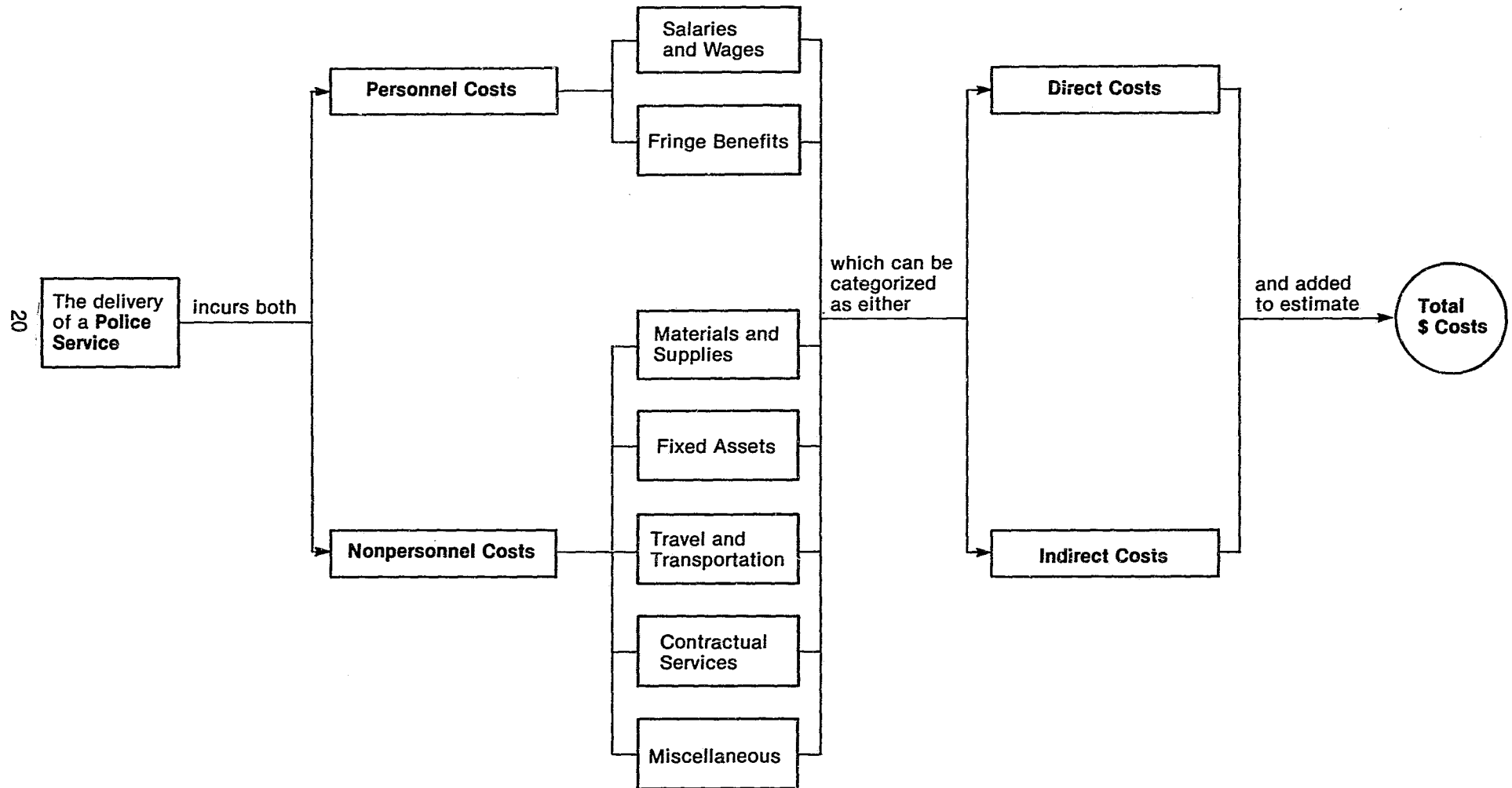
- This same cost principle of accounting for resources only as they are consumed also applies to buildings, equipment, and other "fixed assets." Expenditures for fixed assets are recorded in full when payment is made. Cost analysis recognizes that fixed assets are used over a number of years and records (or "depreciates") the costs of that use over the lifespan of the asset. For example, the annual cost of a \$9,000 patrol vehicle with an estimated service life of 3 years and no trade-in value would be \$3,000.

Thus, cost is a much more inclusive and descriptive measure of the resources used to deliver patrol, investigation, and other police services. Cost analysis makes its principal contribution to police management by relating the costs of particular services to the units or persons identified as responsible for them. In that sense, some definite managerial authority is held accountable for each element of cost. There are no undistributed costs; every resource consumed is the result of a decision by some group or individual with the responsibility for managing the organization's activities.

Types of Cost

The costs of performing a service are usually classified as either direct or indirect. However, the terms have no meaning unless one first identifies the service to which the costs are to be related. Direct costs can be readily measured and directly attributed to a particular service being provided. For example, among the direct costs of a highway patrol service would be the purchase price of the patrol vehicle and the salary of the trooper who operates it. Indirect costs are those elements of cost which are not readily identifiable with a particular service and must be distributed using some equitable method of allocation. An example of an indirect cost of highway patrol would be the cost of building and maintaining a central garage in which all patrol, fire, and maintenance vehicles are housed. As depicted in Exhibit 2.1 and explained below, both direct and indirect costs are incurred for the personnel and nonpersonnel resources required to deliver a particular service.

Exhibit 2.1
ELEMENTS OF TOTAL COST



1. Direct Personnel Costs. The term "direct personnel" is reserved for those labor costs which are directly traceable to the provision of a service. Personnel service costs include:

- Salaries and wages: including expenses for overtime, holiday and vacation pay, sick and funeral leave, hazardous duty pay, etc. Special pay differentials (e.g., shift allowance or educational incentives) are either a separate cost category or included as part of salaries and wages.
- Fringe benefits: including life and hospitalization insurance, contributions to pension fund,* workmen's compensation, uniform allowances, unemployment insurance, and similar benefits.

2. Direct Nonpersonnel Costs. These are the costs of materials and supplies, travel and transportation, fixed assets, contractual services, and miscellaneous charges which are directly attributable to a particular police service. Nonpersonnel costs which are not directly attributable are classified as indirect costs.

- Materials and supplies: are items and commodities which are consumed or used in providing the service, including office supplies, repair and maintenance, and small tools with a limited life expectancy. Materials and supplies may be classified as direct costs if they are specifically attributable to a service and are a significant cost element; otherwise, they should be considered indirect costs. Materials and supplies (e.g., gas, tires, etc.) may be purchased in bulk and used over time but only become a cost when they are actually consumed or used in providing the service.
- Fixed assets: include the costs of land, buildings, improvements other than buildings, and machinery and equipment. A fixed asset has a useful life greater than one year and a portion of its purchase price can be computed annually as a direct cost, provided that the fixed

*In many jurisdictions, scheduled contributions to the pension fund are recorded as costs even if no money is actually deposited into the fund. What is recorded is an obligation to pay a certain amount of money into the fund (technically called an "accrued pension liability") rather than a cash transaction. Such unfunded pensions are a major threat both to the credibility of the local pension system and to the financial stability of the jurisdiction, should it be compelled to use its current operating budget to meet its pension obligations to retired employees.

asset is readily identified with the service being rendered. The annual cost of a fixed asset is also called its "annual depreciation."

- Travel and transportation: include the costs of air and surface transportation, hotel and meal allowances, and similar expenses needed to deliver a specific service. Since these expenses are regularly reported as the basis for reimbursement and easily identified, they are usually considered as direct costs.
- Contractual services: include costs of utilities, insurance and bonding services, communications, rents and leases, accounting and auditing services, data processing services, and other professional services. If the contractual service is consumed by and directly attributable to a given police service, its costs are direct. If the costs of the contractual service cannot be readily allocated to a specific service (as is often the case with utilities' costs), the costs must be allocated to multiple services and considered indirect.
- Miscellaneous charges: include such expenses as printing and binding, memberships and dues, advertising, and other costs not otherwise classified. Whether these costs are direct or indirect depends on the ability to assign a specific cost to a specific service.

3. Indirect Costs. Included in this classification are personnel and nonpersonnel costs associated with the provision of a service but not conveniently traceable to that service. An indirect cost is incurred when a resource is shared by many services and thus it becomes difficult to allocate a fair percentage of the costs of that resource to any one service. For example, a state police headquarters is a building resource which houses all the services of that agency and which should have its costs apportioned among the services on an equitable basis. All personnel and nonpersonnel costs that are classified as indirect fall into two categories:

- Overhead: refers to the costs of purchasing, operating, and maintaining a department's physical assets (buildings, vehicles, equipment, etc.) which are used in common by many services. For example overhead costs for a police department might include general repair and maintenance of headquarters and area stations, utilities, rent, computer charges, and similar expenses. The basis for allocating these costs to a particular service varies, but in all cases the basis is chosen so that the costs are equitably distributed to the service in relation to the benefits received. Examples of bases (discussed in detail in Appendix D) are direct cost, direct labor hours, and direct labor dollars.

- General and administrative (G&A) expense: refers to those costs necessary for the overall management and operations of the jurisdiction or department which are not directly attributable to particular services. Examples of costs associated with this category are the costs of the police chief or other top manager, costs of the personnel, accounting, data processing, and other central support units, and the costs of other individuals and offices needed for the provision of all police services, not just the one being costed. That portion of G&A expense attributable to a specific service is usually determined based on direct cost (also explained more fully in Appendix D).

Some jurisdictions distinguish between "General" and "Departmental" indirect costs. General indirect costs represent the personnel and nonpersonnel expenses of central departments required for the support of all employees in the jurisdiction, including the police. The central departments contributing the largest portion of support to police often include the District Attorney, Finance or Auditing, Data Processing, and Personnel. Miscellaneous expenses such as the costs of operating the City or County Administration Building, printing costs, and outside office rentals are also included in General indirect costs. Departmental indirect costs are based on the support each department incurs in providing administrative and other support services to its own employees. The police department units typically providing the most support to patrol, for example, would include Communications, Records, Training, Garage, and Community Relations.

Cost Centers and Production Units

The identification of cost centers and production units is an essential step in any cost analysis. A cost center is a defined entity to which direct and indirect costs can be allocated. For the purpose of costing, each police service can be its own cost center. In fact, every unit, subunit, or activity in a police department can be a distinct cost center, with its own input and output, thus permitting cost aggregation at multiple levels. The mail survey disclosed that 24% of the jurisdictions used the organization unit as their primary police cost center and 29% used objects of expenditure (e.g., personnel salaries, equipment) while 47% costed by general function (e.g., patrol) or specific service (e.g., response calls for emergency service).*

*Although 47% of the jurisdictions surveyed claimed that they currently cost by function or service, a cursory examination of their financial records reveals that only 20% really cost by service on a regular basis. Most jurisdictions still use the organization unit as the prevailing cost center. In many cases, respondents claiming to cost by service had simply titled their regular bureaus and offices as "programs" rather than organizational units in order to comply with a program budgeting emphasis in the larger jurisdiction.

Exhibit 2.2 is a simplified version of the cost centers that a typical police department might have. It shows how cost centers can be used to estimate varying levels of cost. Entering costs at the lowest possible level, a \$1,000,000 cost for foot patrol and a \$4,000,000 cost for motorized patrol (both separate cost centers) can be aggregated upward to total a \$5,000,000 cost for the Patrol Division which is a higher level cost center. Continuing upward, the \$5,000,000 cost of the Patrol Division, \$3,000,000 cost of the Investigations Division, and \$2,000,000 cost of the Administration Division can be summed to yield a total cost of \$10,000,000 for the highest cost center, the Police Department itself. The number and types of cost centers established by an organization depend on the purposes for which cost information will be used and the level of cost aggregation desired.

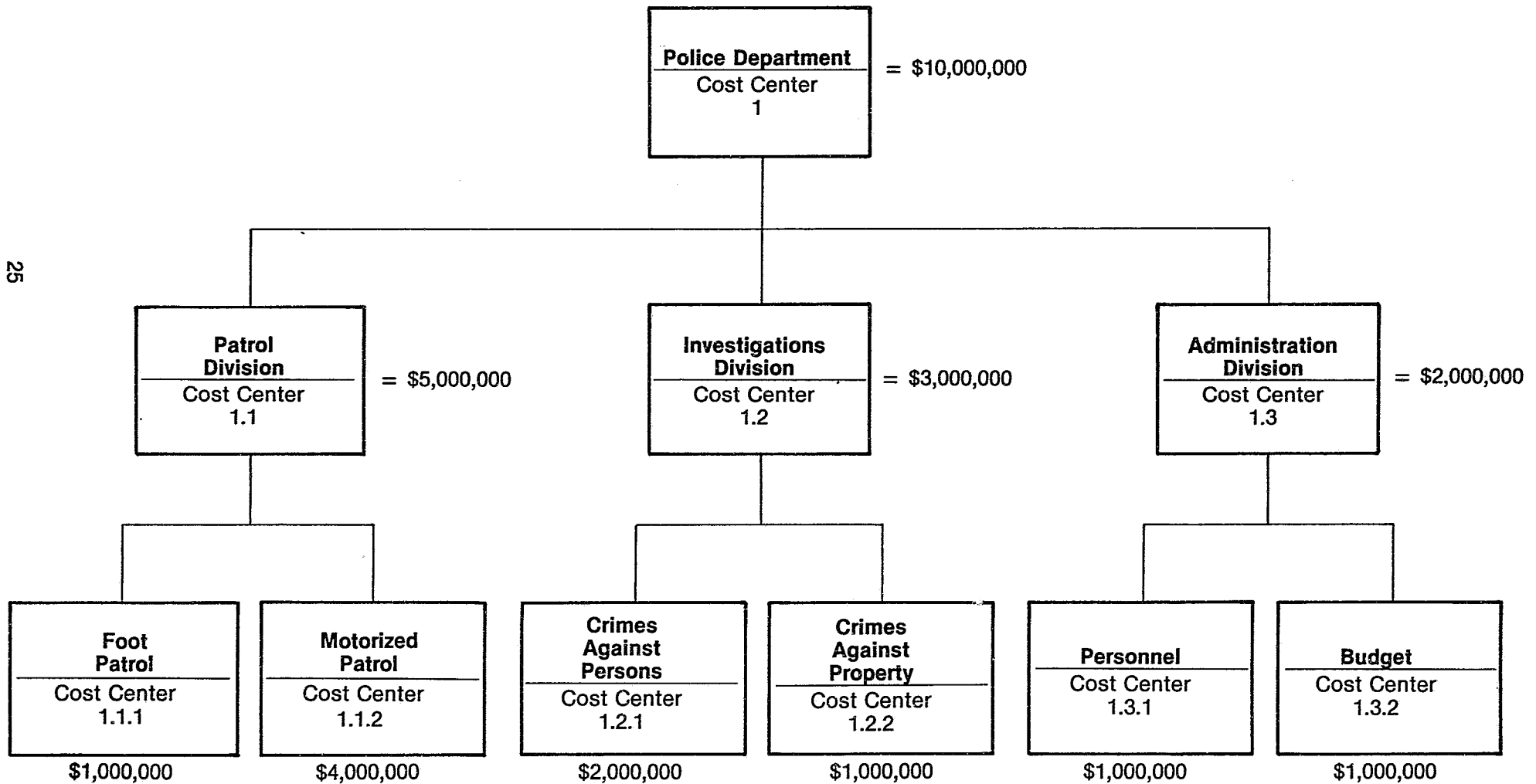
Production units are measures reflecting the activities or outputs of cost centers which result in a cost being incurred. They are also called "costing units" or "service units." In the previous example, crimes against property investigation was an individual cost center. Examples of the production units that could reflect the activities of this cost center would include the number of criminal cases investigated by type, number of crimes cleared by arrest, and number of crimes cleared by conviction. Both cost centers and production units are discussed more extensively in Chapter 3.

Unit Costs

Once appropriate production units have been developed, it is then possible to determine the "unit cost" of each production unit. Unit costs are determined by dividing total costs associated with a cost center by the number of production units created by the cost center. For example, the provision of emergency police services in Sunnyvale, California was projected to cost \$92,444 in FY 1980 and involve 3,872 emergency responses, or a unit cost of \$23.88 per response.

Unit costs are important not only in determining the costs of police services but also in comparing the relative efficiency of programs or departments with different total operating costs. For example, a police department might choose to compare the efficiency of two very different approaches to patrol--foot and motorized--based on the unit cost per arrest of each approach. If foot patrol's annual cost of \$1,000,000 produces 2,000 arrests, its unit cost is \$500 per arrest. If motorized patrol costs \$4,000,000 and results in 10,000 arrests, its unit cost is a somewhat more efficient \$400 per arrest. Another use of unit costs lies in establishing standard costs which can be used as a target or basis of comparison when actual costs are incurred. For example, the police department might hold its patrol division accountable for a standard unit cost of \$400 per arrest and would be alarmed if actual costs were much higher than that.

Exhibit 2.2
USE OF COST CENTERS



Costing Issues

Before proceeding to an explanation of the procedures for measuring and allocating the costs of police services, it is important to understand a few of the unresolved issues in police costing. Unlike some fields of endeavor, there is no "one best way" to organize or perform cost analysis. While many steps are mandatory, others are not. And, in any event, the technical and governmental environment in which a specific costing occurs will influence its scope and content. For example, federal, state, and local governments prescribe certain accounting related regulations that must be observed and often embodied in the public accounting system. In addition, research and pronouncements by professional organizations like the American Institute of Certified Public Accountants (AICPA) contribute to the development and revision of cost analysis theory and practice. This section describes the most significant cost determination issues facing cost analysts in criminal justice agencies:

- Efficiency and Effectiveness;
- Development and Operating Costs;
- Fixed and Variable Costs;
- Cash and Accrual Accounting;
- Inflation; and
- Intergovernmental Comparisons of Cost Information.

Efficiency and Effectiveness

Significant interest exists in finding ways to appraise the quality of police services. Two generally accepted measures of quality are efficiency and effectiveness. Efficiency describes how well a police department is using its resources to provide services by relating the amount of output produced to the amount of input required to produce it. In other words, efficiency is a measure of how much the department gets for the time and money it spends. Given costs as an input and the number of arrests as an output, an efficiency measure (which was termed a "unit cost" in the preceding section) would be cost per arrest. Other examples of unit costs which reflect efficiency are the cost per traffic citation, cost per mile patrolled, or the cost per bank escort. Effectiveness, on the other hand, focuses on results or the degree to which the department is achieving its objectives. Examples of effectiveness measures would be the extent to which the department clears sufficient crimes by arrest, reduces crime to a desired level, and accomplishes its other objectives. In selecting among alternative programs, efficiency favors the alternative with the lowest unit costs whereas effectiveness prefers the alternative that best achieves a given objective.

Both measures have their advocates as the "true" measure of quality. Efficiency is viewed as more important by those who anticipate decreasing funds

for police services and the need to stretch available resources, either by producing the same output with fewer resources or increasing output with the same resources. The advocates of effectiveness are concerned with the "bottom line" of police operations, i.e., the extent to which they have contributed to real or perceived improvements in public safety.

Regardless of which side dominates in a particular jurisdiction, cost information can contribute to analyzing both efficiency and effectiveness. The relationship of cost information to efficiency is clear, in that cost is an input which can be compared to one or more output measures to determine a department's efficiency, e.g., cost per arrest, cost per mile driven, cost per officer, etc. There is no standard line separating efficient from inefficient operations; that judgment has to be made locally depending on prior experience, defined priorities, available resources, and public expectations. It is inappropriate for the users of cost information to assume that the higher the cost of a particular program, the greater its inefficiency. Only when cost information is combined with output measures and managerial judgment can the manager conclude that inefficiency exists, and be alerted to defects that need to be corrected, e.g.:

- Procedures, whether officially prescribed or merely followed, may be more costly than justified;
- Duplication of effort by employees or between organizational units;
- Performance of work that serves no useful purpose;
- Uneconomical use of equipment;
- Overstaffing in relation to the work to be done; or
- Faulty buying practices and accumulation of unneeded or excess quantities of property, materials, or supplies.*

The relevance of cost information to judgments about effectiveness is not as obvious. After all, effectiveness is not supposed to consider the resources required to obtain a given result, only the level of accomplishment in terms of organizational objectives. However, managers should be concerned that they achieve their objectives in the most economical way. If scarce resources can be conserved by picking one strategy over another while still attaining the objective, most managers would opt for the approach that saves a few dollars.

*U.S. General Accounting Office, Standards for Audit of Governmental Organizations, Programs, Activities and Functions (Washington, D.C.: Government Printing Office, 1974), pp. 11-12.

Two techniques exist to help managers analyze both the costs and the effectiveness of alternative strategies. They are called "cost effectiveness analysis" and "cost benefit analysis." Cost effectiveness analysis compares the cost of a service with one or more non-monetary measures (production units) of its effectiveness to derive a unit cost. For example, the analyst might compare the costs of the investigations bureau with the number of crimes cleared by arrest to figure a unit cost per crime cleared by arrest. In this respect, the first step of a cost effectiveness analysis mirrors the analysis of efficiency discussed previously. However, cost effectiveness analysis adds a second step in which there is an explicit consideration of the extent to which the number of crimes cleared by arrest or any other production unit meets departmental objectives. Unlike efficiency analysis, cost effectiveness analysis does not automatically favor the service approach with the lowest unit costs.

For example, a cost effectiveness analysis could be used to compare two approaches (A and B) to criminal investigations. Approach A favors the use of specially trained detectives in investigations while Approach B relies on regular patrol officers. For each approach, the total cost would be divided by the number of crimes cleared by arrest to determine a unit cost per crime cleared by arrest. As shown in Exhibit 2.3, Approach B would be selected in lieu of Approach A if cost were the only consideration. Approach B's total cost and unit cost are lower than those of Approach A. However, when consideration of departmental objectives is added, Approach A would be preferred since the number of crimes cleared by arrest using detectives meets departmental objectives while the number cleared by patrol officers in Approach B does not.

Exhibit 2.3

ILLUSTRATIVE COST EFFECTIVENESS ANALYSIS

	A	B
Total costs	\$600,000	\$400,000
Number of crimes cleared by arrest	1,000	800
Unit cost per crime cleared by arrest	\$ 600	\$ 500
Departmental objective-- crimes cleared by arrest	1,000	1,000

Cost benefit analysis also considers the extent to which objectives have been achieved. It compares costs with measures of effectiveness expressed in monetary terms. For example, a cost benefit analysis might compare the costs of a licensing bureau with the revenue generated by selling taxi licenses or the costs of a burglary squad with the cash value of the stolen property it recovers. A burglary squad with a 1:5 "cost benefit ratio" would be costing the taxpayers \$1 for every \$5 worth of stolen property recovered. Because of its attention to the accomplishment of objectives, cost benefit analysis would not inevitably lead the manager to favor services with the highest ratio. For while a 1:5 cost benefit ratio for the burglary unit may be very acceptable, the costs and/or benefits considered separately may be unacceptable in terms of not meeting desired objectives, i.e., the unit's operating costs may be too high or the cash value of the property recovered may be too low.

A stumbling block in the use of cost benefit analysis is that many benefits are difficult to quantify and putting a monetary value on them is almost impossible. For example, in addition to recovering a quantity of stolen property, the burglary unit may also prompt an increased "feeling of security" and "respect for the law" in the city's neighborhoods--intangible benefits that cannot be readily expressed in dollars-and-cents. In such cases, the analyst has three choices: (1) not considering intangible benefits at all, (2) basing the analysis primarily on the tangible monetary benefits but allowing the intangible benefits to influence the final judgment, or (3) assigning a monetary value ("or shadow price") to the intangible benefits by asking neighborhood residents to relate how much it is worth to them in monetary terms to feel secure or to know that people generally respect the law.*

Development and Operating Costs

The costs of a police service or approach to delivering the service may be divided into development and operating costs. Development costs are incurred for planning, programming, and pilot testing the service or approach. Operating costs result from administering and delivering them on a regular basis.

It is important that development costs be isolated and accounted for separately from operating costs. First, provided that the service or approach remains unchanged, development costs are essentially "one time" costs whereas operating costs recur, and probably increase, year after year. Second, and more significantly, it is unfair to compare the initial annual costs of a new

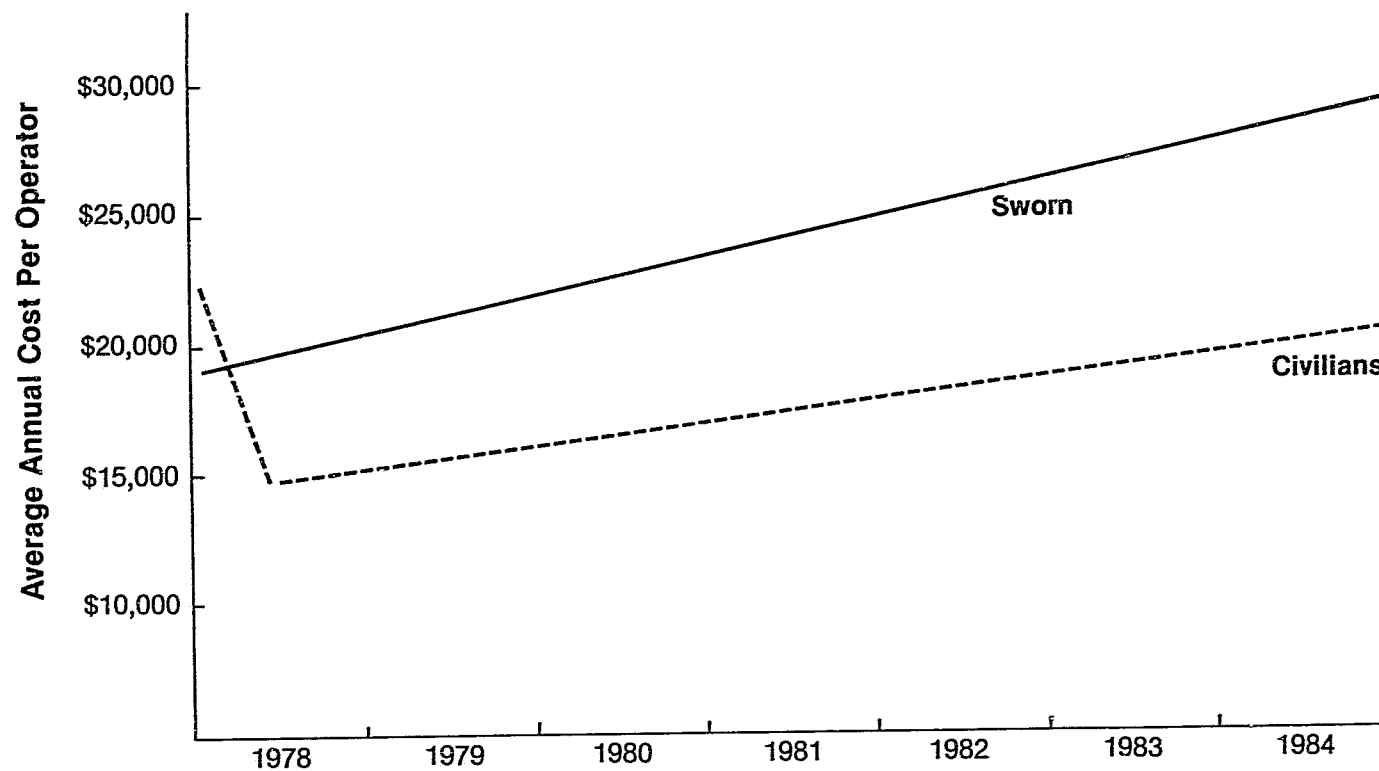
*Additional information on cost effectiveness and cost benefit analyses can be found in: Henry M. Levin, "Cost-Effectiveness Analysis in Evaluation Research," in M. Guttentag and E.L. Struening (eds.) Handbook of Evaluation Research (Beverly Hills, California: Sage, 1975), pp. 89-122; Mark S. Thompson, Benefit-Cost Analysis for Program Evaluation (Beverly Hills: Sage, 1980).

approach to delivering a service with the costs of the existing approach during that same year. The new approach has to bear the burden of heavy development costs plus initial operating costs whereas the existing approach is likely to have only operating costs since its development costs were incurred several years previously. For example, the police department may feel that civilians should replace uniformed officers in staffing the communications system because that would free the uniformed officers for investigations, patrol, and other field duties and would reduce the costs of salaries and fringe benefits. However, the department may hesitate to make the switch because of the substantial training costs of changing over to civilians versus continuing to rely on the previously trained uniformed officers. In this instance, salaries and fringe benefits constitute operating costs while training is a development cost.

Several methods exist that would compare the different development and operating costs of the two staffing options on an equitable basis:

- Development costs could be compared with development costs, and operating costs with operating costs, after adjusting for inflation to reflect the different time periods involved;
- The total cost of using uniformed officers (actual development and operating costs) could be compared with the total cost of switching to civilians (projected development and operating costs);
- A percentage of the development costs of each option could be allocated to each year that the service operates, based on the number of years that the resources for which the development costs were incurred will be used in service delivery. For example, if training costs \$10,000 per communications operator, and the training is expected to be sufficient for five years, then each operating year is assigned \$2,000 (one-fifth) of the development costs of training;
- The development costs of the uniformed officers might be written off as irrecoverable (or "sunk costs") and the cost analysis focused on the longer term implications of switching to civilian operators. Exhibit 2.4 portrays a hypothetical comparison between the average annual costs of using uniformed officers and civilians as communications operators, with the development costs of the civilians included in the first year. This graphic analysis suggests that a cost comparison done in 1978 would conclude that uniformed officers are more economical but that a longer term analysis would favor civilians on the same grounds once development costs for them are no longer incurred and the two options are compared on their operating costs alone.

Exhibit 2.4
**CONSIDERATION OF DEVELOPMENT AND OPERATING
COSTS IN COST ANALYSIS**



In any event, this is a good example of where cost effectiveness or cost benefit analysis should be used in making the final decision. It would be helpful to compare the relative effectiveness of the civilians and uniformed staff (possibly measured by the speed or accuracy with which each group dispatched patrol) along with their costs.

Fixed and Variable Costs

Costs are often classified according to how sensitive each cost is to changes in organizational activity. As the volume of activity increases or decreases, a cost may increase or decrease as well, or it may remain constant. If a cost is to be properly controlled, it is worthwhile to know whether the cost can be expected to change under various operating conditions and how much it may change.

Fixed costs are costs which remain constant in total regardless of changes in the volume or level of activity. If costs are \$4,000 in a period when volume is 1,000 units, they should also be \$4,000 when volume is 2,000 units. For example, assume that a police department pays \$5,000 per month to rent a piece of equipment. The equipment might be used to its full capacity, or it might not be used at all, but this would not affect the fixed rental fee.

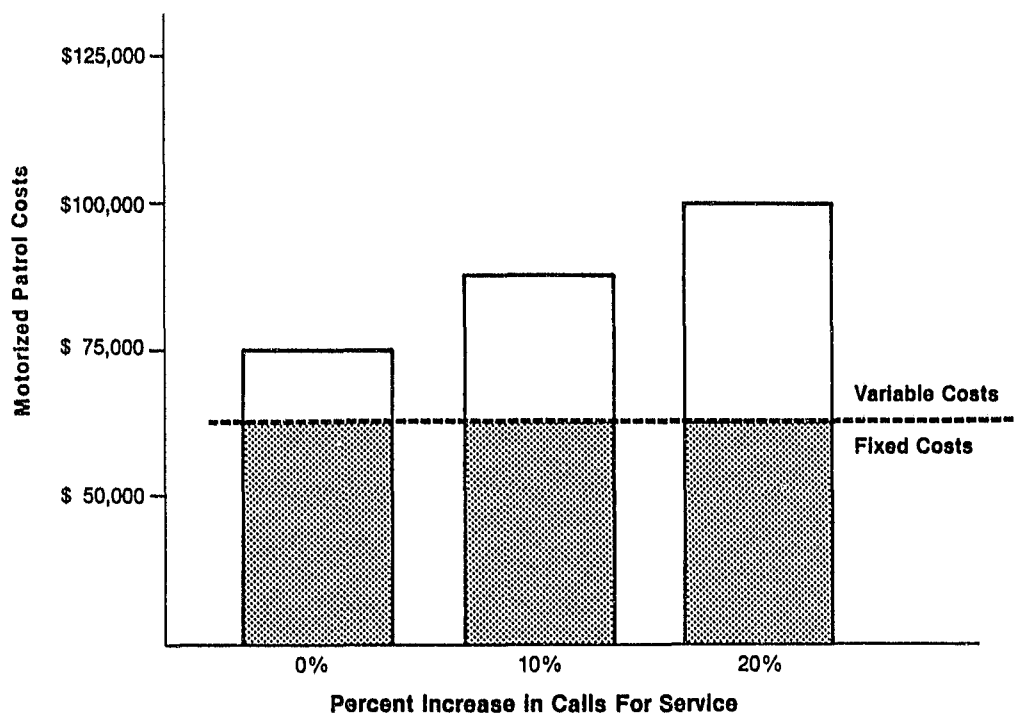
Variable costs are costs which vary in direct proportion to changes in the volume or level of activity. If costs are \$4,000 in a period when volume is 1,000 units, they should be \$8,000 when volume is 2,000 units. Personnel cost is a good example of a variable cost. The personnel cost of a given service will often vary in direct proportion to the number of work hours spent on it. If a police officer earns \$12 per hour, then each hour he spends on a service will cost that service \$12. If the number of work hours increases or decreases, the personnel cost will increase or decrease proportionately.

Whether a cost is classified as fixed or variable may well result from a management decision. For example, a police department may decide to (1) rent an unmarked patrol vehicle at a rate per mile (variable cost) or (2) lease that vehicle for a flat annual fee (fixed cost).

The distinction between fixed and variable costs becomes important when comparing the costs of alternative service levels of the same service. Rather than calculating the full costs of each alternative, the analyst can define certain costs as fixed across all service levels and calculate them only once. The analysis can then be focused on measuring the costs that will vary with the level of service provided and thus must be separately calculated at

each level. For example, a police department may seek to determine the effects on motorized patrol costs of successive increases in calls for service. The purchase price of the patrol vehicles would be among the fixed costs of motorized patrol because it would be the same regardless of the number of service calls received. The costs of gas and oil for the vehicles would be considered variable costs since they would increase each time that a patrol vehicle is dispatched in response to a service call. The analyst would concentrate on figuring the gas and oil costs along with other variable costs in response to all kinds of "what if" questions, such as "What if the number of calls for service increases by 10%?" Adding the variable costs determined for a 10% increase, 20% increase, and other alternative service levels to the fixed costs that are the same for all service levels provides a range of costs for motorized patrol as illustrated in Exhibit 2.5.

Exhibit 2.5
FIXED AND VARIABLE COSTS OF MOTORIZED PATROL



Cash and Accrual Accounting

Cash accounting and accrual accounting are two ways of recording an organization's financial transactions. Used by many public agencies, cash accounting records revenues when cash is received and expenditures when cash is paid. It debits or credits an account when money changes hands in acquiring the personnel, equipment, and other resources needed for a particular service.

Accrual accounting, on the other hand, is less concerned with money changing hands than with services being rendered. It records revenues from the provision of contract or other services when earned, although payment for those resources may be made in a prior or subsequent period. It records expenditures for resources when they are used in service delivery, although payment for those resources may be made in a prior or subsequent period. For example, cash accounting would treat a patrol vehicle as a cost as soon as it is purchased whereas accrual accounting would not consider the vehicle as a cost until it is used on patrol.

In controlling police expenditures, accrual accounting is preferable to cash accounting. For one thing, accrual accounting permits a better comparison between total expenditures and revenues and the amounts authorized in the budget approved by the legislative body. Cash accounting supplies a manager only with information about the unexpended cash balance of an appropriation; unlike accrual accounting it does not provide information about outstanding claims that are yet to be paid. Consequently, accrual accounting conveys a more accurate picture of financial conditions for organizations that have delayed receipts or disbursements.

But the most significant advantage of accrual accounting is the extent to which it supports the measurement of service costs. Again, cost and cost analysis hinges upon the concept of resources used, regardless of when the resources are acquired. Accrual accounting treats resources as a cost in the period in which they are used even though payment is made in a prior or subsequent period. Cash accounting defines resources as a cost to the government only when checks are issued or paid. Therefore, a cost estimate based on records drawn from a cash accounting system would include cash disbursements for salaries, materials, and other resources but would disregard the degree to which the resources were actually used in delivering services. Cash accounting also fails to consider important financial activities where no money changes hands that would be recognized under an accrual accounting system, e.g., depreciation and inventory costs.

Depreciation is the accounting device by which the value of a major fixed asset (such as patrol vehicle) is gradually entered in the books as a cost as it wears out, regardless of when it was purchased. Cash accounting debits the police department's accounts for the entire cost of the vehicle when payment is made, even if the vehicle will be used over several years. Proper accrual accounting, on the other hand, recognizes this estimated useful life by debiting those same accounts for but a portion of the purchase price each year the vehicle is in service even though full payment had been made during the initial year of operation. In short, cash accounting overestimates the real costs of the patrol vehicle in the year of purchase and ignores these costs in succeeding years while accrual accounting estimates these costs fairly in every year.

Another example where cash accounting does not accurately measure costs is in dealing with inventory, i.e., resources acquired but not yet consumed. Inventory expenditure is recorded under the cash system when the resource is purchased and stored but recorded under the accrual system when the resource is taken out of storage and used in delivering a service. Cash accounting would treat \$5,000 spent on vehicle maintenance supplies as a current period expense even if \$4,000 worth of the supplies were actually used in future periods. Accrual accounting would consider only \$1,000 as a current period expense and allocate the remaining \$4,000 worth of supplies to the periods in which they were used.

For these reasons, the National Committee on Governmental Accounting (NCGA) recommends that the accrual or modified accrual bases be used in accounting for government revenues and expenditures.* All federal agencies were required by a law passed in 1955 (P.L. 84-863) to implement accrual accounting as soon as practicable. The Department of Defense installed an accrual accounting system in 1968. The Departments of Labor, Interior, and Agriculture are also among those that have installed, or are planning to use, accrual accounting.

Despite these shifts to accrual accounting and the obvious limitations of cash accounting in supplying an accurate and current picture of organizational costs, the cash basis is still widely used in the public sector. One reason for the cash system's survival is that it is relatively simple in terms of the skills and time required to keep financial records.** In addition, state legislatures and city councils tend to feel that cash accounting restricts bureaucrats to recording revenues only when the money is "in hand" and discourages them from accounting for and possibly exaggerating revenues that are merely "anticipated." On the expenditure side, the use of cash accounting reflects a legislative desire to prevent an agency from spending in excess of the agency's appropriated funds.

*NCGA recommends that the accrual basis be used in accounting for enterprise, internal service, nonexpendable trust and pension trust funds but that the modified accrual basis be used for general, special revenue, capital projects, debt service, special assessment, and expendable trust funds. They define the "modified accrual" basis as that method of accounting in which revenues are recognized when they become both measurable and available to finance expenditures and expenditures are recorded when the liability is incurred. Source: NCGA Statement 1, Governmental Accounting and Financial Reporting Principles (Chicago: Municipal Finance Officers Association of the United States and Canada, 1979), pp. 3, 11-12.

**A practical explanation of how to use cash accounting is in Patricia Jenkins, Guide to Accounting for Nonprofits (Los Angeles: The Grantsmanship Center, 1977).

Thus, many analyses of the costs of police services will have to rely on existing cash accounting systems. Procedures for transforming expenditure data recorded under a cash accounting system into cost data are described in Chapter 3.

Inflation

The increasing effects of inflation have to be considered in analyzing police costs, especially when comparing costs between years. A rise in the unit cost per arrest, for example, from \$1,000 in 1977 to \$1,200 in 1979 may be due as much to inflation as to other factors like the use of more expensive equipment or a deterioration in staff productivity. The contribution of cost data to maintaining staff accountability for results depends on the extent to which the responsibility for increasing or decreasing costs can be assigned.

Essentially, the cost implications of inflation can be estimated by using the Consumer Price Index (CPI) published by the U.S. Department of Labor. Taking 1967 as its base year (which assumes that \$100 in that year would purchase \$100 worth of goods and services), the CPI reflects the purchasing power of the consumer dollar by stating how much money would be required in succeeding years to purchase the same items that could have been bought in 1967 for \$100. Exhibit 2.6 presents the national CPI for the years 1967-80.

Exhibit 2.6

NATIONAL CONSUMER PRICE INDEX

1967	100.0	1974	147.7
1968	104.2	1975	161.2
1969	109.8	1976	170.5
1970	116.3	1977	181.5
1971	121.3	1978	195.4
1972	125.3	1979	217.4
1973	133.1	1980	246.8

The exhibit shows that what originally cost \$100 in 1967 cost over \$246 in 1980, or a loss of purchasing power of 59% over a thirteen year period. The CPI can be used in police costing to transform multi-year unit costs into "constant" dollars, thereby facilitating comparisons.* Either current

*See: National Institute of Law Enforcement and Criminal Justice, Cost Analysis of Correctional Standards by Neil M. Singer and Virginia B. Wright (Washington, D.C.: Government Printing Office, 1976), p. 24.

dollars can be deflated to their value in an earlier year or dollars in that earlier year can be inflated to their value in the current year, e.g.,

- To deflate a 1980 unit cost of \$1,000 to what that same item would have cost in 1970:

$$\frac{1970 \text{ CPI } 116.3}{1980 \text{ CPI } 246.8} \times \$1,000 = \underline{\$471}$$

- To inflate a 1970 unit cost of \$1,000 to what that same item costs in 1980:

$$\frac{1980 \text{ CPI } 246.8}{1970 \text{ CPI } 116.3} \times \$1,000 = \underline{\$2,122}$$

Using the CPI and these ratios, it is possible to compare the costs of a service in two different years in constant dollars. For example, the analyst could compare a service's actual unit costs of \$1,000 in 1970 with its actual costs of \$2,100 in 1980 by deflating the 1980 dollars to their 1970 equivalent. Or, as shown in Exhibit 2.7, the 1970 dollars could be inflated to their 1980 equivalent.

Exhibit 2.7

ADJUSTING SERVICE COSTS FOR INFLATION USING NATIONAL CPI

	<u>Actual Dollars</u>	<u>Constant Dollars</u> (1980 prices)
1970	\$1,000	\$2,122
1980	2,100	2,100

In constant dollars, then, the 1980 actual unit costs of \$2,100 are almost identical to the inflated 1970 costs of \$2,122 which suggests that without inflation the costs of the service would have remained about the same over those ten years. However, if the actual costs in 1980 had been \$3,000 instead of \$2,100 and the inflated 1970 costs held at \$2,122, this could be interpreted as a real increase in unit costs and an indicator of diminished productivity, use of new and more expensive technology, or some other factor.

To achieve even greater precision in adjusting for inflation, it is possible to acquire regional CPI's which may be more accurate in terms of local inflation rates. In addition, since the CPI is a composite index of the prices paid for a "market basket" of items, a cost analyst might want individual CPI's for the specific items being costed, e.g., police salaries and patrol vehicles. In most cases, though, cost analyses that need to be adjusted for inflation can rely on the national CPI noted earlier.

