

OUTPUT MEASURES FOR LOCAL GOVERNMENTS

by

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## ABSTRACT

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The thesis is concerned with the type of output measures which should be systematically collected by government to assist in resource-management decisions.

The programming-planning-budgetary system vogue with its promise of efficient resource allocation within government neglected government efficiency for analysis of government policy. As a result, PPBS neither brought about efficiency nor did it have significant policy impact.

The major deficiency in local government is an effective management control process for translating administration goals through the executive. While such a process faces peculiar difficulties in government, these are not conceptually insuperable. What are required are production measures suitable for use in management appraisal. The type and comprehensiveness of the measures which would be suitable are commonly misrepresented. A management control process can, however, rely on quite informal information flows to supplement relatively formal measures.

Criteria for production measures which could be used in the management control process of local government departments are suggested. There is an inverse relationship between the accuracy, ease of collection, and ease of auditing of measures and the correlation of these measures with overall organizational goals. PPBS made no attempt to analyze this tradeoff. The most suitable measures for governments are multivariate measures rather than single-measures.

For major local government departments, production measures suitable for a management control system are reviewed. Most city departments do not report even a fraction of the minimum measures required for a full

control system in their budget reports. It seems that the management control system in such departments is correspondingly ill-developed.

The obstacles to implementation of management control systems in local government appear to be practical rather than conceptual. It seems that the pessimistic conclusions of the incrementalists such as Lindblom, that government resists systematization and shuns open reporting, are the main causes of the present inadequate development of management control measuring in local government.

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TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
CHAPTER I. INTRODUCTION.....	1
CHAPTER II. EFFICIENCY, ANALYSIS AND PPBS.....	6
CHAPTER III. MANAGEMENT CONTROL AND ITS CHARACTERISTICS IN GOVERNMENT.....	13
Efficiency within An Organization.....	13
The Management Control Profess.....	18
Management Control in Government.....	21
Production Measures.....	24
CHAPTER IV. CHOOSING MEASURES OF PRODUCTION.....	26
Introduction.....	26
Classification of Production Measures.....	30
Requirements for Management Control Measures....	34
Devising Management Control Measures.....	38
Multivariate Product Measures.....	42
Recent Development of Production Measures.....	47
CHAPTER V. MEASURES FOR LOCAL GOVERNMENT DEPARTMENTS.....	52
i. Police.....	55
ii, Fire.....	61
iii, Education.....	70
iv, Library.....	78

TABLE OF CONTENTS  
(continued)

	<u>Page</u>
CHAPTER V. (continued)	
v. Recreation.....	84
vi. Welfare.....	88
vii. Public Health.....	93
Service Departments.....	97
viii. Finance.....	98
CHAPTER VI. CONCLUSION.....	106
BIBLIOGRAPHY.....	110

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## CHAPTER I

### Introduction

It is a commonplace that government is less efficient than business; that it produces less value with its share of resources than would a business performing the same tasks with the same share of resources. This has always been a source of citizen complaint against government and at times during the last 100 years there have been major movements to improve government efficiency.

It is difficult to quantify the exact degree of inefficiency in government since there are no accepted measures of the value of government output and certainly no measures of the income distributive impacts of government but there are several indications that government production is less than fully efficient. Inflation figures show that government is costing steadily more in proportion to the rest of the economy; productivity figures suggest a long-term sluggishness in man-hour productivity in government; where government does compete with private firms it is often more costly for similar output.

According to a recent article by Fisher (1971) government sector output has been inflating in cost at twice the rate of inflation in the general economy. In the government sector, state and local government have been leading this trend.

Factor productivity measures are notoriously unreliable and particularly so where production cannot be valued as in government.

However, indications are that in government as a whole productivity has been sluggish and that there has been a dearth of technological innovation in the whole government sector. Kendrick (1961, p.318) quotes manpower and capital employed data for the period 1910 - 1957 that show a steady of slightly falling capital/manpower ratio for the government sector at the same time that the private sector of the economy doubled its capital/manpower ratio.

Government does directly compete with private sector institutions in a few areas of health care, education, and fire prevention on more or less equal terms - i.e. it makes no significant attempt to serve a restricted clientele. Of all hospitals in Massachusetts in 1971, those with the greatest cost rise over 1970 were the state and municipal hospitals. Some towns in the Southwest have turned over fire protection to private companies for considerable cost savings with no attendant rise in insurance rates or fire losses. Even in education, although an OEO report has declared incentive contracts to produce no worthwhile improvement in educational achievement, there remain some examples of outstanding successes by profit-making firms (Leninger, 1970).

These examples are, of course not reliable indications of inefficiency in government since they may hide changes in a major variable, quality of output. In the absence of systematically collected measures to the contrary, it seems plausible that quality of government output has not risen in step with other sectors of the economy - policemen may now ride patrol cars rather than walk on foot but they no longer try doors.



The presumption is strong that government does not deliver the output that it could attain by more efficient use of its resources.

In municipal government there have been three major movements to reform this state of affairs - the Reform movement of the 1900's, the efficiency movement of the 1920's and 1930's and, most recently, a PPBS effort in the 1960's. All of these three were concerned with increasing the effectiveness of local government, each though in very different ways.

The Reform movement in the 1900's saw the foundation of the reform clubs, including the National Municipal League. It was a movement essentially directed against corruption in municipal government - its interest in finance was largely concerned with introducing effective auditing and strengthening the executive budget.

The 1920's and 1930's saw a movement towards efficiency in local government - according to Clarence Ridley,

"A generation ago a municipal government was considered commendable if it was honest. Today we demand a great deal more of our public services. It must not only be honest but efficient as well" (Ridley, C.E. and Simon, H.A., 1938)

The movement is particularly important for the present thesis in that it was the major period of development of measures of municipal output; since the 1930's there has been virtually no development of new responsibility measures for municipal output.

Since 1965 the pressure for efficiency in government has been focused on the implementation of PPBS, programming, planning, budgeting systems. Developed at the Department of Defense and introduced to local governments through the 5-5-5 project, PPBS has aimed at introducing

policy analysis to governments.

None of these three movements can be said to have succeeded. The reform movement of the 1900's died away; only a few cities and then only a few departments in those cities stand out as having implemented the proposals of the efficiency movement of the 1920's; PPBS likewise seems to have been checked.

This thesis is concerned with one of the major elements of these reform movements - the measurement of the output of government services. It contends that recent attempts at devising output measures for local government services have been misguided and that this misdirection stems from a concept of the management process most clearly realized in the federal model PPBS. The thesis contends that the output measures most urgently required for a local government are accountability measures useful for motivating department and agency heads of the local government, i.e. management control measures for controlling their performance and use of resources. The thesis suggests how such measures might fit into the resource-allocation process of a local government; what the desirable characteristics of such measures are; and how such measures might be developed. The thesis reviews the usefulness of measures of local government output presently available and the practices of major cities in using these measures.

The body of the thesis is divided into five chapters: a chapter discussing the PPB system; a chapter on the management control process in government and its relation to efficiency; a chapter on devising performance measures and their present use in the control process. The thesis concludes with a summary and a bibliography.

Although the thesis is concerned particularly with local government functions, much of the discussion is relevant to the greater part of the government and non-profit sector of the economy, or at least the larger organizations in this sector. Accordingly, in chapters of the thesis the terms government, local government and municipal government are interchangeable.

## CHAPTER II

### Efficiency, Analysis and PPBS

An individual can be said to be efficient when he is producing the maximum value possible with the resources available to him. For an organization such as government the same definition applies to the overall performance of the organization. However, securing efficiency in an organization requires that the individuals in the organization act efficiently. Accordingly an organization secures efficiency by determining the value of products, by allocating resources to different products in proportion to the marginal value of production, and by maintaining efficiency in each production line. Over and above the efficiency problem confronting the individual, the organization has the problem of coordination.

The most recent efficiency movement in government has been associated with the name PPBS. Here PPBS is understood as defined by the presence of two elements in budgetary procedures: a program-oriented budget and a requirement for the submission of issue analyses with budget requests. Many systems of government reform have been in effect that ignore these elements but have still been entitled PPBS, for example, in New York City and Wisconsin. These are neglected here.

Introduced in the Department of Defense, PPBS was introduced to the whole Federal government in 1965. Since that time the efficiency drive in government has been riding on the fate of PPBS in the governments into which it has been introduced. Local government attempts

at PPBS were focused by the Federally funded '5-5-5' project (Subcommittee on Economy in Government, 1969), although dating from before 1965 (Schick, 1971). Subsequently several cities made changes along PPBS or claimed PPBS lines in their administrative practices, notably Dade County, Florida (Miami), Philadelphia, Dayton, Ohio and New York City.

The goals of PPBS were nothing if not ambitious. Fred Hoffman of the Bureau of the Budget, the person actually responsible for the day-to-day oversight of the Federal PPBS, stated the goals of PPBS as roughly equivalent to those of securing efficiency given above:

"The system (PPBS) was introduced to improve Federal decision-making about resource-allocation in several important ways. The system is designed to

- Improve the efficiency of alternative ways of controlling government resource-using or resource-affecting activities as the market tests the efficiency of private resource allocations.
- Relate...to the proper objectives of public action.
- Present major issues for decision in a useful way to high officials." (Hoffman, 1969, p. 850)

The first objective roughly corresponds to the translation of efficiency throughout the organization, the second corresponds to estimating the need for and the value of programs, and the third objective corresponds roughly to assisting the allocation of resources.

However, PPBS as realized did not give equal weight to each of these objectives. PPBS was, in the event, heavily concerned with Hoffman's objectives two and three to the neglect of maintenance of efficiency throughout the organization. This reflected its concentration on improving the process of valuing the output of government.

The concept is most extremely stated in the PPBS literature by

Greenhouse (1970, p. 895):

"the President and Congress would gain the means of regulating the Federal production apparatus and of optimizing the benefit/cost margin across the full range of Federal outputs."

The implications of determining the 'proper objectives of public action' and the size of the government sector rationally are clear. PPBS then became the vehicle for the benefit/cost analyses that would enable governments to reach optimality. Analysis was crucial in order to determine the proper objectives for government; linking these analyses to the budget would give the analysts muscle to implement their decisions.

In fact the linkage went the other way. PPBS has failed in all the governments into which it has been introduced. It seems that the examples of governments claiming some success with PPBS have been precisely those governments using 'PPBS' along other lines than those claimed above. (Schick, 1971). It is not the purpose of this thesis to dissect this failure, but the failure of PPBS does not represent a failure for the efficiency movement except in so far as efficiency was linked to attempts to define the size of the government sector. Observers concerned with the failure of PPBS (Wildavsky, 1969; Schick, 1971; Schultze, 1969; Hinrichs, 1969) seem to agree that this linkage of analysis to the budget was fatal for analysis. Linked to the routine of the budget, analysis was unable to avoid being humdrum. Without analysis, the decisions being made were no different than before; PPBS had failed.

"Budgeting comes to esteem and rely on that which can be routinised; the things that can be routinised are often matters pertaining to the operations of public agencies rather than to outside events. A Gresham's Law is at work driving out analysis." (Schultze, 1968, p. 18)

"PPBS discouraged policy analysis. To collect vast amounts of random data is hardly a serious analysis of public policy. The conclusion is obvious. The shotgun marriage between policy analysis and budgeting should be annulled." (Wildavsky, 1970, p. 846)

R. N. Anthony's (1965) classification of management decision-making into three types - operations control, management control, and strategic planning - is commonly recognized as a convenient structure for explaining the clash between analysis and budgeting. It is less commonly recognized as suggesting avenues for approach to the efficiency problem in government.

Operational control decisions are in Anthony's words:

"The process of ensuring that specific tasks are carried out efficiently and effectively" (1965, p. 18)

Such decisions are routine, frequent production decisions, typically taken by lower levels in the hierarchy of an organization. Such decisions include the allocation of personnel to their tasks, the detection of fraud in an accounting system, and the purchase of equipment. Most current budgetary systems are organized as operational control systems devoted to ensuring that money is spent only for the intended purposes and have little to do with determining how these purposes should be set, or if the purposes are achieved, or the value of these purposes. The information systems set up for such a budgetary system does not therefore support decision-making for any of these latter goals.

"Management control is the process by which managers ensure that resources are obtained and used effectively in the accomplishment of the organization's objectives." (1965, p. 17)

Decisions here include hiring and firing of staff, production technology, pricing, location of service outlets, formulating budgets, capital financing, measuring and appraising management performance, i.e. decisions typically taken by middle management, at least in the business firm. In most state and local governments such decisions are commonly the prerogative of the legislature rather than the executive but the executive will typically have a good deal of influence on the decisions. In management control at least is included one of the major criteria given for efficient government, viz. concern with the translation of administrative objectives through the organization.

Strategic planning corresponds to PPBS planning:

"... the process of deciding on objectives of the organization on changes in these objectives, on the resources used to attain these objectives, and on the process governing the acquisition, use and disposition of these resources." (1965, p.16).

It concerns long-range planning (except where this is trend extrapolation), the monitoring of environmental changes likely to affect the organization, and the setting of organizational policy to operate in this environment. In government such decisions as the busing decision, deciding to offer welfare relief, represent decisions taken at the strategic planning level. Typically such decisions are entirely the prerogative of the legislature, with only limited advice from the executive.



Anthony particularly stresses the distinctiveness of strategic planning. It is asystematic, acyclical, and creative; it responds to events external to the organization; it relies upon information on events external to the organization. As such it will defy routinization. Accordingly, in terms of this classification the linkage of analysis (strategic planning) to the budget (operational control) in government was likely to result in the overload of both operational control and strategic planning systems with information irrelevant to both.

Anthony's classification is essentially based on the assertion that organizations are segregated in order to achieve these three purposes. The pursuit of efficiency as defined above lies in an area, management control, not corresponding to the primary focus of PPBS, viz. strategic planning. Going beyond Anthony for non-profit organizations and governments, strategic planning does not have simple goals in governments and hence is always likely to remain the prerogative of the legislature. As such it will remain separated from executive processes.

In contrast certain of the participants of the original PPBS movement appeared to have thought that this segregation might not be necessary. Schultze, for instance, declares (p.5-6, 1968) that the functions of a budget were:

"financial control.... insuring that public funds are spent only for those purposes specified only by law...management control...programming the use of resources,...manpower, equipment, transportation, and the like...to carry out an appropriate set of activities in an efficient manner. strategic planning....determination of the kind and level of activities that management control seeks to carry out efficiently."

In other words a single budget can be all of Anthony's three types. It is clear that Schultze misinterprets the Anthony classification. His 'management control' is concerned primarily with task management rather than the motivation of managers; the activities that he describes are all concerned with tasks rather than managers and cover only a fractional part of management control. His definition of strategic planning stresses a neat dovetailing with management control and operational control. It seems that Schultze was following Schick (1966) in identifying the Anthony categories with chapters in the history of budgeting rather than in the actual decision-making.

Contrary therefore to the hopes of some of the participants in the PPBS movement it seems that the area of profitable systematization of analysis is restricted. Furthermore it seems that systematization of analysis cannot be expected to bring efficiency in its wake. PPBS as implemented in the Federal government cannot be achieved.

## CHAPTER III

### Management Control and Its Characteristics in Governments

#### Efficiency Within An Organization

At the beginning of Chapter II, it was asserted that three conditions were necessary for saying that an organization acts efficiently: valuation of products, allocating resources to different products in proportion to the marginal value of production, and translating efficiency to each product line. More formal proofs of these assertions suggest how a government may set out to secure these conditions.

The problem of efficiency is a particularly acute one for socialist economies for here the allocation of resources by a free market is to be replaced by allocation in line with social preferences as opposed to individual preferences. All economics textbooks present the conditions under which the private sector of the economy will be efficient and effective. However, derivation of comparable conditions for the public sector of the economy and the internal management of organizations, where individual advantage is not directly linked to the advantage of the sector or the organization, is less widely discussed. Work on models of efficient socialist economies is directly relevant both to the within-organization behaviour of business firms and to the resource allocation of governments.

Debate on the efficiency of socialist economies was focused in the 1930's by the debates of Von Mises and Oskar Lange (Lange, 1936), the chief concern of the debate being whether a socialist economy could

possibly be efficient. After 1936 the debate paused. Oskar Lange had shown that a set of socially-determined preferences could be imposed on an economy and the economy could still reach a maximum of utility through the action of "social profit" maximizing decision agents within the economy. However, to all practical intent the problem remained insoluble except by the restriction of the number of decision-making agents in the economy. However, in the 1960's there have been devised a new set of planning procedures, closely related to those of Lange, which seem much more practicable as a means of allocating resources, and illustrate the interlinking of these three conditions given for efficiency more practically. This work is associated with Arrow and Hurwicz at Harvard, and Malinvaud at Berkeley. However, here reference is made to a process proposed by Heal. (Heal, 1969).