Intergovernmental Comparisons of Cost Information

There are often instances when a police department should know how its costs compare with those of others. Such comparative information offers the police a basis for discerning whether they should be proud or worried about their fiscal management. Comparatively low costs per emergency response, for example, may be very satisfying and may prompt some favorable publicity. In addition, a police department may be able to use this information to direct attention to areas of operation that incur significantly higher costs than are being reported by comparable departments.

The cost information required for these comparisons is often formally reported to, or generated by, state or federal agencies concerned with criminal justice. Informally, police officials compare costs at conferences, over lunch, or by reading the newspapers. Exhibit 2.8 exemplifies the types of intergovernmental cost comparisons that many police departments are making. It contrasts the costs incurred by the Birmingham, Alabama Police Department for patrol officers' salaries, equipment, and other police resources with the costs of these same resources in three other cities.

In comparing costs however, it must be remembered that there are differences among jurisdictions that may affect the validity of the analysis. Discrepancies in reported costs may not be due to differences in management efficiency but to differences (1) in the programs being compared or (2) in the accounting methods used to measure costs. Such differences should be examined before a police department decides to boast about or be embarrassed by its relative costs.

Programmatic differences result from differences in organizational purposes, structures, and processes. Among the programmatic differences affecting the comparison and analysis of cost information are:

- Mission, goals, and objectives differ among jurisdictions.
- Organizational structure, programs, and units of service differ.

Exhibit 2.8

TYPICAL INTERGOVERNMENTAL COST COMPARISONS

Resource	Birmingham Alabama	Hartford Connecticut	Peoria Illinois	San Jose California	Composite
Average patrol officer's salary, including fringe benefits	\$ 17,426	\$ 19,845	\$ 21,375	\$ 25,301	\$ 20,987
Value of annual uniform allowance	175	390	240	150	239
Equipment furnished each officer (including weapons, badge, handcuffs, etc.)	254	160	185	440	--
Annual value of equipment presumed to last 5 years (Total \$5)	51	32	37	88	52
Average cost of new patrol car	5,389	5,500	5,500	3,700	5,022
Cost of Chief's office and staff	1,569,972	884,785	628,025	1,067,000	1,037,445
Cost of service bureaus (including communications, personnel, training, etc.)	2,827,692	838,840	1,379,415	4,692,473	2,434,605
Allocable overhead from Chief's office and service bureaus per uniformed officer	5,135	2,953	7,007	5,403	4,917

Source: Birmingham Police Department and Police Executive Research Forum, "Differential Police Response Strategies" (1981), pp. 144-151.

- Citizens in different jurisdictions have different needs and, therefore, require different police services.
- Costs for similar items may vary among geographical regions.
- Distinct cost differences are inevitable between established institutions and developing agencies with large "start-up" costs.
- Economies of scale may be available to a larger jurisdiction and not to a smaller one, e.g., availability of discounts for purchasing supplies or equipment in large quantities.

Methodological differences result from costing procedures that are not applied uniformly. Accounting systems frequently are inconsistent within a jurisdiction or even within the same agency. Accounting in the federal government is highly decentralized, each agency or field office being allowed to develop its own system. At the state and local level, organization units are permitted to develop their accounting systems to meet their particular needs, provided that the information needs of higher echelons can still be met. As a result, cost comparisons among jurisdictions can be invalidated by incompatible definitions of direct and indirect costs, depreciation, inflation, and other costing terms.

Professional organizations like the Municipal Finance Officers Association and the American Institute of Certified Public Accountants have been working to resolve major methodological differences by recommending uniform standards for determining cost. For example, they advocate the accrual or modified accrual bases of accounting and the use of depreciation in estimating fixed asset costs. While these costing standards will facilitate a more consistent definition of cost, they will not insure automatic comparability among jurisdictions because local statutes, judgment, and other factors are involved in the costing process. Therefore, much study is required to improve the utility and validity of intergovernmental cost comparisons.

* * *

To this point, the Program Model has attempted to supply a conceptual framework for understanding cost analysis in general and how it applies to police management in particular. Part One has described the characteristics of cost analysis and the environment in which police costing takes place. It has demonstrated the ways in which cost information is needed in management planning, budgeting, controlling, pricing, evaluating, and reporting while

acknowledging the degree to which undeveloped skills, inadequate record keeping systems, and other technical and organizational problems impede cost analysis in many police departments. It has also examined the major terms and issues with which the cost analyst should be familiar, e.g., direct and indirect costs, cash and accrual accounting, depreciation and inventory costs. This basic information will be useful in Part Two as the Program Model defines and explains the specific procedures involved in measuring the costs of police services.

PART TWO: PROCEDURES FOR MEASURING THE COSTS OF POLICE SERVICES

Part Two presents a realistic approach for measuring the costs of police services. It is divided into three chapters. Chapter 3 deals with various aspects of planning for cost analysis, including how to define the purposes of the cost analysis, determine the service to be costed, and decide on the extensiveness of the cost analysis. Chapter 4 suggests how to do a cost analysis in terms of measuring direct and indirect costs, estimating total costs, and reporting the results. Once the technical aspects of planning and doing a cost analysis are mastered, Chapter 5 advances to guidelines for installing a regular cost analysis system in a police department or other criminal justice agency.

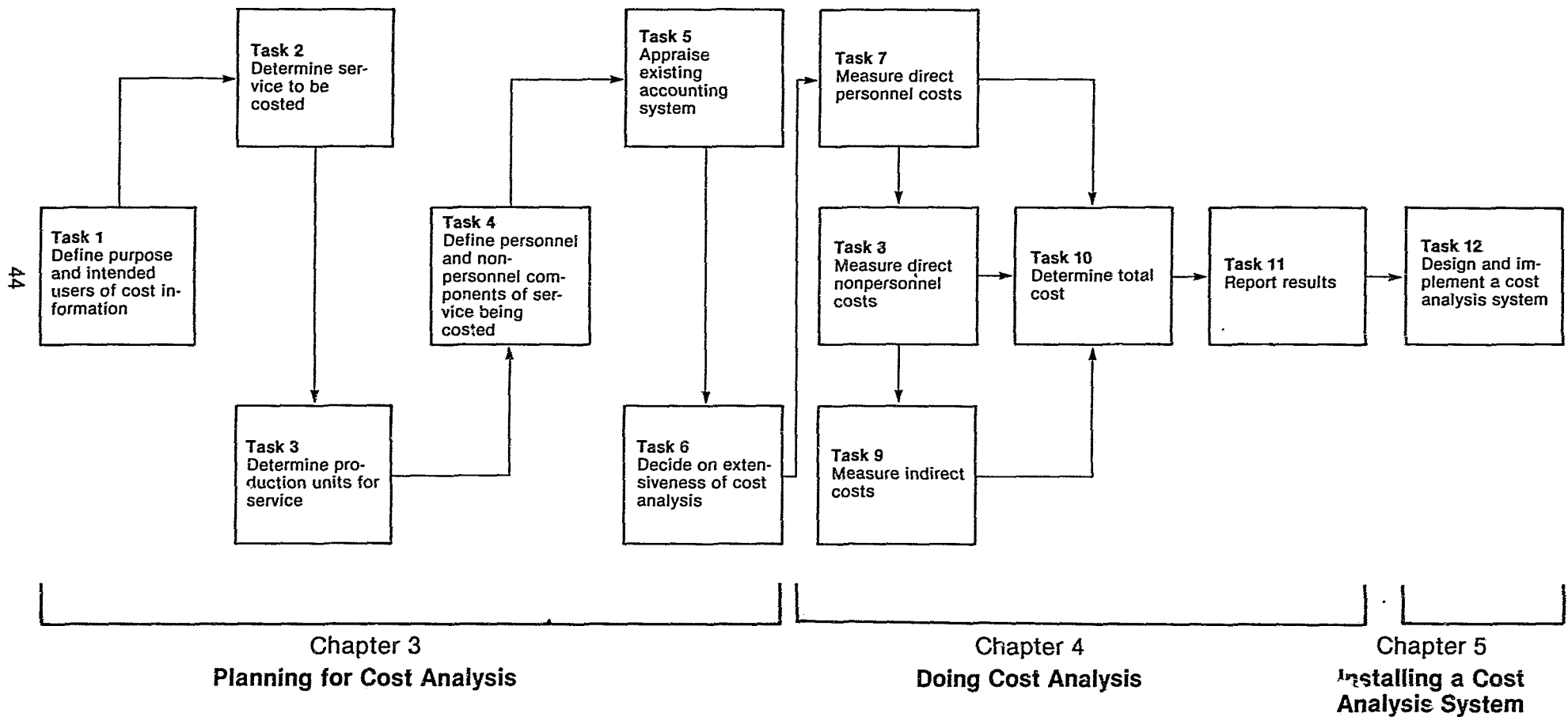
Thus, Part Two proposes a basic logic to cost analysis: a series of twelve tasks that account for an increasing proportion of the costs of a given service. A flow chart depicts these tasks in Exhibit II.1. Some adaptations will be necessary to fit local information needs and resources (as will be evident in the case studies presented in Part Three) but the exhibit is illustrative of the most commonly used and generally accepted accounting techniques for measuring the costs of public services. Part Two describes each of these related tasks, in terms of its objectives and methodology, and explains the relationship among them.

As a way of demonstrating how these general accounting procedures can be used to cost specific police services, a typical costing problem in a hypothetical city has been devised to exemplify and connect the tasks. The problem and its decision context can be portrayed as follows:

Clinton is a medium size city with a population of 60,000 and an annual operating budget of \$40 million. Located in the suburbs of a major metropolitan area, Clinton has relatively high employment and property values and a stable crime rate.

The Clinton Police Department employs 120 sworn officers, and has an operating budget of \$3.7 million for this fiscal year which is about 9% of the total city budget. The largest single item in the police budget is the \$2 million allocated to the Patrol Division. Since Clinton extends over a wide geographical area, almost all patrol consists of 1-officer motorized units.

Exhibit II.1 LOGIC OF COST ANALYSIS



In recent years, the costs of motorized patrol have come under increasing criticism. The City Council (and to some extent the local media) think that it costs too much. The Chief of Police contends that motorized patrol's costs are justified, given the patrol coverage that citizens demand and the high costs of gas and other resources that this service requires. However, no one has any hard data to back up these claims. It is generally agreed that the budget allocation for patrol does not reflect its true cost. Like most cities, Clinton's operating budget is based on projected expenditures rather than costs and is organized by departmental units rather than by individual services.

The Chief wants to know the true costs of motorized patrol in order to justify next year's budget request and to prove that the costs of motorized patrol in Clinton are close to the costs incurred by cities of comparable size. To these ends, he has asked the department's Planning and Research Division to develop a cost estimate within thirty days.

It will be seen in the next three chapters how the Planning and Research Division responded to the Chief's request and estimated the costs of motorized patrol in Clinton.

Chapter 3: Planning for Cost Analysis;

Outline

DEFINE PURPOSE AND INTENDED USERS OF COST
INFORMATION

DETERMINE SERVICE TO BE COSTED

DETERMINE PRODUCTION UNITS FOR SERVICE
BEING COSTED

DEFINE PERSONNEL AND NONPERSONNEL
COMPONENTS OF SERVICE BEING COSTED

APPRAISE EXISTING ACCOUNTING SYSTEM

DECIDE ON EXTENSIVENESS OF COST ANALYSIS

Direct Personnel Costs Only

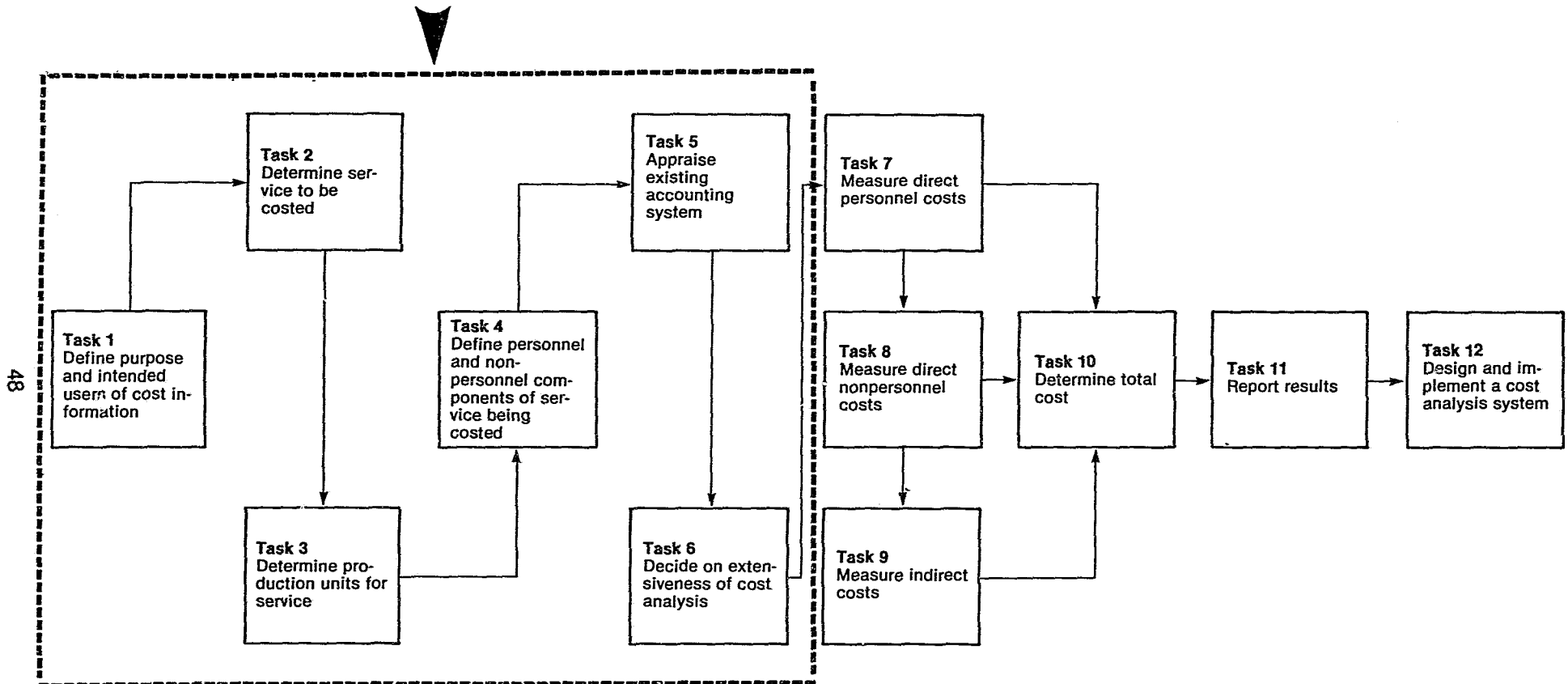
Direct Personnel and Direct Non-
personnel Costs

Direct Personnel and Direct Non-
personnel Costs and Indirect Costs

Planning for cost analysis is deciding in advance what to do, how to do it, when to do it, and who is to do it. Although planning can be a difficult and time consuming process requiring conscious determination of courses of action and decisions based on purpose, knowledge, and careful estimates, the benefits of planning outweigh the effort involved. Without adequate plans, cost analysis is likely to fail: reports may not suit the needs of the audience, sources of information may be missed, or costing procedures may not be within the capabilities of the organization.

Chapter 3 sets forth the basic decisions involved in planning for cost analysis. Depicted in Exhibit 3.1, these decisions relate to Tasks 1-6 of the logic of cost analysis presented in the introduction to Part Two. This chapter describes how to select the purpose and users of cost analysis, the service to be costed and its production units, and the personnel and nonpersonnel components of that service. It also emphasizes the need to appraise the existing accounting system and decide on the extensiveness of the cost analysis before taking any action. If the planning process is thoughtfully done, the cost analysis itself will be not only more technically accurate and managerially relevant but also easier to accomplish.

Exhibit 3.1
PLANNING FOR COST ANALYSIS
(Tasks 1-6)



Task 1

Define Purpose and Intended Users of Cost Information

Before undertaking a cost analysis two essential questions must be addressed: (1) What is the purpose of the cost analysis? and (2) Who are the intended users of the cost data? The purpose of a cost study must be well defined and directly related to management information needs. And, the management level using the information that results from the cost study must be clearly identified. For example, a study undertaken for a staff accountant will differ markedly in scope and detail from one performed for a line commander or city councilman. Careful implementation of Task 1 will make the selection of appropriate costing techniques in subsequent tasks more obvious.

Internal policy development and decision making are among the most common rationales for cost analysis. In this area, variations in costing purposes and users can have definite effects on how the cost study is designed. For example:

- One purpose of cost analysis is to provide management information to the police chief and line commanders for planning and budgeting. If this is the case, the cost centers used by the department should parallel the planning and budgeting systems of the overall state or local government in order to maximize the influence of cost information. Thus, the cost centers should reflect the organization structure, programs, or specific services that the jurisdiction uses to plan and budget itself.
- The function of management control can be best served by cost data that isolate the units and persons responsible for incurring the costs. This approach will aid in maintaining accountability for results and in taking remedial action where necessary. In Clinton, for example, information on motorized patrol costs will be considered in appraising the efficiency of the Patrol Division.
- Cost information intended for legislators and program analysts often emphasizes unit costs and the historical pattern of those costs. Given fluctuating levels of service, unit costs are a better productivity measure than the total cost of a service. For example, to impress his City Council with how economical the motorized patrol service has been, the Clinton Police Chief intends to have calculated not only total cost but also unit costs such as the cost per call for service.

- Projected costs may also be useful for executives and legislators interested in the future costs of programs for which initial funding is being requested. These officials need to know the long-term cost implications of authorizing a new program and appropriating funds to get it started.

External reporting is typically a secondary, though equally valid, concern. For cost accounting to federal and state bodies or foundations, careful attention should be paid to the nature and extensiveness of the cost data that these organizations require. Some may demand full cost reporting while others will limit their needs to direct costs. Costs may have to be accumulated at annual, quarterly, or other mandated intervals. Finally, if a purpose of the cost study is comparative analysis, then it should be remembered that the greater the programmatic or structural differences between the jurisdictions being compared, the less valid the cost comparison. Before comparing the costs of motorized patrol in Clinton with the costs incurred for this service in other cities, the Clinton Police Department wants to insure that the comparison jurisdictions share Clinton's governmental structure, socio-economic characteristics, and probably most importantly, method of delivering motorized patrol.

In any event, the cost analyst does not determine the purpose of the cost analysis: the users do. Discussions with top management and other potential users, and a review of standard practices and organizational documents, will help the analyst to identify what should be costed and to whom the cost information should be reported. The analyst's conclusions should be widely circulated prior to the cost analysis so that its audience is fully prepared for and accepts the kind of cost information that will be reported at a future date.

Task 2

Determine Service to be Costed

The purpose of this task is to develop and obtain agreement on the service that will be costed. A service is a program or activity which does not produce a tangible commodity but which nonetheless contributes to the welfare of others. In Clinton's case, it has already been decided that motorized patrol will be the costed service. But, in most jurisdictions, this will be a more difficult task because it requires police administrators, cost analysts, and possibly even executive and legislative officials to agree formally on the service for which cost information will be sought. Since most jurisdictions have limited time and money to invest in cost analysis, the service must be carefully chosen based on the need for information, perceived importance of

the service to overall public safety, and other technical and legal considerations. Police services can be divided into four general categories:*

- Crime repression which includes all services that field policing units engage in to minimize, deter, or eliminate various criminal acts and to keep the peace before enforcement actions are required;
- Crime investigation which includes all incidents of a criminal nature that a police department is obligated to handle, primarily Part I and Part II offenses that are reported;
- Traffic control which includes the services required to minimize or deter traffic accidents which result in personal injury or property damage and to regulate traffic flows and parking on streets; and
- Community service which includes all incidents that are not criminal in nature, primarily civil incidents and other public service calls.

Exhibit 3.2 exemplifies the types of specific police services within each category. In defining the service to be costed, it is important to be as specific as possible and to avoid the combination of major service areas or activities. For example, "crimes against property/repression" and "crimes against property/investigation" are better defined as two separate services rather than joined as "crimes against property/control" or an equally general term. The New Orleans Police Department carefully distinguishes among burglary, auto theft, forgery, and shoplifting in estimating the costs of handling complaints, making arrests, and clearing cases. The California State Highway Patrol makes individual estimates of workload and costs for specific services within the general function of protecting and assisting highway users, e.g., aiding disabled vehicles, administering first aid, and providing travel directions and other information. In addition, priorities must be established among services to guide subsequent decisions on where limited staff time will be invested in measuring costs. Observation, discussions, and surveys can suggest the relative importance of services to police administrators, city or state officials, and the community being served and thereby assist in deciding which service(s) should be costed.**

*Booz-Allen Public Administration Services, Performance and Cost Decision Making System for the Field Policing Function (Los Angeles: California Contract Cities Association, 1972), pp. 10, 32.

**The design and implementation of a cost analysis system (see the discussion of Task 12 in Chapter 5) will simplify not only the estimation of service costs but also the choice of which service(s) should be costed, since the system will make cost data for many services more routinely available.

Exhibit 3.2

EXAMPLES OF SERVICES WITHIN MAJOR SERVICE AREAS

<u>SERVICE AREA</u>	<u>SERVICES</u>
Crime repression	Motorized patrol Foot patrol Aerial patrol Crowd control incidents handled Home security inspections Crime prevention talks given
Crime investigation	Crimes against persons investigated by type (homicide, assault, etc.) Crimes against property investigated by type (auto theft, burglary, etc.) Arrests made and bookings by type Trips for prisoner transportation Warrants or summons served Response to calls for service Court appearances made Criminal case reports written by type
Traffic control	Warnings given by type of violation (parking, moving, etc.) Citations issued by type of violation Traffic accidents investigated Funeral or parade escort Traffic safety talks given Traffic direction tasks Stranded motorists aided Potential traffic accident hazards identified and removed
Community service	Insane persons handled Mail or bank escort Missing persons report written Speech or talk given Public events monitored Animal noise disturbance or injury handled Ambulance escort Lost property report written Lost property recovered Property hazards handled (broken water main, electrical line down, etc.)

Task 3

Determine Production Units for Service Being Costed

As defined in Chapter 2, a production unit is a quantifiable indicator of the extent to which a service has been delivered. It is a physical unit of work that defines the service for purposes of evaluation, e.g., miles, labor hours, etc. It is crucial that the production unit accurately reflect and define the service, as demonstrated in Exhibit 3.3:

Exhibit 3.3

EXAMPLES OF PRODUCTION UNITS

<u>Service</u>	<u>Production Unit</u>
Response to calls for service	Number of responses to calls for service
Ambulance escort	Number of ambulance escorts
Motorized patrol	Number of street miles patrolled
Traffic safety talks	Number of traffic safety talks given
Traffic citations	Number of citations issued

By dividing the number of production units into a total service cost, a unit cost of the service can be determined. For instance, a \$100,000 total cost for bank escorts and the delivery of 1000 bank escorts yields a unit cost per bank escort of \$100. Using the above examples, unit costs could also be calculated for cost per street mile patrolled, cost per traffic safety talk given, cost per citation issued, etc.*

The national mail survey revealed that over 62% of the jurisdictions use unit costs to some extent in managing their financial affairs. These jurisdictions also supplied examples of the unit costs that they considered most useful. In the investigations area, they relied on estimates of cost per arrest, cost per conviction, and cost per case investigated. Unit costs in the patrol area included the cost per mile of motorized patrol, cost per response to call for emergency service, and cost per vehicle in service. The traffic control service area relied most often on the unit cost per citation issued, cost per accident investigated, cost per registered motor vehicle, and cost per arrest for serious violations. The unit costs of administering all the service areas were also considered important, especially the unit cost per citizen, cost per sworn officer, and cost per in-service training hour.

*Ray H. Garrison. Managerial Accounting (Dallas, Texas: Business Publications, 1976) pp. 50-51.

The Clinton Police Department decided to use a range of unit costs in appraising the efficiency of its motorized patrol service. Overall, they planned to break down total costs into the unit cost per call for service, cost per street mile patrolled, and cost per arrest made. For specific resources, they sought to uncover additional unit costs: cost per hour in use for vehicles and buildings and the building cost per square foot.

Task 4

Define Personnel and Nonpersonnel Components of Service Being Costed

To prepare for costing, it is necessary to stipulate the personnel and non-personnel components used directly in providing the service. For example, among the types of personnel components that can be associated with a motorized patrol service are: police officers, sergeants, lieutenants, captains, civilian analysts, communications operators, community service aides, etc. Nonpersonnel components include equipment such as marked patrol vehicles, unmarked vehicles or two-wheeled motorcycles, as well as building space in police headquarters or a garage. With respect to its own motorized patrol service, the Clinton Police Department defined the following components for costing:

- Personnel
 - Supervisors (Lieutenants and Sergeants)
 - Police Officers
 - Communications Operators
- Nonpersonnel
 - Equipment: patrol vehicles (including optional equipment)
 - Building: space in police headquarters used for motorized patrol
- Other
 - Uniform allowance
 - Officer equipment (e.g., handcuffs, weapons)
 - Miscellaneous

Such components may be organized for costing either: (1) as an "individual service unit," e.g., one vehicle and one police officer, or (2) in the aggregate by identifying all the vehicles and police officers in the department that provide patrol services. In both cases, total service costs as well as a cost per service unit would be sought in order to establish standard costs and to facilitate cost comparisons over time. However, as depicted in Exhibit 3.4, in the case of the individual service unit, the unit cost would be the cost of the service unit itself while total service cost would be the cost of the service unit multiplied by the number of service units offered by the police department. On the other hand, if the aggregate approach is

Exhibit 3.4
ALTERNATIVE METHODS OF ORGANIZING FOR COSTING

		Method	
		Individual Service Unit	Aggregate
Type of Cost	Unit Cost	Cost of 1 individual service unit 1 vehicle @ \$10,000 1 officer @ \$15,000 Unit cost \$25,000	Costs of all vehicles and officers providing patrol services ÷ number of units on patrol 100 vehicles @ \$1,000,000 100 officers @ \$1,500,000 Aggregate cost \$2,500,000 ÷ 100 units on patrol Unit cost \$ 25,000
	Total Service Cost	Cost of 1 individual service unit x number of units on patrol 1 service unit @ \$25,000 No. of units x 100 Total service cost <u>\$2,500,000</u>	Aggregate cost of all vehicles and officers providing patrol services Aggregate cost @ \$2,500,000 Total service cost <u>\$2,500,000</u>

taken, total service costs become the costs of all the vehicles and officers in the department providing patrol services whereas unit costs are derived by dividing the aggregate costs by the number of units on patrol.

Services with fairly homogeneous personnel and nonpersonnel components should be listed and costed as individual service units since almost any listing of the components for that service will be "typical." For example, almost all of the patrol units in a particular department may employ a police officer making perhaps about \$15,000 per year and a vehicle costing about \$10,000. In estimating unit costs for patrol in that department, it makes little difference which police officer or vehicle is used in the analysis since the costs of one will be about the same as any other. On the other hand, heterogeneous services entailing a wide range of personnel and nonpersonnel components should be considered in the aggregate since it would be impossible to define a typical service unit. Another police department might staff its patrol units with personnel from police officers earning \$15,000 to captains earning \$30,000 and use vehicles ranging from a \$5,000 motorcycle to a \$10,000 vehicle. It would not be possible to describe a "typical" patrol unit. Under these circumstances, unit costs can best be determined by aggregating the costs of all the components involved in patrol and then dividing by the number of patrol units.

It is important to note that the emphasis in this section has been on components used directly to render the service. Other components will be used indirectly but these are included as an indirect cost of the service. For example, in delivering patrol services, the vehicle and sworn officer will require assistance from a communications facility, supervision from headquarters, and other indirect sources. Rather than listing and costing the many indirect components, they are treated in the aggregate as an indirect cost (see Task 9 in Chapter 4).

An actual example of the use of individual service units in police costing can be drawn from an assessment in the San Diego Police Department of the relative costs in 1976 of 1 and 2 officer patrol units.* The individual service unit for patrol was defined as consisting of: police officer (1 or 2); set of flashlight batteries per officer (1 or 2); patrol vehicle (1); patrol vehicle equipment package, including a mobile radio, PA & siren, red top light, and spot light (1); and a handi-talkie (1).

Personnel, nonpersonnel, and indirect costs were included in the analysis. The personnel cost of the police officer and the nonpersonnel cost of the flashlight batteries were regarded as variable costs in that they would depend on whether 1 or 2 officers were assigned to the patrol unit. The

*John Boydston, et al., Patrol Staffing in San Diego: 1 or 2 Officer Units (Police Foundation/Systems Development Corporation, 1977).

nonpersonnel costs of the patrol vehicle and its equipment package were obviously fixed costs since they would not vary with the number of police officers assigned to the unit. Indirect costs could be viewed as semi-variable since the analysis found that the indirect costs of a 2-officer unit were slightly less than twice that of a 1-officer unit because certain supporting services (e.g., communications) served whole patrol units rather than individual officers.

The end result was that the annual cost of a 1-officer patrol unit was \$142,470 while the 2-officer unit cost \$261,565. Due largely to the disproportionate application of indirect costs and the fixed costs of most nonpersonnel items, the 2-officer option increased the personnel complement of the patrol unit by 100% over the 1-officer option while only increasing costs by 84%.

Task 5

Appraise Existing Accounting System

Before deciding on the extensiveness of cost analysis (Task 6), it is important to appraise the capacity of the existing accounting system to deliver information about service costs. The availability of this information depends on many factors, including:

- availability of source documents recording personnel and nonpersonnel expenditures (work reports, invoices, requisitions, etc.);
- access to the ledgers and journals in which these expenditures are posted;
- use of the accrual or modified accrual bases of accounting rather than the cash basis;
- degree to which the accounting records are kept by operating unit and service as opposed to object of expenditure; and the
- extent to which records have been computerized.

One particularly important factor in the appraisal of the existing system is determining the analyst's access to the journals and ledgers in which expenditures are posted. Virtually all public agencies maintain a current journal that lists financial transactions chronologically as they occur. Most jurisdictions also keep a general ledger which allocates these same transactions

to a specific organization unit, activity, or service. Transactions noted in the journal are noted in the ledger at the end of the month or other accounting period. This process is exemplified in Exhibit 3.5 which shows how transactions entered in the journal in chronological order have to be reclassified in the ledger according to the service for which each transaction was incurred.

Exhibit 3.5

RECONCILIATION OF JOURNAL AND LEDGER ENTRIES

<u>Journal</u>			<u>Ledger</u>
9/12/81	Personnel salaries	\$1,000	A. Motorized patrol
9/12/81	Equipment	9,000	
9/15/81	Supplies	50	
9/15/81	Personnel salaries	1,500	B. Community relations
9/16/81	Mileage allowance	25	
9/18/81	Supplies	80	

For the purpose of costing police services, a journal system of accounting entails a methodical and frequently exhausting search through voluminous monthly records in order to isolate the costs of one service. A ledger system, in contrast, facilitates cost analysis by routinely distributing financial transactions among activities or services. The Arkansas State Police keeps several different computerized ledgers which enable its managers to monitor expenditures by organizational unit, by program that crosses organizational boundaries, by legislative appropriation, or by other cost centers. In small jurisdictions, a manual ledger is frequently maintained and is not very detailed. Expenditures are usually recorded by object classification rather than by activity or service. If the accounting system cannot track expenditures by service, then the police department can set up a system of subsidiary ledgers or a separate cost analysis system which would group expenditures by service for analysis purposes.

Another pivotal factor to consider before starting a cost analysis is the extent to which the jurisdiction's financial records are kept on the accrual or modified accrual bases of accounting rather than on a cash basis. As explained in some detail in Chapter 2, an accrual accounting system facilitates cost analysis by recording financial transactions on a cost basis, i.e., when the resources needed for a service are used, regardless of when they were originally purchased. Tires purchased in 1979, for instance, would not become a cost until they are used in 1980 or even later. Cash accounting focuses on expenditures or cash outlay by recording transactions when the resources are acquired; not when they are used.

However, while the existence of a cash accounting system in a jurisdiction will impede cost analysis, it need not preclude it. Expenditure data recorded under a cash accounting system can be revamped in order to approximate the cost data that would have been automatically recorded using accrual accounting. First, the analyst must decide on the period for which cost information is needed, e.g., a fiscal year, quarter, month, or any other period. Second, the analyst must total the expenditures recorded for this period, deduct the expenditures for resources used in other periods, add expenditures of other periods used in this period, and determine the net costs.

For example, as depicted in Exhibit 3.6, the Clinton Police Department might have spent a total of \$5,000 in 1980 for vehicle maintenance supplies, from which \$4,000 would have to be deducted because those items will not be used until 1981, and to which \$3,000 must be added to account for those items purchased in 1979 but not used until 1980. This would yield a total 1980 cost of vehicle maintenance supplies of \$4,000 (\$5,000 less \$4,000 plus \$3,000). Accounting for costs in this manner thus presents information on financial transactions from the perspective of assessing the actual costs of operation during a relevant time period. It is not, nor is it intended to be, a complete record of all financial transactions.

There are many sources of data for examining a jurisdiction's use of ledgers and journals, its reliance on accrual or cash accounting, and the other factors listed earlier. Organizational documents can be one source, including handbooks or other written instructions for users of the existing system, external audit reports, and samples of the management and financial reports produced by the system. Interviews with top, middle, and first line management will be another source of data. These discussions will reveal any differences between the system "on paper" and its actual operations in the "real world." They may also gauge management's satisfaction with the types of cost information that the system provides. Since so much cost data collection occurs out of habit instead of due to a careful assessment of information needs, there is a high probability that the interviews will indicate that significant amounts of data are collected that are not needed and needed data are not collected. Both the organizational documents and interviews may even disclose that no "system" really exists and that cost information is collected and reported irregularly, if at all.

The results of these inquiries will have to be considered very carefully before proceeding with the cost analysis. To some extent, the kind of cost information that can be collected, and the manner and timing of its collection, will depend on the support of the existing system. The existence of an inadequate system, or the absence of any system, need not prevent a cost analysis but it will make the effort more difficult and time consuming. If this should be the case, the guidelines in Chapter 5 on how to design and implement a cost analysis system may be especially useful.

Exhibit 3.6

RECONCILIATION OF EXPENDITURES AND COSTS*

19XX-1979	1980	1981-19XX
	Current expenses for vehicle maintenance supplies	
	\$5,000	
	<u>Less</u>	
	Expenditures for vehicle maintenance supplies that will not be used until 1981	
	\$4,000 ----->	
	<u>Plus</u>	
	1979 expenditures for vehicle maintenance supplies that will be used in 1980	
----->	\$3,000	
	<u>Equals</u>	
	<hr/>	
	1980 COSTS OF VEHICLE MAINTENANCE SUPPLIES	
	<u>\$4,000</u>	

*Adapted from: Edward S. Lynn and Robert S. Freeman, Fund Accounting (Englewood Cliffs, New Jersey: Prentice Hall, 1974), p. 647.

Task 6

Decide on Extensiveness of Cost Analysis

As discussed in Chapter 2, efforts to calculate the total cost of providing a service must consider two kinds of costs: direct and indirect. Direct costs generally include the expenses of salaries, supplies, and materials that can be readily measured and directly attributed to the service being provided. An indirect cost is one which is incurred for several services and is not therefore readily identifiable with a specific service, e.g., the expenses of utilities, buildings, and equipment. After direct costs have been determined and directly charged to the service being costed, the remaining costs become indirect, are added together to form a "pool" of costs, and then distributed among the pertinent services in a rational and logical manner. The distinction between direct and indirect costs has to be judgmental in most cases based not only on the relationship of the cost to the service but also on the feasibility of collecting the cost information. Minor direct cost items may be classified as indirect for reasons of practicality.

Not every cost analysis needs to account for the total cost of a given service. Indeed, the national mail survey and case study research suggest that most service cost estimates are based on direct costs with only a few jurisdictions, notably Sunnyvale and San Diego, California, attempting to add some consideration of indirect costs.

Studies focusing only on major direct cost elements are often justified because of limited information needs, lack of time or money for the analysis, or an awareness that indirect costs may only account for a negligible portion of total costs. Frequently, much effort is required to track down indirect costs with the results not being materially different from what would have been obtained had these costs been merely estimated or not even measured. At other times, indirect costs may be substantial and not including them in the analysis would lead to unrealistically low total cost estimates. A trade-off between analysis effort and cost information benefit must be addressed and the extent of cost analysis limited to what is both practical to collect and useful in management decision making.

Essentially, therefore, cost analysis can be conducted on any one of three levels. As will be explained in Chapter 4, each level accounts for an increasing proportion of total cost:

- Direct personnel costs only;
- Direct personnel and direct nonpersonnel costs; or
- Direct personnel and nonpersonnel costs and indirect costs.

Chapter 4: Doing Cost Analysis

Outline

MEASURE DIRECT PERSONNEL COSTS

Time Required

Direct Personnel Costs

MEASURE DIRECT NONPERSONNEL COSTS

Fixed Assets

Other Nonpersonnel Costs

Direct Nonpersonnel Costs

MEASURE INDIRECT COSTS

DETERMINE TOTAL COST

REPORT RESULTS

Characteristics of Effective Reporting

Reporting Mode

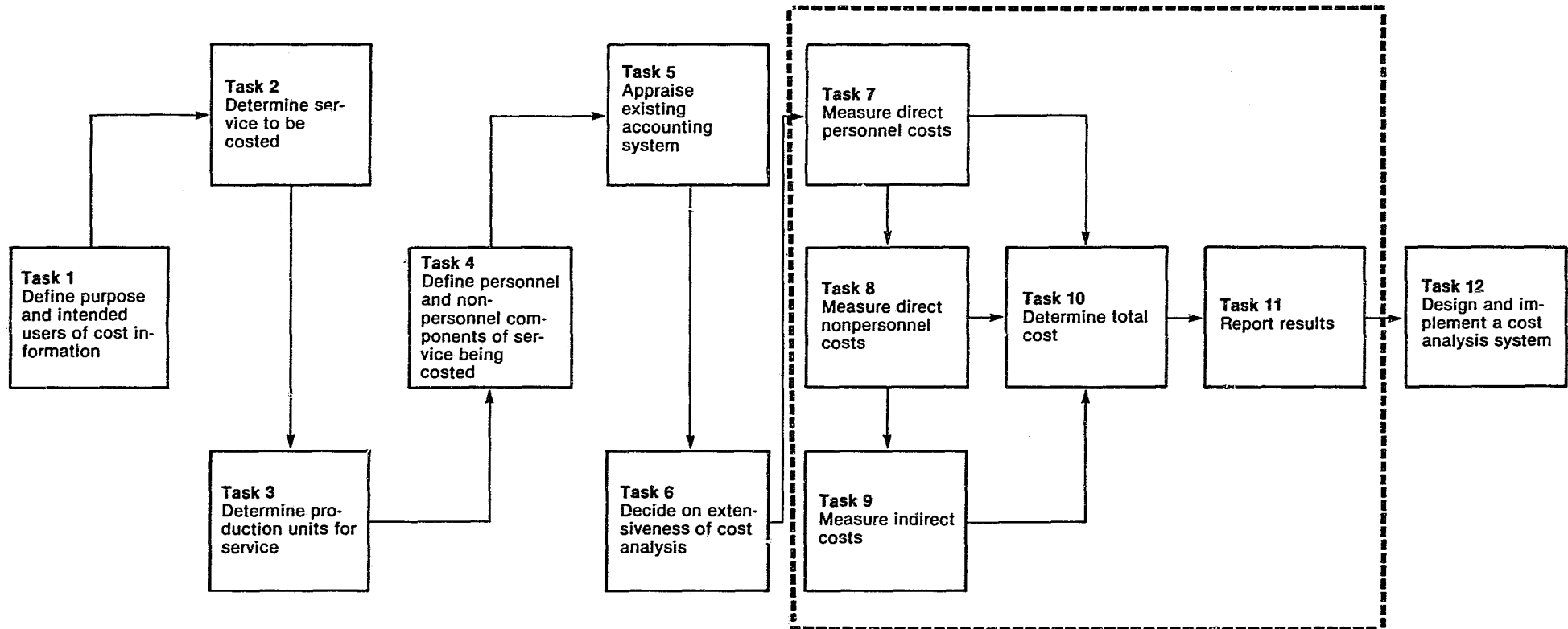
Types of Reports

Once the cost analysis has been planned, the actual cost analysis may be carried out. Essentially, doing a cost analysis is a management control problem, i.e., ensuring that the analysis conforms to the plans adopted and to the best interests of the organization. If major deviations from the plan occur, and they are inappropriate, steps must be taken to get the analysis "back on track." However, even the best-laid plans cannot be rigidly followed; some flexibility is needed to take advantage of unexpected opportunities and to cope with unanticipated difficulties.

Chapter 4 presents the tasks (7-11) involved in doing a cost analysis. Portrayed in Exhibit 4.1, these tasks entail measuring personnel and nonpersonnel costs, possibly both direct and indirect; estimating total costs; and reporting the results in a clear and understandable fashion.

Exhibit 4.1
DOING COST ANALYSIS
(Tasks 7-11)

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Task 7

Measure Direct Personnel Costs

Typically, personnel costs account for most of the costs of a police service. Up to 90% of total service costs has been attributed to personnel expenses, although the exact percentage varies from department to department and depends principally on salary levels and the extent to which the service utilizes equipment and other nonpersonnel resources.* The personnel costs of a given service can be measured by estimating the time required to deliver the service and then calculating the cost of that time in salaries and fringe benefits.

Time Required

In determining the time requirements of a given police service, the cost analyst occasionally can rely on an automated management information system that is capable of reporting the time spent by each employee on discrete tasks or services. Each service is assigned a unique account code which may also identify the department and organization unit providing the service, e.g.:

04-002-195

Police Department	_____	_____
Investigations Bureau	_____	_____
Crimes against persons	_____	_____
investigation		

In the San Diego Police Department, each account code is called a "job order." These codes are entered on the payroll reporting forms (usually time sheets or time cards) completed weekly or bi-weekly by each employee.

In most instances, however, the payroll accounting system is not set up to isolate the time requirements of specific services because of two problems: the system does not have service oriented reporting forms nor does it insure that the forms are properly completed. The first problem relates to the format of the payroll reporting form, i.e., work hours can be reported by organization unit or employee but not by service. For example, a police officer in Precinct #11 has all his work hours charged to that unit's salary account because he cannot specify on his time card how many of those hours

*George D. Eastman and Samuel G. Chapman, Short of Merger: County-wide Police Resource Pooling (Lexington, Massachusetts; Lexington, 1976), p. 116.



were spent on bank escorts, preventive patrol, traffic control, and other services. Or, as is the case with the Arkansas State Police, work hours may be reportable by service but only one service per employee per payroll period can be noted on the time sheets, thus failing to account for the delivery of multiple services by the same employee. Exhibit 4.2 addresses this first problem by illustrating a service-oriented time card used in Sunnyvale, California. Each week the police officer enters the number of hours worked on one or more of the tasks recognized by the city government's accounting system. Each task has a unique number, e.g., 41101 (provide non-emergency police services), 41122 (conduct bicycle safety operations). The first digit in the task number (4) identifies that task as belonging to the Department of Public Safety; the next two digits when added to the first (411) denote Police Services within the department, and the last two digits (01,22) specify the exact task. This numbering system permits payroll cost data to be aggregated not only by task but also at higher levels in the organizational structure. In addition to entering work hours, the police officer also notes any hours spent on vacation, sick leave, and other activities. Both the officer and his/her supervisor sign the card before submitting it for payroll processing.