Heal discusses a procedure which is directly applicable to local government, or indeed to a central government or a non-profit organization. It is postulated that the economy has a pre-set utility function involving the different products of the socialist economy. The economy involves producing units, producing goods for final consumption or for intermediate demand. There exists a central planning board which itself does not directly produce but which directs the allocation of resources to the different operating units. Each producing unit has a different production possibility set. The goal of the planning procedure is twofold: to share out the resources between each production unit to maximize the economy's utility function and to motivate managers to cooperate in this process and use resources efficiently.

The procedure is quite simple. The central planning board offers an initial allocation of resources to firms and successively firms report what they will produce for marginal adjustments to these resource allocations. The central planning board adjusts its resource allocations in proportion to the marginal value of a firm's production. At each step, managers are rewarded according to the "social profit" of their production. Heal shows that such a gradient procedure will converge on at least a local optimum of utility for the economy and that managers will be motivated to produce efficiently - not to waste resources and to maximize social utility for the resource allocation given.

It is necessary to make a correction to the Heal model. Like Malinvaud and Arrow and Hurwicz, Heal assumes that managers can be directed to report accurately their production and what they will produce for marginal adjustments to their resource allocations. However, for the reward function used for managers - i.e. proportional to the marginal value of their total production - it is in managers' interest to mis-report to the center their production targets and to engage in lobbying for more resources than warranted by the value of their production. An adjustment must be made to the reward function. In particular, managers must not only be rewarded in proportion to the marginal value of their total production, they must also be penalized if their targets were not accurate, whether under-estimated or, more likely, over-estimated. Depending upon the size of the penalty, it can be shown in the model that managers can always be made to lose if they do not report accurately while still being encouraged

to produce the maximum of social utility for their allocated resources.

The Heal model and the other gradient models of socialist economies are important for the resource-using activities of government. The Heal model can be directly applied to a local government case in which firms in the economy become departments and agencies in a local government while the central planning board is the power of the government to raise revenues to support its operations. The problem is then much simpler than in the economy at large: there need be only one resource allocated, viz. revenues, since factors of production can be purchased in the outside market; there are in general far fewer budgetary units than in the whole economy.

It seems utopian to advocate the use of a procedure similar to this in the government sector - specification of a utility function is beyond the capacity of any realistic political process. There are examples though of public sector enterprises using similar reward functions to motivate production. Performance contracting in education (Lessinger, 1971) is the most recent example.

The procedure does show sufficient conditions for efficiency of allocation which may be replicated in many organizations. As Heal points out, a variety of different institutional settings would fit the model as a model of socialist planning. (Heal, 1969, p. 361). The model demonstrates that efficiency can be secured with a system which is very skeletal indeed. A sufficient process for efficiency requires:

1. knowledge of outputs communicated to central authorities

2. motivation of departments in proportion to the value of their production to central administration
3. and their budgeting accuracy
4. allocation of resources in proportion to the marginal contribution of a department to central administration's value

Should any of these conditions not be met, then the procedure will not attain a maximum of utility and managers will not attain a maximum reward.

Quite a skeletal system for firstly, it is not necessary that central administration know the production functions for each department, and secondly, it is not even necessary that the department managers have any precise knowledge of their production possibility set at least initially for they will be strongly motivated to learn more about the production possibility set. These are ideal conditions for a decentralized organization. By using the information distributed throughout the organization, the organization attains the same maximum utility which it would have attained had all decisions been centrally taken. The second point emphasizes that sophisticated knowledge of the production possibility set, such as would be derived in the local government case from comparisons of the records of several local authorities, is not necessary, even though it would be useful to both budgeteer and budgetee.

Attainment of these conditions within the organization will not, however, guarantee that the organization is beneficial to society. The government can be internally efficient but not produce the outputs that society requires. This is the distinction made by Anthony. As pointed out in Chapter II, PPBS was designed with one eye on ensuring

that government was socially beneficial. The planning procedures discussed stress, however, that even if the political process, assisted or unassisted by analysis, has ensured that government has beneficial goals, without the securing of the efficiency criteria discussed here and in Chapter II, government will not attain these goals efficiently and may well not attain them at all. Moreover, the key to the attainment of efficiency is the measurement of government production.

#### The Management Control Process

Obtaining the conditions required in the discussion above is the concern in the Anthony classification of management control - motivating management to perform efficiently and effectively. The best short description of a management control process is given in Anthony (1970, ch. 14-17).

Anthony stresses the working of the management control system as a negative feedback loop designed to keep management decisions in line with administration policies. The process requires the identification of responsibility centers - sections of the firm headed by a single responsible person with distinct resource-using and service-producing duties. In a firm, examples of responsibility centers might be the sales division, the car lines salesman, the line foreman, and even the welder. In governments such responsibility centers can similarly be recognized: for instance in a school system responsibility extends from the superintendent, the principals to the individual teachers.



These responsibility centers are then the foci of a cyclical management control process (Anthony, 1970, p. 424). Anthony sketches a loop from budgeting (allocating resources), monitoring the uses of the resources and the output from these resources by each responsibility center; appraisal and evaluation of the use made of resources, and motivation of managers on the basis of these appraisals. The essential tool of management control is the variance report, testing actual performance against some standard of expected performance. The goals of the process is to motivate managers to act in accordance with the goals of administration. Anthony shows administration policies as impinging on the management control process through the budget, when resource allocations are affected by the policies of administration, as well as by observed efficiencies.

It should be stressed that the degree of formality in these processes is quite flexible. As Forrester points out (Forrester, 1968), the information used in running an organization is predominantly informal. Likewise much of the evaluation of production, and performance appraisal in the management control process can be informal. Motivation can be directly via such means as salaries or promotion or it can be informally by peer review. Standards can be derived by comparisons with other similar organizations, by comparison with the history of the organization itself, or even by a simple process of negotiation. The standards can be laid down formally by administration, or administration can acquiesce in the use of professional standards.

A well run management control system has several benefits; not only those of a rise in productivity and efficiency but also the

indirect benefits of a "Hawthorne effect". In addition, as the highest level of systematic monitoring of production in the organization, management control provides basic information on organizational capabilities to the strategic planning process. This is true, whether in a large organization's management control system of formal variance reports and remote supervision or in the person-person contact system of the smallest organization.

Creation of an effective management control system is not without its difficulties, however. It is difficult for administration to impose all its preferences on management. Inter-management competition for resources promoted by such a system can produce destructive use of centrally supplied resources such as auditing and makes for strong attempts to beat the system. Management may have goals considerably different from those of administration and may balk at an administratively imposed system. In particular professional associations can be expected to have their own goals of service which transcend the goals of the individual organization and to be accordingly reluctant to accept organizational goals. An example in local government might be in public health departments, where medical prestige might be concentrated in relatively unproductive areas for public health. The management control process is unlikely to operate effectively where standards are not carefully defined and fairly stable. In the Heal model, if the central planning board's utility function were to change sharply during the planning process, then managers will gain by second-guessing the center's utility function and mis-reporting their marginal contributions to utility. The management

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control process, while not insulated from administration policy should at least be not subject to constant interference. Thirdly, the management control process does require clear definition of responsibilities. The goal is to motivate individuals to perform efficiently and effectively by rewarding them and penalizing them. If they cannot be held responsible for any set of products then the rewards are less effective.

### The Management Control Process in Government

Few governments have even the rudiments of a formal management control system. Budgeting is commonly quite divorced from management control and considerations of efficient/effective performance. Cresine (1968) has shown how the decision-making power in a large city differs drastically from the model of Anthony; that there is no formal consideration of efficiency or effectiveness before committing resources to a department; that budgeting is a negotiation with last year's budget as a base point for the budget. In almost all cases, governments make no use of variance reports. Where they are used, the variances reported are simply expenditure variances. Motivation is rarely linked to performance. Civil Service provides for strict seniority, veteran's preference rules and gives only slight attention to on-the-job evaluations. Examinations supposed to measure on-the-job performance are only accurate for typists and keypunchers; evaluations by superiors can be absolutely subjective. Little if any information is collected on the production of government. As will be shown in

Chapter V, the information is rarely if ever used in within-organization decision-making. In such a situation performance can only drift at a low level; government can only be unresponsive to administration.

In part this does reflect peculiar difficulties in management control in government. Professional associations are commonly important in government agencies; doctors or lawyers in government service share standards with their counterparts in private practice, others such as librarians or teachers have their independent standards of quality. These goals often clash with community preferences and are accompanied by attitudes of service at any price. More than in any business firm, the goals of the government are a matter of debate and political resolution. (Lindblom, 1963). This debate leaves in many areas little consensus on what government should achieve and even what the significant areas of achievement are. In Anthony's terms the strategic planning debate extends well down into the organization. Typically in governments too, responsibilities are diffuse, programs overlap, production's effectiveness is poorly known and the private sector often provides similar or complementary products.

However, these factors do not compel the poor development of management control in government. Even with Civil Service rules, local government could begin to stress performance and to systematize management control. Government organizations like profit-making organizations have responsibility centers. While Civil Service may make motivation through promotion and salary boosts difficult in most governments, it seems that peer review pressures may be reinforced by the strong esteem deriving from the concept of public service. Professionalism does at least promote debate about service being

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provided. Although political debate and interference do cover large areas of resource allocation, nevertheless there are wide areas of agreement on what the important dimensions of government agencies are and what missions government agencies should focus on. Even where, as in education, there is a more or less continual debate on the goals of the educational system, nevertheless several areas of consensus on methods remain. Even here an informal management control process relying on internally generated 'standards' could focus debate.

For there are some notable examples of successful implementations of highly informal management control systems in agencies where consensus on production value is extremely unlikely ever to prevail. For example, a recent article in the Harvard Business Review (MacLeod, 1972) discusses a 'PPBS' system in a mental health work clinic, with strong emphasis on management control although in a non-threatening context. Each professional in the clinic received a report of how his time per case compared with the average time required per case of the particular type. The result was a strong motivation among the professionals to bring their time per case in line with the professional norm, without at the same time 'rate-busting' by spending too little time per case. The result was a considerable gain in throughput of cases with no change in quality of treatment in the opinion of the professionals. The clinic itself had become more efficient. In the circumstances a program budget could come into its own. Resources could be allocated to programs in the assurance that there was likely to be no loss of efficiency with the changed

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allocation. As will be discussed in Chapter V, there are many departments in government where, although there will be no consensus on the value of different programs, nevertheless efficiency can be assured by introduction of such a skeletal management control program based on a simple workload measure, professional control over quality, and a program budget.

### Production Measures

In Chapter II, it was pointed out that information on results was useful in all areas of decision-making in the Anthony classification. Information on the results of organizational actions is, however, particularly the province of the management control system. Strategic planning is primarily concerned with information on events external to the organization; strategic planning itself is not primarily concerned with monitoring organizational performance. Operational control uses information remote from the missions of the organization. To make efficient resource allocation decisions, it is essential to know how efficiently these resources will be used by the responsibility center receiving them. It is highly unproductive to allocate resources to a methadone program if, as strategic planning reports, there are no addicts in the city; it is also highly unproductive to allocate resources to a methadone program which will cure no one.

Small organizations may collect sufficient information informally on management control for their needs, but without a formal collection system management control information on organizational capabilities

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will not be available for administration. Before most government organizations can become efficient, the collection of production measures at the management control level is required. These in turn will supply information required for strategic planning and resource allocation. What is not required is a performance budgeting system along the lines remembered by Schick and Schultze of measuring tasks, but a system to measure responsibility center performance. Management control is essential for efficiency; it is essential for resource allocation. Development of management control systems and their attendant performance assessment systems is the first priority in most governments.

In Chapter IV, the problems of measuring the production of government agencies is discussed. The different types of measures available are considered and methods of devising suitable efficiency measures are discussed. In addition, recent emphases on output measures are criticized. In Chapter V, measures suitable for management control in major departments are discussed, together with the present use of these measures. The conclusion of the chapter is that while there are usually a considerable number of measures available for management control these are rarely if ever used.

## CHAPTER IV

### Choosing Measures of Production

#### Introduction

Selection of appropriate production measures for governments is a major technical problem, yet its solution is important. As the models of Chapter III show, the difference between good measures and bad measures for management control is the difference between optimal and sub-optimal performance.

Underlying much of the discussion of production measures (e.g. Hinrichs, 1970; Hatry, 1970) has been a systems view of organizations - that an organization or a government department is a system for converting inputs into outputs. Accordingly there is a nice division of measures convenient to hand: the organization can be measured with respect to its inputs, to the state of the system - its production technology - and in terms of its outputs. Thus a school district may be measured by its inputs, which include teachers, money, classroom space; by its production technology which includes, say, modern math versus traditional math teaching; or by its outputs, which include pupils with particular skills. At each level there are different measures: an input measure might be expenditure per pupil, a technology measure might be curriculum offered, and output measure might be numbers of people graduating with a particular gain in reading age.



From this model it is normally a short-step to decriing all measures but 'output' measures and asserting the immediate priority of devising 'output' measures and using only these as bases for resource allocation.

Indeed the models of organization resource-allocation show that measurement in terms of inputs and organizational design will yield indifferent performance. Measuring inputs results in over-consumption of factors, measurement of organizational type results in lack of innovation. However, the models further suggest that the divisions between inputs, system state and output may not be a necessary one at the management control level even though it may be important at the strategic planning level. Output for an electrical system or a factory is quite simply measured - there is a restricted set of sources of value from such a system. However, for an organization the identification of value and output with a distinct product line may be unduly restrictive; rather the output of the organization is that which produced value to its clientele. The parents of school children may be numbered among a school's clientele and they may find the school's function as a day-care center to be valuable whereas they may find certain aspects of the school's curriculum quite odious. In this respect some measures of the school system that might otherwise be considered input measures can be very useful in evaluation of the school system - class size, for example, which according to the Coleman report has no influence on scholastic attainment, may nevertheless have quite a share in what effect a school system is perceived to have on pupil attainment and accordingly, for purposes of evaluating

schools should be measured as a quality indicator. A court system has no identifiable outputs but may have definite policies set for it - observance of 'due procedure' for example, and should at the management control level be evaluated with respect to these policies. In this respect 'due procedure' is an output of the court system.

Accordingly, the model above suggests that for resource allocation purposes a definition of output as value added is more appropriate than the narrow product line definition typically assumed.

Before proceeding further it is necessary to discuss the concept of measurability or ease of measurement. Ease of measurement is related to two concepts - firstly, the type of scale on which measurement is possible and secondly the objectivity of the measures, or the ease of persuading people to accept the measure.

There are four types of scale on which measurement is possible: nominal, ordinal, ratio and cardinal. Flexibility of mathematical operations increases from nominal to cardinal scales. A nominal scale consists of a simple classification - a go/nogo assignment of a phenomena to a type. The scale is very commonly seen in political debates; there is quality education or there is not quality education; there is a crime wave or there is not; drug addicts are bad people or sick people. On an ordinal scale there is a definite ranking of the phenomena. In a given city it is possible to rank schools in order of quality by experienced supervisors and teachers, even if quality cannot be exactly identified, or the observers do not easily agree on what constitutes quality. A ratio scale is one in which it is possible to measure distances between items, the distance being

constant over the whole scale. Thus on the National Board of Fire Underwriter's scale it is possible to say that a city graded 3 is as much better than a city graded 5 as the latter is than a city graded 7. However, a city graded 10 (the lowest grade on the scale) is not a city with no fire protection nor is a city with a zero on the scale a city with absolute fire protection. A cardinal scale possesses all the properties of a ratio scale together with the properties of having a definite zero. A city's traffic department may ticket 1000 cars per day; it tickets twice as many cars as a city ticketing only 500 a day. A city ticketing 0 cars per day has performed no ticketing that day - the zero is a true zero. A city spending \$2 million on schools spends twice as much as a school spending \$1 million.

All things equal, it is preferable to have measurements on a cardinal scale to other scales and so on down the list to nominal, simply because a fuller range of mathematical operations is possible with a cardinal scale than with other scales. However, it is usually not often practicable to rely exclusively on cardinal measures.