The second problem concerns how the forms are completed. Account codes may be entered incorrectly or the work hour entries may be rough estimates rather than exact figures. One way to minimize these errors is being considered in San Diego where the City Auditing Department wants the Police Department to check and verify each time sheet before submitting it for payroll processing. It is hoped that this verification procedure will not only correct mistaken entries but also prevent them from happening in the future by making personnel more aware of the need to complete their time sheets as carefully as possible. An alteration in the reporting form might also reduce the error rate. Going back to the Sunnyvale example, it may be advantageous to add extra columns to the form which would allow the police officer to record work hours daily instead of just weekly. While these additional columns would lengthen the form, they would permit a more detailed reporting of time allocations by task which would be easier for the supervisor to check. Further, they would encourage the police officer to use the time sheet or card as a "running record" by recording the hours worked each day rather than waiting until the end of the week when recollections may be hazy about tasks performed and time spent earlier in the week.

But if the payroll accounting system just cannot provide reliable service time data, these estimates must be done manually by one of several methods:

- Recording start and end times for various services on dispatch or incident cards through voice communications and time stamping between field units and dispatchers;
- Using work sampling to determine time requirements for various services by randomly observing service delivery;

Exhibit 4.2
SERVICE ORIENTED TIME CARD

NAME John Miller				
DATE 20 AUG 81		EMPLOYEE NUMBER 16977		
TASK NUMBER	ACCOUNT CODE	HOURS	UNITS	DEPT USE ONLY
41101	1	32		
41122	1	8		
41188 COMP TIME	16 ACCUM		RECORD ACTUAL AS FOR OT	
41188 COMP TIME	17 USED		RECORD ACTUAL AS FOR REG.	
TASK NUMBER	ACCOUNT CODE	HOURS	LEAVES	
78100	4		VACATION	
78100	5		HOLIDAY	
78100	6		SICK LEAVE	
78100	7		WORKER'S COMP.	
78100	8		FAMILY LEAVE	
78100	9		DEATH LEAVE	
78100	10		MILITARY LEAVE	
78100	11		JURY LEAVE	
78100	12		MEDICAL LEAVE	
78100	13		WITHOUT PAY	
78100	14		SPECIAL LEAVE	
TOTAL HOURS:		40		
EMPLOYEE'S SIGNATURE:		QP 810		
SUPERVISOR'S SIGNATURE:		<div style="text-align: center;">   </div>		

- Using daily work reports or supervisor reports to estimate service delivery time;
- Having supervisors periodically estimate the time requirements for selected services; or
- Employing time and motion studies to measure time requirements of recently instituted services without a long "track record."

Whether the time estimates are generated automatically or manually, the end result should be a listing of the total and unit amounts of time required for each service. The Wisconsin Department of Transportation summarizes service time estimates for its state patrol on the form shown in Exhibit 4.3. The form distinguishes between performance data on the number of traffic activities conducted and time data on the traffic hours expended. In addition, the first few columns on the form provide overall statistics on total duty hours, total patrol hours, and total mileage as well as selected unit time estimates such as patrol hours per contact. Time data can be entered on the form at varying levels of specificity, from individual troopers to regional districts to the entire state.

The Clinton Police Department was able to make total and unit time estimates on an annual basis through its payroll reporting system and selective interviewing. Its service time estimates, although not as extensive as those done by the Wisconsin Department of Transportation, still included the total work hours consumed by the service, performance data expressed in production units, and a calculation of the number of units that could be delivered in an hour. These data are presented in Exhibit 4.4.

Exhibit 4.4

SERVICE TIME ESTIMATES

<u>Service</u>	<u>Total Work Hours</u>	<u>Production Unit</u>	<u>Units Per Hour</u>
Bank escort	100	300 escorts	3.00 .
Funeral escort	50	100 escorts	2.00
Prisoner Transportation	245	475 trips	1.94
Court appearances	3,000	1,500 appearances	.50
Safety talks	150	450 talks	3.00
Motorized patrol	76,059	40,000 service calls	.53

Exhibit 4.3

DISTRICT-TROOPER MONTHLY WEEKLY ACTIVITY REPORT
MVD 4224-75

District No. _____ FOS Month(s) _____ 19____

State of Wisconsin/Department of Transportation

[illegible]

Direct Personnel Costs

The resultant time estimates can then be multiplied by the costs of that time (in terms of salary and fringe benefits) to calculate direct personnel costs. If the jurisdiction's payroll records isolate specific service costs, the task of calculating the direct personnel costs of a service is a simple matter of retrieving the appropriate documents, checking them for accuracy and timeliness, and noting the direct personnel costs for a year or other time period. However, as was suggested in Chapters 1 and 2, local payroll records frequently do not provide this type of information and direct personnel costs for individual services must be estimated manually.

Manual personnel costing usually involves a four-step process: (1) inventory the various personnel classifications that are directly engaged in providing the service, (2) calculate the average cost of each personnel classification, (3) determine an average hourly cost rate for the classification, and (4) multiply the hourly rate by the service time estimates to determine the total direct personnel cost for the service.

1. Inventory personnel classifications. The first step in determining direct personnel costs is to inventory which personnel classifications or job types are directly engaged in providing the service. Personnel classifications commonly used by police departments include: police officer, sergeant, lieutenant, captain, police cadet, civilian analyst, communications officer, reserve officer, etc. In Clinton's case, the staffing arrangement for motorized patrol involved supervisors (lieutenants and sergeants), police officers, and communications operators.*

2. Calculate average cost of each classification. As discussed in Chapter 2, personnel costs include both salaries and fringe benefits. These costs can be determined for a given week, month, quarter or, as in this case, year. An examination of payroll records should reveal the average annual salaries paid to employees in each personnel classification.** Fringe benefits are

*Recalling a prior discussion in Task 4 about homogeneous and heterogeneous services, these service costs can be calculated either as individual service units when the components are similar (homogeneous) or, as in this case, in the aggregate when the components are different (heterogeneous).

**It is also possible to estimate an annual salary for the classification by using the highest or middle step in the classification. Most public agencies use "steps" to subdivide their major personnel classifications in order to gain some flexibility in compensating personnel even within the same classification based on merit or seniority. For example, the classification of "captain" may have a pay range of \$28,000 to \$30,000 which is broken down into five steps: (1) \$28,000, (2) \$28,500, (3) \$29,000, (4) \$29,500 and (5) \$30,000. In this situation, the highest step would be \$30,000 and the middle step \$29,000.

usually a fixed percentage of the annual salary (typically between 20-40%) and include the costs of pensions and insurance. Accurate fringe benefit data should also be included in the payroll records although some jurisdictions pool their fringe benefits in a separate, citywide account which may complicate the establishment of a fringe benefit rate for police. Confronted with this problem, the Clinton Police Department figured its fringe benefit rate based on the actual fringe benefits and salaries paid over a period of 12 months:

$$\frac{\text{Actual fringe benefits (\$ 775,000)}}{\text{Total salaries (\$2,200,000)}} = 35\% \text{ fringe benefit rate}$$

Exhibit 4.5 shows how the Clinton Police Department used this fringe benefit rate, and the salary data obtained from payroll records, to calculate the average annual cost of each personnel classification involved in motorized patrol.

Exhibit 4.5

CALCULATION OF AVERAGE COSTS OF EACH PERSONNEL CLASSIFICATION

<u>Average Costs</u>	<u>Personnel Classifications</u>		
	<u>Supervisors</u>	<u>Police Officers</u>	<u>Communications Operators</u>
Average annual salary	\$22,000	\$15,000	\$14,000
Fringe benefits @35% of salary	7,700	5,250	4,900
Totals	\$29,700	\$20,250	\$18,900

In addition to helping estimate the total costs of a service, the step of calculating costs by personnel classification may suggest opportunities for cost savings by identifying activities which might be appropriately handled by:

- part-time rather than full-time employees in order to take advantage of the reduced fringe benefit packages typically available to part-time personnel;
- civilian rather than sworn personnel in order to save on salary and fringe benefit costs; and
- lower level personnel (like a community services officer rather than a police officer).

3. Determine hourly cost rate. An average hourly cost rate for each personnel classification can be established by dividing total costs by the number of work hours in the same time period. Work hours are defined as hours when the employee is actually available for service delivery and not hours used for vacation, sick leave, etc. As illustrated in Exhibit 4.6, Clinton calculated the average work hours for its full-time employees in the same way that the San Diego Police Department does:

Exhibit 4.6

CALCULATION OF WORK HOURS

Total days in year		365.0
Less:		
Weekend days	(104.0)	
Average vacation days	(13.0)	
Scheduled holidays	(9.0)	
Average sick leave	(8.0)	134.0
Total work days		231.0
Hours per day		<u>X 8</u>
Average work hours per year		<u>1,848.0</u>

This figure of 1,848 work hours per year can then be divided into the average annual costs of each personnel classification to determine an average hourly rate, as shown in Exhibit 4.7.

Exhibit 4.7

DETERMINATION OF HOURLY COST RATE

<u>Personnel Classification</u>	<u>Average Cost</u>	<u>Average Work Hours</u>	<u>Average Hourly Rate</u>
Supervisors	\$29,700	1,848	\$16.07
Police Officers	20,250	1,848	11.01
Communications Operators	18,900	1,848	10.23

The average hourly rates for each personnel classification involved in providing the service should be kept separate whenever possible, especially if the rates are significantly different and averaging them across classifications would be misleading. Separate hourly rates multiplied by separate service time commitments by each classification yield the most precise estimates of total personnel costs. However, if the hourly rates for the various classifications are reasonably close, or if the number of work hours expended on individual services cannot be broken down by personnel classification, then an aggregate average hourly rate across all classifications may be appropriate.

This aggregate hourly rate may be unweighted or weighted. An unweighted average would sum the average hourly rates of each classification and divide by the number of personnel classifications which might skew the aggregate average toward the extremely high or low hourly rate of a classification with few positions contributing to the service. For example, an unweighted average of \$15 per hour might have been equally influenced by the \$20 hourly rate of a classification with only two positions in the service and the \$10 rate of a classification with 300 service-connected positions. A weighted average would reflect the varying levels of commitment to the service by each personnel classification by first multiplying the hourly rates of each position by the number of full time equivalent positions in that classification involved in the service. The results of these individual computations would be summed and then divided by the total number of positions involved in the service, e.g., $(\$20 \times 2 \text{ positions}) + (\$10 \times 300 \text{ positions}) = \$3,040 - 302 \text{ total positions} = \$10.06 \text{ weighted aggregate average hourly rate.}$

The Clinton Police Department could not allocate the total work hours spent on motorized patrol to specific personnel classifications. Thus, they examined both unweighted and weighted averages, as evidenced in Exhibit 4.8, and then selected the weighted average rate of \$11.57 per hour as most accurate.

4. Calculate total direct personnel costs. Multiplying the hourly rate (whether an individual rate for each personnel classification, unweighted average rate, or weighted average rate) by the service time estimate determines the service's total direct personnel cost. As shown in Exhibit 4.9, the Clinton Police Department used a weighted average rate and an estimate of the total work hours expended on the service in determining service personnel costs for the year. With a weighted average hourly rate of \$11.57 and time estimates of 76,059 work hours spent on motorized patrol, the total direct personnel cost of this service was about \$880,000.

Exhibit 4.8

COMPARISON OF UNWEIGHTED AND WEIGHTED AGGREGATE
AVERAGE HOURLY COST RATES

<u>UNWEIGHTED AVERAGE</u>		<u>WEIGHTED AVERAGE</u>	
<u>Position Classification</u>	<u>Average Hourly Rate</u>	<u>Number of Positions Involved</u>	<u>Total</u>
Supervisors	\$16.07	x 8 Supervisors	= \$128.56
Police Officers	11.01	x 40 Officers	= 440.40
Communications Operators	<u>10.23</u>	x 10 Operators	= <u>102.30</u>
Total:	\$37.31	Total:	\$671.26
Divided by number of classifications	$\div 3$	Divided by number of positions	$\div 58$
Unweighted Average:	\$12.44/hour	Weighted Average:	\$11.57/hour

Exhibit 4.9

CALCULATION OF TOTAL DIRECT PERSONNEL COST

<u>Average Hourly Rate</u>	X	<u>Service Time Estimate</u>	=	<u>Direct Personnel Cost</u>
\$11.57		76,059 work hours		\$880,000

Dividing total personnel cost by number of production units generated by the service can yield a range of unit cost estimates. Exhibit 4.10 portrays unit costs of three production units generated by motorized patrol in Clinton.

Exhibit 4.10

CALCULATION OF UNIT DIRECT PERSONNEL COSTS

<u>Direct Personnel Costs</u>	÷	<u>No. of Production Units</u>	=	<u>Unit Personnel Cost</u>
\$880,000		40,000 calls for service		\$22.00 per call
\$880,000		330,000 miles patrolled		2.67 per mile
\$880,000		2,500 arrests		352.00 per arrest

As suggested previously, the cost analysis could be stopped at the point when direct personnel costs are known. These costs constitute the highest percentage of total costs in almost all cases. If this particular cost analysis were ended now, the total annual cost of motorized patrol would be synonymous with its direct personnel costs, or \$880,000. If it is felt that direct personnel costs alone are not enough, the analyst would then proceed to measure direct nonpersonnel costs and add them to the total, which was what Clinton did.

Task 8

Measure Direct Nonpersonnel Costs

Nonpersonnel costs include the costs of materials and supplies, fixed assets, travel and transportation, contractual services, and miscellaneous charges. They can be classified as either direct or indirect costs depending on the ability to assign the costs to a specific service. Nonpersonnel costs can be accumulated directly by organizational unit or service when an agency has established the appropriate account codes and has charged nonpersonnel

expenses to the code assigned to the service being costed. Otherwise, non-personnel costs must be identified using available and possibly voluminous financial records and posted separately to service cost summaries.

For costing purposes, nonpersonnel costs fall into two categories: (1) fixed assets, and (2) other nonpersonnel costs. This distinction recognizes both the relative importance of fixed assets in measuring the total costs of a police service and the unique way that a fixed asset is costed.

Fixed Assets

Fixed assets are buildings and equipment with a useful life greater than one year which are used in providing a service. Both capital costs and operating costs are incurred in using a fixed asset. Capital costs are incurred in purchasing the asset whereas operating costs result from maintaining and utilizing it.

1. Equipment Cost. The cost of equipment required in rendering a service needs to be computed and annualized, as follows:

- Annualized capital costs should be estimated by taking purchase price, less resale or salvage value, divided by the useful life to the police department which is usually three years for patrol vehicles and 5-10 years for other equipment. This capital cost (or "depreciation") becomes part of the annual cost of equipment.
- Annual operating costs for fuel, insurance, supplies, maintenance and repair (parts and labor) should be calculated.
- Annual percentage of time that the equipment is used exclusively by the service being costed should be computed.
- Resultant data can be used to determine the annual equipment cost incurred by the service as well as the unit cost per operating hour, or mile, or other production unit.

Exhibit 4.11 depicts how these costing procedures were employed by the Clinton Police Department in calculating the equipment costs of patrol vehicles. It reveals that, when capital and operating costs were considered, the use of patrol vehicles in motorized patrol annually cost the

Exhibit 4.11

CALCULATION OF EQUIPMENT COST

$$\begin{aligned}\text{Annual Equipment Cost} &= (\text{Annualized Capital Cost} + \text{Annual Operating Cost}) \times \text{Percent Time Used by Service} \\ &= (\quad \$2,000 \quad + \quad \$3,000 \quad) \times \quad 100\% \\ &= \underline{\$5,000} \text{ Per Vehicle or } \underline{\$55,000} \text{ for Service (11 Vehicles @ \$5,000 Each)}\end{aligned}$$

$$\begin{aligned}\text{Where Annualized Capital Cost} &= \frac{\text{Purchase Price} - \text{Resale Value}}{\text{Useful Life}} \\ &= \frac{\$7,500^* - \$1,500}{3 \text{ Years}} \\ &= \$2,000\end{aligned}$$

$$\begin{aligned}\text{Unit Equipment Cost} &= \frac{\text{Annual Vehicle Cost}}{\text{No. Miles Driven}} \quad \text{or} \quad \frac{\text{Annual Vehicle Cost}}{\text{No. Hours in Use}} \\ &= \frac{\$5,000}{30,000 \text{ Miles}} \quad \text{or} \quad \frac{\$5,000}{8,000 \text{ Hours}} \\ &= \underline{17\text{¢ Per Mile}} \quad \text{or} \quad \underline{63\text{¢ Per Hour}}\end{aligned}$$

*Includes package added to each vehicle: radio, gun racks, PA & siren, red top light, and spot light.

department \$5,000 per vehicle and \$55,000 for the entire patrol vehicle fleet.

In fact, the purchase and maintenance of vehicles is the largest single equipment cost incurred by most police departments. The Arkansas State Police has its own vehicle monitoring system that tracks each vehicle's year and price of purchase, estimated useful life, repair costs, and operating costs. The system is computerized and can calculate vehicle costs at any level, i.e., by total fleet, by troop, by make or model, or by individual vehicle. This information has assisted the State Police in deciding when to replace each vehicle and in purchasing the most economical replacements. Vehicle utilization and cost studies have also been done by police agencies in Houston, Minneapolis, Rochester (New York), Atlanta, and the State of California.

2. Building Cost. Annual occupancy costs of facilities used in delivering a service should be ascertained in this manner:

- Annualized capital costs should be computed by adding construction costs and interest costs (if any), and dividing by the estimated useful life of the structures involved. Most buildings can be depreciated over an estimated useful life of 50 years.
- Annual operating costs should be estimated for all police facilities for items such as insurance, maintenance, and housekeeping.
- The percentage of building space used by the service is calculated by dividing the space used by the service being costed by the total gross space of police facilities (both expressed in square feet) and then multiplying the result by the percentage of time that the space is used exclusively by the service.
- Adding annual operating and capital costs and multiplying by the percentage of space allocated to the service being costed determines the total annual building cost incurred by the service as well as various unit costs.

As illustrated in Exhibit 4.12, the Clinton Police Department employed these procedures in estimating the annual building cost of motorized patrol. Based on the assumption that motorized patrol occupied about 20,000 square feet of the space at police headquarters (which had total space of 50,000 square feet), the total building cost attributable to this service was \$25,500. Much of this cost, as the exhibit suggests, was due to heavy interest charges on the funds borrowed to finance construction--a contributor to building costs that is becoming very significant.

Exhibit 4.12

CALCULATION OF BUILDING COST

$$\begin{aligned}\text{Annual Building Cost} &= (\text{Annualized Capital Cost} + \text{Annual Operating Cost}) \times \text{Percent of Space Used by Service} \\ &= (\quad \$50,000 \quad + \quad \$35,000 \quad) \times \quad 30\% \\ &= \underline{\$25,000} \text{ Annual Building Cost of Motorized Patrol}\end{aligned}$$

$$\begin{aligned}\text{Where Annualized Capital Cost} &= \frac{\text{Construction Cost} + \text{Interest Charges}}{\text{Useful Life}} \\ &= \frac{\$1,500,000 + \$1,000,000}{50 \text{ Years}} \\ &= \$50,000\end{aligned}$$

$$\begin{aligned}\text{Where Percent of Space Used} &= \frac{\text{No. Sq. Ft. Used by Service}}{\text{No. Sq. Ft. in Building}} \times \text{Percent Time Used by Service} \\ &= \frac{20,000 \text{ Sq. Ft.}}{50,000 \text{ Sq. Ft.}} \times \quad 75\% \\ &= 30\%\end{aligned}$$

$$\begin{aligned}\text{Unit Building Cost} &= \frac{\text{Annual Building Cost}}{\text{No. Sq. Ft. Used by Service}} \quad \text{or} \quad \frac{\text{Annual Building Cost}}{\text{No. of Hours in Use}} \\ &= \frac{\$25,500}{20,000 \text{ Sq. Ft} \times 75\%} \quad \text{or} \quad \frac{\$25,000}{8,760 \text{ Hours Per Year}} \\ &= \underline{\$1.70 \text{ Per Sq. Ft.}} \quad \text{or} \quad \underline{\$2.91 \text{ Per Hour}}\end{aligned}$$

For both equipment and buildings, a schedule should be established for depreciating these fixed assets by individual units, i.e., buildings, pieces of equipment, or a group of pieces, such as typewriters or chairs, which are alike and purchased as a group. This will enhance the accuracy of the depreciation taken each year and prevent the depreciation of a fixed asset for more than its originally cost. The suggested schedule shown in Exhibit 4.13 is adapted from a schedule used by the State of Illinois.* One line has been filled out to demonstrate an appropriate use of this costing tool.

Other Nonpersonnel Costs

Other nonpersonnel costs consist primarily of items which fall in the "operating expense" category like telephone, printing, minor equipment purchase and repairs, office supplies, etc. These items usually account for only 3-5 percent of the annual cost of most police services. If the cost analyst has good reason to believe that this small percentage applies to the police service being costed, and it would be difficult to allocate individually the other nonpersonnel costs to this service, the costs should be included in the indirect cost pool.

On the other hand, other nonpersonnel costs should be considered as direct costs if they can be readily attributed to the service being costed, even if they are relatively minor. Minor direct nonpersonnel costs can be allocated directly to the service being costed by adding a flat 3-5 percent charge to total direct costs. A second method would be to take the total of the other nonpersonnel costs incurred by the jurisdiction or department and allocate these costs to each service based on its relative personnel costs. Hence, if motorized patrol consumes a certain percentage of the total personnel costs of the jurisdiction or department, that percentage is added to the costs of the service to cover its other nonpersonnel costs. The Department of Public Safety in Sunnyvale, California uses a third method that involves apportioning miscellaneous nonpersonnel costs to specific tasks based on the percentage of total departmental work hours that each task consumes.

However, if these other nonpersonnel costs constitute a significant portion of total service costs, they should be measured more exactly. For example, a community information service is likely to incur unusually high printing costs for handouts, flyers, and brochures which would be underestimated if they were not costed separately. In this case, other nonpersonnel costs can be calculated by surveying expense reports and materials

*Cited in Charles T. Roberts and Allen R. Lichtenberger, Financial Accounting (Washington, D.C.: National Center for Educational Statistics, 1973), p. 66.

Exhibit 4.13
FIXED ASSETS AND DEPRECIATION SCHEDULE

Buildings	Original Cost	Depreciation in Prior Years	Balance of Cost Remaining	Estimated Useful Life	Life Remaining	Depreciation Current Year	Depreciation Remaining
01	\$ 1,500,000	\$ 150,000	\$ 1,350,000	50 yrs	45	\$ 30,000	\$ 1,320,000
02							
03							
Equipment							
Vehicles							
A							
B							
C							
D							
Other (list)							
TOTALS	<u>\$</u>	<u>\$</u>	<u>\$</u>			<u>\$</u>	<u>\$</u>

requisition forms, either by computer or manually.* Unless unique account codes have been established for each service and noted on these forms whenever a nonpersonnel cost was incurred, interviews and observation may have to be used by the cost analyst to identify to which service or services the nonpersonnel cost can be allocated. As mentioned in Chapter 1, the Arkansas State Police had to do just that in attempting to reconstruct the costs already incurred for its handling of the disturbances at Fort Chafee.

An example of a materials requisition form which would avoid such ex post facto recollections and thus expedite the determination of service costs is presented in Exhibit 4.14. The form is a composite of forms currently used by several respondents to the mail survey. It allows the person requesting the materials not only to identify which items are needed but also to enter a billing code which will be used to charge a specific service for the cost of each item. For example, the billing code on the form for traffic tickets denotes the Department of Public Safety (4), Patrol Division (11), and the particular traffic service for which the traffic tickets are needed (98). The costs of the portable radio batteries and burglary prevention pamphlets are charged to other service accounts.** In most cases, the initiator of the materials request will complete the basic information at the top of the form as well as the columns labelled "Item," "Unit," "Description," "Quantity Requested," and "Billing Code." The request should then be approved by the initiator's supervisor and forwarded to the supply department. The supply department completes the "Quantity Issued" and "Cost" columns; indicates on the bottom of the form which staff member(s) filled the order, priced each item, and entered the transaction on the inventory record; and ultimately sends the materials back to the person who requested them. Multiple copies of the form with the transaction data completed should be kept by the initiator, supply department, and accounting department for eventual cost data collection.

A special issue in costing materials and supplies is how to handle inventory. If the materials and supplies are acquired over an extended period of time at different prices, what cost should be charged when an item is issued to be used in a service: actual cost, replacement cost, or average cost? To illustrate the effects of each approach, assume that a police department

*Since the key definition of cost is resources used regardless of when acquired, purchase orders should not be used in estimating other non-personnel costs because these will only indicate the ordering or receipt of an item rather than its actual use.

**Whenever items of nonpersonnel cost are shared among several services, the cost of the shared item must be divided among the services in proportion to its use. For example, a \$2,400 equipment cost incurred equally in support of both patrol and investigations services would have to be split \$1,200 to patrol and \$1,200 to investigations.

Exhibit 4.14
MATERIALS REQUISITION

MATERIALS REQUISITION						No. 16938											
Deliver to <u>Room 818 - DPS</u>		Date <u>7 Oct. 81</u>															
Requested by <u>John Miller</u>		Approved by <u>Robert Johnson</u>															
Department <u>Public Safety/Patrol</u>																	
Item	Unit	Description	Qty. Reqt'd.	Billing Code	Qty. Issued	Cost											
						Unit	Total										
3791	Book	Traffic Tickets	2	41198	11	3.00	6.00										
0437	-	Portable Radio Batteries	6	41151	1111	1.00	6.00										
0910	lot	Burglary Prevention Pamphlets	1	41120	1	10.00	10.00										
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Filled By</td> <td style="width: 20%;">Priced by</td> <td style="width: 20%;">Entered by</td> <td style="width: 20%;">Received By</td> <td style="width: 20%;">Date</td> </tr> <tr> <td>JCT</td> <td>LR</td> <td>LR</td> <td>John Miller</td> <td>9 Oct. 81</td> </tr> </table>								Filled By	Priced by	Entered by	Received By	Date	JCT	LR	LR	John Miller	9 Oct. 81
Filled By	Priced by	Entered by	Received By	Date													
JCT	LR	LR	John Miller	9 Oct. 81													

acquires tires for its patrol vehicles in two lots: (1) 1980/100 tires @ \$60 each and (2) 1981/100 tires @ \$70 each. Also assume that one day a materials requisition form is sent to the storeroom which requires the issuance of 10 tires from the 1980 lot to the patrol division. What would be the cost of those tires to the patrol division?

- The actual cost approach would charge the patrol division for the actual cost of the 1980 tires, i.e., \$60 each.
- The replacement cost approach would charge the patrol division for the most recent cost (the approximate cost to replace the tires in inventory) even though the 1980 tires had a lower purchase price. Thus, the patrol division would be charged the 1981 purchase price of \$70 each.
- The average cost approach would charge the patrol division for the average cost of all the tires in stock, i.e., \$65 each.

The actual cost approach is recommended whenever materials and supplies can be easily identified as belonging to a particular lot and they are purchased in bulk at low cost. However, this approach would be awkward if frequent purchases are made at different prices or it is not feasible to label each item with an invoice price in order to identify the used unit with its actual cost. It has been argued that costing based on the average cost of all units of an item in stock would be advantageous if inventory consists of many items low in unit cost and especially if prices are subject to frequent change because the average cost approach minimizes the effects of unusually high or low prices and it is mathematically easy to calculate.

At times of high inflation, however, the replacement cost approach is preferred because it reflects how much it will cost the jurisdiction to replace the item in stock. There may be a substantial difference between the purchase price and current price which means that charging a service with the actual or average cost of an item will not recover enough money to replace it. Moreover, since the materials and supplies are used to deliver a current service, the cost of the item should reflect current prices. Finally, the replacement cost approach places the fewest demands on inventory record keeping since it does not require the labelling of every item to fix its actual cost nor the perpetual revision of average cost estimates as items are added to inventory. It simply charges the service for the present market value of whatever item is used.*

*Further discussion of materials costing methods can be found in: Adolph Matz and Milton Usry, Cost Accounting (Cincinnati, Ohio: Southwestern, 1980) pp. 318-324.

The Clinton Police Department considered several items as "other nonpersonnel costs" in measuring the costs of motorized patrol. These included the annual uniform allowance as well as the articles furnished each sworn officer such as leather goods, weapons, badge, handcuffs, etc. Since these articles were presumed to last five years, the annual cost would be one-fifth (20%) of the original purchase price. In addition, the Clinton cost analysts added another \$10,000 to cover miscellaneous expenses as shown in Exhibit 4.15. By these calculations motorized patrol's annual other nonpersonnel costs totaled \$26,500.

Exhibit 4.15

CALCULATION OF OTHER DIRECT NONPERSONNEL COSTS

$$\begin{aligned}
 \text{Other Direct Nonpersonnel Costs} &= \frac{\text{Purchase Price Item \#1}}{\text{Useful Life}} + \frac{\text{Purchase Price Item \#2}}{\text{Useful Life}} + \text{etc.} \\
 &= \frac{\$235 \text{ Uniform Allowance} \times 60 \text{ Officers}}{1 \text{ Year}} + \\
 &\quad \frac{\$200 \text{ Officer Equipment} \times 60 \text{ Officers}}{5 \text{ years}} + \\
 &\quad \frac{\$10,000 \text{ Miscellaneous Expenses}}{1 \text{ Year}} \\
 &= \$14,100 \text{ Uniforms} + \$2,400 \text{ Equipment} + \$10,000 \text{ Miscellaneous} \\
 &= \underline{\$26,500}
 \end{aligned}$$

Direct Nonpersonnel Costs

After other nonpersonnel costs are measured, and the results added to equipment and building costs identified earlier, the analyst has identified the service's primary nonpersonnel costs. Exhibit 4.16 indicates that with equipment costs of \$55,000, building costs of \$25,500, and other nonpersonnel costs of \$26,500, the total annual direct nonpersonnel cost of motorized patrol in Clinton was \$107,000.

Exhibit 4.16

CALCULATION OF TOTAL DIRECT NONPERSONNEL COST

<u>Nonpersonnel Cost</u>	<u>Item</u>	<u>Total</u>
Equipment	Patrol Vehicles (11)	\$ 55,000
Building	Space at Police Headquarters	25,500
Other	Uniform Allowance	14,100
	Officer Equipment	2,400
	Miscellaneous	<u>10,000</u>
		\$107,000

At this point, the Clinton Police Department could have ended the analysis, just as they could have ended it after Task 7 when direct personnel costs were known. Stopping the analysis after the computation of direct nonpersonnel costs in Task 8 expands the definition of total cost to include not only the direct personnel cost of \$880,000 but also the direct nonpersonnel cost of \$107,000. Thus, the total annual cost of motorized patrol at this point is \$987,000.

Task 9

Measure Indirect Costs

Once the direct personnel and nonpersonnel costs of a service have been determined, only indirect costs need be identified in order to complete a full cost analysis. This Program Model has defined indirect costs as those expenses which cannot be readily allocated to a specific service, because either the costs were incurred for the common good of several services or the costs were so minor as to make it impractical for both time and effort reasons to charge them directly to a specific service. Examples of possible indirect costs included the capital and operating costs of buildings, equipment, and other fixed assets; costs of heat, light, telephone and other utilities; and the costs of data processing, payroll, personnel, accounting and other central staff units. Indirect costs are simply added together to form a "pool" of indirect costs which are then distributed in a fair and equitable manner among the services that incurred them.

If these costs can be conveniently and concretely traced to the service being costed, then they are direct costs with respect to that service, as was the case in the previous task when building and equipment costs were treated as direct nonpersonnel costs. However, if a cost cannot be readily assigned to a particular service, then it is an indirect cost of that service. This often happens when many services are housed in the same building, use the same equipment, or are assisted by the same staff units.

Whether or not to measure indirect costs depends on their anticipated amount and on the difficulty expected in isolating and allocating them to a particular service. If indirect costs are insignificant and would be too expensive or time-consuming to measure, the cost analyst can properly omit them. Yet there are good reasons for endeavoring to identify indirect costs, including obtaining a true picture of total cost when indirect costs are substantial and recovering a portion of indirect costs incurred in support of federal grants. Furthermore, it also has application in productivity analysis when comparing the unit costs of alternative ways of delivering the same service. Unit costs may differ not only because one way is more efficient than the other but also because the cost estimates are based on incompatible definitions of what constitutes a direct cost. For example, a police department that compares the direct costs of contracting out for vehicle maintenance versus handling that activity itself may be confounded by the tendency of prospective contractors to reduce their direct costs by classifying certain expenses as indirect. Unless the full costs, both direct and indirect, are included in the analysis, it will be virtually impossible to compare the two alternatives fairly.

In many jurisdictions, an indirect cost rate already exists and should be used whenever possible to figure indirect service costs. Usually established by a federal or state auditing agency, the indirect cost rate is a fixed percentage of total direct costs or direct labor costs, and its use can save the cost analyst considerable time and money. The city or state finance department is the cognizant agency with respect to the existence of an indirect cost rate.

In situations where the rate has not been set, or is thought to be outdated or unreliable, indirect costs must be determined locally. There are several steps that should be followed in measuring indirect costs. They involve: (1) an identification of the sources of indirect cost, (2) determination of a basis for allocating indirect costs to a particular service, (3) determination of the type of indirect cost rate, and (4) application of that rate to the service being costed. The methodology for executing these steps is explained in Appendix D.

In the case of motorized patrol, Appendix D suggests several alternative bases for allocating indirect costs to this or any other service, including

direct personnel or labor costs. Such a basis might lead the cost analyst to allocate 50¢ in indirect costs for each \$1.00 for direct personnel costs incurred by the service. Hence, in Clinton, the \$880,000 in direct personnel costs incurred by motorized patrol would prompt an indirect cost allocation of \$440,000. Adding this \$440,000 in indirect costs to the \$880,000 in direct personnel costs and the \$107,000 in direct nonpersonnel costs estimated previously would result in a total cost estimate for motorized patrol of \$1,427,000.

Task 10

Determine Total Cost

Depending on information needs and the data collection capacities of the police department, "total cost" can be defined as (1) direct personnel costs, (2) direct personnel and direct nonpersonnel costs, or (3) direct personnel costs and direct nonpersonnel costs plus indirect costs. The three methods of calculating total costs are illustrated below in Exhibit 4.17.

Exhibit 4.17

ANNUAL COST OF MOTORIZED PATROL

	(1)	(2)	(3)
	Direct Personnel Costs	Direct Personnel Costs + Direct Nonpersonnel Costs	Direct Personnel Costs + Direct Nonpersonnel Costs + Indirect Costs
Direct Personnel Costs	\$880,000	\$880,000	\$880,000
Direct Nonpersonnel Costs		107,000	107,000
Indirect Costs @ 50¢ per direct labor dollar			440,000
TOTAL COST	\$880,000	\$987,000	\$1,427,000

The approaches require an increasing amount of effort to account for an increasing proportion of total cost. In this example, the direct personnel costs approach (#1) accounts for 62% of total cost while the other approaches account for 69% (#2) and 100% (#3) of total cost, respectively. It is important to note that although considering indirect costs allows the analyst to account for 31% more of the true total cost, such consideration can add far more than 31% to the time and expense invested in the cost analysis. As argued previously, careful attention must be given to the trade-offs between additional accuracy and additional effort when deciding on the extent of a cost analysis.

The mail survey and site visits suggest that most jurisdictions routinely analyze direct personnel costs and direct nonpersonnel costs but have to make a special effort to include indirect costs. "I consider myself lucky to be able to estimate the direct costs of a service," remarked a police manager in a large city, "and just do not have the time or the skills to uncover the indirect costs which are probably minor in any case." Alexandria, Virginia is a jurisdiction that focuses almost exclusively on direct costs. The Arkansas State Police and San Diego manually calculate the indirect costs of police services and then add these costs to the direct costs that their information systems regularly provide. Sunnyvale is one of the few cities that automatically considers indirect costs in estimating the total and unit costs of its police services.

Exhibit 4.18 is a worksheet that can be used to summarize the results of a cost analysis at different levels. A separate worksheet should be maintained for each service being costed. Cost data should be extracted from the accounting and payroll systems where this information is available or developed from invoices, requisitions, labor allocation reports, etc. Instructions are provided below for completing the various sections of the worksheet.

SECTION

INSTRUCTIONS

- | | |
|-----|-------------------------------------------------------------------------|
| (1) | Describe the exact service to be costed. |
| (2) | Indicate the period of service for which cost data have been collected. |
| (3) | Name the person or persons performing the analysis. |
| (4) | Identify the organizational unit responsible for the analysis. |
| (5) | Indicate the date on which the analysis was completed. |

Exhibit 4.18
COST SUMMARY WORKSHEET

Service (1) <i>Measure cost of motorized Patrol</i>				Analyst (3) <i>John Miller</i>			
Period of Analysis (2) <i>1/1/82 - 12/30/82</i>				Unit (4) <i>Patrol</i>			
				Date Completed (5) <i>2/1/83</i>			

Source Document		Direct Personnel Cost		Direct Nonpersonnel Cost			Indirect Cost
(6) Date	(7) Description	(8) Hours	(8) Cost	(9) Equipment	(9) Building	(9) Other Non-personnel	(10)
<i>7/15/82</i>	<i>Payroll Summary 1st half</i>	<i>41,000</i>	<i>\$484,000</i>				
<i>1/15/83</i>	<i>Payroll Summary 2nd half</i>	<i>34,227</i>	<i>\$396,000</i>				
<i>12/30/82</i>	<i>1982 General Ledger</i>			<i>\$55,000</i>	<i>\$25,000</i>		
<i>12/30/82</i>	<i>Invoice #4072</i>					<i>\$26,000</i>	
<i>1/20/83</i>	<i>Attached analysis</i>						<i>\$440,000</i>
(11) Subtotal			<i>\$880,000</i>			<i>\$107,000</i>	<i>\$440,000</i>
(12) TOTAL			<i>\$880,000</i>			<i>\$987,000</i>	<i>\$1,427,000</i>

- (6) List date or dates on which costs were posted for each line item entry.
- (7) Specify the management report, payroll record or ledger, purchase or material requisition, invoice number, etc. that is the source document supporting the entry.
- (8) List hours and direct personnel dollars incurred in each reporting period.
- (9) If appropriate, list nonpersonnel costs of buildings, equipment, and other costs of items actually used in delivering the service. Inventory does not become a cost until used.
- (10) If appropriate, list indirect costs and attach supplementary worksheet explaining the indirect costs considered, and how they were calculated.
- (11) Subtotal the costs in each column so that direct personnel, direct nonpersonnel, and indirect costs can be analyzed separately.
- (12) Keep a running total of costs accumulated as a result of including additional types of cost.

If desired, an inflation rate can be applied to the total costs in order to compare costs over several years. Otherwise, the effects of escalating inflation on purchasing power will prevent the tracking of total or unit costs in terms of "constant dollars." Discussed earlier in Chapter 2, the Consumer Price Index can be used to determine the appropriate inflation rate which can then be applied to the total costs noted in Exhibit 4.18.

Total cost can be analyzed more thoroughly by considering its unit costs. As shown previously, unit costs are calculated by dividing total cost by the volume of one or more production units generated by the service. By relating costs to outcomes, these unit cost figures help in monitoring the efficiency of service delivery, especially if "standard" unit costs have been established which service managers are expected not to exceed. Unit costs can also be used to compare the costs incurred for the same service by different agencies since the unit cost estimate, unlike total cost, is independent of the dissimilar volumes of production units that the agencies might generate. Exhibit 4.19 depicts the unit total costs of three production units involved in the Clinton Police Department's motorized patrol service.

Exhibit 4.19

CALCULATION OF UNIT TOTAL COSTS

<u>Total Cost</u>	<u>÷</u>	<u>No. of Production Units</u>	<u>=</u>	<u>UNIT TOTAL COSTS</u>	<u>Unit Personnel Costs</u>	<u>Unit Nonpersonnel Costs</u>	<u>Unit Indirect Costs</u>
\$1,427,000		40,000 calls for service		\$35.67 per call	\$22.00	\$2.67	\$11.00
\$1,427,000		330,000 miles patrolled		4.32 per mile	2.67	.32	1.33
\$1,427,000		2,500 arrests		570.80 per arrest	352.00	42.80	176.00

Task 11

Report Results

The final and potentially most important step in cost analysis is the reporting of results. These reports will provide the information necessary for public officials in general and police managers in particular to: (1) operate their agencies in an efficient and economical manner and take remedial actions when appropriate, (2) report to funding bodies and the general public on the discharge of their responsibilities in administering the programs of the agency and the use of resources under their direction, (3) report generally on the results of organizational activities and the use of public funds, and (4) confirm and report legal compliance with statutory or administrative regulations governing the acquisition and expenditure of resources.* Yet, even the most painstaking and exhaustive cost study will not serve these purposes unless it is reported in an effective manner, in a way that managers can understand and use.

Characteristics of Effective Reporting

To be of value, cost information must be used. To be used, it must be understood by managers with or without backgrounds in accounting. Effective information usage depends on the form and method of the reporting techniques, whether written, oral, or visual. Some of the characteristics that are required for effective reporting are:**

- Relevance. Reports should relate to the organization chart, i.e., they should be directed at the individuals responsible for the resources and services covered by the report. Providing detailed information on the cost of accident investigations to the person in charge of the burglary detail, for example, is probably a waste of time. Another waste would be giving top management the detailed operational cost statements that would be more useful to middle and lower level management.
- Consistency. Reports should be consistent in form and content each time they are issued so that they become increasingly familiar to managers and increasingly used.

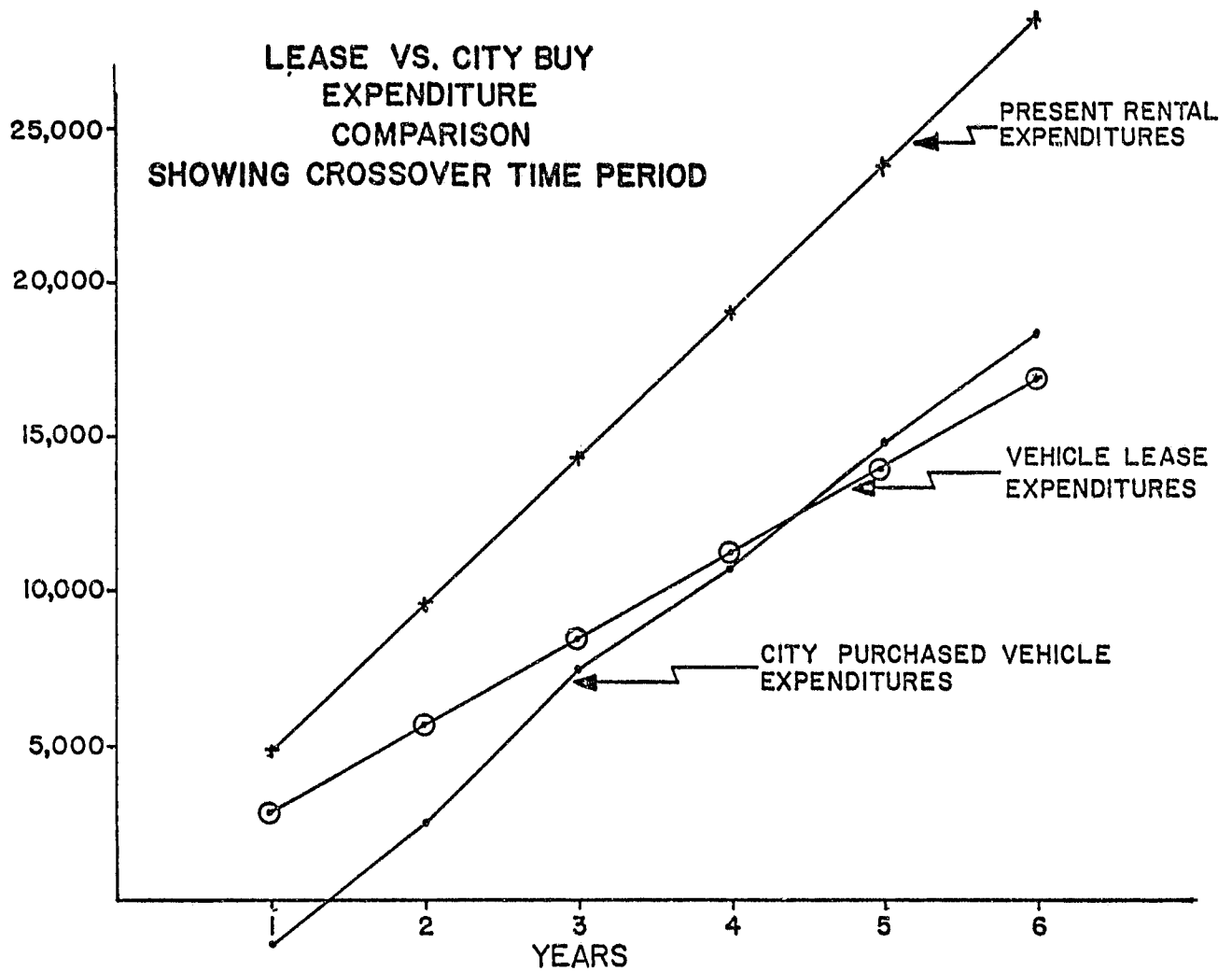
*Robert G. May et al., A Brief Introduction to Managerial and Social Uses of Accounting (Englewood Cliffs, New Jersey: Prentice-Hall, 1975), p. 62.

**Matz and Usry, op. cit., pp. 286-287. See also: U.S. General Accounting Office, op. cit., pp. 39-53.

- Timeliness. Reports should be issued promptly in accordance with established reporting periods so that information is available when it is expected and needed.
- Clarity. Reports should be easy to understand and free of complicated accounting jargon that confuses the typical manager.
- Conciseness. Reports should convey sufficient but not excessive detail. They should be designed to satisfy the management information needs that prompted the cost analysis, no more and no less. Further, the higher the management level receiving the report, the less detailed the report should be. Top management should be most interested in reports on total cost by service whereas lower levels may need data on specific types of cost and the units incurring them.
- Comparative. Reports should offer comparative figures (a comparison of actual versus budgeted costs or of standard unit costs with actual unit costs) and should isolate variances (differences between actual costs and the costs originally budgeted or expected). Comparisons among jurisdictions with similar political and socioeconomic characteristics may also be pertinent. This is what the Clinton Police Department did in attempting to show the City Council that the costs of its motorized patrol service compared favorably with the costs incurred in neighboring cities.
- Physical. Reports for operating management should be stated in physical units (work hours, miles driven, etc.) as well as in dollars to facilitate cost control and accountability for results. The Clinton Police Department, as has been noted, performed the cost calculations needed to report the total costs of motorized patrol as well as unit costs per call for service, mile patrolled, and arrest.

One example of a report that is technically acceptable yet understandable to the typical manager was the Phoenix Police Department's lease vs. buy analysis for unmarked patrol vehicles cited earlier in Chapter 1. To provide top managers with an overview of the report's purpose, conclusions, and recommendations, it was prefaced by a brief executive summary on paper stock of a different color than the main body of the report. The main body had many descriptive tables and diagrams (such as that presented in Exhibit 4.20) comparing the costs of the present monthly rental arrangement with the potential costs of yearly vehicle leases and city purchased vehicles. Exhibit 4.20 clearly demonstrates that: (1) the costs of yearly leased vehicles and city-purchased vehicles are always less than the costs of monthly rentals and

Exhibit 4.20
LEASE VS. BUY ANALYSIS
Phoenix, Arizona 1979



(2) leased vehicles become more economical than city purchased vehicles after 4-1/2 years (noted on the diagram at the point where the trend lines representing each option intersect).

A second example of effective reporting was an analysis of police officer personnel costs done by the Houston Police Department. The report attempted to measure the payroll and fringe benefit costs of the typical police officer in the department. Rather than presenting a series of tables which might have been factually accurate but uninteresting, the authors used the pie chart in Exhibit 4.21 to depict what part of the personnel cost dollar was composed of various cost elements: pay for time worked (61.6¢), pay for time not worked (11.4¢), fringe benefits outside base payroll (19.7¢), etc. Such a graphic illustration plainly shows the large proportion of personnel costs that is not directly connected with service delivery.

Reporting Mode

The Phoenix and Houston examples suggest one way of effectively reporting cost information, i.e., a formal, written presentation. However, as illustrated in Exhibit 4.22, there are many ways of disseminating the results of a cost analysis in a clear and understandable fashion, including both oral and written methods. An increasing number of police departments are turning to computer printouts as the most efficient reporting mode. The mail survey revealed that about 88% of the jurisdictions routinely report police expenditures to their management teams. Of those that report, 91% use computerized output and only 9% report manually, usually by memorandum.

The most appropriate method will vary with local needs and resources. Invariably, some form of written report will have to be presented (either manual or computerized) in order to document the cost analysis and preserve its results. In cases where cost analysis is new to the organization or a particular report is highly visible, the written presentation is often supplemented by an oral presentation. Individual or group meetings provide the cost analyst with an opportunity to answer questions about the study and to respond to criticisms. But whatever reporting mode is selected, it should be as simple as possible in order to compete successfully for the time and, more importantly, the attention of busy police managers.

Types of Reports

A cost report can involve a range of cost data and analyses: from straightforward computations of a service's major personnel and nonpersonnel costs to sophisticated multivariate analysis of costs, effects, and benefits. The composition of any single report will depend on many factors, including:

Exhibit 4.21
DISTRIBUTION OF POLICE OFFICER DOLLAR COST
Houston, Texas 1979

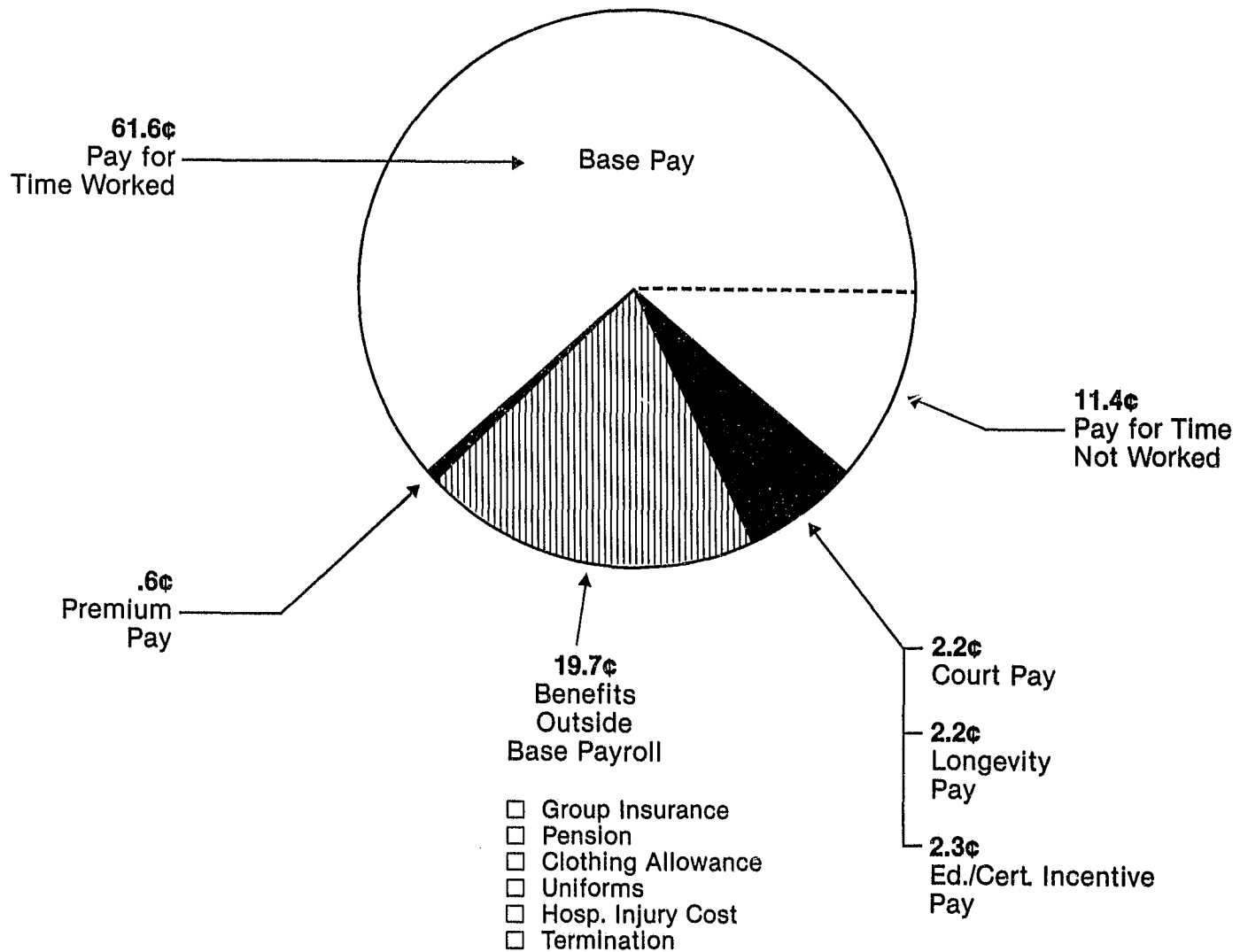
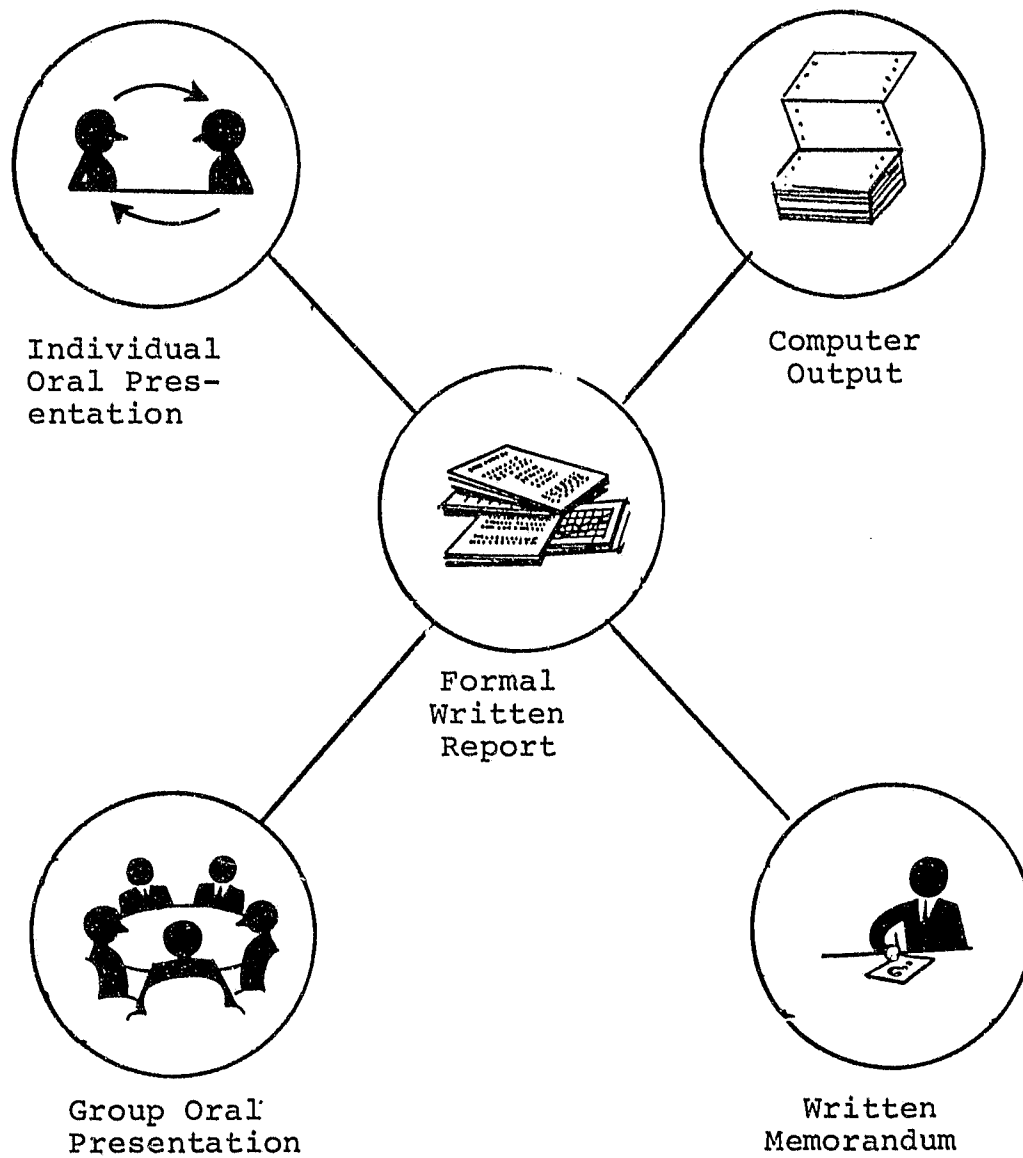


Exhibit 4.22
ALTERNATIVE REPORTING MODES



- definition back in Task 1 of the purpose of the study which should have strongly influenced how the study was designed and what cost information should be reported.
- availability of particular kinds of cost information, especially information about indirect costs and other "hidden" costs;
- identification of management functions which should be aided by particular kinds of cost information, i.e., planning, budgeting, controlling, evaluating, pricing, and external reporting; and
- specification of the target audience(s) who need particular kinds of cost information, including police top managers, police operating managers, police planners and researchers, fiscal managers in central finance, budget, or auditing departments, public officials (mayors, city managers, legislators, etc.), and the general public.

These factors interact in different ways in different situations to produce different types of reports. For example, cost information reported by organizational unit is most useful for preparing the unit's budget, controlling its operations, and evaluating its performance and is most helpful to police top managers, police operating managers, and central fiscal managers. Reports on the full costs of providing certain services assist in establishing a fair price for the service and an equitable fee, e.g., fees for bicycle and taxi licenses or an inter-jurisdictional service contract. Finally, information about a service's costs and benefits is most useful to police planners and researchers as well as to central fiscal managers in budgeting the police department and in evaluating its effectiveness.

Exhibit 4.23 offers a more systematic way of examining the relationships among the kinds of cost information, management functions, and target audiences. It cross-references various kinds of cost information that can be reported (organized by type of cost, level of cost, timing of cost, and impact of cost) with the management functions and target audiences that such a report would best serve. It assumes that one report usually contains more than one kind of cost information. An "X" suggests a primary function or audience for that kind of cost information. Most of the cross-references were based on the mail survey and in-depth field visits in which respondents suggested a number of management functions and audiences that can be helped by specific kinds of cost information.

However, since the exhibit is meant to be illustrative of the most common practices in police cost reporting, it should not be used to limit the

Exhibit 4.23
TYPES OF REPORTS

Kind of Cost Information Reported		Primary Management Contribution						Primary Target Audience					
		Planning	Budgeting	Controlling	Evaluating	Pricing	External Reporting	Police Top Managers	Police Operating Managers	Policy Planners & Researchers	Control Fiscal Managers	Public Officials	General Public
By Type of Cost	Personnel Costs	X	X	X	X			X	X	X	X		
	Nonpersonnel Costs	X	X							X	X		
	Indirect Costs		X				X			X	X		
	Full (Total) Cost	X	X		X	X	X	X	X			X	X
	Unit Cost	X		X	X	X			X		X	X	X
By Level of Cost	Specific Service	X	X	X	X	X	X	X	X	X	X	X	X
	Organization Unit		X	X	X			X	X		X		
	Department-Wide	X	X					X		X		X	
	Intergovernmental Comparison				X	X	X	X		X		X	X
By Timing of Cost	Historical	X	X			X				X	X	X	
	Current Period			X					X	X	X		
	Fiscal Year-to-Date			X					X	X	X		
	Projected	X	X			X				X	X	X	
	Current vs. Projected	X	X		X				X	X	X		
	Actual vs. Budgeted		X	X	X			X	X	X	X	X	
By Impact of Cost	Cost-Effectiveness Analysis	X	X	X	X		X	X	X	X	X	X	X
	Cost-Benefit Analysis		X		X					X	X		

reporting of cost information to particular functions or audiences. The exhibit is descriptive rather than prescriptive of the ways in which cost information assists management decision making.

The mail survey also revealed more specific examples of the types of reports that have been prepared. Each jurisdiction was asked to list the police cost studies they had done as a basis for allocating human or financial resources. The examples provided ranged from the costs of substantive crime analysis to the costs of purely administrative functions. Most frequently cited were studies of the costs of responses to calls for service and the costs of patrol vehicles. Other examples included cost analyses of:

- gasoline pricing and usage;
- proposed precinct consolidation;
- out-of-state recruiting of police applicants;
- use of civilians in police communications;
- early retirement programs;
- federal grant administration;
- overtime reduction; and
- court appearances.

Chapter 5: Installing a Cost Analysis System

Outline

COMPONENTS OF A COST ANALYSIS SYSTEM

- Administrative and Operational Systems
- Management Reporting System
- Information Retrieval System

PRECONDITIONS TO SYSTEM INSTALLATION

- Top Management Support
- Support from Outside Agencies
- Availability of Qualified Staff
- Assignment of Organizational Responsibility

STEPS IN SYSTEM DESIGN AND IMPLEMENTATION

NEED FOR COMPUTER SUPPORT

- In-House Computer versus Outside Services
- Rental or Purchase of In-House Computers
- Incompatible Data Processing Systems

Thus far cost analysis has been treated as a special, almost idiosyncratic, organizational function consisting of eleven tasks. It might seem that successful cost analysis involves the analyst selecting a service to be costed, planning and doing the cost analysis, and moving on to the next service. Such an approach would likely prevail in the short run, and produce pertinent cost information while it lasted, but would fade over time as the staff changes or as the novelty of cost analysis evaporates. Although knowledge of the technical costing terms, concepts, and classifications is essential for reliable cost analysis, this knowledge alone is insufficient to guarantee that cost information will become an integral part of management decision making.

To ensure that cost analysis is successfully incorporated into the everyday functioning of the police department, it is necessary to focus on a twelfth task: the design and implementation of an ongoing cost analysis system. The relationship of this task to the previous eleven tasks is portrayed in Exhibit 5.1. The system would be an integrated and interdependent array of mechanisms and procedures that would routinize the collection, processing, and reporting of cost information. It would ensure that cost analysis becomes as natural to managers as the other management responsibilities with which they have long been familiar, i.e., planning, budgeting, staffing, etc. The purpose of this chapter, therefore, is to describe the components of a cost analysis system, establish a few preconditions for its successful installation, suggest the steps appropriate to systems design and implementation, and offer guidance on computer support.

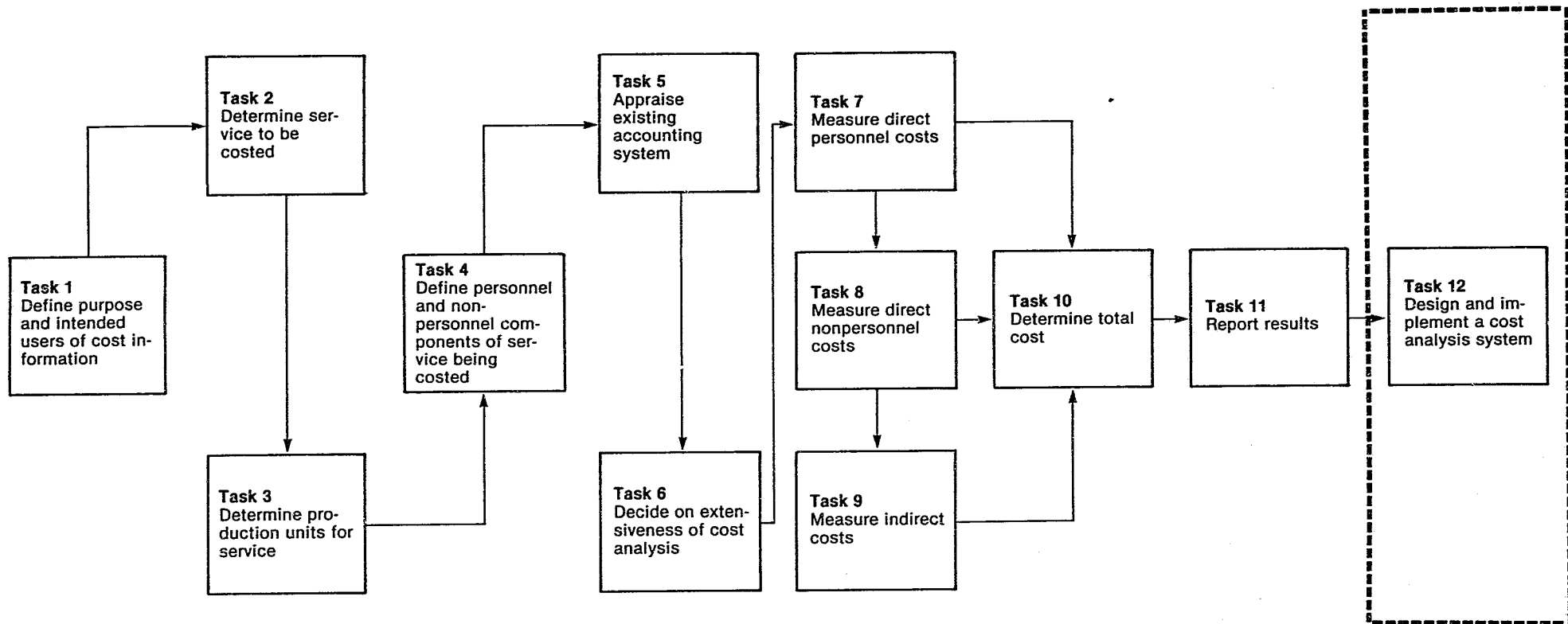
Components of a Cost Analysis System

The observation that data become information when they are put in a form that can be used in decision making summarizes the basic objective of a cost analysis system. Its immediate aim is to provide reliable cost information in a readily available and understandable form to the persons involved in the management of the organization. Ultimately, the system is intended to promote the use of cost information in the widest possible range of strategic and tactical decisions.

A cost analysis system can be operated manually or with the aid of a computer. As will be argued in a subsequent section of this chapter, the issue of whether or not to install a cost analysis system is separable from the issue of the extent to which that system should be computerized. Smaller jurisdictions may be able to perform acceptable cost analyses by hand or with programmable calculators while larger jurisdictions with more extensive information needs and resources will usually install or use a computerized system. To be sure, a computer reduces the probability of computational error and increases the speed of calculation, but requires a substantial investment of human and financial resources.

Whether computerized or manual, the effectiveness of the cost analysis system will depend, in large measure, on the extent to which its components are compatible with the components of the organization's overall information system. The incremental costs of adding a cost analysis capability are less when the cost system can be appended to an existing information system than when the system has to stand on its own. Integrating the cost and general information system also reinforces the notion that cost information is just part of the basic knowledge that all managers need in order to operate.

Exhibit 5.1
INSTALLING A COST ANALYSIS SYSTEM
(Task 12)



An information system consists of those elements of the organization concerned with the acquisition, processing, transmission, and presentation of information useful to management, including cost information. As shown in Exhibit 5.2, an information system has several sub-systems or components, each of which serves a unique purpose: routine administration and operations, management reporting, and information retrieval. All components share a common data base from which they extract the information they need for their own analyses and to which they contribute information possibly needed by another component. Information in a common data base applicable to cost analysis would include financial data on the amount of cash on hand, personnel rosters and payroll figures, and inventory acquisition and use as well as operational data relevant to the estimation of unit costs, e.g., the number of arrests made or miles driven in a given accounting period. How each component and the information contained in the common data base serves the cost analysis system is described below.

Administrative and Operational Systems

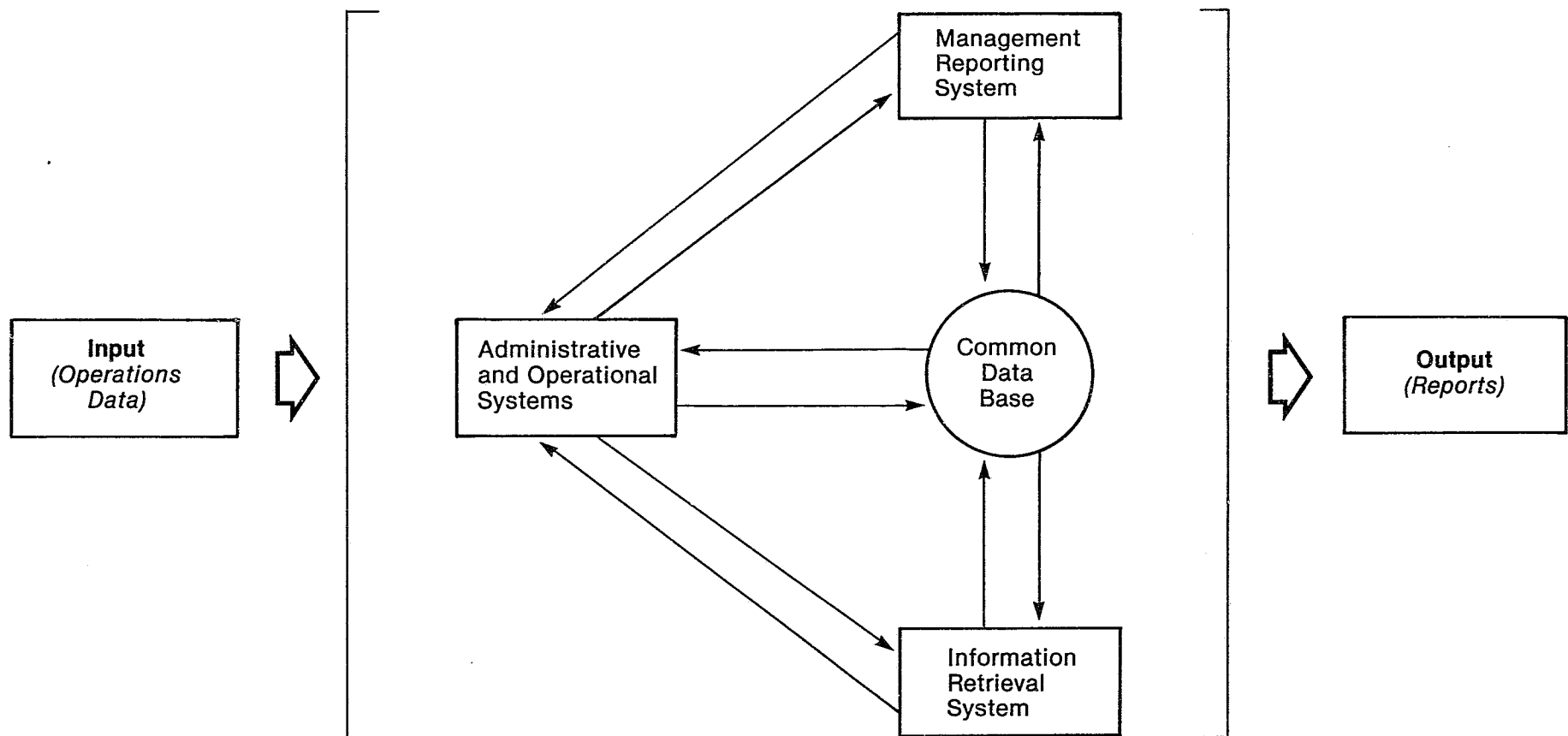
This component supports the organization's routine functions, e.g. maintenance of personnel records, scheduling of inventories, etc. In the financial area, this component handles the payroll, accounts receivable and payable, and internal audit. In many organizations, these functions are mechanized and computer supported and are referred to as "data processing." In others, the functions have been reduced to manual procedures which are undertaken or overseen by staff members.

The greatest proportion of the data and information processed by an administrative and operational system serves the routine functions for which it is primarily responsible, e.g., issuing payroll checks, paying bills from vendors, monitoring personnel turnover, etc. However, some of this information may also be useful to the cost analyst. For example, payroll data may be essential in establishing the personnel costs of a specific police service.

Management Reporting System

The purpose of the management reporting system is to present managers at all levels in the organization with reports that are useful to them in their day-to-day decision making. It can produce reports required for control of the use of resources; reports relating to the efficiency of operations; and reports relating to effectiveness in achieving goals and objectives as a function of resources expended. These reports should include information found

Exhibit 5.2
INFORMATION SYSTEM COMPONENTS



from experience to be required regularly and periodically in the management process, e.g., actual versus planned costs by organization unit or service or the total costs of a particular accounting period.

In operation, the management reporting system provides timely and consistent reports following a previously agreed upon format and schedule. The content and level of detail of management reports typically varies according to the intended audience: higher level managers receive more aggregated and summarized information while mid- and lower-level managers receive more specific reports. In designing its financial management system, the State of Arkansas worked with managers at all levels to define the form and content of the reports that each manager would receive. For example, the state police director is likely to receive only the most general form of cost report, broken down by major operating units, whereas a bureau chief or troop commander will receive much more detailed information about the officers and services under his jurisdiction. The structure of the management reporting system therefore follows the management structure of the organization which it serves.

Exhibit 5.3 represents the information produced by the computerized management reporting system used by the Arkansas State Police. It arrays the same costs in different formats to meet legislative mandates or the information needs of executive officials. The first format follows the state government's program budgeting structure by showing the costs of the program element entitled DP [Data Processing] Services which is at the most discrete level of the program structure. The system also has the potential of aggregating element costs to higher levels of the program structure, i.e. to the unit, section, activity and, ultimately, agency levels.* The second format identifies specific line item expenditures within the program element, e.g. data processing service center, lease of terminals. The third format takes these same dollars and allocates them by appropriation, or the legislative authority to spend funds, and by grouped line item (character) amounts within each appropriation. Thus, diverse information needs at varying levels of specificity can be met by scanning this one report.

Information Retrieval System

The information retrieval system has a function similar to that of the management reporting system in that it provides information to all levels of management as required by them in their daily work activities. However, while the reports provided by the management reporting system are structured

*A more detailed explanation of the Arkansas' program structure is contained in the Arkansas State Police's case study in Chapter 6.

Exhibit 5.3

SAMPLE OUTPUT OF A MANAGEMENT REPORTING SYSTEM

PAB01446-DSI
R1327

ACCOUNTING / FEDERAL GRANTS MANAGEMENT SYSTEM
STATEMENT OF OPERATION BY APPROPRIATION / COST CENTER TO ELEMENT LEVEL
PERIOD ENDING 09/30/79 FISCAL YEAR 80

PAGE 10
22.17.58 09/29/79

AGENCY 990 DEPT OF PUBLIC SAFETY - ARKANSAS CRIME INFORMATION

EXP CODE	TITLE	AMOUNT	MONTH BUDGET	DATE VARIANCE	AMOUNT	YEAR BUDGET	DATE VARIANCE
①	ELEM 04 DP SERVICES						
	ELEM 04 TOTAL	39,337.01	0.00	39,337.01-	39,337.01	0.00	39,337.01-
	UNIT 75 TOTAL	39,337.01	0.00	39,337.01-	42,472.36	0.00	42,472.36-
	SECT 32 TOTAL	39,337.01	0.00	39,337.01-	42,472.36	0.00	42,472.36-
	ACTIV 080 TOTAL	39,337.01	0.00	39,337.01-	42,472.36	0.00	42,472.36-
	AGENCY 990 TOTAL	100,015.16	84,129.00	15,886.16-	202,095.56	206,270.00	4,174.44
②	28100-DATA PROC SERV CENTER	29,863.01	0.00	29,863.01-	29,863.01	0.00	29,863.01-
	28400-LEASE OF TERMINALS/DCS	3,319.00	0.00	3,319.00-	3,319.00	0.00	3,319.00-
	28600-INDIRECT COST ALLOCATI	6,155.00	0.00	6,155.00-	6,155.00	0.00	6,155.00-
	CHAR 44 TOTAL	39,337.01	0.00	39,337.01-	42,472.36	0.00	42,472.36-
③	APPRO 371 TOTAL	100,015.16	84,129.00	15,886.16-	202,095.56	206,270.00	4,174.44

and periodic, the information retrieval system gives managers the capability of obtaining information from the system on demand, in a form that is not structured in advance. For example, if the state police director has a specific question that is not answered by the general cost report he receives from the management reporting system, he can use the information retrieval system to obtain more detailed or different cost information on a "one time" basis. Information retrieval systems currently in use range from manual systems in which cost estimates are prepared in response to occasional requests (as is the case in Alexandria, Virginia and most of the jurisdictions covered by the mail survey) to a fully computerized system utilizing remote terminals and video display screens such as the one being installed in San Diego, California. Continual demand for information in a specific format from the information retrieval system is a legitimate reason to suggest that this format be included in the regular management reporting system since the latter is less expensive to operate than the former.

Preconditions to System Installation

The installation of a new or substantially revised cost analysis system is a major organizational change. It cannot be accomplished by administrative fiat nor will it succeed on its technical merits alone. Careful attention must be paid to the preconditions for a successful change effort before attempting system installation. These preconditions are top management support, support from outside agencies, the availability of qualified staff, and the assignment of organizational responsibility for the cost analysis system.

Top Management Support

Top management support was identified in the national mail survey as the most important precondition to successful cost analysis. Jurisdictions such as New York City, Cincinnati, San Diego, and Alexandria, Virginia pointed to the backing of the city manager or mayor as well as the police chief as vital to the installation of a cost analysis system. This support included not only verbal encouragement and concrete resources for cost analysis but also a mandate that staff produce cost information that could be used in justifying the department's budget or operations. Under pressure to economize, top managers seemed to want cost information to show how economical their departments already were.

One reason why management support is so critical is that it tends to mitigate the natural concern and resistance that operating managers may have when faced with a change of systems. Even if operating managers and line officers

feel that an existing cost analysis system is inadequate, it is nevertheless a system they have worked with and are comfortable with. At a minimum the new system changes the way decisions are made and establishes new patterns of communication and discussion between managers at various levels. Although the information provided by the new system is presumably better, it is unfamiliar and may take some getting used to. Those expected to work with the new system are uncertain of its effects and are unlikely for this reason to support it in advance of its installation. A top management that has the confidence of its employees can do much to alleviate unnecessary fears while at the same time making it clear that the new system is needed and is "here to stay."

Top managers, therefore, must be prepared to allocate a significant amount of time and effort to the cost analysis system. They must understand the general concepts and operations of the new system well enough to discern the benefits and limitations, and must be able to explain to their principal subordinates how it affects and hopefully assists their work. Top management must be willing to monitor closely the system's installation and initial implementation and to remove impediments as they occur. In some situations, top managers must advocate the cost analysis system with chief executives, legislators, and others who might otherwise prevent its adoption.

Most important of all, top management must be willing to go on record in support of the system with an official statement of management policy that can be endorsed by senior management and distributed to everyone who might be concerned about or affected by the new system. The statement should contain a summary of top management's reasoning behind and support of the new cost analysis system while leaving considerable discretion as to how the system should be implemented. An example of such a statement based on the case of the Clinton Police Department is contained in Exhibit 5.4.

Support from Outside Agencies

Any cost analysis system for police needs the support of outside agencies to make it work. Most criminal justice agencies collect and maintain their own information on program operations, e.g., arrests made, citations issued, or vehicle miles driven. These data are usually very current (especially if computerized) and consistent with the decisionmaking needs of agency management. However, an issue raised in Chapter 1 was that many criminal justice agencies share the responsibility for cost finding and analysis with other agencies in the jurisdiction. A financial management or budget office coordinates the annual or bi-annual preparation of the jurisdiction's budget and calculates historical or projected costs in allocating scarce resources among competing programs, including the police. Once the budget is approved,

Exhibit 5.4

STATEMENT OF MANAGEMENT POLICY
ON COST ANALYSIS SYSTEM

CITY OF CLINTON

Police Department

MEMORANDUM TO: All Management Staff
FROM: Mark Simpson, Chief of Police
SUBJECT: Installation of Cost Analysis System

The Clinton Police Department is embarking on a system of cost measurement and control that will require the cooperation of all management staff. This system has been authorized by an Executive Order from the Mayor and is consistent with the city's new Financial Management Plan.

This cost analysis system is a practical and reasoned response to the city's fiscal constraints which will help make the most efficient possible use of available resources and thereby preserve existing personnel and service levels. The system will enable headquarters staff and field commanders to monitor the costs of their units and activities, identify potential cost overruns, and take immediate action to reduce expenses or reallocate resources. Its essential components are:

- measurement of the full costs of police services, including personnel salaries, the costs of equipment and supplies, and the overhead expense incurred by the department and other city agencies in supporting the service;
- payroll reporting forms that require sworn and civilian staff to allocate their work hours by specific service;
- cost information reported to managers on a service basis as well as by organizational unit;
- capacity to produce not only standardized reports at regular intervals but also, using the city's computerized financial data base, special reports at the request of individual managers; and
- accountability for results at each level of management assessed partly in terms of degree of attainment of agreed-upon cost objectives.

Captain Jim Scott, Director of Planning and Research, will be coordinating this department's involvement in the cost analysis system. He will be contacting each of you in the next few days to arrange your participation in system design and installation. I expect you to give him your enthusiastic support and cooperation.

the jurisdiction's auditor or comptroller tracks and records expenditures to insure that public funds are being spent in accordance with authorized budgetary ceilings and objects of expenditure. This official also reports to the police and other agencies on their planned and actual expenditures so that spending limits are not exceeded. The potential complexity of these external relationships is exemplified by Exhibit 5.5 which depicts how the Houston Police Department views its fiscal management coordination.

This "division of labor" hampers police costing. One problem is that although these central agencies possess more expertise than the police in cost analysis, they are less familiar with the substantive police activities being costed. Given information on police manpower and equipment utilization and community impacts, a finance department or auditor's office can calculate unit costs (e.g., cost per patrol unit) but sometimes lacks the criminal justice background necessary to understand the reasons behind varying service levels and unit costs. Conversely, the police have the proper background in criminal justice but not in cost analysis. Some jurisdictions have addressed this gap by training police managers in cost finding and analysis or by promoting fiscal experts out of the police department into the central budget or auditing office. Yet a third approach is that taken by the Arkansas State Police: the state trooper in charge of financial management was formerly an analyst in the state budget office.

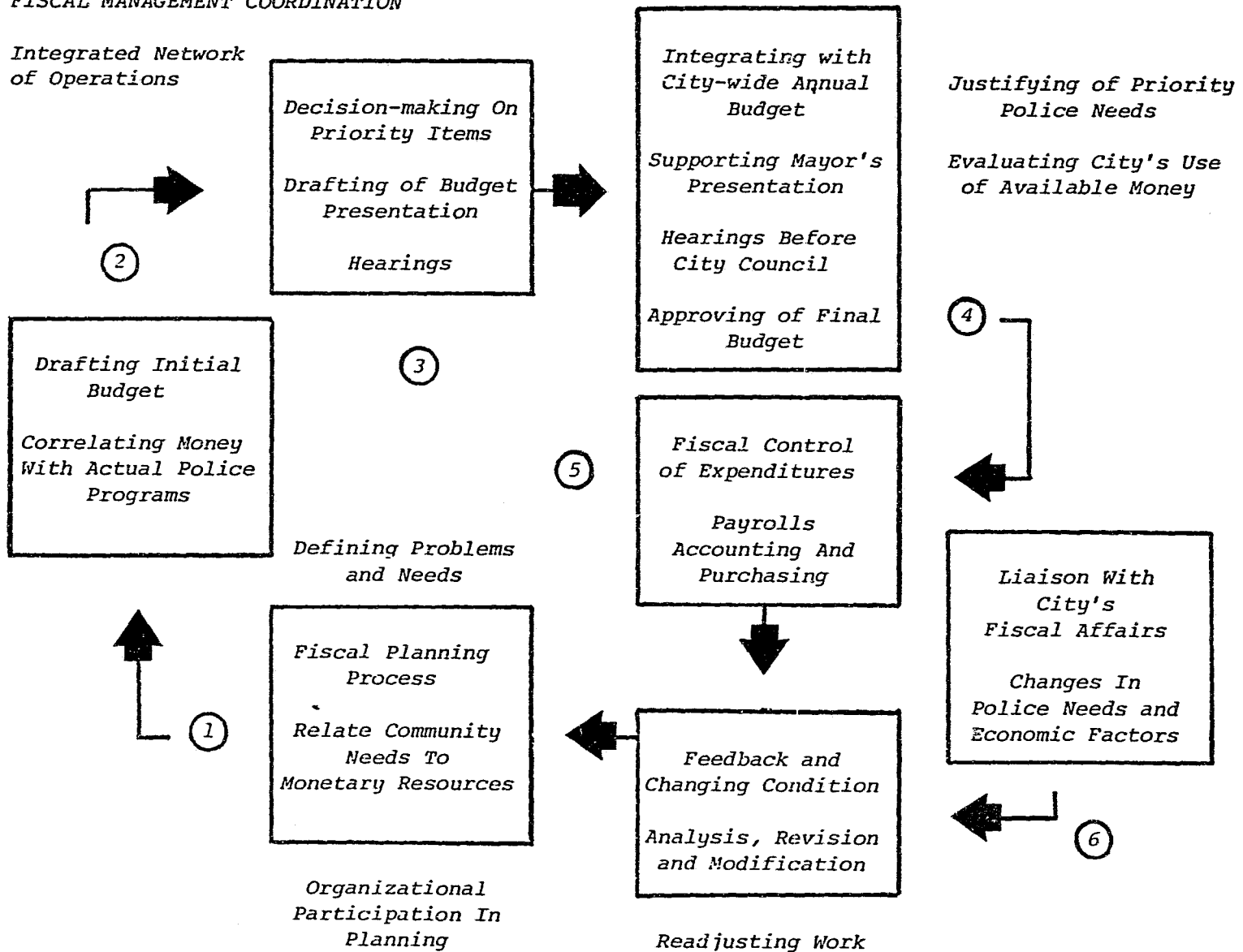
Another problem is that different agencies record financial information in different ways. The budget office may budget by program or task, while the auditor will account for actual expenditures by organization unit or by object of expenditure. These agencies have grown accustomed to receiving financial information from the police department in a certain format and may not perceive that the information produced by the new cost analysis system is any better. Conversely, these outside agencies may be the sponsors of the new cost system and the police department may be a reluctant participant. In either case, one or more agencies may be unwilling to change the information they receive to accommodate a new cost analysis system. If this happens, the system designers have two options that will allow them to install the new cost system while still meeting the needs of opposing agencies: crosswalking and operating a dual system.