A key to any measurement is that it be objective, i.e. replicable or at least a subject of agreement. Clearly when political debate focuses on quality education there is no agreement among the debaters on the exact meaning of the nominal assignment, quality. As such the concept of quality is reduced to obscurantism. A measure must be accepted as having value before it can be used in the resource allocation process. It is thus easier to measure the sharply defined: "does the police department have a 24-hour manned switchboard" than the

obscure "is the police department alert". Although the latter represents the politically relevant question, the former is at least a partial answer to the second and has the advantage of being less ambiguously answerable. A concept such as quality of education may involve underlying disagreements such that no agreement can be achieved on the measurements appropriate for it whereas such lower level measures as scores on attainment tests are more likely to be accepted.

#### Classification of Production Measures

In any organization, and particularly in local government, there is a hierarchy of output measures. This hierarchy corresponds fairly closely to divisions of responsibility within the organization and fairly closely moreover to Anthony's discussion of decision-making. Passing down the hierarchy there is generally an inverse relationship between measurability and relationship to the overall goals of the organization. The goals of a major department may be very clear - e.g. the police should reduce crime but measurement of this effect is not easy for a change in crime rate cannot be attributed only to police practices. At this level a measure of progress towards objectives is not available. In other comparable situations the goals may be more obscure and measures even more difficult. In the case of the public library, professionals always desire to upgrade the public's reading material. Securing political acceptance of the goal and measuring progress toward the goal are about equally difficult.

However, lower down the organization it is often possible to devise very accurate measurements - the patrol division of the police force's output can be measured very precisely in terms of patrol-miles per night, number of alerts responded to, even response time. However, such measures even though very precise may have no connection at all with the overall goals of crime prevention and at times even be counter-productive - as with police incidents sparking off riots.

Here it is proposed that there is a classification of output measures into three types: workload measures, performance measures, and social indicators. The terms are not without confusing connotations, as all of them are used in different contexts than used here, but the connections with the present subject are sufficiently close to make their use worthwhile.

Workload measures are usually simple volume indicators, corresponding to the work of fairly low-level responsibility centers. Such measures are numbers of inspections performed, numbers of lines typed, number of arrests made, number of rate demands issued, number of cases handled. Such measures clearly are easily measurable but have no necessary relationship to the overall goals of the organization. The building department may carry out many shoddy inspections, overlooking most of the violations actually present, or may carry out a few thorough inspections detecting all violations. Control by a mere workload measure ignores the purpose of inspections.

Performance measures represent a higher level of measurement. The term performance is perhaps unfortunate in view of the association

with performance budgeting: the performance measures used in performance budgeting were not true performance measures; rather they were somewhat puny workload measures. Performance measures here refers to measures suitable for use in management control and appraising efficiency. Such measures usually control not only for quantity of production but also for quality of production. Performance measures correspond to responsibilities of middle management. For a business it is generally possible to translate the overall profit goals of the company into profit goals for these middle-level responsibility centers - by a careful accounting system on profit center lines. In government this is much more difficult and the performance of any single department need not bear any one-to-one relationship with the overall goals of the government. Thus a fairly useful measure for police department performance is percent of crimes resulting in assignment of guilt, weighted by average sentence for the crime - measuring both the effectiveness of police in solving and detecting crimes and apprehending criminals and maintaining a quality check on the work. However, the measure is not necessarily related to reductions in crime rates although the connection is plausible.

Social indicators are those measures which are most closely related to valuing the output of the organization. The term social indicator is generally used for quantitative indicators of major changes in society such as crime rates or GNP. See Bauer (1967) for discussion of these measures. Such measures are affected by the work of government organizations - indeed the phenomena that they measure,

education, crime, culture, are often the prime reasons for the government programs. However, in general, a government does not have control over these measures. Crime rates are a prime example. Crime itself depends (plausibly, though not proven) on the work of the police, the courts, the penitentiaries, as well as upon such exogenous factors as poverty, charitable and religious organizations, anomie, strength of private crime protection - i.e. any number of overlapping factors. It would be hard to separate out these overlapping effects and indeed no successful criminological research has yet done so.

The social indicators presently available are moreover not accurate at measuring the phenomena that they purport to measure. GNP ignores many of the considerations associated with a satisfactory life; crime rate ignores many instances of criminal behaviour; indeed it sidesteps the issue of defining criminality.

Social indicators are therefore not useful for control purposes but are chiefly useful in estimating needs for government programs.

Clearly this classification is not absolute - crime rates, for the police and the courts are not merely social indicators but also workload measures, useful in budgeting for patrol strength. Several other classifications could be devised and output measures broken down into several more categories than the three given here, even based as here on the observed inverse correlation of measurability and relevance to overall organizational goals. Others could be developed tied to other theories of management of organizations. However, the

present classification, based on Anthony's decision-making classification, does serve to support that classification. There are very different purposes to which production measures can be put and different measures are appropriate for different purposes.

#### Requirements for Management Control Measures

Returning to Chapter III it can be seen that the essentials for measures useful in management control are that there be some measure of volume and some of quality of output provided. The conditions for such output measures are quite stringent. Not all output measures would be suitable for use in the budgetary model given - allocating resources to the police on the basis of their social indicator, crime rates, without any supplementary efficiency measure would be a license for crisis management.

Several criteria should be considered in devising measures for management control.

Firstly the quantity measured must as far as possible have a cause-effect relationship with the work of the responsibility center controlled. Thus educational attainment is affected by the work of the school system but taken alone it is not a suitable measure for management control in the school system, since the educational attainment itself is most highly correlated with socio-economic background rather than schooling. Even other city agencies could have some effect on attainment, e.g. the library department; it is not within the competence of the school system to affect attainment measures drastically. Attempts to charge educational attainment scores to a school principal or a



district supervisor would result in speedy disillusionment.

Secondly, the measurement involved must be relatively precise if it is to be credible (and to be easily checked for tampering). While a figure for the number of narcotics addicts in a city may be accepted without demur in a strategic planning debate, it is unlikely to pass unchallenged when used to appraise the contribution being made by the city's methadone program to reduce the numbers of addicts, with the jobs of program directors in the balance. This relates to the objectivity problem discussed above - the measurement need not, however, require detailed agreement on the exact nature of the entities being counted, but often some peer-review ranking will be accepted.

Thirdly, a measure on a responsibility center should as far as possible be timely - it should be available as quickly as possible after the event measured. Thus in evaluating a recreation program it may well be necessary to wait 10 to 20 years to observe how the clients of the program turn out as citizens in society, but for at least the time span of the program some measure of output of the program, such as specific entertainments provided or numbers of children registering in the program (reflecting demand for the program) is necessary.

Fourthly, the measure should match some responsibility center in the organization. This, while not essential, is vonbrnirny. Thus the National Board of Fire Insurance Underwriter's grading schedules gives an overall rating of a city's fire risk involving appraisal of areas of responsibility for the fire department, building code department, planning department, and the water department, as well as

appraising various natural characteristics of the city. However, the grading schedule can be broken down by department and the contribution of each department to the overall grading thus evaluated. By contrast a measure such as crime rate cannot be yet apportioned between the various departments and natural factors concerned with crime control.

Fifthly, a measure for management control will be monitored, it is anticipated, fairly regularly and as such should be fairly cheap to collect. Thus it is desirable for many city departments to measure attendance at many of their functions - the recreation/parks department being the prime example. However, any accurate count of attendance would be too expensive to collect in most cases. Normally it is desirable if a measure is collected as part of an already installed records system, as some operational control system.

Sixthly, a measure should be part of a system of balances and checks on accuracy. The problem is one which Webb, Campbell and others discuss (1966) for social science research. People behave differently when they are being measured - indeed the purpose of management control is to set up strong motivations to behave differently and to perform in the best light possible under the measurements. Webb and Campbell discuss how to devise measurements which are either imperceptible or will not be reacted to; in management control the problem is to devise measurements which will be reacted to in the desired direction and which will not be tampered with. The most elementary principles of auditing systems should always be applied to measures used in management control since there is almost always strong motivation to

interfere with the statistics. At present there are few checks on the accuracy of crime rate figures. With a strengthening of the management control system, it could be anticipated that motivation to alter these figures, to report accurately or inaccurately, could be increased by the very presence of the control systems. If, as at present, the control system associates bigger budgets with higher crime rates, there might be an incentive to overstate the crime rate figures. In a future system where this figure is no longer the focus but the major figure controlled is percentage of crimes cleared by arrest, then motivation would shift to either reducing reports of uncleared crimes (a doubtful move since this would involve interfering with previously compiled books) or to increase the number of arrests.