- Crosswalking is an administrative procedure and set of forms used by public agencies to translate management or financial data from the format they ordinarily use for internal purposes into the format required by another agency. For example, federal agencies use crosswalking to convert management data into the format required by congressional appropriations committees. The San Diego Police Department uses crosswalking to take its budget allocation for a particular service area (e.g., investigations) and apportion it among the organizational units

EXTERNAL RELATIONSHIPS IN POLICE FISCAL MANAGEMENT
Houston Police Department

FISCAL MANAGEMENT COORDINATION

Integrated Network
of Operations



that serve that program, e.g., a \$100,000 budget item for the investigations program might be divided among Units X, Y, and Z. An example of the crosswalking form used by the Arkansas State Police is presented in Exhibit 5.6. It shows an accounts payable voucher on which the same costs can be categorized in different forms, i.e., by legislative appropriation, level of the program structure (activity, section, unit, element), object of expenditure, organization unit incurring the cost, and federal grant (if any) providing the funds. In some cases, this reclassification is exact because the jurisdiction's internal and external systems are compatible. More often, however, the systems have irreconcilable accounting structures, bases (cash versus accrual), or periods (month versus quarter) which can make crosswalking an arbitrary and, to some managers, pointless exercise.

- Dual Systems are used when the outside agency insists that the same format be used both for internal control and for external reporting. The City Council, for example, may require a cash basis of accounting when an accrual basis is far more compatible with a cost analysis system. Under these circumstances, the police department may operate dual systems, i.e., keep one set of accounting records on an accrual basis for costing purposes and a second set on a cash basis to accommodate the City Council. A dual system creates two management problems: (1) additional bookkeeping and (2) the conflicting signals that managers receive when asked to keep two sets of books for what the Chief of Police may view as "political" reasons and the City Council as a legitimate exercise of its oversight function.

The problems inherent in the crosswalking and dual systems options suggest that a new costing system should not be implemented unless outside agencies can be convinced to drop their special requirements and to accept the cost information that the system produces. However, it might also be argued that the benefits of a new costing system are worth the costs of crosswalking or operating dual systems and that, as time goes on, the outside agency will perceive these same benefits and modify its requirements accordingly.

Availability of Qualified Staff

A third prerequisite for success is the availability of an adequate staff of people to design and install the system. Technically, they must be

Exhibit 5.6
CROSSWALKING FORM

Name and Address of Payee	

WARRANT NO.

FISCAL YEAR

DISBURSING OFFICER

TO THE AUDITOR OF STATE:

As the bonded disbursing officer, or his authorized agent, of the state agency shown on this voucher, I hereby certify that the amount set out herein is a legal account due by the State of Arkansas for services rendered to, or purchases made by, this agency for which payment has not heretofore been made; that said account has been found correct with consideration given to all allowable discounts and other credits; that such claim is in compliance with the applicable state purchasing and fiscal laws and regulations on the subject, and is within the provisions and limitations of funds available to this agency. I further clarify that all required supporting papers, attached to this voucher, have been furnished or certified by the payee, that detail tickets or other substantiating evidence have been checked by this agency and found to agree with the statements attached, and that all original papers and detail supporting evidence for this account are on file in this agency for audit purposes.

DESCRIPTION OF SERVICES OR PURCHASES					EXPENDITURE CODE	AMOUNT	
TRANSACTION CODE	DATE	FUND CODE	AGENCY CODE	APPRO. CODE	CHARACTER CODE	VOUCHER NUMBER	VOUCHER AMOUNT
41							

[illegible]

proficient in police management, cost accounting, and data processing. Interpersonally, they must be able to communicate with operating managers and understand their concerns, since the cost analysis system has to meet the managers' information needs and since their sustained cooperation will be essential to the survival of the system.

There is no fixed number of such staff that must be retained. Whoever coordinates cost analysis for the police department should be as close as possible to full time on this assignment but the need for additional staff will depend on many factors, including:

- support of cost analysis system by other units and departments, expressed in terms of active technical assistance or the commitment of staff time;
- availability of basic financial data and whether the accounting records are kept manually or by computer;
- extensiveness and complexity of the desired cost analyses, and whether this demand will persist over time; and
- capacity to identify and recruit potential cost analysts which may be affected by civil service regulations and the local labor market.

In many cases, the police department will have to look outside in order to hire qualified staff for its costing system since its current employees will not have been trained or educated in cost analysis. Some departments have decided on civilian hires with accounting backgrounds. Others, with increasing frequency, have turned to outside consultants.

Most large public accounting firms have extensive expertise and experience in police cost analysis and information systems. These consultants are likely to be highly qualified, fairly objective, detached from organizational politics and conflicts, and capable of adding a degree of prestige to the system they introduce. They also have access to "canned programs," i.e., standardized computerized and manual approaches to cost analysis that have been implemented elsewhere with apparent success. Private consultants assisted in the installation of the State of Arkansas' accounting system while consultants from the U.S. General Accounting Office helped Sunnyvale to design its budget and audit system.

To protect both consultant and the employing jurisdiction, a formal contractual agreement should be executed between the parties. Sometimes called the "terms of reference," this contract should specify the consultant's duties,

a schedule of activities and deadlines, and amount and timing of fee and expense payments. In most cases, the contract has to be approved by the jurisdiction's contracting specialist or legal counsel and requires a specific budget authorization to cover the cost of the contract. The form used by the San Diego Police Department when requesting a budget for professional and contractual services is reproduced in Exhibit 5.7. It requires the department to describe the contractual arrangement and the program element it serves, specify its costs and benefits, and explain how the consultancy will impact internal personnel requirements.

A special budget request for outside consultants is often necessary because they can be quite expensive. A reputable private systems consultant can cost \$500 or more per day plus expenses although it might be argued that an outside consultant works more efficiently than an internal staff member and thus will consume fewer days. Of more concern is the fact that outside consultants are outsiders, without the kind of in-depth understanding of organizational problems and personalities that only comes with daily contact over an extended period of time. In addition, the greater the involvement of outside consultants, the less opportunities for building internal expertise in and commitment to the system which will be essential to its survival once the consultants leave.

For these reasons, the most extensive involvement of the consultants should occur in the design and initial implementation of the new system, with maximum feasible participation of internal staff.* After that point, serious consideration should be given to the consultants gradually decreasing their assistance and visibility and allowing internal staff to direct the installation of the system. The most fruitful consultant-client relationship is one where consultants eventually encourage the new system to succeed or fail based on the in-house expertise and support they have helped to establish.

Assignment of Organizational Responsibility

People work together most effectively if they know the parts they are to play in the effort and how their roles relate to one another. This is as true in police cost analysis as it is in football or baseball. It is difficult to attract qualified staff to a poorly defined position in an ambiguous structure.

Responsibility for coordinating the cost analysis effort should be centered in one office with full authority to manage the design, installation, and

*Anthony and Herzlinger, op. cit., p. 321.

BUDGET REQUEST FOR OUTSIDE CONSULTANTS

DEPARTMENTAL BUDGET REQUEST – PROFESSIONAL AND CONTRACTUAL SERVICES

PM-100 (0-70)

eventual operation of the cost analysis system. However, the successful exercise of that authority will depend on the establishment of cooperative relations with other agencies and groups, e.g.:

- The office must be continuously attentive to the cost information needs of top and operating managers in deciding on the system's scope and reporting capacity;
- As will be discussed, a task force should be established to help plan the system whose membership will be drawn from various agencies. The office in charge of the cost analysis system will have to consider the task force's findings and recommendations; and
- Even if responsibility for managing police costing is vested in a single office, it has been mentioned previously that the actual work of cost analysis will be spread throughout several agencies, including the police department, finance or budget department, and the auditing or comptroller's office, who will need to be consulted at every step of system design and installation.

In the end, such cooperative relations will ensure that everyone knows who is to do what and who is responsible for what results. They will also remove obstacles to performance caused by confusion and uncertainty of assignment. And, they will foster a cost analysis network reflecting and supporting the objectives not only of the cost analysis system but also of the jurisdiction as a whole.

Where should this office be located? Who should have the responsibility for managing the cost analysis system? The mail survey revealed that 40% of the jurisdictions expect police and other line departments to do their own costing, usually relying on the expertise of each department's planning and research division. About 60% concentrate primary responsibility for police costing in a central fiscal agency: 35% to a finance or budget department and 25% to a central auditing or comptroller's office. Those who centralize the cost analysis function in one organization unit for the entire jurisdiction claim that: (1) knowledgeable cost analysts are rare and such scarce talent should not be spread too thinly throughout numerous line departments, and (2) a central unit can standardize costing procedures and reporting, and avoid duplication of effort. The 40% who decentralize cost analysis to line departments, including the police, argue that this arrangement: (1) lodges the responsibility for cost analysis in the managers most knowledgeable about their own services and information needs, (2) allows analyses to be implemented quickly without waiting for action or permission from possibly over-worked central units, and (3) encourages initiative and commitment to cost analysis throughout the jurisdiction.

These are all plausible arguments, but no one of them is always true or always false. Local circumstances will influence which agency takes the lead in police costing. For, in deciding whether to house overall responsibility for police costing in the police department or in a central fiscal agency, it is recommended that decision makers consider three important factors: size and complexity of the jurisdiction, availability of qualified staff, and degree of standardization desired in cost analysis procedures and information needs.

Exhibit 5.8 illustrates how these considerations affect which agency becomes responsible for the cost analysis system. It suggests that the larger the jurisdiction, the more responsibility for cost analysis can be delegated to line departments because of the inability of a central fiscal agency to keep track of such a multitude of financial transactions. While basic financial information will be centralized in a common data base, the degree to which and the ways in which cost information is used in larger jurisdictions is left up to the line agencies. On the other hand, police departments in smaller jurisdictions probably cannot afford to assign someone full time to cost analysis (since this is what such an assignment typically requires) and will rely more heavily on the expertise in central fiscal agencies.

In terms of the availability of qualified staff, jurisdictions with a low number of knowledgeable cost analysts should probably group them in a central unit which line departments could access for technical assistance rather than splitting them up among the departments. Departmental assignments would only be considered for jurisdictions with high numbers of qualified cost analysts. Lastly, the greater the degree of standardization in costing procedures and information needs, the greater the degree of centralization permitted. If repetition and standardization of operations can be introduced, the cost analysis system can be controlled more easily from a central location. In most cases, however, costing procedures are much more susceptible to standardization than information needs which argues for the adoption of a more decentralized organizational model.

Again, it is important to remember that these are general guidelines which must be adapted to fit local circumstances. The level of centralization of cost analysis responsibility must be determined, in the final analysis, by the needs and expectations of the jurisdiction, its situation, and its management style. Moreover, cost analysis is never completely centralized or decentralized; under either arrangement, central fiscal agencies must cooperate with line departments, and vice versa, if the cost analysis system is to succeed and its cost information used in management decision making and resource allocation.

Exhibit 5.8
ASSIGNING ORGANIZATIONAL RESPONSIBILITY

Organizational Responsibility For Cost Analysis Management Consideration	Centralized in Central Fiscal Agency	Decentralized to Line Agencies, including the Police Department
1. Size and Complexity of Jurisdiction	SMALL (less than 200,000 population)	LARGE (greater than 200,000)
2. Availability of Qualified Staff	LOW	HIGH
3. Standardization of Cost Analysis Procedures and Information Needs	HIGH	LOW

Steps in System Design and Implementation

If the preconditions to a successful costing system are met, then it is probably safe to proceed with systems design and implementation. Details of the installation process are covered in many books on the subject so it will not be necessary to describe them here.* However, as illustrated in Exhibit 5.9, these steps can be summarized as follows:

1. Organize for Installation. A task force should be created to design and implement the system composed of top management, operating managers, cost and data processing specialists, and representatives from outside agencies that will be affected by the new system. The financial management systems used by the Arkansas State Police and the San Diego Police Department profitted from such broad involvement in system installation. As a policy making body, the task force should serve to:

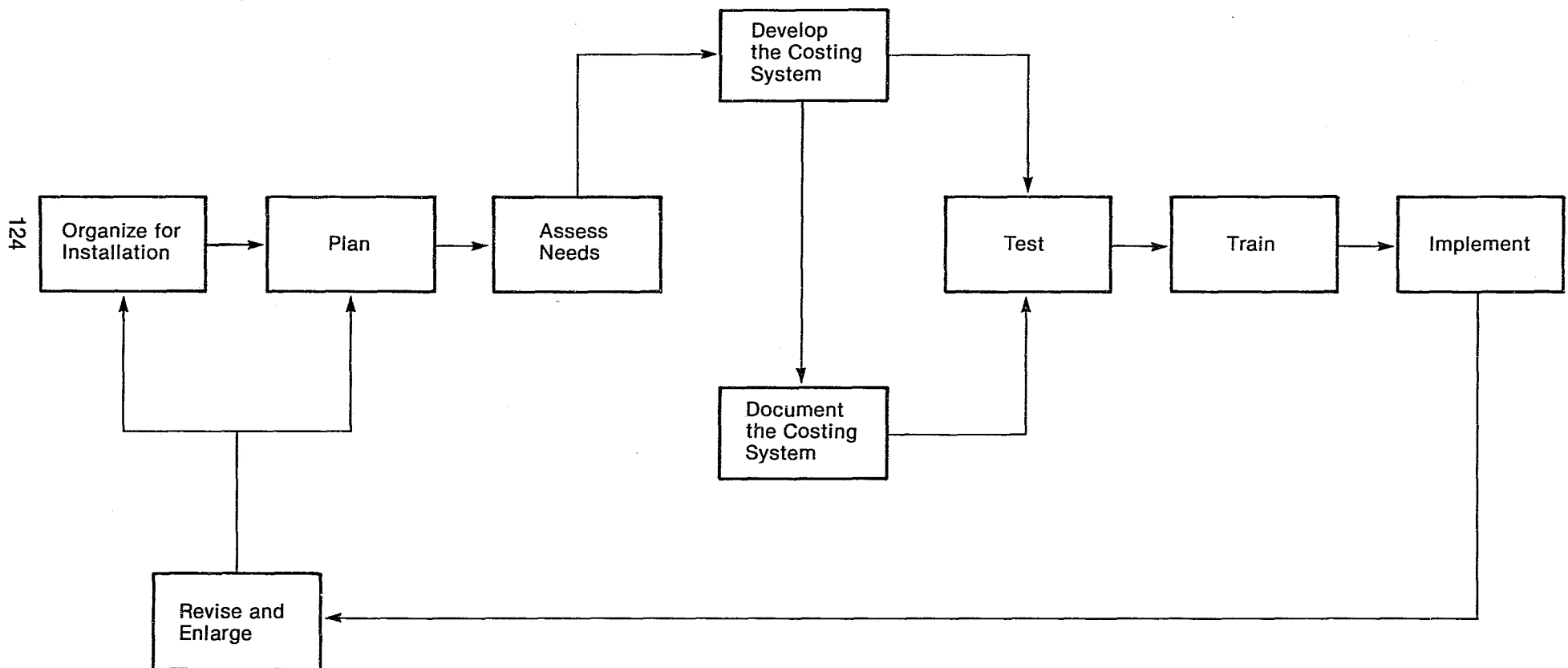
- determine the objectives to be achieved and the general approach to be taken in the installation of the cost analysis system;
- decide on priorities of design and implementation according to the resources available for the project; and
- evaluate the effectiveness of the cost system as it comes into operation.

Participation of management on the task force stresses the organization's commitment to the new system and involves them in designing a system they will eventually have to implement. Given the heavy demands on the time of senior management, the day-to-day work of installation and the technical aspects of system installation should be handled by smaller working groups staffed by internal specialists and possibly outside consultants.

2. Plan. In a large criminal justice agency, two or three years will elapse between the time a decision is made to proceed with cost systems development and a date that the system is implemented. Smaller organizations may require up to eighteen months. This long lead time is necessitated not only by the technical and management demands of the system itself but also by the need to coordinate the cost system with the accounting and budgeting cycles of the

*See, for example, Robert J. Mowitz, The Design and Implementation of Pennsylvania's Planning, Programming, and Budgeting System (University Park: Pennsylvania State University, 1970) or K.J. Radford, Information Systems in Management (Reston, Virginia: Reston Publishing, 1973).

Exhibit 5.9
STEPS IN SYSTEMS DESIGN AND IMPLEMENTATION
(Task 12)



larger jurisdiction. The planning process for this period involves the development of an overall plan for systems design and installation, including as careful a statement of responsibilities as is feasible and a timetable (preferably in the form of a GANTT chart or a similar scheduling device). A sample GANTT chart that suggests a hypothetical timetable for installing a cost analysis in Clinton is depicted in Exhibit 5.10.

3. Assess Needs. The objective of a needs assessment is to determine if: (a) the present costing system is effective in terms of providing managers with the type and level of information about service costs that they need for decisionmaking, and (b) the data are being compiled and reported in an economical and efficient manner. In assessing needs, the analyst should start with the existing financial management system because, whether or not it includes service cost information, the existing system is likely to contain payroll and other types of cost information that can be used in costing police services. It is important to appraise the existing system's data input and processing specifications, reporting methods, and overall utility to managers. The U.S. General Accounting Office provides more specific guidelines applicable to such an appraisal which are contained in Exhibit 5.11.

There are two pitfalls to avoid in assessing organizational and individual needs for a new costing system. The first is the automatic assumption that the existing system will have to be swept away. Even if the existing system has serious flaws, it is far less expensive to build the new system on the old than to start from scratch. As San Diego discovered in upgrading its cost analysis capabilities, utilizing the old system as much as possible also lessens the anxieties of operating managers as they change over to a new costing system.

The second pitfall is an overreliance on the opinions of operating managers in the needs assessment, no matter how straightforward and honest these comments may be. Because they are often familiar with only one system, operating managers may be unaware of the existence of certain information which would be very useful to them. Thus, careful analysis of information needs must be undertaken. Rather than depending on managers' perceptions of their information needs, the task force should involve managers more indirectly in systems design by asking them to cooperate in:

- defining their general and specific activities;
- identifying the informational inputs to those activities, including cost information;
- appraising the capacity of the current system to deliver cost information in a timely and understandable manner; and
- formulating design strategies that would allow the new system to remedy the perceived defects of the old system.

Exhibit 5.10

**GANTT CHART FOR SYSTEMS DESIGN AND INSTALLATION
CLINTON POLICE DEPARTMENT**

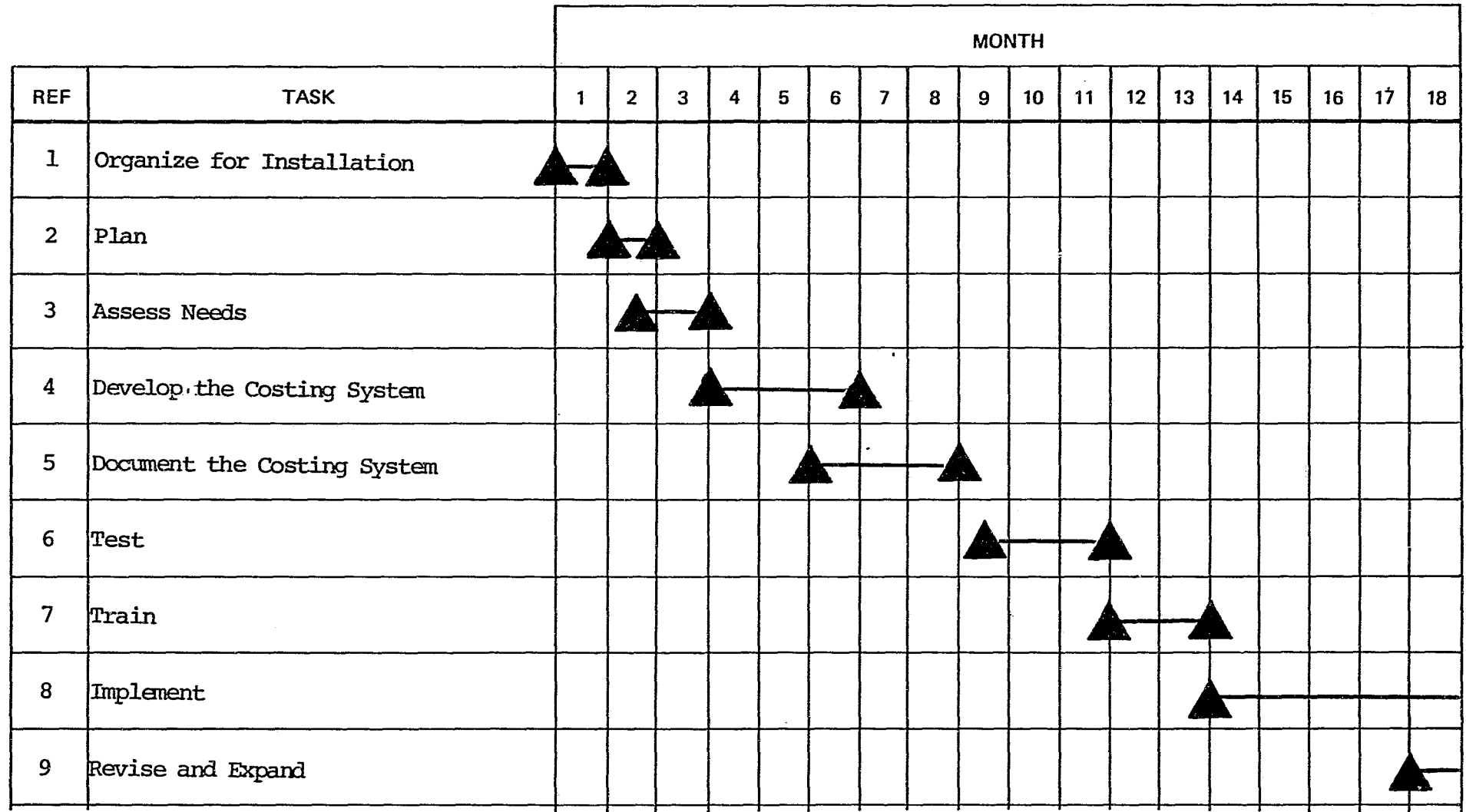


Exhibit 5.11

ILLUSTRATIVE PROCEDURES FOR APPRAISING AN EXISTING
COST ANALYSIS SYSTEM

1. Review any written policies and procedures concerning the reporting system. Determine if these policies clearly specify each individual's reporting responsibility.
2. Obtain cost data pertaining to the present Management Information System (MIS). Examine and analyze the costs looking for irregularities or inconsistencies including costs which appear to be either too high or too low.
3. Test the validity of data being produced by the system.
4. Determine if reports are being produced on a timely basis.
5. Flowchart the distribution of specific MIS output (reports) to determine if the proper levels of management are receiving data and that the reports are being distributed only to those levels with need for the specific data.
 - a. Review in detail the use of reports by persons now receiving the data. This can be done through interviews with report users.
 - b. Based on step "a," determine if the persons receiving the reports are using the data to manage the program. Answer the following:
 - 1) Are the reports in usable format?
 - 2) Do the users receive too little or too much detail?
 - 3) Do the users have other methods of gathering the same data?
 - 4) Are users aware of what data are available from the MIS? (Any problems noted in this step may indicate that some data are unnecessary. Any reduction in MIS output should result in cost saving.)
6. Determine if management has a procedure to assess the MIS periodically in terms of changing informational needs. If a procedure does exist, is it complete in terms of users' input?

Adapted from: U.S. General Accounting Office, Guidelines for Economy and Efficiency Audits of Federally Assisted Programs (1978), pp. 30-31.

4. Develop the Costing System. The costing system will be based on the cost analysis tasks discussed in Chapters 3 and 4 of this Program Model. Time and effort must be devoted to the establishment of cost centers and production units for the services to be costed. In addition, system designers must determine the data collection and analysis procedures for direct and indirect costs, and develop the administrative and operational systems, the management reporting system, and the information retrieval system to supply managers with needed cost information. It may also be important to expand the organization's expenditure accounts ("chart of accounts") to reflect the costing system's emphasis on service costs in addition to current spending by organizational units. Finally, a study must be conducted of required computer support (which is discussed in the next section of this chapter). Several iterations of the system and many meetings will be needed before the new cost system meets the needs and expectations of participating individuals and agencies, although systems development will be simplified if the costing system for police services is being added to a pre-existing cost analysis system for the larger jurisdiction.

5. Document the Costing System. At the same time that the new costing system is being developed, the system must also be documented. Written guidelines must be produced which detail, plainly and concisely, the purposes and procedures of the cost analysis system. Otherwise, use of the system will be too dependent on the collective memories of its developers and potential users will be discouraged from accessing the system. Such documentation is especially critical if the cost system is computerized since access will not only be more complicated under these circumstances but also more threatening to the manager without previous data processing experience. Well written and organized systems documentation can be a significant aid to removing some of the mystery, and some of the fear, surrounding the new system. In this regard, the State of Arkansas has developed not only extensive documentation for its accounting system but also separate orientation materials for agency directors and lower level staff which recognize their varying levels of involvement in the system.

6. Test. No matter how carefully designed and implemented, a new costing system will contain "bugs," or flaws that impede the system from operating at peak efficiency and effectiveness. Rather than permitting these bugs to surface in an organization-wide implementation, which might threaten the credibility and hence the long term survival of the costing system, the task force should first test the system's structure and procedures in one part of the organization. This entry strategy will limit the negative effects of system flaws and, if the test succeeds, will provide a concrete example that will encourage others in the organization to embrace the new system.

7. Train. Almost everyone who will use the new costing system will need training in its scope and content. In addition to lectures and exercises

on the technical aspects of the system, the training should cover the reasons why managers should want to use the system, i.e., what the new costing system and its informational outputs will do for managers instead of to managers. Participants must be convinced that the personal and organizational costs of implementing a new system are outweighed by the benefits, at least in the long term if not in the short term. It is especially important that system designers avoid overselling the system. A cost analysis system definitely aids management in a variety of areas (e.g., planning, budgeting, controlling, etc.), but it does not lessen the need for aggressive and effective management. Even with the best costing system, managers must still analyze and interpret the data, consider much qualitative information not in the system (e.g., political realities, budget restraints, availability of new technology), and make their own decisions. If training leaves the erroneous impression that the new cost analysis system will replace management discretion over financial matters, those attending will either resent the new system or realize the impossibility of such an all-purpose costing system and therefore regard its inventors as impractical theorists.

8. Implement. In most organizations, systems implementation will begin in a single unit or bureau for reasons given in Step 6, above. At first, the new costing system will co-exist with the old system. Simultaneous operation will avoid any "down time" when neither system is fully operational as well as demonstrate the advantages of the new over the old. Anthony suggests that it is "often desirable to install a system in stages, allowing enough time for managers to become accustomed to using the techniques available at one stage before proceeding to the next."* A possible sequence of stages is:

- Budget by programs and responsibility centers, using only direct costs, with few services and rough production units. Do not alter the accounting system.
- Develop improved output measures for the programs and responsibility centers that can be used to calculate unit costs.
- Collect accounting information according to the new structure.
- Continue development of better output measures.
- Add sophistication by adding more services to be costed, calculating indirect costs, considering depreciation of fixed assets, and other costing parameters.
- Gradually enlarge the number of reports and the range of scheduling and formatting options in both the management reporting and information retrieval systems.

*Anthony and Herzlinger, op. cit., p. 331.

As mentioned previously, special reports continually demanded from the information retrieval system should be switched to the regular reporting stream of the management reporting system. Also, reports available on the latter system that are seldom used should revert to an "available on demand" basis to cut costs and to report only that cost information which is most needed for management decision making.

9. Revise and Expand. As a result of initial implementation, unanticipated problems and opportunities will emerge, prompting changes in the way in which the costing system is organized or operates. Feedback from both managers and systems specialists must be considered by the task force in evaluating the system's effectiveness. Recognized deficiencies may result in reorganization of the task force or working groups, refinements in the system or its documentation, improvements in the reporting stream, and other changes. As deficiencies are removed and the organization becomes more convinced of the comparative advantages of the new cost system, it can be gradually enlarged to include more organizational units to the point where the whole organization (and possibly the larger jurisdiction as well) is using the new system to analyze costs and make management decisions based, at least in part, on their cost implications.

Need for Computer Support

A special issue when installing a cost analysis system is the extent to which the new system can or should be computerized. Many smaller police departments use manual systems to report cost data. They enter expenditure data in journals and ledgers by hand and then manually extract the data needed for cost analysis. These manual systems are easy to understand and use as well as being inexpensive. However, as population growth and the demands for more police services multiplies the number of accounting entries, a manual system can incur high error rates and escalating reporting costs.

Although this Program Model is written with the assumption that costing can be done manually, more and more governmental entities are recognizing the benefits of automated data processing in terms of reporting speed and accuracy. In the mail survey, 91% of the jurisdictions reported that they use computers in managing their financial affairs. An automated system can be useful in compiling and storing information and then in retrieving it for cost analysis and other purposes. But by far the greatest use of computers to date, and their chief effect on criminal justice agencies, has been in performing routine clerical operations.

While the initial capital costs of automation remain high, developments in the microcomputer field may change this situation in the future. Retailing for between \$4,000 and \$10,000, a microcomputer is a small computer whose memory usually sits on a chip of silicon less than a centimeter square. About a million microcomputers have been sold in the United States and the number in use is growing by over 24% per year, according to industry estimates. A microcomputer system usually consists of the computer itself, a typewriter-like keyboard, a video screen, a printer, and some external memory. Although microcomputers are not as versatile or capable as full size computers, they are nevertheless highly reliable and simple to use, with many systems including extensive "help menus" right on the video screen to assist the new user.

On the other hand, computers are not faultless, automatic answer machines, nor are they applicable in every situation. As mentioned previously, they have high start-up costs and, in addition, they require internal data processing skills and the reliability of the analyses that flow out of them are dependent on the accuracy of the data fed into them (hence the expression "garbage in, garbage out"). Institutionally, computerization poses special problems to police departments since in many jurisdictions the computer is controlled by a central data processing staff and not by the police. This centralization sometimes restricts the police department's access to the computer, and can lessen the relevance of the financial reports that the computer produces. It can also impede the timeliness of the reports, as one respondent to the mail survey observed:

The time delay in producing the output reports makes the system almost obsolete by the time the data are produced. For example, the hard copy reports are not provided to bureau managers until three weeks after the ending date of the accounting period. Those bureaus which have the capability then manually add in all the transactions which have occurred during the three weeks of elapsed time to provide an updated budget status report.

There are no standard rules to use in determining whether or when to automate. The process for choosing between manual and automated reporting is the same as that used in other police decisions (1 or 2 officer patrol, computer assisted dispatch, etc.) and requires a careful appraisal of the costs and benefits of each alternative. More specifically, the existence of trained programmers and keypunchers, availability of computing funds, need for speed and accuracy, and the trade-off between innovation and proven methods are all factors that can be weighed in this decision.

If the decision is made to computerize the cost analysis system, the task force has to:

- prepare detailed specifications for the components of the cost analysis system that are to be computer supported;
- choose a data management system and other data processing standards; and
- identify the computer programs and machines necessary to run these systems.

It is essential that the above steps be undertaken in the order given. It would be foolhardy to attempt the selection of a particular data management system or machine without first knowing which costing components they will support. Regrettably, some public agencies take the opposite view which Radford characterizes as "let's get a computer in and we will build the system around it."* Computer manufacturers often encourage this attitude in order to sell their machines more quickly.

When the design of a costing system has reached the stage where an estimate can be made of the required computer support, the task force must address three issues: (1) choice of an in-house computer versus outside services, (2) if an in-house computer is chosen, should it be rented or bought, and (3) how to reconcile incompatible data processing systems.

In-House Computer versus Outside Services

The rapid increase in the number and variety of computer service vendors in the last few years has introduced alternatives to the installation and maintenance of an in-house computer. These alternatives include off-site batch processing, on-line time sharing, and distributed services.

- Off-site batch processing involves the use of a bank with excess computing capacity or a computer service center. Basic cost data are prepared by the jurisdiction and mailed or delivered to the center. The center keypunches the data and produces written reports according to pre-specified timetables and formats which are mailed or delivered back to the jurisdiction.
- On-line time sharing allows a very large and powerful computer to be shared among many users. Costs are shared based on the time used. In such an arrangement,

*Radford, op. cit., p. 111. See also: James M. McKeever, "Building a Computer-Based MIS," Journal of Systems Management 20:9 (September, 1969).

a printer terminal or video display screen is connected by phone lines to a computer that may be hundreds or even thousands of miles away. To access the computer, the user simply dials the computer's phone number and provides proper identification, including a "password."

- Distributed services involves the installation of a programmable terminal or microcomputer in the jurisdiction that allows user agencies to do small applications completely independent of the outside vendor. For major data processing and large reports, the programmable typewriter can be attached via phone lines to the vendor's main computer on a time sharing arrangement.

The advantages and limitations of each of these alternatives (including an in-house computer) are presented in Exhibit 5.12. This comparative analysis can be used by a particular jurisdiction in deciding which alternative best meets local needs and resources. This analysis can also be used by jurisdictions who already have an in-house computer and seek to examine alternative data processing methods.

Rental or Purchase of In-House Computers

The history of computer applications to date is one of very rapid expansion once the use of such equipment is accepted. Unless the future can be predicted quite confidently, therefore, it is advisable to rent rather than buy. Rental is also the preferred option when the jurisdiction is small, or new to the computerization of its management functions. Rental gives the jurisdiction more flexibility in augmenting current data processing systems or in switching to entirely new systems. In cases of doubt, it is usually possible to obtain a purchase option whereby a part of the rental fees already paid can be put toward the cost of purchasing the equipment should that seem desirable at some future date.

Incompatible Data Processing Systems

In many jurisdictions, the requirements of a comprehensive cost information system imply the installation of, or at least access to, automated data processing equipment. Most large jurisdictions currently possess some computer systems' capability. However, the hardware and software support for these systems have often been introduced haphazardly at agency levels without central direction. There is little compatibility among the agencies'

Exhibit 5.12
AUTOMATION OPTIONS

Option	Advantages	Limitations
In-House Computer	<ul style="list-style-type: none"> <input type="checkbox"/> guaranteed access; computer services available when needed <input type="checkbox"/> source documents stay on-site which protects data confidentiality <input type="checkbox"/> fast turnaround time <input type="checkbox"/> high use lowers cost; "economies of scale" 	<ul style="list-style-type: none"> <input type="checkbox"/> entails hiring and training programmer; may not be enough work to justify full-time programmer <input type="checkbox"/> inefficient when low use is expected <input type="checkbox"/> difficult to "trade up" when more advanced models become available
Off-Site Batch Processing	<ul style="list-style-type: none"> <input type="checkbox"/> avoids expense of owning and operating own computer <input type="checkbox"/> low fees for standard services <input type="checkbox"/> used only when needed <input type="checkbox"/> no programmer needed 	<ul style="list-style-type: none"> <input type="checkbox"/> lack of flexibility in formatting reports <input type="checkbox"/> slow turnaround time <input type="checkbox"/> off-site processing threatens data confidentiality
On-Line Time Sharing	<ul style="list-style-type: none"> <input type="checkbox"/> avoids expense of owning and operating own computer <input type="checkbox"/> available when needed <input type="checkbox"/> fast turnaround time <input type="checkbox"/> source documents stay on-site which protects data confidentiality <input type="checkbox"/> responsive to local needs 	<ul style="list-style-type: none"> <input type="checkbox"/> entails a programmer <input type="checkbox"/> no "economies of scale," i.e., costs increase proportionate to use
Distributed Services	<ul style="list-style-type: none"> <input type="checkbox"/> for small applications, shares advantages of in-house computer <input type="checkbox"/> for large applications, shares advantages of on-line time sharing 	<ul style="list-style-type: none"> <input type="checkbox"/> for small applications, shares limitations of in-house computer <input type="checkbox"/> for large applications, shares limitations of on-line time sharing

systems. Different computer languages may be used (COBOL vs. FORTRAN). A major task for the police cost analyst, therefore, involves inventorying existing computer capabilities and determining the comparability among the systems. Such comparability will permit the upward reporting of cost data to central budget offices and the sharing of data with other agencies in determining joint service costs.

Fortunately, one of the most important innovations in the last five years has been the development of computer software that can deal with many of the problems caused by incompatible data processing systems. The term "computer software" refers to the programs, or sets of instructions, which direct computational equipment in their operations and in the performance of specified tasks in specified ways.* Software packages are often written by manufacturers of computational equipment and supplied in connection with the purchase or rental of that equipment. Also widely available are general purpose applications program packages developed by government agencies or university research centers with the needs of social scientists and managers in mind. In the accounting field, literally hundreds of packages have been developed, typically broken down into modules for accounts payable and receivable, payroll, inventory, cash, and overall costs. The most popular accounting packages are priced between \$200 and \$2,000.

* * *

Part Two has presented the twelve tasks encompassed by the logic of cost analysis. These tasks were organized into three chapters which reflected the major operations of a cost analysis system: planning for cost analysis, doing cost analysis, and installing a cost analysis system.

Planning for cost analysis emphasizes the need for careful design of the objectives and methods that will guide the analysis. It covers Tasks 1-6 of the logic of cost analysis, including deciding on the purpose and users of the study, the service to be costed and its production units, the personnel and nonpersonnel components of the service, and the extensiveness of the cost analysis. Consisting of Tasks 7-11, doing cost analysis entails measuring personnel and nonpersonnel costs, estimating total costs, and reporting the results in a clear and understandable fashion. This chapter made the point that there are alternative ways to doing cost analysis; each task compels the analyst to choose among those alternatives based on local management information needs and resources. Finally, Task 12 explains how to institutionalize cost analysis so that it becomes more than just a one time activity. It suggests how to lay out and install an ongoing cost analysis system,

*Jerome M. Clubb and Michael W. Traugott, Using Computers (Washington, D.C.: American Political Science Association, 1978), p. 77.

either manual or computerized, which will help make costing an everyday concern and activity of the effective police manager.

In Part Three, the applicability of these costing principles will be "tested" through an examination of the cost analysis systems in four jurisdictions. The three cities and a state about which case studies have been written have chosen to meet their financial management obligations in diverse and interesting ways.

PART THREE: CASE STUDIES

Part Three examines the extent to which the costing principles discussed previously are actually used in police management. It contains case studies of four jurisdictions--three cities and a state--and the methods each uses to cost a specific service. The jurisdictions were chosen to exemplify a range of cost analysis experience and capabilities, from the simplest to the most sophisticated. Suited to both independent study and training programs, the cases are intended to help readers to:

- understand the uses of cost data in police budgeting, planning, personnel allocation, and general decision making;
- gain confidence that cost analysis is a logical and straightforward process that can be used successfully without extensive training or experience in accounting or computers;
- adapt the cost analysis methods described in the cases to fit their own needs and contexts;
- assess the relationship of police cost analysis to the management structures and processes present in the larger city or state government;
- appreciate the need for top management support in building a cost analysis system; and
- reject the idea that there is "one best way" to cost police services and recognize the existence of many acceptable costing strategies that can be applied to given problems and situations.

Case Development

As discussed in Chapter 1, a national survey was conducted to assess the state-of-the-art in police cost analysis and to suggest which jurisdictions'

cost analysis systems might make good case studies. Not surprisingly, the survey revealed a wide disparity in how police costs were estimated, from some jurisdictions with limited cost analysis capabilities to others with advanced accounting systems. All this information was invaluable in the development of the Program Model--identifying its audiences and developing its framework and content. However, for the purpose of the case studies, it was decided that presentation of cases about jurisdictions with atypically good or bad cost analysis systems would serve no useful purpose. Most readers would be unable to emulate the former and unwilling to repeat the mistakes of the latter. Instead, case development required a selective focus on jurisdictions with "exemplary" cost analysis capabilities that were not only technically sound but replicable elsewhere.

By these criteria, four jurisdictions were judged as having exemplary cost analysis systems:

- Alexandria, Virginia
- State of Arkansas
- San Diego, California
- Sunnyvale, California

Each jurisdiction was asked to provide documentary evidence of their systems and to permit a team of researchers to visit and conduct interviews. Those interviewed usually included the police chief, police research and planning staff, representatives of the chief executive's office and fiscal agency, and others significantly involved in costing police services or using cost information in management decision making.

Case Content

The police agencies portrayed in these case studies are different. They exist in distinct economic and political environments, confront unique patterns of criminal activities, operate within locally defined governmental and management structures, and use cost data for their own purposes. Hence, it would be unfair to label any of the systems as better or worse than any other.

A more appropriate comparison would be between the cost analysis systems and other factors described in the case studies and the costing procedures currently used or envisioned by the reader. It may be possible for readers to adapt one or more of the systems described, either in whole or in part, to fit their own needs and situations. But the cases would still serve a purpose for police agencies if all they did was to stimulate further discussion about the uses of cost data and how to collect them.

To facilitate such usage, the cases have been placed roughly in order of their complexity and state of development so the reader can start with the most straightforward system before addressing those that are more elaborate. Chapter 6 contains the case studies of Alexandria, Virginia and the State of Arkansas while Chapter 7 covers San Diego and Sunnyvale, California and includes a brief cross-case analysis. Further, the cases are written to a common outline for the most part. Each case begins with basic demographic information about the city or state and then describes the police agency and details of its cost analysis system, including its historical development, costing procedures, reporting modes, and uses of cost data in police decision making.

When reviewing the cases, it should be noted that they accurately reflect the costing systems in each jurisdiction at a specific point in time (Summer, 1980) and that subsequent events may have altered the police agency or its cost analysis system. Moreover, occasional liberties have been taken with the data used to exemplify particular costing procedures in order to simplify the reader's analysis and understanding. It should also be noted that while all of the jurisdictions adhere to the basic logic of cost analysis--namely, definition of a service to be costed, collection of personnel and nonpersonnel costs, and determination of total cost--none of them exactly duplicates the costing tasks presented in Chapters 3-5. Those procedures were manifestly intended to be adapted to fit local information needs and resources. Finally, it may be necessary to refer back to earlier chapters of the Program Model to understand certain technical terms repeated in the case studies.

Chapter 6:
Measuring the Costs of Police Services in Alexandria,
Virginia and the State of Arkansas.

Outline

ALEXANDRIA, VIRGINIA

Alexandria Police Department
Cost Analysis System
Future Prospects

STATE OF ARKANSAS

Arkansas State Police
Cost Analysis System (Accounting
Federal Grants Management)
Future Prospects

Chapter 6 presents case studies of how Alexandria, Virginia and the Arkansas State Police measure the costs of police services. Alexandria's Police Department performs cost analyses on request while the Arkansas State Police is endeavoring to provide cost information on a more regular basis through a state government-wide accounting system.

Alexandria, Virginia

Located across the Potomac River from Washington, D.C., Alexandria is attempting to preserve its colonial heritage and architecture while, at the same time, engaging in massive community and commercial redevelopment. It is a relatively affluent city with high per capita income, significantly increasing employment and property values, and an excellent AA bond rating. Unhappily, it is also a city with one of the highest crime rates in Northern

Virginia with 84.8 crimes per 1000 population reported in 1979.* This is due, in part, to high population density and the influx of vulnerable shoppers and tourists to its restored downtown area.

Alexandria Police Department

To address this crime problem, Alexandria has committed 16% of its city operating budget and 35% of its employees to public safety. Although many city agencies are involved in this effort, the Police Department alone employs 237 sworn officers and 110 civilians and has a budget (FY 1979) of \$7.4 million. With a population of 117,000, the per capita expenditure for police service is about \$63.

Starting late in 1977, the Alexandria Police Department completely reorganized its command structure. Currently, all Field Operations, Patrol, Special Operations and Criminal Investigations are grouped under one Deputy Chief to eliminate duplication and ensure closer working relationships among units. To provide for more efficient administrative control, Administrative and Support Services have also been consolidated under another Deputy Chief. The Special Investigations Division has been created to improve coordination among its Internal Affairs Unit, Vice/Narcotics Unit, and Intelligence/Organized Crime Unit. This division reports directly to the Chief of Police as do the Crime Resistance/Community Relations Division and Planning and Research Division. These organizational relationships are depicted in Exhibit 6.1.

Cost Analysis System

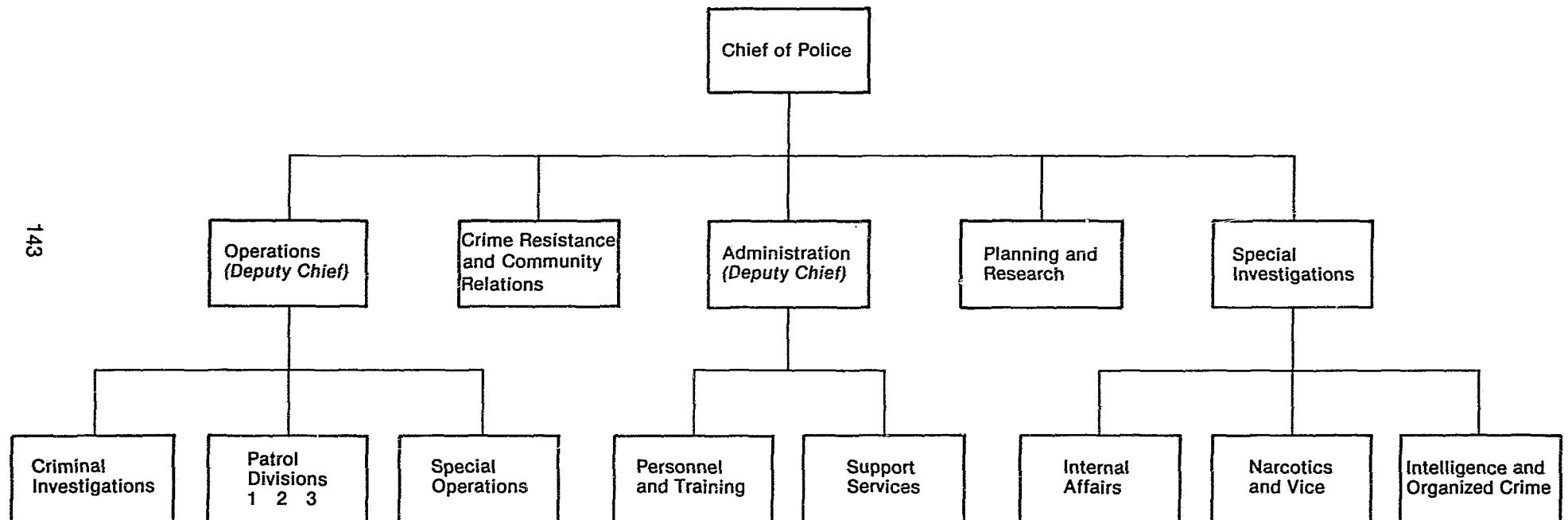
System Features

The Alexandria Police Department really does not have a cost analysis "system," i.e., a mechanism for routinely providing information on service costs to top management and line commanders. Most of the computerized financial information available to decision makers reports current expenditures by organizational units within the department. As a result, and as discussed in Chapter 2, information is not readily available on the use of resources in rendering services to the public and on the indirect or "hidden" costs of those resources.

On occasion, the costs of particular services have been calculated manually by the department's Planning and Research Division. Special studies have been done on the costs of domestic calls, taxi licensing, issuing solicitor's permits, and funeral and bank escorts. An analysis of the costs of responding to silent bank alarms was especially useful. It revealed that over \$10,000 per year was being spent on false alarms. Eventually, it led to

*Preliminary figures for 1980 show a decrease in the crime rate.

Exhibit 6.1
STRUCTURE OF ALEXANDRIA POLICE DEPARTMENT



restrictions on when a patrol unit would be dispatched to a given alarm, a consequent reduction in the number of units sent to false alarms, and a substantial financial savings.

The problem with these studies is that although they have dealt more with services provided than with things purchased, they have been done only in special circumstances and by hand. Perhaps more importantly, they have left out the indirect costs of providing the service, e.g., the overhead costs of buildings and equipment and the administrative expenses incurred by support units like communications or personnel in delivering the service.

More recently, however, costs have started to become a more important factor in police decision making. The Alexandria Police Department is engaged in an extensive performance budgeting effort that will link financial and human resources to key indicators of police performance. This change can be attributed, in part, to a "Proposition 13" mentality in which citizens are insisting on major reductions in taxes and public agencies feel compelled to evaluate their programs in terms of both impact and cost. Such cost consciousness pervades the City Council's annual budget hearings for the police and other city departments and leads to repeated requests to justify and explain program costs. All these factors have contributed to a better understanding of program costs in the department and the need to identify them more systematically.

Costing Procedures

The Alexandria Police Department uses standard accounting practices for measuring the costs of its services. Both production units and unit costs are identified and total direct costs calculated. Using Alexandria's methods, a hypothetical estimation of the costs of responding to false bank alarms would involve the following steps:

1. Define service as the false alarms to which police responded in a 12-month period.
2. Identify personnel and non-personnel components as the patrol officer, patrol vehicle, etc.
3. Estimate number of production units used by reviewing time cards and activity reports to determine the number of hours spent by personnel in responding to false alarms in a year (e.g., 900 hours) and by reviewing vehicle records to figure the annual number of miles driven for the same purpose (e.g., 7,200 miles).

4. Determine unit costs for patrol officer in cost per hour by dividing average annual salary for sworn officers involved in patrol (e.g., \$16,000) and their fringe benefits (e.g., \$4,000) by the total number of work hours in a year (e.g., 2,000).

$$\text{Officer cost} = \frac{\$16,000 \text{ salary} + \$4,000 \text{ fringe benefits}}{2,000 \text{ work hours}}$$

$$= \underline{\$10 \text{ per hour}} \text{ unit cost of patrol officer}$$

5. Determine unit costs for patrol vehicle in cost per mile by dividing the total costs of the vehicle in an average year (e.g., \$3,500) by the number of miles driven in a year (e.g., 25,000). Total vehicle costs of \$3,500 would include some percentage of its purchase price plus annual operating expenses for gas, oil, and repairs. Little or no trade-in value is expected.

$$\text{Vehicle cost} = \frac{(\text{Purchase allowance}) + (\text{Operating Expense})}{\text{Miles driven per year}}$$

$$= \frac{(\$2000) + (\$1500)}{25,000 \text{ miles per year}}$$

$$= \underline{14¢ \text{ per mile}} \text{ unit cost of patrol vehicle.}$$

$$\text{where Purchase allowance} = \frac{\text{original purchase price}}{\text{years of useful life}}$$

$$= \frac{\$8000}{4}$$

$$= \underline{\$2000}$$

$$\text{where Operating expense} = \text{gas} + \text{oil} + \text{repairs}$$

$$= \$750 + \$100 + \$650$$

$$= \underline{\$1500}$$

6. Determine total direct cost: by individually multiplying the number of production units used (step #3) by the appropriate unit costs for the officer (#4) and vehicle (#5) and then adding the results. Minor direct costs (paper, supplies, etc.) are not included in Alexandria.

$$\text{Patrol officer cost} = 900 \text{ hours spent on false alarms} \times \$10 \text{ per hour unit cost}$$

$$= \underline{\$9,000} \text{ personnel cost of responding to false alarms}$$

Patrol vehicle cost = 7,200 miles driven on false alarms X
14¢ per mile unit cost

= \$1,008 nonpersonnel cost of re-
sponding to false alarms

TOTAL DIRECT COST = Personnel Cost + Nonpersonnel cost

= \$9,000 + \$1,008

= \$10,008 direct cost of res-
ponding to false alarms

As mentioned previously, Alexandria's present approach to police costing has at least two shortcomings that the department is working to remedy. First, it does not automatically include the indirect costs of delivering the service (e.g., overhead or administrative expense). Second, cost calculations must be performed manually because the city's computerized financial data base is expenditure oriented and reports cash outlay by organizational unit instead of total costs by police service. In addition, the present approach's reliance on police time cards for personnel data introduces some unreliability into the results because time cards may not always accurately reflect the work performed. In fact, the Chief of Police in Alexandria speculates that a high percentage of the time reported by police on their time cards is not allocated to their actual tasks and activities.

Reporting

The Alexandria Data Processing Department routinely provides computerized expenditure information by organizational unit (e.g., patrol or investigations) to the Chief of Police and the Director of Planning and Research. In addition, line commanders are becoming more interested in these data because they have recently been given responsibility for formulating and monitoring their own budgets. More attention is focused on increases or decreases in expenditures than on the full costs of police services, however. Service costs, as observed earlier, are manually calculated only on request and reported by memorandum.

Yet, when cost data have been available, their impact on the organization or operations of the Police Department has been evident. Cost data have been used by police and city officials in changing internal police procedures (e.g., rules for responding to alarms), in deciding on personnel deployments, in setting fees for taxi licenses and solicitors' permits, and in formulating the annual budget.

Future Prospects

The department's ability to provide cost information has improved due to refinements in data processing systems that now permit faster turn-around for cost analysis requests, upgraded managerial skills in cost findings, and the centralization of fiscal management responsibilities in its Planning and Research Division. As a result, in the future the department expects to be able to perform more cost studies and to report cost information to managers on a regular basis. For example, the Chief of Police intends to determine the historical and projected costs of his tactical unit, criminal investigations, data processing, and preventive patrol.

Another potential opportunity for cost analysis concerns the demand for additional foot patrol in an affluent area of the city where persons in transit from local night clubs have been relieving themselves on the residents' azaleas. One of the negative effects of the city's revitalization of its downtown shopping and entertainment area has been an increasing incidence of rowdiness, public intoxication, and disturbing the peace. Local residents are demanding increased foot and motorized patrol to stop these incidents even though the police feel that these demands would cease once people realized that such heavy coverage would be very costly without having an appreciable impact on the problem. The department is hoping to use a special cost study of this problem to resist these demands.

State of Arkansas

Arkansas is a sparsely populated (2 million persons), predominantly rural state with a mix of southern and western cultures. Food products are the state's largest employing sector, with lumber and wood products a close second. National economic problems and a severe drought have substantially reduced state tax revenues and adversely affected state agencies and services. Arkansas has the lowest per capita state revenue and expenditures in the U.S. State spending has been limited to 91% of last year's budget which is even more of a cut when inflation is considered. Revenue shortfalls cannot be remedied by deficit spending or local borrowing due to constitutional limitations.

Arkansas State Police

The Arkansas State Police is an independent state agency reporting directly to the Governor. Until 1980, its command structure was based on a statewide functional separation of criminal investigations and highway patrol, both

headed by a major. At present, the agency has a geographical organizational structure that divides the state into three regions and provides for a major to coordinate criminal investigations and highway patrol in each region. A fourth major manages the administrative services of the agency (personnel, budget, planning and research, etc.) and reports to the Director and Assistant Director of State Police. Exhibit 6.2 portrays these organizational arrangements.

The State Police's staff numbers 775, with 517 uniformed officers and 158 civilians. The 517 uniformed staff can be further divided into 386 troopers and 131 supervisors organized into 12 troops. The FY 1980 budget approximates \$18,000,000 of which about \$11,000,000 represents funded state appropriations and \$7,000,000 comes from federal grants, license fees, and other special revenue sources. Due to surplus funds carried over from prior years, the State Police has avoided many of the personnel and nonpersonnel cutbacks that have affected other state agencies. But fiscal austerity may soon hurt the State Police as the surplus is depleted and the state treasurer has to claim much of what is left for the general fund to support other agencies.

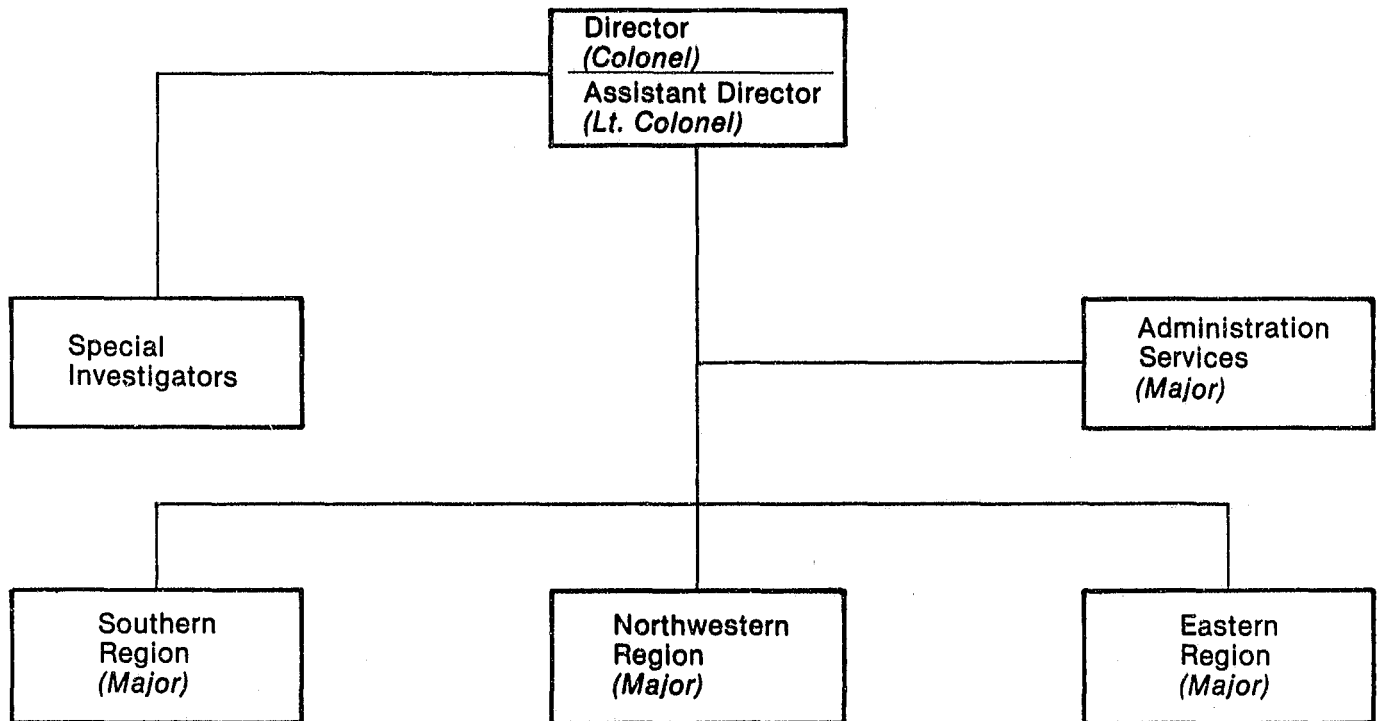
Cost Analysis System

Before 1966, the State of Arkansas' accounting system was limited to expenditure ledgers for each agency with manual entries at the most detailed level. Expenditures were recorded for object codes (known more familiarly as "line items" or "objects of expenditure") like postage, subscriptions, stationery, printing and film processing. In 1966, the accounting system was upgraded slightly to allow entries not only at the object code level but also at the character, or summary object code, level. For example, postage, stationery and similar object codes were summarized as the maintenance and general operations character. All transactions were done by hand until 1968 when an IBM computer mechanized the posting and reporting of expenditures.

Introduced in 1969, program budgeting allocated funds to government-wide programs, some of which crossed agency lines, rather than to organizational units. This new system also encouraged multi-year program and financial planning for two and then five years in the future. A major advance in cost analysis was made in 1971 when the State of Arkansas began to adopt the U.S. Air Force's Financial Management System (FMS) which computerized the program budgeting system, significantly expanded the number of on-line programs for which fiscal information was kept, and allowed reporting of expenditures by cost center and appropriation code.

However, FMS did not fully utilize available computer technology in developing a really useful management information system. Reports were not current

Exhibit 6.2
STATE POLICE ORGANIZATION



enough and managers had limited flexibility in how they could structure and schedule financial reporting. Grants management was neither automated nor integrated into the state accounting system. An Executive Proclamation in 1972 established an Information Systems Executive Committee to ensure implementation of an efficient system of information management in support of state government. A 1975 feasibility study commissioned by the Executive Committee recommended the development of a new accounting system and the automation of federal grants management. IBM Corporation was hired in 1977 to design and help implement an Accounting Federal Grants Management (AFGM) system starting in 1979 which is the basic component of the State Police's cost analysis capability.

System Features

The AFGM System used by the Arkansas State Police and other state agencies is a flexible, computerized approach to fiscal management. AFGM is designed to improve Arkansas' capacity to track expenditures by line item and organizational unit, to monitor programs that cross organizational boundaries, to establish a defensible audit trail for expenditures, and to report data to managers in a timely and useful fashion. Operating primarily through remote, on-line terminals, AFGM permits accounting and grant data to be entered into the system by line agencies and by overhead administrative and fiscal units. AFGM's value to management decision making has been affirmed by the California Department of Finance in a study of the accounting systems in six states which concluded that only Arkansas' AFGM system "appeared to contain a high degree of inherent flexibility" both in conceptual design and use of appropriate technology and thus had a "higher probability of successful implementation."*

A notable feature of AFGM is its functions and transactions module which allows the same dollars to be arrayed in different formats to meet legislative mandates or the information needs of executive officials. Among the ways in which the State Police's \$18 million budget can be broken down are by the organization structure and by program code:

- By organization structure. In this format, receipts and expenditures of the \$18 million budget are charged against organizational units or "cost centers" on five levels: agency, activity, section, unit, and element. Cost centers established by the State Police Director and other state officials must reflect agency operations since AFGM produces key management reports along cost

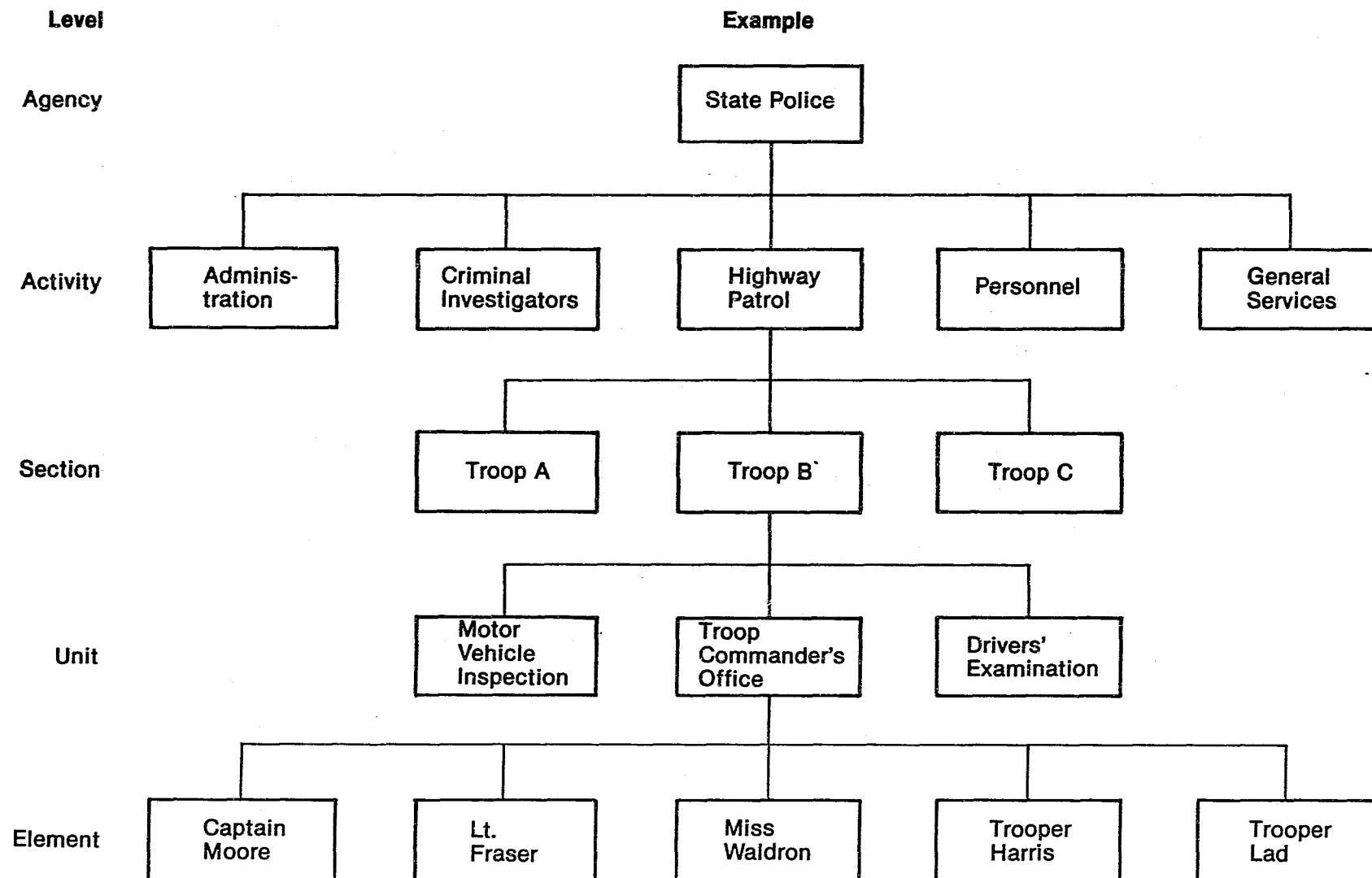
*Euell Anderson et al., Review of Other States' Accounting Systems (California Department of Finance, 1979), p. 3.

center lines. Since the new organization structure for the State Police reflected earlier in Exhibit 6.2 had not yet been incorporated into AFGM when this case was written, it seemed more appropriate to discuss how the \$18 million could be allocated organizationally by using the old structure as depicted in Exhibit 6.3. Thus, until recently, the Arkansas State Police constituted a cost center at the highest, or agency level. Within the agency, its major operating divisions were classified as activities: administration, criminal investigations, highway patrol, personnel, and general services. Within the highway patrol activity, for example, its regionally based troops were considered sections which, in turn, could be split into units such as motor vehicle inspections, drivers' examinations, or troop commander's office. Even though the State Police is not interested in this level of detail, units can be even further subdivided into individual elements, e.g., each staff member could be an element of the troop commander's office. Costs are charged at the lowest possible level of the organization structure and, if desired, accumulated upward to the unit, section, activity, and ultimately to the agency level.

- By program code. The State Police Director and other state officials can also establish program codes to capture costs that involve more than one organizational unit within the same agency, two or more agencies, or the entire state government. Personnel and nonpersonnel costs (regardless of which organizational unit incurred them) are charged to the appropriate program code. The State Police appreciates the utility of program codes when trying to isolate the costs of natural disasters or civil disturbances that engage the entire agency. Since program codes are created in special circumstances, it is unlikely that the total dollars allocated to program codes within the State Police would equal the \$18 million regular budget.

Another important feature of AFGM is that it allows individual agencies to maintain their own data bases apart from the statewide common data base. The State Police maintains statistical data on crime, traffic accidents and injuries, and citizen complaints in order to monitor performance and make realistic personnel assignments. Some effort is now underway to link AFGM with the State Police data base so that expenditures can be related to key performance indicators and unit costs derived, e.g., cost per arrest, cost per drug investigation or arrest, and cost per traffic ticket issued.

Exhibit 6.3
BUDGET ALLOCATION BY ORGANIZATION STRUCTURE



In addition, as discussed in Chapter 4, the State Police has its own internal vehicle monitoring system that tracks each vehicle's year and price of purchase, estimated useful life (now 75,000 miles), repair costs, and operating costs (gas, oil, etc.). The system is computerized and can calculate vehicle costs at any level, i.e., by total fleet, by troop, by make or model, or by individual vehicle. For FY 1980, the operating cost was estimated at 11¢ per mile and the overall cost (including depreciation) at 14¢ per mile. This information has assisted the State Police in deciding when to replace each vehicle and in purchasing the most economical replacements.

AFGM's capacity to identify full service costs is limited in two respects. First, it cannot allocate to a specific service the overhead costs of buildings and equipment or the administrative expenses of support units like personnel or communications. For example, AFGM considers the full cost of a patrol unit to include vehicle expense, trooper's salary and benefits, and equipment but does not consider the indirect costs to patrol of the personnel department that hired the trooper, payroll office that pays him, building that houses him, or the communications unit that links him with headquarters. Indirect costs must be calculated manually. Second, the state payroll system does not permit the entry of more than one program code on personnel vouchers thus preventing the automated apportionment of personnel time and expense among multiple programs or services during the same pay period. Thus, a single trooper can only note on the voucher that he spent his time on Program X during the past two weeks even if he also worked on Programs Y and Z during the same period. To enter the correct allocation of personnel time, the agency has to submit an expenditure error correction form directing AFGM to reallocate personnel costs to the appropriate program codes. Efforts are now underway to remedy both shortcomings.

In any event, the State Police has not yet made extensive use of AFGM in analyzing police costs. Unlike other state agencies using AFGM, the State Police's accounting structure resembles its organizational structure which hinders the accumulation of program or service costs. Expenditures are reported by unit and not by specific program or service. Hence, the isolation of service costs within or across units is a complicated undertaking.

This problem was exemplified by the State Police's deployment to handle the previously cited riot at Fort Chafee. Over one-third of the State Police's uniformed staff was assigned to crowd control and guard duty for almost a week. But when the State Police was asked to bill the federal government for the costs the state incurred, it was difficult to reconstruct their personnel and nonpersonnel expenditures because few records had been kept in the field and Fort Chafee expenses were charged to and buried in general purpose accounts. Next time the State Police has vowed to establish a special program code that will isolate these extraordinary expenditures.

However, special program codes are effective only when they are set up in advance of the event or service to be costed. The estimation of historical costs must rely on manual aggregation of costs charged to diverse cost centers or appropriations codes and scattered throughout the financial information system. Again, using the Fort Chafee example, the Arkansas State Police accessed AFGM for some of these costs but had to search through time sheets, hotel bills, and receipts of various kinds in order to estimate how much had been spent in total.

Costing Procedures

The State Police is currently studying the costs of its patrol units to improve their understanding of vehicle use and to support a request for additional manpower. The following hypothetical example of their cost finding methodology will clarify both the potential advantages and current limitations of AFGM in measuring police costs.

1. Define the service: as the annual cost of a patrol unit.
2. Identify its personnel and nonpersonnel components: as primarily a uniformed trooper and a vehicle.
3. Calculate direct personnel costs: by identifying an average annual salary of a state trooper, and adding the annual cost of all fringe benefits and allowances (e.g., hospitalization, life insurance, retirement, social security, uniform allowance, workmen's compensation, and unemployment benefits).

Annual salary	+	Fringe benefits	=	Total salary costs
\$15,000		\$5,000		\$20,000

Then determine the percent of time that the trooper is actually engaged in patrol operations, defined not only as the time spent in the vehicle but also as the time spent in patrol planning and reporting. The best method of time estimation would be to review activity reports or payroll summaries in which trooper time was allocated to discrete programs or services like patrol. Unfortunately, as was mentioned earlier, the state payroll system cannot accommodate charges to multiple AFGM program codes and the State Police would have to rely on its own records to split a trooper's time among several programs. As an alternative, the cost analyst could rely on interviews with troopers or supervisors or on selected observations of patrol activities to

develop a percent time commitment figure. This figure could then be applied to the total salary costs to derive a direct personnel cost for a patrol unit.

Total salary costs X Percent time on patrol = Direct personnel cost
of patrol unit

\$20,000 X 80% = \$16,000

4. Calculate direct nonpersonnel cost: by utilizing the State Police's vehicle monitoring system to determine the average number of miles driven on patrol and the total cost per mile of the typical patrol vehicle in a given year.

Miles driven X Cost per mile = Total nonpersonnel cost

25,000 X 14¢ = \$3,500

5. Allocate indirect costs: Since AFGM cannot yet perform this calculation, indirect costs must be allocated manually by one of three methods discussed in Appendix D. In this instance, it would be reasonable to assume that any of these methods would yield an indirect cost estimate for a patrol unit of approximately \$4,800.

6. Calculate total cost. AFGM provides computerized data on direct costs while manual calculations derive indirect costs. In the case of a patrol unit, its total costs would be determined in this manner:

Direct personnel + Direct nonpersonnel + Indirect costs = Total costs per
patrol unit

\$16,000 + \$3,500 + \$4,800 = \$24,300

Reporting

The AFGM reporting module is very responsive to the needs of user agencies. By noting the appropriate codes for organization unit, program, and other cost centers (on payroll and expense vouchers), the Arkansas State Police can rely on AFGM to produce a variety of financial reports. The number, type, and frequency of reports depend on the information needs of the user and the available computer processing time and funds.

The State's Office of Accounting works with each agency to define the reports it needs and the time periods that the reports cover. To date, a limited number of reports have been available on a monthly basis through the Office of Accounting due to the unfamiliarity of most agencies with this new system and the substantial amount of processing time needed to produce reports. Current plans, however, envision agencies eventually being able to obtain reports directly from the computer as frequently as needed. Computer processing costs for AFGM transactions are paid by the Office of Accounting but user agencies are required to pay for their own hardware (e.g., terminals).

AFGM is still too new for its reports to have had a significant impact on the use of cost data in decision making. However, the Arkansas State Police has independently done a few cost analyses to support strategic and tactical decisions in its highway patrol and criminal investigations divisions. In addition, the State Police has started to use the expenditure data provided by AFGM in concert with its own data on crime, traffic accidents, and other performance indicators to estimate the unit costs of selected services. The consumers of these data within the State Police have included the divisional commanders as well as the State Police Director, Administrative Services Director, and the Technical Assistant to the Director who oversees the agency's planning and budgeting processes. Other cost data users include the chief fiscal officer of the Department of Public Safety in which the State Police is located and the Senior Budget Analyst in the Department of Finance and Administration who monitors the State Police's budget.

Future Prospects

Four circumstances will substantially affect cost analysis in the Arkansas State Police. First, cost analysis depends on the continued implementation of AFGM throughout state government in general and in the State Police in particular. The use of the system's cost centers, program codes, and computerized data processing will insure a regular flow of cost information to top management. Second, the reorganization of the State Police will decentralize initial budgetary decision making to the regional commanders; they will need cost data in making requests for additional personnel or equipment.

Third, the State Police has recently assigned one of its troopers who has extensive fiscal experience to coordinate financial and accounting activities. His expertise will be invaluable in maximizing the agency's use of AFGM and cost data. Fourth, external exigencies like economic problems and disasters will compel increased attention to the costs of current services in order to make efficient use of scarce resources. For these reasons, it appears that the collection and analysis of accurate cost information will become an integral part of the operations of the Arkansas State Police.

Chapter 7:
Measuring the Costs of Police Services in
San Diego and Sunnyvale, California

Outline

SAN DIEGO, CALIFORNIA

San Diego Police Department
Cost Analysis System (Job
Order Costing)
Future Prospects

SUNNYVALE, CALIFORNIA

Sunnyvale Department of
Public Safety
Cost Analysis System (Program
Budget and Audit System)
Future Prospects

CROSS CASE ANALYSIS

This chapter contains case studies of the police costing systems in San Diego and Sunnyvale, California. San Diego utilizes "job order costing" whereas Sunnyvale has developed its own "Program Budget and Audit System" in cooperation with the U.S. General Accounting Office. Following the case studies themselves, there will be a brief analysis of the similarities and differences among all four case studies presented in Part Three.

San Diego, California

San Diego is a popular place to visit, live, and work. Its population has grown rapidly from 697,027 in 1970 to 874,608 in the 1980 preliminary U.S. Census which makes San Diego the 8th largest city in the U.S. Its proximity to Mexico and Orange County's parks and beaches attract many thousands of

tourists each year. Its excellent climate and natural harbor have made the city an important commercial center and the site of several large U.S. Navy installations. Electronics and aerospace are major industries. In 1979, thirty new companies relocated to San Diego, although chronic high unemployment remains a problem for inner city residents.

San Diego Police Department

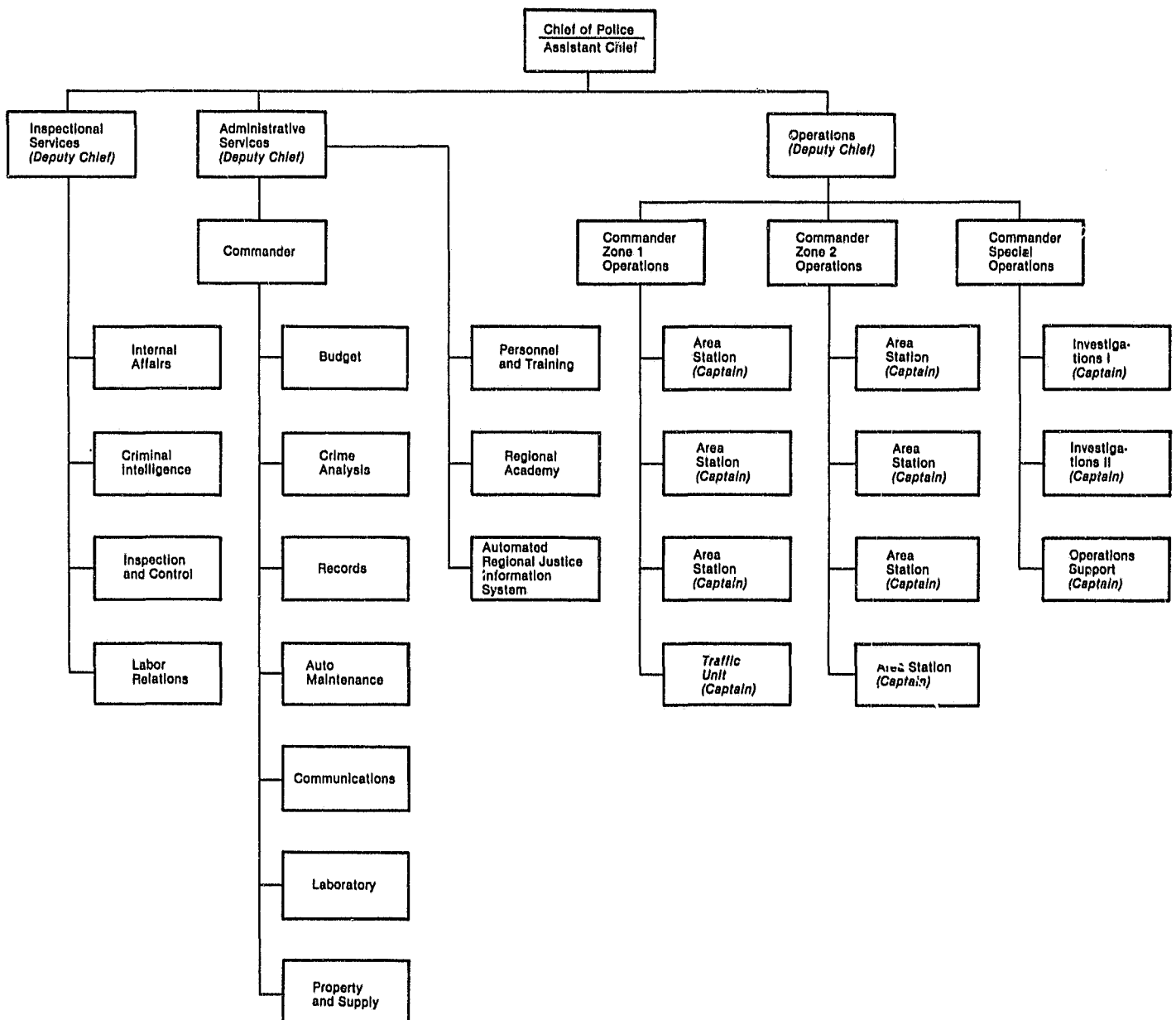
The San Diego Police Department has recently undergone an extensive reorganization in order to distinguish between the policy-making functions of top management and the operational responsibilities of middle and lower levels of the agency. Until 1980, the San Diego Police Department was organized around major police functions such as investigations, internal affairs, patrol, and administration with most management decisions centralized at headquarters. This arrangement tended to involve the department's top management in operational details and did not allow them enough time for general policy making and goal setting. This problem, plus the need to increase police visibility in the city's neighborhoods, led to a reorganization of the department's field operations. Responsibilities for patrol, juvenile, and crimes against property investigations were decentralized to seven area police stations. Crimes against persons investigations and other police functions continued to be managed at central headquarters. Furthermore, all the activities of the department were grouped into three major divisions headed by Deputy Chiefs, i.e., Inspectional Services, Administrative Services, and Operations. The aim of these changes was to provide the Police Chief and his Deputy Chiefs with maximum time for department-level planning and coordination and to leave day-to-day decisions to the Commanders and Captains who report to this top management group. Exhibit 7.1 depicts these new organizational relationships.

The Police Department has 1726 employees--1247 sworn officers and 479 civilians--which is about 2 employees per 1000 population. Public safety has been declared by the City Council to be its top priority and they have been eager to spend increasing amounts of money on it. For example, the City Council authorized 100 new sworn positions even though the Police Department requested only 20 new positions. The current police operating budget is \$52 million or about 18% of the total city budget of \$287 million. Per capita police expenditures are approximately \$59.

Cost Analysis System

Much of San Diego's interest in efficient fiscal management stems from its involvement in George Washington University's State-Local Finances Project in 1966 which introduced a Planning-Programming-Budgeting System (PPBS) in

Exhibit 7.1
DEPARTMENT ORGANIZATION



selected jurisdictions. PPBS entailed an across-the-board government program structure that ignored organizational boundaries, a multi-year program and financial plan, and special analytical studies to evaluate programmatic efficiency and effectiveness. Like most governments, the City of San Diego had difficulties in fully implementing such a comprehensive, apolitical, and sophisticated approach to public budgeting. However, the PPBS effort did establish the feasibility and desirability of an output-oriented budgeting style.

Fiscal Year 1974 was significant in that programmatic terminology, format, and concepts became part of the Annual Budget document. In order to focus on program costs and outputs instead of on departmental spending levels, program budgeting grouped expenditures by program and activity rather than by organizational unit, although until recently the Police Department simply retitled its units as "programs" when submitting its budget recommendations. Explicit consideration was given to comparing costs with output performance measures, e.g., number of crime reports filed, numbers of calls for service, etc.

In 1978, the need for cost analysis was strengthened considerably by the passage of California's "Proposition 13" which limited property tax assessments. Although the state government's distribution of its persistent budgetary surpluses has enabled many cities and towns to avoid major revenue losses and program reductions, these surpluses will soon end and force greater attention to cost analysis and control. San Diego's potential revenue problems have been exacerbated by a local city ordinance that limits annual increases in government spending to 75% of the city's inflation rate plus a small allowance for population growth. Growing reliance on the federal and state governments for cost reimbursement and the need to document these costs very extensively is also popularizing cost analysis. For example, in order to calculate the costs of handling a major strike, the Police Department assigned a fiscal analyst out in the field for its duration to keep track of all personnel and nonpersonnel costs.

System Features

The key to understanding the San Diego costing system is the "job order" concept. A job order is a cost center or account, pertaining either to an operation which occurs regularly or to a specific project, against which all labor and materials costs can be charged. Job orders are very versatile in that they can correspond to:

- organizational units, e.g., operations division, area stations, or arson squad;

- programs or program elements, e.g., investigations program or its crimes against property investigations element; and to
- special events, e.g., VIP escort or civil disturbances.