The accountant's system of debits and credits has the great advantage of making different sections of the data collection system the responsibility of different persons while making it possible for third parties to detect disagreements between different parts of the system. While accounting systems do have the advantage that all flows in the system can be reduced to a common unit, many output measure systems could at least in part be set up as this part of a system and divided between responsibility centers. For instance, a unified crime reporting system could have three major accounts - crime reported, arrest made, and guilt assigned - each account maintained separately. Inspection systems lend themselves quite easily to auditing systems of a different kind involving experimental designs to compare different inspectors against each other and detect deficiencies in inspection.

These six criteria imply quite stringent restrictions on the output measures suitable for use in government departments. It may seem that several departments are not susceptible of management control measurement. Education is the obvious example: no quantity has seriously been accepted as a parameter solely attributable to formal education, precise measurement is only possible for a few restricted quantities such as I.Q.; education is concerned more than virtually any other government department with the long-term capabilities of the individual; all the products dispensed by the educational system can probably be acquired or inculcated at other points in society. Criteria five and six are minor difficulties by comparison with these four. In general, as will be seen in Chapter V's survey of presently available measures, there are disappointingly few measures available for many areas of local government function that will meet all these criteria.

However, by ingenuity it is possible to begin to measure for management control purposes the output of even the most recalcitrant of local government organizations. It is certainly not necessary to despair of measuring the output of an organization once the focus is on how well output meets criteria already set by the political system.

#### Devising Management Control Measures

The key to production measurement is designing measures which accurately reflect the contribution of each responsibility center to overall goals of the organization. These, at the management control level, as has been stressed thus far, need not be in any one-to-one

match with the overall goals of the organization but can be surrogate measures. Global measures can be left for the strategic planning debate.

There are of course restrictions on surrogate measures. As the models of Chapter III show, if the reward system based on these surrogates does not motivate a department to act in parallel with overall organizational goals, then the result will be sub-optimization. It may even be worse than uninstructed behaviour. There are a multitude of notorious examples from socialist economies of the farcical results of inadequate surrogate measures - ten-ton chandeliers from factories appraised on a basis of their weight of chandeliers produced; small-size only nails from factories appraised on number of nails produced. (Nove, 1969) The federal government offers similar examples. The Secretary of Defense's office issued an order to assess contract buying efficiency on the basis of number of incentive contracts concluded. Incentive contracts are appropriate for contracts in which cost-overruns or underruns are likely; they are not required if genuinely competitive bidding for contracts occurs. They will cost the Department of Defense a premium because of the bookkeeping costs incurred by the contractor. Since the order there has been a rapid increase in the number of incentive contracts in otherwise competitive bidding procurements.

However, subject to these restrictions surrogate measures can be derived that are suitable for assessing the efficiency of responsibility centers in government. Firstly will be discussed the possibility of using measures already to hand as proxies for production

measures; secondly will be discussed problems in devising surrogates when means to hand fail.

In the first instance production can occasionally be directly measured. Number of children graduating to college is an objective measure for the high school system; number of library books on circulation is at least one output variable of the library system. Normally, though, this type of measure will be only one component of output and most often it will neglect information about the quality of output.

Secondly, it may be possible to use judgemental measures of the system, even where they may require less than cardinal measurement. Such measures may often reflect 'state of the system' rather than the output of the system in the classical sense but often they will be essential to measuring product quality and how well the system conforms to objectives set for it. For instance, there are relatively objective measures of children's performance in, say, reading skills, beset by discussion about bias against certain personality types it is true, but still fairly widely accepted. By contrast there are no accepted measures of maintenance of classroom order and pupil interest. However, a judgemental measure of such quality parameters could be made by teachers, or supervisors involving a ranking against the schools of their experience. The need for judgmental measures extends to other areas - the quality of recreation programs or a library's book collection, for example. There are, of course, several dangers in judgmental measures, bias caused by assessment by professionals rather than clients of the service for example, slow innovation caused by over-

emphasis on the characteristics of a particular technology, but such measures do have their place.

Thirdly, it may be possible to measure production against input, provided that input is fairly widely defined. The model of Chapter III indicates that this fault can be fatal. However, the measure of input as a proxy for production is not entirely without merit. In the worst case it is certain that if input was zero then production is zero too. The use of input measures is most suitable if input is plausibly correlated with production; classroom space per pupil is a measure of a factor input that is plausibly correlated with what effects education can have on pupils. Again, of measures of fire department efficiency (see Chapter V), there are several questionnaire measures which include the question "Does the fire chief have tenure?", an input measure (and in part a judgemental one too) but the correlation with the efficiency of his administration of the department is highly plausible. However, in general such measures should be avoided: the motivation to over-consume the important factor is always present, the threat of inflexible factor combinations always near.

Chapter V and Mushkin and Cotton (1970) are almost entirely lists of measures of the types above, single measures of production volume with a few measures of quality. A glance at the Mushkin and Cotton list reveals the inadequacy of measures proposed for any management control system with 'teeth'. For example, in the Mushkin and Cotton list, performing arts programs are to be evaluated on the

basis of numbers of persons attending (p. 335, 1970) and number of companies with national reputations performing (p. 337, 1970). The potential misallocation from making reward dependent on these measures is obvious; the recreation department would be motivated to engage only nationally famous troupes, thus drawing large crowds, but neglecting the need to give performance opportunities to local troupes. For airports the proposed measures are: number of passengers embarking, number of aircraft takeoffs, delay time, ground transport times - no controls on noise or pollution or safety.

The fact is that there is a long way to go in devising production measures suitable for management control use. The fact is further that the PPBS effort shied away from such work.

#### Multivariate Product Measures

The production of public sector programs is a many-sided phenomenon and accordingly a measure of production would be anticipated as being many-sided. A suitable output measure for management control in the public sector must be of the weighted attribute, weighted questionnaire, or multi-variate regression type. The crucial need in management control is the development of such measures.

There are good grounds for asserting this to be the case and for maintaining the superiority of such measures for management control over other, single-measure criteria.

First, from the control standpoint the greater the number of measures used to evaluate each responsibility center the less likely it is that the cost-finding system of the responsibility will enable



the center to set out to trick the system as in the examples given above. This observation is subject to qualification. There are research results that suggest that (Charnes and Cooper, 1962) in the presence of a multiple goal function management will concentrate on achieving one goal to the exclusion of all other goals. It is easy to envisage that the control agency itself could become so swamped with information on the production measures that it would have to tolerate a responsibility center's adopting this policy.

However, this can be avoided by the computation of some multivariate weighting of the output measures into a scalar, and evaluating the responsibility centers on the basis of this scalar. This would sidestep the Charnes and Cooper results. Several measures quoted in Chapter V are of this form: the National Recreation Association's three schedules for urban recreation, the National Board of Fire Underwriter's grading schedule, the various questionnaires for police conformance with professional standards, the ALA schedule for book collection adequacy. There are numerous other such weighted schedules, especially in the field of health care. These questionnaires, though, introduce new problems because the weightings on the questionnaire may not coincide with the organization's policy objectives. Indeed the weightings may be a focus of controversy. This is undoubtedly the reason why the National Board of Fire Underwriters grading schedule has not received wider acceptance for control - that it concentrates on the role of fire departments in preventing catastrophic fires and ignores the other

services, minor emergency and rescue, provided by the fire department.

Secondly, there are grounds for asserting this use of multi-variate measures against the overwhelming concentration thus far in public sector work on single-variable measures. The overwhelming source of these measurement attempts has been cost-benefit analysis attempts - an attempt to compare the public sector with the private sector. A market does prevail for the private sector: such disparate features of an automobile as its verve, power, steering, style, smooth ride, or its suspension, repair-free record, resale value, safety and comfort are all reduced to one measure by the market clearing mechanism. There is no such process in the public sector; it is the sector of the economy where it has been decided that the market clearing process will not prevail. The qualities of the public sector's product line are to be valued independently.

There remains the problem of devising such weighted multi-variate measures. There are two approaches that could be chosen. In the past the approach to the development of multi-variate measures has been almost exclusively that of attaching weights to various questions relating to a department's operations and its achievements of objectives. There is reason to believe though that in the future multivariate statistical analyses will become more important in the devising of management control measures. Such analyses open the possibility of separating out different effects on the objectives of the department, connecting performance measures to social indicators. The latter approach, statistical analysis, consists of an analysis of the output into the various factors accounting for the variation observed. Dis-

cussion of this approach has been particularly important in the area of education with the recent experiments with educational performance contracting. Barro (1970) and Hanushek (1970) both discuss the methods available for separating out the effects of education into their teacher, school and school district components.