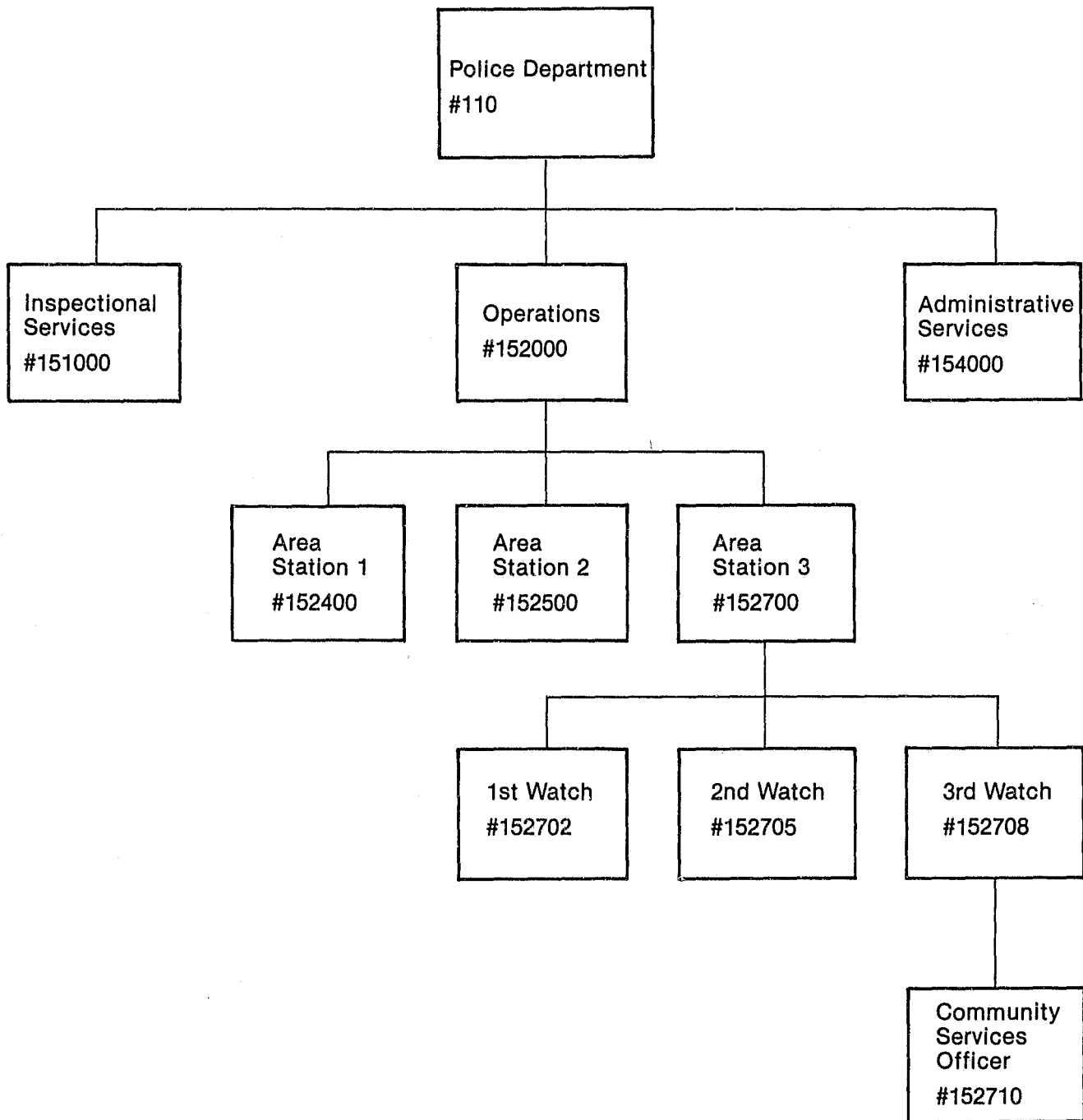
Every department in the city is responsible for identifying its major activities and for formulating its own job order system. The police department, for example, has chosen to construct a job order system which closely follows the organizational lines of the department, except for special events. Currently, the department has over 350 job orders in use and work is now underway to use job orders in the program budget structure, too. This will permit costs to be charged to the job order corresponding to the specific organizational unit that incurred them and, at the same time, to the job order for the program or special event that made the costs necessary. Such double or triple entries would allow police cost analysts, using the city's Accounting and Management Resource Information System (AMRIS), to accumulate costs by organizational unit, special event, or program. AMRIS is a computerized financial information system that has been installed in city agencies to allow, among other things, greater flexibility in the storage and retrieval of fiscal data.

Under the job order cost analysis system, a unique number is assigned to each activity at each level. Exhibit 7.2 applies hypothetical job order numbers to a portion of the department's organization structure. Expenditures are entered at the lowest possible level and accumulated upward, if desired. Thus, for example, Job Order #152710 would contain cost information on just the third watch Community Service Officer (CSO) in Area Station 3. Job Order #152000 (Operations) would automatically contain financial information from each of its component job orders, and would therefore provide cost data on the entire Operations Division.

Collection of current cost data for a particular activity requires only that the analyst know the proper job order number assigned to that activity. Because all personnel and nonpersonnel expenditures are charged to job orders rather than to organizational units per se, cost analysis becomes a matter of entering the appropriate job order number into the computer (AMRIS) and acquiring a printout of expenditures to date. Indirect costs (such as overhead expenses) are then added manually. Hence, the San Diego Police Department's job order approach departs from true cost analysis in one important respect--its computerized data base reports current expenditures (cash outlay plus obligations) rather than full costs (including indirect costs).

Although it is fairly easy to do, full costs must be calculated manually. One valuable feature of the job order system is its capacity to accumulate costs at any level, from the most discrete (third watch CSO in Area Station 3) to the most general level (Operations Division). Thus, to obtain cost

Exhibit 7.2
COST ACCUMULATION WITH JOB ORDERS



information on a discrete activity, the analyst enters the account number of that job. Cost information on general levels is also available by entering the appropriate job order number--the computer will automatically accumulate and report the aggregate expenditures of all job orders comprising the general activity, such as operations.

A second major benefit of the job order system is the capability it provides to collect cost data for those tasks that involve more than one city department. An example of such an activity would be an occasion in which the Police, Parks, Public Works, and Cultural Affairs departments might work together on a jazz concert in a city park. A city-wide job order number is assigned the special event by the Auditor's Office, whereupon the various departments charge against the number for services performed. Expenditures for the job order will be available at the department level and can be summarized to determine the total cost to the city.

Costing Procedures

A combination of computerized and manual calculations can be performed to ascertain the full costs of a police service in San Diego. Using a hypothetical case, the steps are as follows:

1. Define service as generally or as specifically as needed. A good example of a service that could be costed via the job order method would be "Crimes against Property Administration."
2. Identify personnel and nonpersonnel components by consulting the programmatic job order report. It would show that administering this service involves mostly personnel expense for general management, clerical services, field supervision, and training. Nonpersonnel objects of expenditure would include supplies, energy/utilities, and equipment outlay.
3. Calculate direct costs by examining the total personnel and nonpersonnel expenses charged against this job order either during the current period or year to date, as exemplified in Exhibit 7.3. Several sample items in the exhibit require explanation since they pertain to significant features of the cost analysis system:
 - Account and Type of Expense are objects of expenditure within the job order, e.g., labor, fringe benefits, energy/utilities, etc.
 - Units are a standard measurement for various types of expense, e.g., hours are the units for the labor expense.

Exhibit 7.3
PROGRAMMATIC JOB ORDER REPORT
(partial)

Job Order: Crimes against Property Administration

Number 154201

104

Description	Account	Type of Expense	*---Current Period---*		*-----Year-To-Date-----*			
			Units	Expenditures	Units	Expenditures	Encumbrances	Total
Management	6031	Labor	40.0	600.00	80.0	1,200.00	.00	1,200.00
	6031	Fringe Bft		180.00		360.00	.00	360.00
	5100	Enrgy/Util		22.40		63.00		63.00
Training	6046	Labor	100.0	1,000.00	200.00	2,000.00	.00	2,000.00
	6046	Fringe Bft		300.00		600.00	.00	600.00
	3101	Supplies		200.00		200.00	.00	200.00
Field	6042	Labor	80.0	1,200.00	200.00	3,000.00	.00	3,000.00
Supervision	6042	Fringe Bft		360.00		1,000.00	.00	1,000.00
	6010	Eqp. Outlay		9,400.00		9,400.00	600.00	10,000.00
TOTAL for Job Order #154201								
TOTAL Cost and Hours			220.0	13,262.40	480.0	17,283.00	600.00	18,423.00

- Expenditures are either a function of the number of units multiplied by a given rate (e.g., 40 hours in labor x \$15 per hour = \$600) or a direct charge (e.g., \$9,400 in equipment outlay for a patrol vehicle).
- Encumbrances represent obligations incurred during the period covered by the report for which expenditures will have to be made at some future date, e.g., a \$600 encumbrance for equipment ordered during the period covered by the report in Exhibit 7.3 which will not be delivered or purchased until the next reporting period. Encumbrances are included in the total costs for the period.
- Equipment outlays are fully debited at the time of purchase and not depreciated over the number of years of useful life. Thus, the \$9,400 cost of the patrol vehicle was entered in full as an expenditure during the current period. Following the cost analysis methods recommended in Chapter 3 of this Program Model, it would be preferable to divide the \$9,400 cost by its life expectancy (e.g., 3 years) and only enter \$3,133 in three successive years as equipment outlay for the vehicle.

The total direct costs reported in Exhibit 7.3 are \$13,262 for the current period and \$18,423 for the year to date. Excluding the one time equipment outlay of \$9,400 for the vehicle, personnel/labor costs account for over 90% of the total.

Significantly, there is some question about the validity of the number of labor hours allocated to the various job orders used by the Police Department since (1) account numbers are often entered incorrectly on the time cards, (2) labor hour entries are rough estimates rather than exact figures, and (3) the total hours do not always add up to the full-time equivalent of 40 hours per week. The city's Auditing Department plans to institute a departmental review procedure to catch these defects before the time cards are turned over to payroll for processing and misinformation is entered in the financial information system.

4. Calculate indirect costs by applying to the job order the city's overhead rate which is calculated by dividing the operating costs of all city administrative agencies (financial management, auditing, etc.) that support the Police Department and dividing by the total city budget, e.g.:

<u>Administrative support costs @ \$35 million</u>		12.3% overhead rate ap-
Total city budget @ \$287 million	=	plied to salaries of all departments/job orders

Thus, the indirect costs of the crimes against property administration job order would be determined by multiplying salaries for the current period (e.g., \$2800) by the overhead rate (12.3%) = \$344.40. A drawback of the current system is that the computation of indirect costs must be done by hand. Thought is being given to two methods of simplifying the calculation of indirect costs: (1) adding the overhead rate to the AMRIS program or (2) creating job orders to which support units could charge their services for line agencies, e.g., the Police Department could create a job order in its own budget for the Financial Management Department's work on its behalf.

It should be noted that the definition of overhead used in San Diego is closer to the definition of "general and administrative expense" used in the Program Model. Thus, San Diego omits the cost of fixed assets in its determination of the indirect costs of "Crimes against Property Administration."

5. Calculate total cost of "Crimes against Property Administration" by summing direct and indirect costs for a given period. For the period being studied, direct costs total \$13,262.40, indirect costs are \$344.40, and total cost is \$13,606.80.

Reporting

Like all city departments, the San Diego Police Department has access to a wide range of cost data reports. The aim has been to control expenditures and to provide managers with current financial data on which to make decisions. Every four weeks, managers get an expenditure report on the job orders for which they are responsible and may obtain reports more frequently if necessary. One of the principal advantages of the city's financial information system is that it was computerized in 1976 and permits instantaneous data entry and retrieval through remote terminals and video screens located at various points throughout city government. For data inquiries and reports, a user merely enters the appropriate transaction number and password on any terminal. However, to protect the system from inadvertent or deliberate misinformation, data entry is permitted only from carefully controlled terminals at selected locations.

The AMRIS system is also starting to permit better crosswalks (defined in Chapter 5) between the program structure used for budgeting (patrol, investigations, etc.) and the organization structure used for reporting accounting data (Area Station, Regional Academy, etc.). Right now, the Police Department is finding it difficult to monitor the expenditures of its organizational units because much of the fiscal reporting is still done on a program basis. Reporting by program or service rather than by organizational unit adheres to the principles of cost analysis but also impedes, in the Department's view, management control over operations. The eventual crosswalks

should permit more flexible reporting and serve both cost analysis and management control. Another complicating factor is that budgeting is handled by the city's Financial Management Department whereas accounting is the responsibility of the Auditing Department.

Despite these problems, the impact of cost reports on police decision making has been demonstrated on many occasions. With the active support of the City Manager and his staff, the San Diego Police Department has used cost data primarily to bill for its services and to defend its budget requests. More specifically:

- Regulatory fees are charged based on the principle of full cost recovery which entails regular updates of cost estimates for issuing bicycle and taxi licenses, conducting inspections, and related activities.
- To win City Council approval, the Police Department figured the full costs of hiring sixty community services officers to respond to low priority requests for service.
- The State of California was billed for the use of San Diego Police to handle a civil disturbance in a neighboring region (Imperial Valley) which entailed a careful cost analysis in order to support the city's claim.
- Increasing emphasis is being given to costing and billing for police services at special events, e.g., football and soccer games, neighborhood parties, etc.

Future Prospects

The San Diego Police Department's use of cost data in planning and budgeting will probably increase. One reason is that emerging fiscal restraints have enhanced the influence of cost considerations in decision making. In addition, the department's reorganization and its decentralization of power and responsibility will involve line commanders and captains for the first time in budgeting and thus spread the use of cost data on all levels of the department. Also, the capacity of AMRIS to deliver current financial information at a reporting level and frequency suited to the individual manager's needs will continue to encourage cost analysis.

Finally, the department's Fiscal Management unit has taken the initiative in planning cost analysis throughout the department. Full cost studies are envisioned for activities such as traffic control, narcotics and vice

suppression, and police psychological counseling. Given the continued use of program budgeting, job order accounting, and a computerized financial information system, these and other studies are not only possible but also likely.

Sunnyvale, California

The area between San Francisco and San Jose, where Sunnyvale is located, has become popularly known as the "Silicon Valley" because of the large number of high technology companies that have settled there. The rapid industrial growth has prompted significant increases in commercial activity and population. Since 1950, Sunnyvale's population has risen from 9,290 to 107,195. It has also prompted urban sprawl, unwieldy commuter traffic, and rapid housing turnover despite high property values. This brisk real estate market has largely offset the limitations of California's Proposition 13 on local property tax assessments and revenues since the law allows property to be reassessed to its true market value each time it changes ownership, as happens with increasing regularity in "Silicon Valley."

Sunnyvale Department of Public Safety

The Department of Public Safety has a unique approach to the delivery of police and fire services to the citizens of Sunnyvale. All personnel are trained to provide both police and fire services. Not only are they reassigned from police to fire duties, or vice versa, every 1-3 years, but also persons assigned to police patrol respond to fire emergencies when required. This system was adopted in 1950 on the premise that training and equipping safety personnel to provide both police and fire services would result in:

- better utilization of personnel since statistics show that only a small percentage of a firefighter's time is actually spent responding to emergencies;
- improved flexibility and responsiveness to community safety needs; and
- less duplication of effort and significant reductions in personnel costs.

Sunnyvale claims that this joint service approach is responsible for the city's standing among the top 10% in the nation for the lowest crime rate for cities over 100,000 population and for its excellent Class 3 fire rating. It has also allowed the ratio of total departmental personnel (police and

fire) per 1000 population to decline from 2.45 per thousand in 1950 to 2.08 in 1980--the national average for police alone is 2.1. Employing 223 persons (of whom 103 are assigned to police services), the Department of Public Safety in Sunnyvale operates with 25% fewer personnel than other cities of similar size and services.

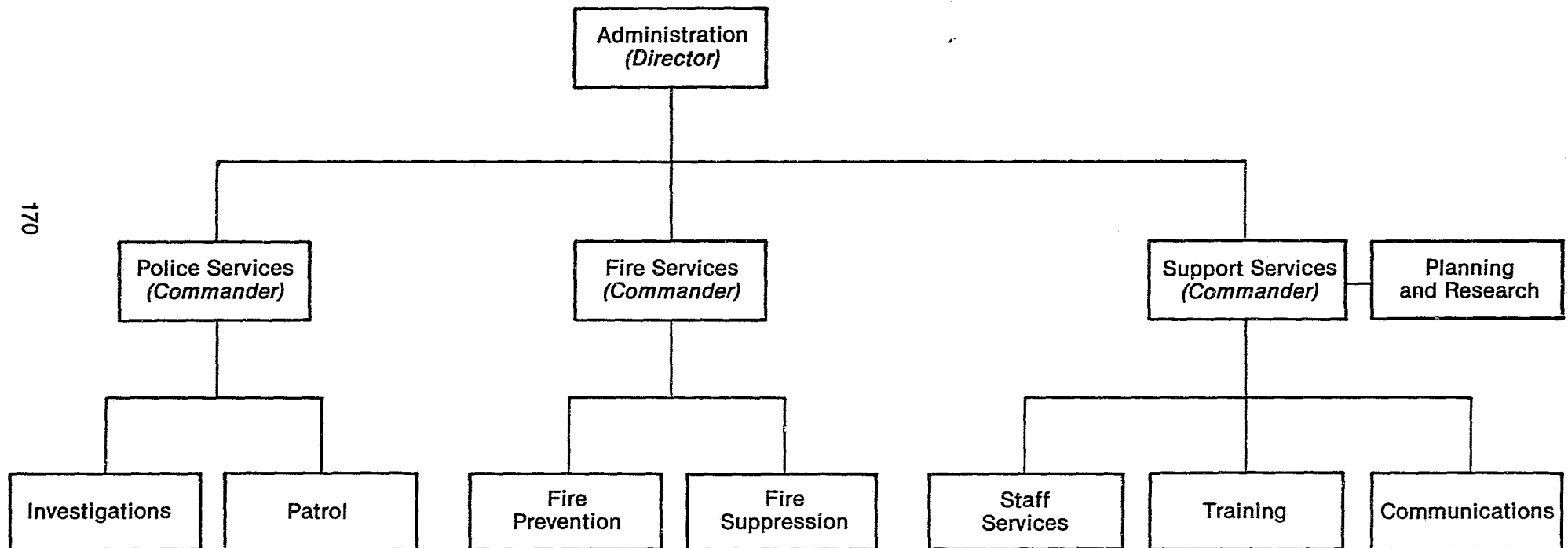
It is not as easy to assess the impact of the joint service approach on Sunnyvale's per capita police expenditures. Out of a total budget for the Department of Public Safety of \$9.47 million in FY 1980, police services have been allocated \$3.92 million. But this police budget does not include the costs of support services that police departments in other cities have to include in their budgets, e.g., training, personnel, payroll, purchasing, etc. Sunnyvale funds these support services in a separate budget within the Department of Public Safety. However, if these support costs of \$2.2 million are allocated to police services based on its 54% share of the total departmental budget allocated to direct service delivery (exclusive of support costs), an estimated support cost for police of \$1.2 million is obtained. When this support cost is added to the base budget for police of \$3.92 million, the total police budget becomes \$5.12 million. Given a population of 107,195, even this adjusted budget of \$5.12 million translates into a low per capita police expenditure of about \$48 per year.

Organizationally, police, fire, and support services are managed by separate commanders who, in turn, report to the Director of Public Safety. The Planning and Research unit coordinates the department's budgeting and cost analysis under the supervision of the Commander for Support Services. These organizational arrangements are depicted in Exhibit 7.4.

Cost Analysis System

The origin of Sunnyvale's cost analysis system dates back to 1968 when the city implemented a program budget system that allocated costs not to organizational units but to programs, some of which crossed departmental boundaries. It was hoped that the use of a program budget would help managers to focus more on service delivery and less on their units' funding and staffing levels. This output orientation was reinforced in 1975 when the Sunnyvale Department of Public Safety became the first department in the nation to work with the U.S. General Accounting Office to develop a model police and fire performance audit program that would evaluate objectively the use of resources in relation to the service provided. These experiences led Sunnyvale to design a Program Budget and Audit System (PBAS) for the entire city government that functionally relates broad city policies and goals to the tasks, work outputs and costs needed to accomplish them. Implemented in 1979 with the assistance of a national accounting firm, PBAS is now being used in its second budget cycle.

Exhibit 7.4
DEPARTMENT OF PUBLIC SAFETY



System Features

PBAS is the basis of Sunnyvale's system for measuring the costs of police services. Its key features in this respect are: (1) cost allocation to programs, objectives, and tasks rather than to organizational units, (2) accent on levels of service in departmental budgeting and cost accounting, (3) inclusion of both cash outlay and overhead expense in its definition of cost, and (4) sharing of fiscal responsibilities among city agencies.

First, PBAS allocates budgets and costs to programs, and within each program, to objectives and tasks rather than to organizational units. Police Services and Fire Services are separate programs within the Department of Public Safety, and each has its own objectives and tasks. Since each task is a specific service provided by the Department of Public Safety, and all personnel and non-personnel expenditures are charged to the task, an analyst can readily estimate service costs. This is in sharp contrast to most police departments where the costs of specific services would be buried in the voluminous expenditure records of the department or bureau providing the service. Among the tasks/services for which cost information can be provided are:

- conduct "Safe Way to School" operations;
- conduct talks and tours of public safety facilities;
- maintain liaison with courts and district attorney; and
- conduct juvenile delinquency diversion services.

Second, PBAS' approach to departmental budgeting and cost accounting puts less emphasis on the human and financial resources invested into the police program than on the level of service produced by that program. PBAS is output-oriented. When the Director of Public Safety formulates the annual budget for the department, he does not think immediately in terms of organization units, authorized personnel lines, or objects of expenditure as would happen in most public agencies. Rather, he proposes a given level of service by task (expressed in quantifiable production units) that the department will provide during the next year and a unit cost is then applied to devise an initial budget estimate. For example, the Department of Public Safety proposed a level of service of 140 public safety talks and tours during FY 1981 which at a unit cost of \$15.09 per talk or tour, translated into a total task cost of \$2,112.

Third, PBAS views cost as more than just the expenditures, or cash outlay, of an organizational unit. It also includes the overhead costs of buildings and equipment in determining the full and unit costs of a task. Sunnyvale has an

interesting method for estimating overhead in that all equipment and buildings are owned by the city and "rented" to programs at a rate designed to cover the operating costs of buildings (utilities, janitorial, and minor maintenance) and the replacement costs of equipment. The building rental charge is apportioned as a direct cost among the programs that use the building based on the square footage of space used. Within each program, the rental charge is distributed among tasks on the basis of the percentage of the department's total work hours utilized on each task. Thus, a task consuming 3.5% of the Police Services Program's total work hours would be charged 3.5% of the rent that the program pays to the City for building space. Equipment rental cost is charged directly to the tasks to which the equipment is assigned (a specific percentage of the equipment cost may be assigned to two or more tasks that share the same piece of equipment based on the percentage of time that it is utilized by each task).

Fourth, PBAS promotes greater participation in police budgeting and cost estimation on the part of other city agencies. For instance, the Finance Department computes the unit costs of police services that the Department of Public Safety needs for its budget estimates. The Finance Department also adjusts these estimates to account for inflation and other "additives." The inflation factor is generally the consumer price index, except that some items can be inflated at a slightly higher rate, e.g., gas and asphalt. "Additives" are included in each budget to cover other direct costs like data processing or building charges. This budget figure then forms the basis of negotiations among the Public Safety Department, Finance Department, and City Manager to decide on a final budget recommendation to the City Council. Yet, due to the use of production units and unit costs, most of these discussions center on an appropriate level of service for the coming year instead of on how much money shall be spent on which line items like personnel or travel. Requests for additional personnel must be justified in terms of an increased level of service.

Costing Procedures

PBAS simplifies the costing of police services through its use of tasks: (1) as the basic service unit, and (2) as the accounting structure to which personnel and nonpersonnel expenditures can be allocated. Whenever a time card is completed or purchase order issued, expenditures are charged to the line item account of a specific task and not to organizational units. Using a computerized coding scheme that links these discrete tasks to larger activities and programs, PBAS permits the aggregation of cost data at almost any level in the Department of Public Safety and, if needed, the whole city government. Moreover, organizational unit costs can be estimated by aggregating the costs of all tasks assigned to that unit. PBAS is a very flexible system with diverse managerial uses.

The methodology for using PBAS to estimate the costs of police services is similar to that which would be used without PBAS, except that the calculations can be done more quickly with it. A hypothetical example might be instructive at this point:

1. Define service: As implemented in Sunnyvale, PBAS contains over 1500 work tasks or services, many of which are assigned to the Department of Public Safety. A manager can either select one of these tasks for costing or create a new task. In the latter instance, a unique task and account number would be devised, personnel time and nonpersonnel expenses charged to it, and a cost figure reported at any desired interval. In this instance, let us focus on a regular police activity--the "Conduct Safe Way to School" task.
2. Identify production units for the task that quantitatively measure its output. The production unit for the "Safe Way to School" task happens to be the "number of children contacted." Attendance figures might reveal that 9,400 children are contacted in a typical year.
3. Identify personnel and nonpersonnel components of the task needed to provide the production units. In order to contact the children, the "Safe Way to School" task might require sworn officers, police cruisers, and printed handouts.
4. Calculate a unit cost for the task by determining the unit costs of each component and adding overhead expense. PBAS automatically includes direct costs and the costs of overhead in its unit cost calculations. Exhibit 7.5 shows how these unit costs might be determined. However, the indirect cost of general and administrative expenses incurred by support units (e.g. personnel, accounting, etc.) in providing the service must be added separately by hand (see Step #5, below).
5. Determine unit cost for general and administrative expense by taking the total indirect costs incurred by the city for central staff units (personnel, accounting, etc.) and dividing by the total direct costs of city services. This result, an indirect cost rate for G&A expense, is then multiplied by the direct costs of the "Safe Way to School" task and divided by the number of children contacted. The principle is that this task should be charged for the indirect costs that the city's central staff units incur in its support.

Exhibit 7.5

CALCULATION OF UNIT COSTS FOR
"SAFE WAY TO SCHOOL" TASK

COMPONENT	COST FACTORS	UNIT COSTS PER CHILD
1. Sworn Officers	$\frac{7,000 \text{ hrs.}^a \times \$25 \text{ per hr. (inc. salary and fringe benefits)}}{9400 \text{ children contacted}} =$	\$18.62
2. Police Cruiser	$\frac{2,000 \text{ miles} \times 14¢ \text{ per mi. (inc. depreciation and operating costs)}^b}{9400 \text{ children contacted}} =$.03
3. Handouts	$\frac{(40 \text{ hrs. typing} \times \$15 \text{ per hr.}) + (50 \text{ pp.} \times 2¢ \text{ per page photocop.} \times 10,000 \text{ cop.})}{9400 \text{ children contacted}} =$	1.13
174 4. Miscellaneous ^c	$\frac{\$8,272 \text{ (supplies and materials)}}{9400 \text{ children contacted}} =$.88
5. Overhead	$\frac{\left(\frac{\$100,000 \text{ building rent to Police Svs. Prog.}}{9400 \text{ children contacted}} \times 3.5\% \text{ (% of total prog. work hrs. in task)} \right) + \left(\frac{430 \text{ equipment hours}}{9400 \text{ children contacted}} \times \$10 \text{ per hour} \right)}{9400 \text{ children contacted}} =$.83
TOTAL UNIT COST (excluding G&A expense)		<u>\$21.49</u> per child contacted

NOTES

a. Sworn officer labor hours: represents the total number of hours reported on activity reports by all sworn officers participating in the "Safe Way to School" task.

b. Police cruiser operating cost: includes expenditures for fuel and repairs. Repairs are charged directly to the vehicle by the maintenance staff while gas is charged to the vehicle by inserting a car-coded key into the gas pump when filling the tank.

c. Miscellaneous. Expenditures for minor items like paper and supplies are charged to each program. The computer then allocates the cost to each task in that program based on the percentage of total program work hours that are in each task. For example, the "Safe Way to School" task expends 7,000 work hours out of the 200,000 work hours expended by the entire Police Services program, or 3.5%.

$$\begin{aligned}
&\text{G\&A} && \text{Total city indirect costs} && \text{X Direct costs of service} \\
&\text{Unit} = && \text{Total city direct costs} && \text{being costed} \\
&\text{Cost} && \text{No. of production units} \\
\\
&= && \frac{\$ 2,135,961}{\$44,174,085} && \text{X } \$202,006 \text{ cost of "Safe Way to School"} \\
&&& && \text{9400 children contacted} \\
\\
&= && \frac{.048}{9400} \text{ X } \$202,006 \\
\\
&= && \underline{\$1.03} \text{ unit cost for G\&A expense per child contacted}
\end{aligned}$$

6. Determine total service costs by adding the general and administrative expense unit cost (\$1.03) to the total of the other unit costs (\$21.49) and multiplying by the expected or actual number of production units to be provided, e.g., 9400.

$$\text{Total unit costs} = \$1.03 + \$21.49 = \underline{\$22.52} \text{ per child contacted}$$

$$\text{Total service cost} = \$22.52 \times 9,400 \text{ children contacted}$$

$$= \underline{\$211,688} \text{ for "Safe Way to School" task}$$

As mentioned previously, computerization makes these costing procedures much simpler in reality than they appear on paper. Except for general and administrative expenses, all mathematical computations are done automatically and a total service cost can be quickly determined for any police activity.

Reporting

Through PBAS, public safety officials in Sunnyvale have access to a wide variety of reports on departmental performance. The system allows expenditures and costs to be allocated by line item, by function or activity, or by organizational units. It issues computerized reports every four weeks or thirteen times per year. Managers receive reports on the number of labor hours and other production units expended and on financial expenditures at the task and activity level. Every two weeks, PBAS issues a report on the number of labor hours by employee by task. More attention is paid to the production unit reports than to the expenditure summaries in line with PBAS' emphasis on level of service provided over money spent.

Exhibit 7.6 depicts a typical PBAS cost report for the police services program exclusive of G&A expense. It focuses on three police activities: (1) calls for service, (2) traffic enforcement, and (3) citizen awareness of public safety. The exhibit demonstrates Sunnyvale's emphasis through PBAS on objectives, tasks, production units, and unit costs in managing its fiscal affairs.

This information has been used in a variety of decision situations. Cost has rarely been the only factor considered in choosing among alternatives but has affected decisions on:

- use of in-house vs. contracted maintenance services;
- feasibility of a full-time evidence technician;
- cost of a bicycle safety program;
- blood tests for drunk drivers;
- use of fire engines;
- use and appropriateness of training;
- use of photographs vs. motion pictures as evidence in criminal trials;
- requests for additional police manpower; and
- need for additional traffic directors.

Cost data are also used for management control. Each department or unit is held responsible for expending no more than the number of labor hours budgeted for each of the thirteen reporting periods during the year. By using the labor hour cost, these data can be easily translated into a personnel cost figure as well. These financial trends are closely watched for significant variances from budget and corrective action is taken when necessary.

Future Prospects

PBAS has been implemented in Sunnyvale for less than two years. Therefore, it would be premature to render a final judgment on its institutionalization or contribution to cost accounting capabilities.

In general, PBAS seems to meet the needs of managers in Sunnyvale, although there is some concern that the typical manager is overwhelmed with data from

Exhibit 7.6

SAMPLE PBAS COST REPORT

Program 411/Police Services

	Type of Production Units	# Units	Unit Cost	Task Cost*	
Objective: 411A Respond to and handle all non-emergency calls effectively and maintain a response time on emergency calls which will provide on-scene services within an average time of 5 minutes.					
Task					
41101	Provide non-emergency police services	Non-emergency responses	54,000	\$46.45	\$2,508,300.00
41102	Provide briefing to personnel	Briefing manhours	7,270	\$20.05	\$ 145,763.50
41104	Provide emergency police and fire services	Emergency responses	3,872	\$23.88	\$ 92,463.36
Objective: 411B Provide sufficient patrol and radar traffic enforcement to insure a safe and orderly flow of traffic and maintain an enforcement index of 20.					
Task					
41111	Conduct traffic safety operations	Traffic citations	17,500	\$ 5.45	\$ 95,375.00
Objective: 411C Promote citizen awareness of and cooperation in department efforts toward safety through the "Safe Way to School" and "Bicycle Safety" programs by providing the programs as scheduled 100% of the time, and through talks and tours of public safety facilities as scheduled 100% of the time.					
Task					
41121	Conduct "Safe Way to School" program	Children contacted	9,400	\$21.49	\$ 202,006.00
41122	Conduct Bicycle Safety operations	Bicycle citations	600	\$ 5.28	\$ 3,168.00
41134	Conduct talks and tours of public safety facilities	Talks and tours	140	\$15.09	\$ 2,112.60

*# Units x Unit Cost = Task Cost

the system and that more computerized analysis needs to be done with the raw data to enhance their usefulness. For example, PBAS does not routinely compare current expenditures of funds or production units with expenditures for the same period last year. However, this concern is far exceeded by overall satisfaction with how much better decision making has become since PBAS started. If the paperwork problems can be overcome, and PBAS retains its cost-by-task structure and computerization, then Sunnyvale will be able to measure its police costs quickly and inexpensively for many years to come.

Cross Case Analysis

It is important to synthesize some conclusions in light of the multi-faceted realities of cost analysis in a variety of governmental and community contexts. The costing approach taken in each jurisdiction had some features that were unique and many that were shared with other jurisdictions.

1. Responsibilities for police costing. In all cases, the police agency shared the responsibility for costing its services with other agencies in the jurisdiction, usually the finance and auditing departments. While this arrangement increased the expertise brought to bear on costing problems and analysis, such a division of labor often slowed the costing process and did not build a sufficient cost analysis capability within the police agency. The police often collected the raw data but left it to these other agencies to perform the cost analysis.

2. Extent of cost analysis. Only Sunnyvale automatically included indirect costs in its calculation of full costs. To varying degrees, the other jurisdictions focused on the direct costs of the service but were able manually to add indirect costs to their cost computations.

3. Definition of cost. Expenditures were confused with costs in the jurisdictions with the result that some police managers and public officials mistakenly cited data and collection procedures related to expenditures when asked to describe their costing systems. Of the two characteristics that distinguish costs from expenditures, most jurisdictions were more adept at supplementing their expenditure data with indirect cost information to estimate actual costs than they were at adjusting expenditure data to satisfy the definition of cost as resources used regardless of when acquired. Cost estimates tended to reflect items purchased rather than items used because of limitations in their accounting systems.

4. Cost centers. Although all jurisdictions were capable of associating costs with different cost centers, most routinely allocated costs to organizational units rather than to services. Service costs had to be inferred

from the costs of the one or more organizational units that delivered the service.

5. Reporting. Reports of cost information were available in all jurisdictions although sometimes these reports had to be requested instead of being an integral part of the regular management information system. Moreover, as suggested earlier, these reports paid more attention to expenditures than actual costs. Finally, all jurisdictions were working to improve their cost reporting, especially in terms of formatting and scheduling the reports to meet decision-making needs.

6. Financial position. While not "independently wealthy," the police agencies had as many or more financial resources than other agencies in their respective jurisdictions. Public safety was a high priority of the executive and legislative officials and budgetary awards were made accordingly. Another important source of police revenue was federal grants, particularly LEAA. It was also evident that the police agencies would not be as financially secure in the future, due to tax cutting initiatives, economic problems, declining federal funding, and stronger competition among agencies for available funds. For these reasons, cost analysis was receiving more attention in all jurisdictions as a basis for defending budget requests, obtaining reimbursements from other government entities for services rendered, and improving existing programs.

* * *

Part Three has demonstrated that there is no "one best way" to measure police service costs. The four jurisdictions described in the case studies, as well as the fifty jurisdictions that participated in the mail survey, meet their costing obligations in different and diverse ways. Prospective police cost analysts must weave a methodology from the experiences of these jurisdictions, the available costing approaches, local information needs and resources, and the nature of the service being costed. On the one hand, the analyst must try to emulate the increasing emphasis in police management on integrating budgeting with accounting, performance measures with services, and cost analysis with routine management functions. On the other hand, the analyst must avoid the common pitfalls to accurate cost analysis revealed in the case studies and mail survey: confusing costs with expenditures, reporting costs by organization unit rather than by service, and overlooking indirect costs. These can be difficult tasks. Hopefully, this Program Model has made them a little easier.

APPENDICES

Appendix A: Annotated Bibliography

Appendix B: Survey Instrument

Appendix C: Glossary of Terms

Appendix D: Indirect Cost Allocation

Appendix A
ANNOTATED BIBLIOGRAPHY

ANNOTATED BIBLIOGRAPHY

This bibliography lists and describes books, articles, and other publications that are particularly informative about measuring the costs of police services. They are drawn not only from the police management literature but also from the literatures of business and public management, accounting, and evaluation. All are available either through public libraries, university bookstores, or one of the major computerized library data bases, e.g., the National Criminal Justice Reference Service.

1. Anthony, Robert N. and Herzlinger, Regina. Management Control in Nonprofit Organizations. Irwin (1975).

Management control has been defined as the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of an organization's objectives. Co-authored by two professors at the Harvard Business School, this textbook applies business control strategies to public sector organizations. It explains the relationship between control and cost accounting, defines most of the standard terms and concepts in cost analysis, and places accounting in the context of planning, programming, and budgeting. It also suggests how public agencies can set fees for service.

2. Baker, Ralph and Meyer, Fred A. Evaluating Alternative Law Enforcement Policies. Lexington (1979).

This book examines evaluations of police and law enforcement policies in the United States. It also reviews various analyses and explanations for public evaluations. Police cost analysts should focus on a bibliographic essay in the book's second chapter that reviews the literature on the costs of police services.

3. Belkin, Jacob; Blumstein, Alfred; Cassidy, Gordon; and Cohen, Jacqueline. Performance Measurement and the Criminal Justice System. National Institute of Law Enforcement and Criminal Justice (1976).

This paper discusses classification of police activities and resource flows in criminal justice agencies. Measurement of the criminal justice system performance is derived from associating net costs with service provided.

4. Booz, Allen and Hamilton. Determination of Law Enforcement Contractual Costs. (1971).

The study determines methods for charging fees for police services and establishes a standard formula applicable to other criminal justice departments. It identifies police services and cost allocation strategies. It suggests ways to determine actual cost elements and expenses for each service. Several cost models are developed to satisfy financial data requirements for individual departments.

5. Booz, Allen and Hamilton. Performance and Cost Decision Making System for the Field Policing Function. Booz, Allen Public Administration Services (1972).

Written under contract to the California Contract Cities Association, this report provides a methodology for identifying meaningful service levels, documenting the resource requirements to achieve service objectives, and analyzing the benefits and costs of alternative methods for providing field policing services. Its "performance and cost decision-making system" is broken out into fourteen analytical tasks. For each task, the authors explain its purpose, methodology, and which organizational officials and units should be responsible for it. The report is particularly helpful in listing potential police services for costing, recommending how to measure personnel and nonpersonnel costs, and relating these costs to management decision-making.

6. Bouza, Anthony V. Police Administration - Organization and Performance. Pergamon Press (1978).

This book identifies organizational activities of the police department. Its specification of police services will facilitate the determination of the types of costs incurred by each department. Proper analysis of this information will guide police agencies in estimating the percentage of time spent on each activity, and distributing the costs accordingly.

7. Ernst & Ernst. Performance Measurement and Cost Accounting for Smaller Local Governments. Rhode Island Department of Community Affairs (1979).

Written very clearly and containing many exhibits, this monograph suggests ways for smaller local governments to define effectiveness and efficiency measures, estimate direct and indirect costs, and report results both manually and by computer. It includes many police examples and useful costing forms.

8. Police Executive Research Forum. Survey of Police Operational and Administrative Practices. Police Executive Research Forum (1970).

This document provides a source of data on types and levels of cost factors in police departments. It includes salary information and workload factors for cost analysis. Many of the tables in this publication aid in comparing cost data among different cities.

9. Fultz, Jack F. Overhead: What It Is and How It Works. Abt Books (1980).

This is a unique and comprehensive treatment of how to define and measure indirect costs. In a very intelligible manner, the text covers topics such as overhead application, projecting predetermined overhead rates, departmental or cost center overhead, and overhead in government contracts. Of particular merit are its self-evaluation exercises (an answer key is provided), worksheets for calculating indirect rates, and a review of accounting terms and concepts for the non-accountant. Although the text was written with a business audience in mind, its procedures are sufficiently clear and universal that the police cost analyst will also find it a very useful reference book.

10. Funke, Gail S. and Wayson, Billy L. Standards and Cost of Correctional Change. Institute for Economic and Policy Studies/Correctional Economics Center (1979).

The study is an economic approach to identifying all costs: direct and indirect, internal and external, tangible and intangible. Types of cost are stated and work unit measures set up. Its recommendations for cost differential analysis and determination of unit cost are of great value when comparatively little data are available to researchers on direct costing in criminal justice.

11. Gay, William G. Evaluation of the Police Program Performance Measurement System: A Study in Technological Innovation. University City Science Center (1979).

This report focuses on police effectiveness and productivity and sets forth a measurement system for law enforcement managers and city administrators. It is informative about criminal justice objectives and output indicators, especially in crime prevention, crime control, conflict resolution, service, and administration.

12. Hay, Leon E. and Mikesell, R.M. Governmental Accounting. Irwin (1974).

This is a basic accounting text for non-profit entities. Basic principles of governmental accounting are presented as well as in-depth analyses of two key issues in the development of any cost model for police services: (1) accrual versus cost accounting and (2) expenditure versus cost accounting.

13. Horngren, Charles T. Cost Accounting, A Managerial Approach. Prentice Hall (1977).

This book provides cost data for planning and controlling operations, income determination, policy making, and long range planning. It emphasizes costs for substantive and administrative activities, and covers cost allocation to specified cost objectives as well as general types of costs. The text also identifies cost behavior patterns for cost analysis and capital budgeting. Guidelines are offered for accounting for direct personnel and nonpersonnel costs.

14. Jenkins, Patricia. Guide to Accounting for Nonprofits. Grantsmanship Center (1977).

Reprinted from issues 20 and 21 of the Grantsmanship Center News, this pamphlet suggests very simple and practical guidelines for establishing a financial accounting system. It explains the purposes of accounting, single- and double-entry bookkeeping systems, ledgers and journals, and financial reporting. Jurisdictions with little cost accounting expertise or experience will especially like the pamphlet's discussion of where to get accounting help and review of general accounting audit guides and reference books.

15. Lee, Robert D. and Johnson, Ronald W. Public Budgeting Systems. University Park Press (1973).

Co-authored by two professors at Pennsylvania State University with experience in installing budget systems in public agencies, this book describes the history and current practices of public budgeting at all levels of government. Among its key chapters are: "Government and the Economy," "Budget Cycles," "Program Analysis," and "Budget Format and Capital Budgeting." It also contains an excellent chapter on accounting and information systems which compares cash and accrual accounting, explores cost accounting in public agencies, and establishes linkages between the accounting structure and the program and management information structures.

16. Lynn, Edward S. and Freeman, Robert J. Fund Accounting, Theory and Practice. Prentice Hall (1974).

An overview of fund accounting, this book presents alternative accounting, budgeting and auditing techniques. It is sufficiently adaptable to any governmental unit in both theory and practice. The book will serve as a guidebook to the fund accounting system presently used by most police agencies. Special emphasis should be placed on Chapter 15 dealing with cost allocation. By allocating cost to proper cost centers, the financial effects of managerial and technical decisions can be better analyzed. Various cost finding methods and approaches are also readily available in this text.

17. Matz, Adolph and Usry, Milton F. Cost Accounting: Planning and Control. Southwestern Publishing (1980).

Although intended primarily for business managers, this textbook explains concepts and processes applicable to the measurement of police service costs. It is especially helpful in its discussion of controlling and costing materials and in its suggestions for improving the impact of cost reports. It also includes quantitative approaches for costing service components, e.g. linear programming, standard costing, and differential costing.

18. May, Robert G.; Mueller, Gerhard G.; and Williams, Thomas H. A Brief Introduction to the Managerial and Social Issues of Accounting. Prentice Hall (1975).

This book consists of four chapters--two dealing with an introduction to managerial accounting at the private enterprise level, one addressing accounting for public sector organizations, and the last devoted to applications arising from the need to manage the economy as a whole. The theme of the book is that accounting information is a useful management tool in all types of organizations, from small businesses to the federal government. Its chapter on public sector accounting recognizes the similarities between public and private accounting in terms of basic cost concepts but recognizes important differences in the absence of the profit motive as an evaluation criterion in the public sector and in the controls placed on expenditures.