There are some problems in developing such models. In education the factor effects are likely to be so small that analyzing them will require quite sophisticated models and close attention to econometric problems. It seems that in this case the models themselves would be highly controversial. In other areas of government, factor effects are probably stronger and less sophisticated models may be sufficient. Operationally it is unfortunate that such models must be devised by area-wide agencies with large data collecting capacities since this restricts local initiative.

The major multi-variate measures currently available for departmental evaluation are of the weighted questionnaire type. Conceptually the questionnaire approach is similar to the multiple-regression method - the weights are now determined by more or less expert intuition. Typically, however, there are strong differences in the material analyzed in a questionnaire. Most questionnaires will include few measures of production; typically they only include questions on departmental methods, with relatively few questions on direct service. Many of the questionnaires suggested for appraisal of school systems give no rating for pupil achievement scores. This is probably a fundamental limitation of the questionnaire approach for

the intuition of professionals has been insufficient to rate the value added by various outputs and the regression models are intended to supplement this intuition.

Both methods of devising multi-variate weighting scales face quite serious problems of biasing the allocation of resources, even though the purpose of using batteries of measures is to avoid bias. Particularly in the intuitive design of questionnaires there is a tendency to favor a particular production technology, that approved most by professionals. Nor are statistical methods of devising weights free from bias. Here the bias will lie in the output measures to be explained. Most of the statistical work on accountability measures in education has concentrated on explaining variation in achievement test scores. The incentive for schools to convert to crammers is clear.

More seriously, weights are often controversial. There may be considerable controversy on the valuation of the overall output measured. One method might be to use questionnaires with non-exclusive questions - e.g. different types of school might receive the same weightings on the questionnaire rather than attempting to make a polarized scale.

A second approach, more commonly practised, might be to use checklists - unweighted combinations of output measures and proxies - leaving the choice of weightings to the local decision-makers. Classed with these checklists are the various sets of standards published by professional bodies such as the American Library Association and state health agencies. Such checklists provide a

structure for budgeting discussions even though a management control system using such a checklist would not have the sources of comparisons with other cities or even over its own history that are available with nationally consistent measures for use as standards. However, the model of Chapter III has shown that standards need not necessarily be based on comparability with other occurrences. Expected performance can be generated with the help of a checklist and performance monitored for deviation against these 'negotiated' standards. Admittedly, the management control process would be weakened by reliance exclusively on such measures with no sources of comparison but it would not be rendered impossible. It is with such aids that a program budget could come into its own.

Probably the most rapid advance in the field of devising multi-variate measures will come by the combination of statistical analysis approach with that of professional questionnaire design. Professionals have often objected to the use of questionnaires on the basis of an 'arbitrary' weighting. Here the use of techniques such as Guttman scaling or even simple linear regression against subjective evaluations of programs might enable professionals more easily to make the transition from the concrete - the programs - to the weighting system proposed. (Oppenheimer, 1967).

Accordingly there is potentially a wide range of product measures which could be developed for management control. It is maintained here

that few agencies of local government, courts, education and recreation possibly excluded, could not have performance measures developed for a full appraisal of their work. Those departments mentioned above would have to rely on less structured measures but could still be monitored in a formal management control process. Existing measures are indeed in most cases inadequate or partial but the potential is great.

However, as will be seen in Chapter V at present in most governments very little use is made of even those measures that are available; it seems moreover that little attempt has been made to advocate wider use of these measures.

#### Recent Development of Production Measures

In the light of the discussion of budgetary practices and the Anthony classification given above, it is not surprising that most local governments at present use in their budgeting only workload measures and a few social indicators. Indeed many, as predicted by the Crecine model (1968), use only input measures (i.e. decision rules of the type 5% over last year, 3 1/2% down from last year). This is, of course, linked to the predominant operational control function of present budgetary procedures. As Chapter V will show, the budget reports of major cities reveal that this is the case in all but a few cities. Moreover there has been relatively little improvement over the practices of forty years ago.

Furthermore it is not surprising that PPBS did little to advance the use of performance measures. PPBS was after all not aiming to upgrade the efficiency of public programs; its primary concern was with deriving measures of need for programs, developing alternatives to present programs. Of the major papers on output measures for PPBS (Subcommittee on economy in government, 1970; Hinrichs and Taylor, 1967) only one author in discussing output measures contemplates their use in management control (Mushkin and Cotton, 1970, p.332-240) under a section on 'program effectiveness as a determinant of grant awards'; otherwise most observers appear to share the opinion of Hatry (1968, p.94).

'the criteria in the paper are intended for the purpose of proposed program alternatives, not for evaluating staffs or departments current operating efficiency.'

in marked contrast to the attitudes of the 1930's:

'we must devise methods of measuring the degree of.... accomplishment. In this way random instances of good or bad administration will be replaced by systematic observations of the efficiency of operation.' (Ridley and Simon, 1938, p.1)

PPBS is associated with work on two major measures of government programs: benefit-cost analysis and social indicators. It is contended that neither type of measure is appropriate for management control although they may have some value in strategic planning.

It is doubtful whether even this is true for benefit-cost analysis. The benefit-cost analysis, the comparison of the imputed monetary benefit of public expenditures and the expenditures, was very much the model for analysis in PPBS. The major teaching text in the field

has the title 'Program budgeting and benefit-cost analysis' (Hinrichs and Taylor, 1967). The quotation in Chapter II from Greenhouse (1960) gives the flavour of this approach to PPBS. Conceptually the cost-benefit ratio could be used in much the same way as the profit figure (ROI) in the private sector and thus used in management control through a profit center system but in practice this is simply not feasible. While the output of some public programs do represent production valued at market prices - fire protection, for example - distributional effects are the basis for most public programs. To attempt to usurp the role of the political valuation process will be a thankless task. Benefit-cost analysis is certainly not up to such a task.

Social indicators work began, like benefit-cost analyzing before the PPBS effort (see Bauer, 1967). A social indicator is a summary index of major social conditions. Work on social indicators began in the early 1960's with a NASA study of its own impact on society. Currently HEW maintains a social indicators staff, primarily working on health care. Like benefit-cost analysis, social indicators carry no implications for the efficiency of government programs. However, such indices do relate to the welfare of society: Gross's definition of a social indicator (Gross, in Bauer, 1967, p. 117) insists on the normative role of a social indicator:

"when the indicators improve, the supposition is that, other things being equal, welfare has improved, and vice versa" -

i.e. the indicator measures progress on the highest goals of society.



However, as discussed above, society's highest goals are not readily translated into measures for management control. This is not the view of some of the proponents of social indicators' work:

"social indicators are quantitative measures of social conditions designed to guide choices at several levels of decision-making..." (Sawhill, 1970, p. 473)

Precisely the opposite to the Anthony-based classification of the uses of production measures advanced here. Crime rates may be soaring but this is no reason to shift resources into grossly inefficient or ineffective programs for crime prevention such as the various criminal rehabilitation programs. For measures of efficiency and effectiveness in government, it is necessary to look elsewhere.

In the next chapter are summarized those output measures that do have some connection with the management control process. In addition the chapter reviews the current degree of use of these measures in the budgetary processes of a sample of major cities.

## CHAPTER V

### Output Measures for Major Local Government Departments

In this chapter are presented summaries of the major measures of production suitable for use in management control in major city departments.

The departments discussed are:

- i. Police
- ii. Fire
- iii. Education
- iv. Library
- v. Recreation/Parks
- vi. Welfare
- vii. Public Health

together with one example of a service department

- vii. Finance

The section on each department is organized as follows:

- a. the general mission of the department
- b. measures for management control of the department
- c. summary of reporting of production measures in budget documents for major cities

The purpose of section c. is to assess current management practices in the major cities and to evaluate the budget process's reliance on output measures, along the lines of Schick (1971, p.56). A measure

is judged to be used in the management control process if it is reported in a public budget document, planning the allocation of revenue for the annual or biennial activities of the city. Such documents exclude a comptroller's report of past expenditures (not because such documents are not relevant to the management control process, but because all such documents failed to include any measures of production resulting from expenditures) and individual department reports (chiefly on grounds of data gaps). This selection does not therefore include all possible management control uses of production measures. It certainly, by excluding individual department reports, excludes means by which department heads win approval of their management. However, the budget reports do at least indicate what information is generated that could be used in management control.