19. Melone, R. J. Resource Analysis Model for the Arkansas State Police. RAND Corporation (1970).

This report illustrates the analytical aspects of the Planning-Programming-Budgeting System (PPBS). Although never fully implemented in Arkansas, PPBS involves the grouping of existing programs according to the function served instead of by organizational location, multi-year projections of activity levels and costs, and an evaluation system for monitoring effectiveness and efficiency. The model is particularly useful because of its application of PPBS to police services. It identifies current police organization and activities, objectives, cost structures, and revenue sources.

20. National Association of College and University Business Officers and National Center of Higher Education Management Systems. Systems Procedures for Determining Historical Full Costs. (1977).

A comprehensive manual for estimating institutional costs, this book discusses cost objectives, costing units, and types of cost applicable to criminal justice and other types of agencies. Methods for full costing, variable or direct costing, and standard costing are suggested. Its procedures for establishing a cost accounting system and methods for allocating costs of service units to line units will assist in costing police services.

21. National Committee on Governmental Accounting. Governmental Accounting, Auditing, and Financial Reporting. Municipal Finance Officers Association of the United States and Canada (1968).

Popularly known as the "blue book" of governmental accounting, this standard text enumerates the principles and procedures of accounting, budgeting, auditing, and reporting for governmental units. It defines key expenditure categories and accounting terms (with a special section on classifying police costs by function and activity). It thereby assists managers in controlling and compiling statistical cost data on a uniform basis.

22. Pearce, D.W. Cost Benefit Analysis. Macmillan (1971).

This brief textbook contains a highly economic and quantitative approach to the comparison of program costs and benefits. It discusses the origins and basic principles of cost-benefit analysis and applies cost-benefit techniques to selected public programs. Of particular merit is its discussion of how to estimate a cash value for service components or program outcomes without a true market value. These techniques may be applicable to costing such intangible benefits as an increased feeling of public safety.

23. Police Foundation. Police Practices, the General Administrative Survey. Police Foundation (1978).

This publication examines selected aspects of current administrative and operational practices. It provides personnel cost information and types of non-personnel costs incurred by departments.

24. Radford, K.J. Information Systems in Management. Reston Publishers (1974).

This brief book is very useful to those managers without previous exposure to management information systems, both manual and computerized. It describes the information system as an integral part of the organization and describes how the system supports planning, budgeting, and other management functions. Its most practical feature is a clear statement of how to design and install an information system, including specific implementation procedures and an extended case study drawn from private industry.

25. Roberts, Charles T. and Lichtenberger, Allan R. Financial Accounting. National Center for Educational Statistics. (1973).

This handbook contains classifications and standard terminology for local and state school accounting systems. In a manner applicable to police departments, the handbook discusses the implications of financial accounting for program accounting, information systems, analysis, and reporting. It also contains exhaustive lists of expenditure accounts and objects, a skillful treatment of depreciation, and a practical explanation of how to allocate indirect costs.

26. Singer, Neil M. and Wright, Virginia B. Cost Analysis of Correctional Standards. National Institute of Law Enforcement and Criminal Justice (1976).

This two-volume report analyzes and estimates the costs of implementing standards contained in the Corrections Report, issued in 1973 by the National Advisory Commission on Criminal Justice Standards and Goals. Its relevance to measuring the costs of police services is that it contains generally applicable guidelines and estimation techniques for use by jurisdictions in assessing the costs of their own ongoing or contemplated activities in criminal justice and related fields.

27. Shanahan, Donald T. Patrol Administration, Management by Objectives. Holbrook Press (1978).

Patrol Administration is a textbook for the patrol administrator with a management by objectives approach. The book stresses the blending of good management principles and understanding of the total patrol function. It is important in identifying police services and broadening understanding of workload factors so police agencies can allocate the proper cost to these services.

28. Shoup, Donald C. and Mehey, Stephen T. Program Budgeting for Urban Police Services. Praeger Publishers (1972).

This report discusses in operational terms the typical objectives of police operations and alternate budget structures. It relates budgetary choices to the management of police agencies.

29. U.S. General Accounting Office. Standards for Audit of Governmental Organizations, Programs, Activities & Functions. Government Printing Office (1974).

The term "audit" is used to describe not only work done by accountants in examining financial reports but also work done in reviewing compliance with applicable laws and regulations, efficiency and economy of operations, and effectiveness in achieving program results. Issued by the Comptroller General of the United States, this brief monograph (54 pages) discusses general standards for governmental audits and then applies these standards to various activities, e.g. work planning, supervision, and management control. It also presents standards for audit reporting.

30. U.S. General Accounting Office. Comprehensive Approach for Planning and Conducting a Program Results Review. Government Printing Office (1978).

This booklet contains guidelines for measuring the extent to which a program is achieving its objectives. It provides operational definitions of objectives and performance indicators and suggests how information might be collected on their accomplishment. It has a very useful chapter on how to identify factors that inhibit program effectiveness, including budget and staff limitations. Cost control is discussed as an implicit management objective and methods are suggested for gathering data on actual program costs and the costs of program improvement.

31. U.S. General Accounting Office. Guidelines for Economy and Efficiency Audits of Federally Assisted Programs. Government Printing Office (1978).

Defining the audit function as the assessment of the "economy, efficiency, and effectiveness of program operations," this booklet explains the purposes and standards of program auditing, data collection and reporting strategies, and procedures for improving "soft spots" in areas that the auditor believes need more management control. Its particular contribution to measuring the costs of police services is a very clear and concise statement of standards for fiscal administration, including budget administration, financial accounting, and management reporting.

32. University of Tennessee's Municipal Technical Advisory Service, Selected Municipal Cost-Cutting Measures. University of Tennessee (1979).

This document summarizes cost-cutting and productivity measurements for city governments. Although this brief report does not relate directly to cost accounting for police services, it does suggest methods for reducing whatever costs are measured.

Appendix B
SURVEY INSTRUMENT

ABT ASSOCIATES INC.
55 WHEELER STREET, CAMBRIDGE, MASSACHUSETTS 02138
TELEPHONE • AREA 617-492-7100
TWX: 710-3201382

March, 1980

Abt Associates, Inc. is under contract to the National Institute of Justice to develop a handbook to assist state and local police agencies and government officials in applying cost analysis techniques in police management. This project will result in a publication that will explain, in a straightforward and practical way, techniques for estimating the costs of various police functions and the uses of this information in resource allocation decision-making.

To insure that the project benefits from the latest state-of-the-art in police and general government cost analysis methods, and to maximize the handbook's relevance not only to criminal justice specialists, but also to city and state decision-makers, we are surveying several key individuals in a number of state and local jurisdictions -- namely, the police chief, finance director and chief executive.

We hope that you will be able to assist us in this effort by completing the enclosed questionnaire. Directions are on the next page. If at all possible, we would appreciate your returning the questionnaire in the enclosed, postage-paid envelope within 10 days. All jurisdictions completing a questionnaire will receive a copy of the handbook.

If you have any questions, please call me or Robert Gentry collect at (617) 492-7100.

Thank you for your cooperation.

Sincerely,



Kent J. Chabotar
Principal Investigator

Directions

This questionnaire covers different aspects of police budgeting and cost analysis. Wherever possible, we have attempted to minimize respondent burden by the use of multiple choice questions requiring a simple check-off (✓). A number of questions, however, are relatively open-ended and will require some degree of elaboration on your part. If, at anytime, additional space is required for your response, please note and continue your response on the blank page attached at the end of the questionnaire.

In addition to completing the questionnaire, we would appreciate your providing us with samples of any management, performance or budget report forms used for police operations in your jurisdiction.

It is important to note that while the questionnaire has been sent to top managers in each jurisdiction, it can be completed by any of your subordinates who are more familiar with the detailed operations of the accounting and information systems. Just make sure to indicate the name and title of the respondent below.

Again, please return the questionnaire and sample report forms to Abt Associates, Inc. in the enclosed, postage-paid envelope within ten (10) days.

Thank you.

Person completing questionnaire	Title	
Department		
Street address		
City	State	Zip Code

1. Which of the following budgeting approaches is utilized by your police department?

☐ Line item
☐ Program budgeting (PPBS)
☐ Zero base (ZBB)
☐ Other (please name): _____

2. Does your budgeting process include the analysis of costs based upon indicators (measures) of performance?

3. If yes, which of the following levels of cost analysis are performed?

☐ By organizational unit (e.g. division, precinct)
☐ By function or activity (e.g. patrol, criminal investigations)
☐ Other (please list): _____

4. Are alternative levels of resources for each unit or activity -- along with corresponding projections of service levels -- typically provided in the budget?

5. If cost analysis is performed at the organizational unit level, please provide several examples of budget headings (e.g. Bureau of Patrol, Division of Criminal Investigations) and performance measures by which their costs are analyzed (e.g. cost per patrol hour, man hours per arrest).

<u>Budget Heading</u>	<u>Performance Measure</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Budget Heading

Performance Measure

6. If cost analysis is performed at the activity level, please provide several examples of budget headings (e.g. homicide investigations, personnel recruitment) and performance measures by which their costs are analyzed.

Budget Heading

Performance Measure

7. If cost analysis is provided at other than the unit of activity level, please provide several examples of budget headings and performance measures by which their costs are analyzed.

Budget Heading

Performance Measure

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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

12. Who makes the final decisions regarding resource levels funded by the budget?

13. Does the approved budget establish the police department's goals and objectives for the coming year?

14. If yes, does your police department have a performance reporting system which monitors specific units or activities in terms of results?

15. Is cost a variable in the performance system?

16. Is cost analysis performed at any time of the year other than during budget preparation?

17. If yes, for which of the following is cost analysis undertaken?

- ☐ Long range planning
- ☐ Financial resource allocation
- ☐ Human resource allocation
- ☐ Evaluation
- ☐ Contract services
- ☐ Other (please list): _____

18. If cost analysis has been utilized in resource allocation (other than during budget preparation), please provide brief discussions of one or two such studies, their nature and their outcomes.

19. How would you rate your jurisdiction's ability to measure the costs of specific police services?

- ☐ Excellent
- ☐ Good
- ☐ Adequate
- ☐ Fair
- ☐ Poor
- ☐ Not sure

20. Please provide three reasons for your rating in #19.

1.

2.

3.

21. To what extent does your jurisdiction need a handbook that would explain how to measure the costs of police services?

- ☐ Significant need
- ☐ Need
- ☐ Not a need
- ☐ Unsure

22. Please provide reason(s) for your response to #21.

23. To enhance its relevance to your jurisdiction's needs, what topics should be covered by the handbook?

24. General comments.

Please place completed questionnaires in enclosed pre-addressed envelope and return to Abt Associates within 10 days.

Also, please remember to send us examples of any cost or performance measurement reports used in your jurisdiction.

Thanks very much for your cooperation.

Appendix C
GLOSSARY OF TERMS

Glossary of Terms

The scope of the terminology is basically in the field of governmental accounting with the terms used and the definitions and examples provided applicable to criminal justice agencies. Many of the terms used were adapted from: National Committee on Governmental Accounting, Governmental Accounting, Auditing, and Financial Reporting (Chicago: Municipal Finance Officers Association, 1968), pp. 151-172. All of the terms are cited in this Program Model.

ACCOUNTING PERIOD. A period of time for which a cost analysis is prepared, e.g. a month, quarter, or fiscal year.

ACCRUAL ACCOUNTING. The basis of accounting under which revenues are recorded when earned and expenditures are recorded as soon as they result in liabilities, regardless of when revenue is actually received or payment is actually made.

ALLOCATION BASE. Refers to the standard used to allocate the indirect costs of fixed assets, central staff units, and utilities among the services that use them. Greater use should be reflected in greater indirect costs. For example, a typical base for allocating the cost of utilities is the square footage of the building occupied by the service being costed. A service occupying 15% of the building space is charged 15% of the utilities' costs.

APPROPRIATION. An authorization granted by a legislative body to make expenditures and incur obligations for specific purposes.

BLANKET INDIRECT COST RATE. This is a rate established for all the services in a department or jurisdiction which may distort the indirect costs actually incurred by any one service but which is easier to establish than a rate "custom-tailored" for each service or group of services.

CAPITAL COST. An element of cost which results in the acquisition of **FIXED ASSETS** or additions to fixed assets which are presumed to have an **ESTIMATED USEFUL LIFE** greater than one year. Examples include the costs of land or existing buildings, improvements of buildings and grounds, construction of new buildings, or initial, additional, and replacement equipment.

CASH ACCOUNTING. The method of accounting which records revenues only when they are actually received and expenditures only when cash is paid. It is the most common form of governmental accounting.

COST. Cash or cash value of resources used in the delivery of a good or the provision of a service.

COST ANALYSIS. The method of accounting which records all the elements of cost incurred to accomplish a purpose, to carry on an activity or operation, or to complete a unit of work or specific job. It accounts for the cash or cash value of all resources used when they are used and not when the resources were purchased or acquired.

COST BENEFIT ANALYSIS. Evaluation technique that compares a service's costs with its monetary effects and derives a "cost benefit ratio." For example, a cost benefit analysis of a burglary unit might compare its personnel and nonpersonnel costs with the monetary value of the stolen property it recovered. If the analysis revealed that the unit had a 1:5 cost benefit ratio, it would mean that for every \$1 that the unit cost to operate, \$5 in stolen property were recovered.

COST CENTER. An organization unit, program, service, or some other entity to which costs are related.

COST CENTER INDIRECT COST RATE. This is a rate established for a group of related services in a department or jurisdiction which distorts the indirect costs incurred by any one service less than a BLANKET INDIRECT COST RATE but possibly more than a rate specifically established for that service.

COST EFFECTIVENESS ANALYSIS. Evaluation technique that compares a service's costs with its effects expressed in non-monetary terms. For example, a cost effectiveness analysis of a homicide unit might compare its costs with the number of murders cleared by arrest or conviction. Such a comparison would derive a UNIT COST per murder cleared by arrest or conviction.

CROSSWALKING. This is a financial management method used by public agencies to translate cost or other financial data from the format they use for internal purposes into the format required by another agency. A "cross-walk" is an administrative form on which the police department takes a budget assigned to a particular program (e.g., investigations) and apportions it among the organizational units that serve the program (e.g., various units in the operations division and administrative services division). Thus, a \$100,000 budget for the investigations program might be divided among Units X, Y, and Z. It is also possible to reverse the process by taking the budgets of the organizational units and allocating them back to the programs each supports.

DEPRECIATION. The portion of the cost of a fixed asset which is charged as an expense during the current accounting period. The cost charged reflects the gradual expiration of the service life of the fixed asset due to wear and tear, deterioration, action of the physical elements, inadequacy, and obsolescence. Through this process, the entire cost of the asset is ultimately charged off as an expense.

DEVELOPMENT COST. Cost of planning and organizing a service (or new approach to an existing service) and obtaining the human, financial and physical resources required for its operation.

DIRECT COST. Those elements of cost which can be easily, obviously, and conveniently identified with a particular service, as distinguished from **INDIRECT COSTS** incurred for several different services and whose elements are not readily identifiable with specific services.

EFFECTIVENESS. A measure of performance that assesses the extent to which an organization is achieving its stated objectives.

EFFICIENCY. A measure of performance that relates the goods and services produced by an organization to the amount of resources used to produce them. Examples of efficiency measures include cost per arrest, cost per safety talk given, and cost per vehicle mile.

ENCUMBRANCE. An obligation in the form of purchase orders, contracts, or salary commitments which are chargeable to an account and for which a portion of the account has been reserved. It ceases to be an encumbrance when paid.

ENTRY. The act of recording a financial transaction in a **JOURNAL** or **LEDGER**.

ESTIMATED USEFUL LIFE. The amount of time (usually expressed in years) that a building, piece of equipment, or other **FIXED ASSET** is expected to be in active use.

EXPENDITURE. Charge incurred for goods delivered or services rendered which is presumed to benefit the current accounting period.

FIXED ASSET. Land, buildings, machinery, furniture, and other equipment intended for use over a period greater than one year. "Fixed" denotes probability or intent to continue use or possession, and does not indicate immobility of an asset.

FIXED COST. Costs which remain constant in total regardless of changes in volume or level of activity, e.g., cost of a leased vehicle for which a flat annual fee is paid.

GENERAL AND ADMINISTRATIVE EXPENSE. An element of **INDIRECT COST** necessary for the operations or management of the organization providing the service, e.g. cost of central staff units like accounting or travel.

HETEROGENEOUS SERVICE. This is a service whose personnel and nonpersonnel components (e.g. staff involved in service) contain elements of varying kinds (e.g. junior to senior level staff) and costs (e.g. salaries of \$12,000 to \$24,000). This diversity prevents the cost analyst from defining a "typical" delivery mode for the service and costing the service based on any one element of each component. For example, a bank escort service might be staffed by 10 uniformed officers whose annual earnings range from \$12,000 to \$24,000. In this case, the salary of any one officer is likely to be unique and could not represent the salaries of the others in costing the service.

HOMOGENEOUS SERVICE. This is a service whose personnel and nonpersonnel components contain the same or similar elements which allows the cost analyst to use any one element as the basis for costing all the elements in the component since selecting any one element has the same effect on total cost as selecting any other. An example of a homogeneous service would be a bank escort service staffed by 10 uniformed officers, all of whom earn about \$15,000 per year. Using the salary of any one of the ten officers to represent the cost of the personnel component of this service is the same as using the salary of any other: they all earn about \$15,000.

INDIRECT COST. Those elements of cost associated with the provision of a service but not conveniently traceable to that service. An indirect cost is incurred when a resource is shared by many services and thus it becomes difficult to allocate to any one service a fair percentage of the costs of that resource, e.g. light, heat, supplies, building space, etc.

INFLATION. A rise in the general price level caused by an increase in the volume of money and credit relative to available goods and services. Inflation not only increases the costs of police services but also complicates the comparison of service costs derived over several years. Differences in service costs may be due to inflation as well as to changes in productivity or the mode of service delivery.

INVENTORY. The quantity of materials and supplies in stock which are available for use in providing an organization's services, e.g. tires, paper, or gas.

INVOICE. An itemized list of merchandise purchased from a particular vendor. The list includes quantity, description, price, terms of payment, date, and the like.

JOB ORDER. A special form of COST CENTER pertaining either to an operation which occurs regularly (e.g. motorized patrol) or to a specific piece of work (e.g. crowd control at a football game), showing all charges for personnel and nonpersonnel resources used together with any allowance or credits.

JOURNAL. An accounting record which lists financial transactions chronologically as they occur. It usually organizes these transactions by the object for which they were incurred, e.g. personnel salaries, materials and supplies, or fixed assets.

LEDGER. An accounting record which lists financial transactions by the organization unit or service which incurred them.

NONPERSONNEL COST. The costs of materials and supplies, travel and transportation, fixed assets, contractual services, and miscellaneous charges attributable to the provision of a service. Nonpersonnel costs are classified as DIRECT COSTS if they can be readily identified with a particular service and are a significant cost element. If the nonpersonnel costs cannot be readily identified with a particular service, or are an insignificant cost element, they are classified as INDIRECT COSTS.

OBJECT. As used in expenditure classification, the term applies to the article purchased or service obtained as distinguished from the results obtained from expenditures. Examples are personal services, materials, and supplies. Synonyms include OBJECT OF EXPENDITURE, OBJECT CODE, and LINE ITEM.

OFFICIAL INDIRECT COST RATE. This is a rate established by a federal, state, or other authorized auditing agency. Although the primary purpose of establishing this rate is to support indirect cost charges on grants from these agencies, an official indirect cost rate can also be used to estimate the indirect costs of a police service.

OPERATING COST. An element of cost which results from the care and upkeep of buildings, land, equipment, and other FIXED ASSETS. Also refers to the costs of delivering an established service on a regular basis as opposed to the DEVELOPMENT COST of initially planning and organizing the service.

OVERHEAD. An element of INDIRECT COST required to acquire, maintain, or use a physical asset used in the provision of an organization's services, e.g. costs of building construction, utilities, and maintenance.

PERSONNEL COST. The costs of salaries and wages, fringe benefits, pay differentials, and other labor charges attributable to the provision of a service. Personnel costs are classified as DIRECT COSTS if they can be readily identified with a particular service and are a significant cost element. If the personnel costs cannot be readily identified with a particular service or are an insignificant cost element, they are classified as INDIRECT COSTS.

PLANNING PROGRAMMING BUDGETING SYSTEM (PPBS). A form of budgeting which allocates funds on a multi-year basis to programs rather than to organizational units, systematically analyzes alternative ways of delivering the program, and evaluates the extent to which the program performs in an effective and efficient manner.

POSTING. The act of transferring to a LEDGER the data, either detailed or summarized, originally contained in a JOURNAL or other document of initial entry.

PRODUCTION UNIT. A measure of the activities and outputs of COST CENTERS which bear a relationship to the incidence of cost. For example, if motorized patrol is established as a separate cost center, its production units might include number of vehicle miles driven or number of arrests made on patrol.

PROGRAM BUDGET. A budget wherein planned expenditures are allocated primarily by program or service and secondarily by object.

PURCHASE ORDER. A written request to a vendor to provide material or services at a specified price which is used as an ENCUMBRANCE document.

REQUISITION. A written request to a purchasing officer or materials clerk for specified articles or services. It is a request from one public official to another, whereas a PURCHASE ORDER is from a public official (usually the purchasing officer) to an outside vendor.

RESOURCES. The personnel and nonpersonnel assets of an organization which can be used to support its operations and activities. These assets include staff time, buildings, equipment, and cash.

SERVICE. A program or activity which does not produce a tangible commodity but which nonetheless contributes to the welfare of others, e.g., mail escort, motorized surveillance of neighborhoods, investigation of burglaries, etc.

SUBSIDIARY LEDGER. An accounting record which supports in detail the summaries recorded in a LEDGER. An example is a listing of employees and their respective salaries in a subsidiary ledger to support a summary personnel cost entry in the ledger.

UNIT COST. A term used in cost accounting to denote the cost of producing a unit of product or rendering a unit of service, e.g. cost per arrest, cost per patrol mile, or cost per payroll check processed.

VARIABLE COST. Costs which vary in direct proportion to changes in volume or level of activity, e.g., cost of a rental car for which a mileage fee is paid.

Appendix D
INDIRECT COST ALLOCATION

INDIRECT COST ALLOCATION

In Chapter 2, direct costs were defined as those costs that can be DIRECTLY charged to an activity, function, or service. Direct costs generally include the costs for salaries, wages, supplies, and materials. Indirect costs were defined as those elements of the total cost which are not readily identifiable with an activity, function, or service. Further, it was noted that indirect costs must be allocated by some predetermined methodology to the appropriate service incurring the costs.

This appendix to the Program Model describes a methodology and procedures for police departments and other criminal justice agencies to allocate indirect costs to given police services. Chapter 4 suggested that some jurisdictions may already have an official indirect cost rate established by an external auditing agency. Typically, official rates are established by a community when it receives federal or private grant funds, since the jurisdiction must develop a credible formula for charging certain indirect costs to the grant. The rate is a percentage figure which is applied, depending on the nature of the rate and the provisions of the grant, to direct personnel costs and/or total direct costs (e.g., \$100,000 total direct costs x 35% indirect cost rate = \$35,000 indirect costs).

However, as indicated in Chapter 4, if the indirect cost rate does not exist or is unacceptable, there are four steps to be followed in determining indirect costs: (1) identification of the sources of indirect cost, (2) determination of a basis for allocating indirect costs to a particular service, (3) determination of the type of indirect cost rate, and (4) application of that rate to the service being costed.

1. Identification of sources of indirect cost.

Depending on the nature of the service, certain costs will be classified as direct costs and the rest as indirect costs. These sources of indirect cost must be identified so that the indirect costs they generate can be allocated to the services that they support. Among the possible sources are:

- Overhead: represents the costs of the physical facilities necessary for the development of a product or delivery of a service, e.g., buildings, land, equipment.
- General and Administrative Expense: represents the costs of central staff units whose assistance is necessary to generate a product or service, e.g., data processing, payroll, accounting, garage.

2. Determination of a basis for allocating indirect costs.

These indirect costs must be allocated to the service being costed on a basis that equitably reflects the service's use of the fixed assets, utilities, and central staff units. Greater use should be reflected in higher indirect costs. A secondary objective in selecting a base is to minimize clerical cost and effort. When two or more bases seem equally fair, the simplest base should be used.* Good accounting and management practices dictate that the base be consistent from year to year so as to facilitate long term analysis and discourage the manipulation of bases to enhance an agency's fiscal condition. Unless otherwise specified, the cost data used in determining an appropriate basis are drawn from a single year.

There are three standard bases for allocating indirect costs in the public sector: (a) total direct cost, (b) direct labor hours, and (c) direct labor dollars. Even for the same service, the use of a different allocation basis may result in different estimates of indirect costs. The definition and hypothetical example of each basis presented below will demonstrate this possibility and should reinforce the need to select the basis that most equitably reflects the service's incurrence of indirect costs.

Total Direct Cost Basis

This basis relates indirect costs to the direct costs incurred by a service. It determines an indirect cost rate per dollar of direct costs that can be applied to the direct costs of each service being costed. The indirect cost rate is computed by taking the jurisdiction's total indirect cost in a given year (overhead plus general and administrative expense) and dividing by the jurisdiction's total direct cost. Indirect costs are the total capital and operating costs of the jurisdiction's buildings and major equipment,

*See: Charles T. Horngren, Cost Accounting: A Managerial Approach. (Englewood Cliffs, New Jersey: Prentice Hall, 1977), pp. 494-499.

operating costs of central staff units such as purchasing and accounting, and other costs not directly attributable to the management or activities of the jurisdiction's line units, e.g., police department, public works department, parks department, etc. Direct costs are the total personnel and nonpersonnel costs incurred by these line units in managing or delivering the products or services for which they are responsible.

$$\frac{\text{Total indirect cost}}{\text{Total direct cost}} = \text{Indirect cost rate per dollar of direct cost}$$

$$\frac{\$1,500,000}{\$3,750,000} = 40\% \text{ per dollar of direct cost}$$

This rate could then be applied to each service in every department in the jurisdiction to estimate indirect service costs. Using this method, a motorized patrol service that incurred \$100,000 in direct costs would be assessed, at a rate of 40% per dollar of direct cost, \$40,000 in indirect costs. Applying this same rate to every service in the jurisdiction would eventually exhaust the entire indirect cost pool of \$1,500,000.

Direct Labor Hour Basis

This basis treats indirect costs as a function of the time spent in delivering services. The time spent is usually termed "direct labor hours" but is also known as "direct personnel hours" or "direct work hours." The direct labor hours basis divides the jurisdiction's total indirect cost by its total direct labor hours to figure an indirect cost rate per labor hour applicable to all services.

$$\frac{\text{Total indirect cost}}{\text{Total direct labor hours}} = \text{Indirect cost rate per direct labor hour}$$

$$\frac{\$1,500,000}{240,000 \text{ hours}} = \$6.25 \text{ per direct labor hour}$$

Thus, a police service entailing 40,000 direct labor hours would be assessed \$250,000 in indirect costs. Another service requiring 10,000 labor hours would incur \$62,500 in indirect costs, and so on. The direct labor hour basis, although one of the most fair and equitable, requires extra work because direct labor hours must be summarized apart from the regular accounting system.

Direct Labor Dollars Basis

This is the most common basis for allocating indirect costs. The direct labor costs of a service become the basis on which the service is allocated its fair share of the jurisdiction's indirect costs.

$$\frac{\text{Total indirect cost}}{\text{Total direct labor dollars}} = \text{Indirect cost per direct labor dollar}$$

$$\frac{\$1,500,000}{3,000,000} = 50¢ \text{ per direct labor dollar}$$

If motorized patrol has direct labor costs of \$880,000, an indirect cost rate of 50¢ per direct labor dollar would result in \$440,000 in indirect costs for that service. As with the prior allocation bases, if the rate was applied to every service that the jurisdiction provides, the indirect cost pool of \$1,500,000 would eventually be exhausted.

The direct labor dollars basis is the easiest and most equitable basis to use because: (1) most of the information is retrievable from general accounting records, (2) labor dollars information already has to be collected to satisfy government regulations, and (3) the basis is time driven (time x rate = labor dollars) which makes it comparable to more specific allocation bases discussed in the next section that are also based on time, e.g., utilities, data processing, etc.* In fact, the annual survey of the Cost Accounting Standards Board (CASB) typically reports over 70% of the organizations under its jurisdiction use direct labor dollars as their allocation base.**

The only serious disadvantage of direct labor dollars as an allocation base is that total labor hour cost represents the sum of high income and low income staff. By applying indirect costs on the basis of direct labor cost, a cost center is charged more indirect costs when high income persons work for it than when low income persons do, even though both groups may be equally efficient and therefore incur equal amounts of indirect costs. For example, a patrol vehicle might be staffed by a sergeant earning \$28,000 per Year and a rookie patrolman earning \$14,000. Using the direct labor dollars

*Jack F. Fultz, Overhead (Cambridge, Massachusetts: Abt Books, 1980), pp, 39-44. See also: Cost Accounting Standards (New York: Price Waterhouse & Co., 1976).

**Cost Accounting Standards Board, Progress Report to the Congress, published annually. CASB was formed by the U.S. Congress in 1971 to establish uniform cost accounting standards which must be used by defense contractors and federal agencies in the pricing of negotiated contracts.

basis would assign twice as many indirect costs to the sergeant as to the patrolman even though, in reality, both should be assigned a comparable amount. In such cases, direct labor hours is a more precise allocation base.

3. Determination of the type of indirect cost rate.

There are three types of indirect cost rates: (a) blanket, (b) cost center, and (c) step-down. Each of these types listed becomes progressively more precise in estimating the amount of indirect costs incurred by a specific service but also becomes progressively more complicated and difficult to use.

- Blanket Indirect Cost Rate: is established for all the services in a department or jurisdiction which may distort the indirect costs actually incurred by any one service but is easier to establish than a rate "custom tailored" for each service or group of services.
- Cost Center Indirect Cost Rate: is established for a group of related services in a department or jurisdiction (e.g., all patrol services) which distorts the indirect costs incurred by any one service less than a blanket rate but possibly more than a rate established specifically for that service.
- Step Down Indirect Cost Rate: is more precise than either the blanket or cost center rates because it can be calculated for a single service and recognizes the services rendered by central staff units to each other before allocating general and administrative expenses to the service being costed. A step down rate is also very difficult to establish and thus is usually developed by certified public accountants rather than by lay analysts.

Blanket Rate

In the previous section, a "blanket rate" was employed to allocate indirect costs, i.e., a single rate applied to all services in a jurisdiction.* A

*Some jurisdictions distinguish between two levels of indirect costs--General and Departmental--and develop a separate blanket rate for each level. The first or General level consists of the indirect costs incurred by the jurisdiction's central offices in supporting the employees and services of all its line departments, including the police. The District Attorney and the City Auditor would be examples of the central offices that could be expected to support patrol services. The second or Departmental level involves the indirect costs of each line department incurred in support of its own employees and services, e.g., the Office of the Chief, Records, and Communications.

blanket rate is determined by dividing the jurisdiction's total indirect cost (overhead and general and administrative expense) by the jurisdiction's total direct cost, total direct labor dollars, or total direct labor hours. Depending on which of these bases is used, the blanket rate is expressed as cents per direct cost dollar, dollars per direct labor hour, or cents per direct labor dollar. This rate is then applied to the direct costs, direct labor hours, or direct labor dollars of the specific service being costed to estimate its indirect costs.

Cost Center Rate

In actual practice, however, many police departments recognize that different types of services may incur different amounts of indirect costs and thereby warrant a different indirect cost rate. These departments group their services into cost centers (e.g., investigations, patrol, and traffic control) and create a separate indirect cost rate for each cost center.

Essentially, these multiple rates are determined by: (1) defining the cost centers, (2) defining the sources of indirect cost such as light, power, maintenance, etc., and (3) using an individual allocation base to distribute each indirect cost to the appropriate cost center. Exhibits D-1 and D-2 reflect the types of indirect costs that are usually distributed and their common allocation bases.* Exhibit D-1 suggests methods for allocating the indirect costs of overhead whereas Exhibit D-2 pertains to the indirect costs of general and administrative expense (central staff units). Exhibit D-1, shows for example, that the department's telephone costs are distributed among cost centers based on equipment location; the more telephones assigned to a cost center, the higher its percentage of the indirect costs of telephone service. If investigations has 40% of the telephones in a department, this cost center is assigned 40% of the annual telephone costs. Continuing the indirect cost allocations, if investigations occupies 50% of the square footage at police headquarters, it would be charged 50% of the costs of maintenance, insurance, and most utilities.

This procedure would eventually distribute all indirect costs among the various cost centers and lead to the definition of an indirect cost rate that could be applied to every service grouped in each cost center. Exhibit D-3 shows that this service could result in an indirect cost rate per labor cost dollar of 52¢ for the services grouped in the investigations cost center, 57¢ for patrol services, and 31¢ for traffic control services.

*Both exhibits were adapted from: Ernst & Ernst, Performance Measurement and Cost Accounting for Smaller Local Governments (Providence: Rhode Island Department of Community Affairs, 1979), pp. 82, 84.

Exhibit D-1

OVERHEAD ALLOCATION ALTERNATIVES

COST CATEGORY	EXPENSE CLASSIFICATION	ALTERNATIVE ALLOCATION METHODOLOGY
Contractual Services	Data Processing	Frequency of Services Provided
	Reproduction	Machine Meter Control or Hours
	Microfilm	Number of Documents Processed
	Printing	Time Spent to Provide Service
		Hourly Rate or Rate Per Unit of Service
	Laundry	Head Count
		Specific Identification
	Office Space Rental	Square Footage Usage
Repair and Maintenance	Vehicles	Miles Traveled
	Facilities	Square Footage
Insurance	Vehicles	Miles Traveled
	Equipment	Hours Used
	Buildings	Square Footage
	Property Damage	
	Liability	
	Fire	
Utilities	Heat	Square Footage
	Light	Square Footage
	Power	Rated Power Usage; Meter Usage
	Gas	Equipment Location; Meter Usage
	Telephone	Equipment Location
	Telegraph	Minutes Serviced; Log of Users
	Water	Meter Usage, Square Footage

Exhibit D-2

GENERAL AND ADMINISTRATIVE EXPENSE ALLOCATION ALTERNATIVES

SERVICE FUNCTION	ALTERNATIVE ALLOCATION METHODOLOGY
Auditing	Audit Hours Audit Cost
Data Processing	Documents Processed Machine Hours Standard Hourly Rates
Mail and Messenger Service	Documents Processed Employees Served
Motor Pool Services	Miles Driven Days Used Standard Rate Per Mile Direct Charge Per Service
Office Equipment Maintenance	Direct Hours
Microfilm and Reproduction	Documents Processed Direct Hours
ORGANIZATIONAL UNIT	
ADMINISTRATION	Weighted Average Percentage of: Procurement Transactions Processed Number of Employees Number of Administrative Service Requests
Purchasing	Number of Purchase Orders Procurement Transactions Processed Number of Purchase Requisitions
Personnel	Number of Employees* Personnel Transactions Processed Number of new Personnel
Administrative Services	Number of Administrative Service Requests
ACCOUNTING & FINANCE	
Treasurer	Department Budgets Number of Checks Drawn
Collections	Department Budgets, number of transactions processed
Disbursements	Number of Checks Drawn
Investments	Department Budgets, number of transactions processed
Finance Officer	Number of Transactions Processed Department Operating Budgets Department Expenditures
Bookkeeping	Number of Transactions Processed Department Budget Department Expenditures
Payroll	Number of Employees Checks Issued
LEGAL	Direct Hours of Services Provided
MAINTENANCE	Square Footage Direct Hours of Services Provided Work Orders

*If an employee works for more than one cost center, then a %FTE (full time equivalent) should be credited to each cost center. For example, if Captain Miller spends 75% of his time on investigations and 25% on patrol, then the investigations cost center is allocated .75 of an employee and patrol receives .25 of an employee.

Exhibit D-3

ALLOCATION OF INDIRECT COSTS TO COST CENTERS

INDIRECT COST	ALLOCATION BASE	COST CENTER		
		Investigations	Patrol	Traffic Control
Repair and main- tenance of faci- lities @ \$10,000	Square footage	50% \$ 5,000	25% \$ 2,500	25% \$ 2,500
Telephone @ \$5,000	Number of Users	60% \$ 3,000	30% \$ 1,500	10% \$ 500
Depreciation of vehicles @ \$100,000	Miles driven	20% \$20,000	75% \$75,000	5% \$ 5,000
Data Processing @ \$10,000	Machine hours used	60% \$ 6,000	30% \$ 3,000	10% \$ 1,000
Personnel Unit @ \$50,000	Number of Employees	20% \$10,000	70% \$35,000	10% \$ 5,000
Payroll Unit @ \$32,000	Labor Costs	25% \$ 8,000	60% \$19,200	15% \$ 4,800
Total indirect costs		\$52,000	\$136,200	\$18,800
Total labor costs		\$100,000	\$240,000	\$60,000
Indirect cost rate per labor cost dollar		52¢	57¢	31¢

Obviously, this is a time consuming and complicated undertaking which may be beyond the capacity of some police departments and cost analysts. However, many accounting experts argue that even the cost center allocation method is too simplistic because it ignores the costs that central staff units incur in supporting each other. For example, distributing all the costs of the payroll unit to operating departments and services overlooks the fact that personnel in other staff units also get paid by the payroll unit and should properly bear a share of the payroll unit's costs.

Step Down Rate

These experts advocate a "step-down" method of allocation that would recognize services rendered by central staff units to other staff units. The step-down method of allocating indirect costs starts with allocating general costs that apply to all operating and support units, e.g. utilities. Next, the costs of each staff unit are adjusted to reflect the services it renders to and receives from other staff units. Finally, the adjusted costs of the staff units are allocated to operating units and services. After completing this cost allocation sequence, all costs have been allocated to services, showing the total costs of delivering those services. Such allocation procedures are quite complex and are therefore usually determined by professional accountants. However, the procedures can be found in almost any standard cost accounting textbook.*

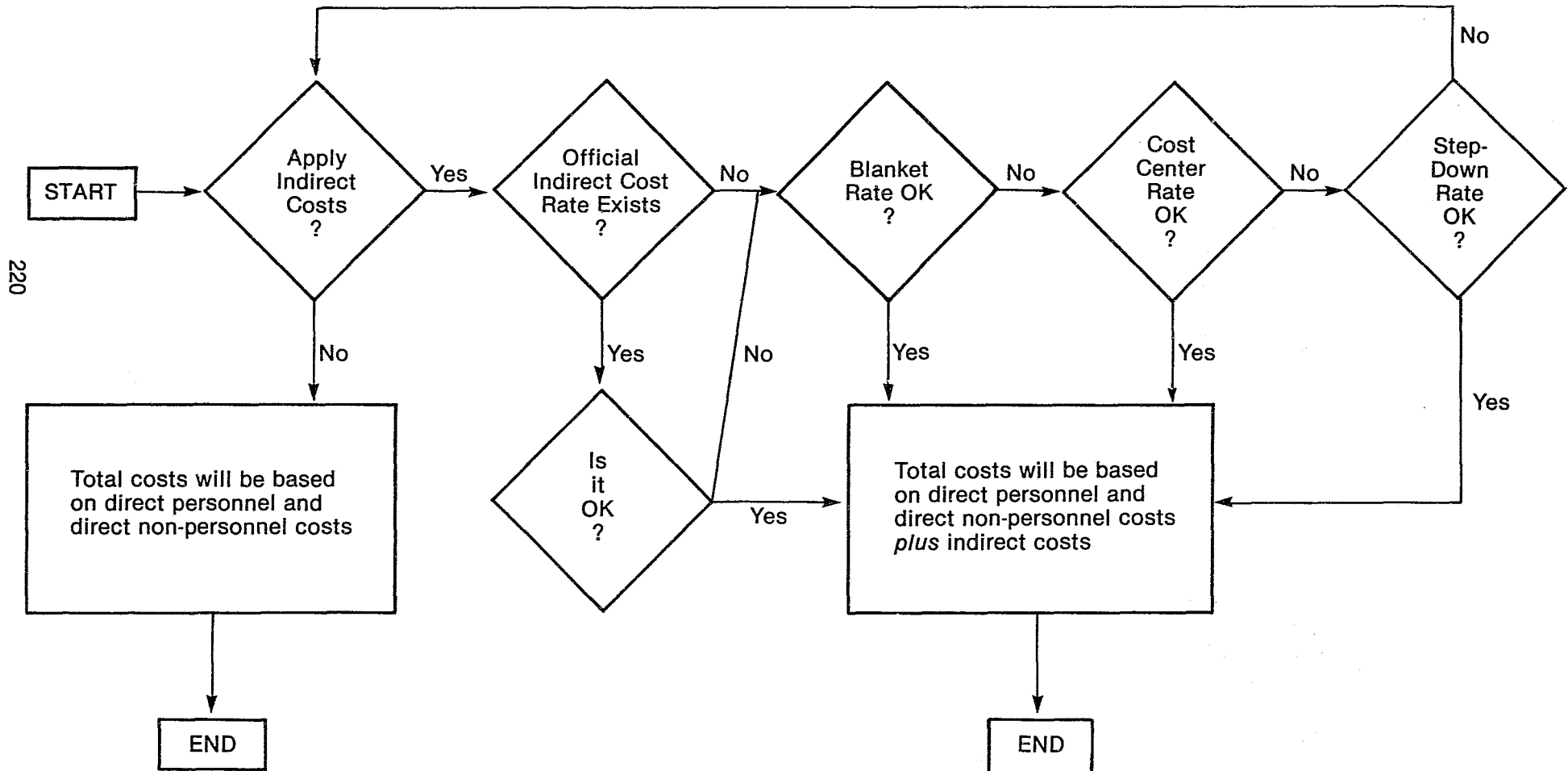
As suggested earlier in this appendix, when indirect costs must be allocated, the cost analyst should first attempt to locate an official indirect cost rate established by a federal or state audit agency. This rate may be a blanket rate, cost center rate, or step down rate. Using the official rate will save significant amounts of time and money. On the other hand, a blanket or cost center rate will have to be computed if an official indirect cost is outmoded. Only those police departments with substantial accounting expertise and the need for very precise indirect cost allocations should attempt the step-down allocation sequence. Exhibit D depicts the decision steps that should be followed in determining the most appropriate indirect cost allocation method.

4. Application of indirect cost rate to service being costed.

To illustrate this final step in measuring indirect costs, let us assume that a blanket indirect cost rate has been selected based on direct labor dollars.

*See, for example, Horngren, op. cit., pp. 526-528 or Matz and Usry, op. cit., pp. 235-257. An especially helpful discussion of "step down" indirect cost allocation is contained in Ernst and Ernst, op. cit., pp. 81-90.

Exhibit D-4
DECISION STEPS IN DETERMINING INDIRECT COST ALLOCATION METHOD



In addition, we will assume that the service to be costed is homicide investigations. The computation of the indirect cost of this service would be based on this formula:

<u>Total indirect cost</u>	X	Direct labor cost	=	Indirect cost
Total direct labor dollars		of homicide		of homicide
		investigations		investigations
 \$1,500,000				
3,000,000	X	\$150,000	=	\$75,000

*U.S. GOVERNMENT PRINTING OFFICE: 1982-0-361-233/1841