The city budgetary documents used are the following:

New York	1942	1958	1968
Los Angeles	1939	1960	1966
Chicago	1939	1960	1967
Boston	1941	1958	1969
San Francisco	1942	1955	1969
Milwaukee	1945	1959	1966
Detroit	1943	1956	1968
New Orleans	1940	1959	1970
Philadelphia	1940	1958	1967
Pittsburgh	1941	1955	1965
Fort Worth	1944	1955	1969
Cleveland	1942	1957	1969

Cincinnati	1943	1958	1968
Seattle	1940	1958	1969
Washington, D.C.	1944	1958	1970
Minneapolis	1942	1958	1969
Miami/Dade County	1943	1958	1969

For each city, it was intended to collect budgetary documents for the years 1941, 1958, 1969, but it was not always possible to find these years in the lists searched.

## I. Police Department

a. A police department's fundamental mission is the protection of persons and property from crime by enforcing laws. Although the typical city police force will have other roles, particularly those of reporting to other city departments such as welfare and the building and health code divisions, law enforcement remains the primary role of the police.

## B. Statistics

### 1. Police cost per capita

This is an input measure and does not reveal either the effectiveness of the spending or the need for the spending.

### 2. Arrest lists

Many cities publish lists of arrests made broken down by type of offence. This probably ranks as a workload measure for although measuring one parameter of police work no indication of the magnitude of the task required is given.

### 3. Crime rates

Although a major social indicator of the need for police protection, crime rates are an inadequate control device for police management. Several other agencies are concerned with crime prevention - the courts, the reformatories, as well as welfare agencies, the schools and other social supportive agencies. There are strong secular trends in crime rate - notably a falling off in war time - reflecting social currents.

"Statistics showing the volume of crime when unsupported by other data, do not provide a basis for comparisons of police efficiency"

Committee on Uniform Crime Records, International Association of Police Chiefs, Uniform Crime Report Manual, 1930, sec. 4.4.

There is a second defect in using crime rates to measure effectiveness. There are two classes of crime called Class I and Class II by the FBI: Class I covers felonies, larcenies, murders, rapes - serious crimes which will normally be brought to the attention of the police; Class II covers offences such as prostitution, illegal gambling, traffic offences, swindling, drug trafficking - such offences will not often be brought to the attention of the police but must be detected by them.

Therefore Class II crime rates are no measure of the prevalence of such crimes - simply a measure of the work of the police in searching out such crimes. Only for Class I crimes is the 'crime rate' even a measure of the committing of crimes.

The problem of determining seriousness of crimes can be approached by the Class I, Class II breakdown. However, one convenient index of the seriousness of crime is the crime rate weighted by the average sentence awarded by the courts for that crime.

#### 4. Property Insurance Rates

These are occasionally used as ratings of police efficiency in property theft prevention. However, such measures being based on experience rating are directly dependent upon crime

rates themselves and are in turn unsuitable for management control of the police department.

5. % Cases Cleared by Arrest

For Class I crimes this is an extremely useful performance measure of the quality of police work. Arrests are a unique power of the police - the quantity measured is entirely within police responsibility. However, for Class II crimes this measure is clearly unsuitable for it will normally be 100%.

6. % Stolen Property Recovered

This is again a useful performance measure, entirely within police competence.

7. % Arrests Resulting in Convictions

Although not solely within the responsibility of the police, since a conviction reflects attitudes of the courts in some degree, the measure does reflect accuracy of police arrests and the adequacy of police presentation of evidence.

8. Response Time to Calls for Assistance

This measure is likely to be difficult and expensive to collect without a fully automated dispatching system. However, it does reflect an important component of police service to the public and could be monitored by periodic sampling.

Accordingly, for Class I crimes there is a battery of police-responsibility measures that could be used in management control.

Besides the apprehension of criminals, however, the public expects

the police to conform to certain other standards, of training, of visibility and of freedom from corruption, which may have only a slight impact on the efficacy of police in crime detection and apprehension. In this matter it seems that judgemental factors cannot be avoided in making an assessment of the police.

There have been several attempts to systematize these judgemental factors. There are three principal measurement scales - only one of which has any currency at present. All three were developed in the 1930's and '40's. All three are questionnaires of police department practices: none include any of the above quoted output measures.

Historically the first questionnaire developed was by Spencer D. Parratt (1935). The questionnaire includes 1300 questions on police practice, covering the work of every department represented in a metropolitan police force. Each of the questions is weighted; the overall questionnaire forms a scalar, the weightings on the questionnaire were according to the author derived in discussions with three of four noted police experts. The questions themselves are generally worked out as objectively as possible - there are only three or four questions of the type "is the police chief's appointment free of politics?", and Parratt advocated the questionnaire as suitable for self-administration or for fairly inexpert observers.

In 1940 the FBI published an internal document, partly based on the Parratt scale, entitled "Rating scale for police force effectiveness". Although never widely published, the scale has had some currency, and



the FBI in 1960 published an updated edition and claims to process several requests from cities for copies of the questionnaire each year. However, the FBI itself does not publish ratings of forces.

In 1950, Leonard, a police service consultant, likewise published a rating scale for police forces in an addendum to the book, 'Police Organization and Management'. It is not specified whether the questionnaire has ever been used by police forces. In fact, the scale is no more than a checklist and no attempt is made to give any overall ratings. The questions involved are often subjective - e.g. Q. A17 "are police operations PLANNED?" (actual emphasis) or Q. Bb2 "Is the department 'traffic-oriented'?".

All these questionnaires are essentially attempts to evaluate police forces against professional standards of force effectiveness. As such they may not reflect public concepts of police effectiveness and are probably over-advocative of particular methods and procedures. None of the questionnaires are suitable for overall evaluation since none include any of the production measures given for police forces. Conformity with professional standards is in order provided that the cases cleared by assignment of guilt figures and cases cleared by arrest figures are also in line with expectations. However, subject to this proviso, either the FBI scale or the Parratt scale would be excellent summaries for laymen of the standards of a police force.

c. Measures Used in Budget Reports of 17 Large Cities

	1940's	late '50's	late '60's
<u>Measures</u>			
Cost per cap.	15	16	14
Arrest list	17	15	9
Crime rates	13	11	14
% Cases/arrest	8	7	4
% Value recovered	10	5	5
% Autos recovered	4	5	5
% Arrests/conviction	2	0	1
Rating scale	0	0	0
Insurance rate/theft	2	0	4

In all cases not reported by police but in other  
section of report.

Clearly few cities publish performance statistics for the police departments. In this respect police departments compare unfavorably with fire departments where measurement problems are of only slightly less difficulty. On the whole this probably reflects the autonomy of most city police departments vis a vis central authority.

## ii. Fire Department

a. The mission of the fire department is probably more clearly defined than any other city department, with the exception of perhaps the police and the library system. Fire protection is almost the entire mission of the fire department; rescue from non-fire dangerous situations is the only exception. Fire protection itself can be broken down into measurable sub-objectives. "The four objectives of fire protection are: to prevent fires from starting, to prevent loss of life and property when a fire starts, to confine a fire to the place where it started, and to put out the fire." (International City Managers Association, 1967, p.1)

However, devising responsibility measures for these missions and sub-missions is complicated by the fire department's sharing the task of fire protection with other city departments and by the dependence of fire risk upon environmental influences. Risk of fire depends upon the building conditions in a city, upon the climate of the city, upon social conditions; upon the prevalence of over-insurance, upon the efficiency of the building department's inspectors. Effectiveness in fighting fires depends not only upon the fire department's staff and equipment but also upon the adequacy of the water supply and even upon congestion of traffic. As with other departments of local government, it is necessary to separate out these extraneous effects from those effects that are within the responsibility of the fire department. However, in distinction from other departments, fire departments do have the advantage of a well-defined mission and service provided.

b. Statistics

Before proceeding further it is useful to derive one measure of risk in fire protection, value of burnable property. This is usually calculated as the total assessed value of the city, less assessed value of land, the result multiplied by a price adjustor to bring assessments to fair market value. The assessment records of almost all cities are sufficient to support this measure.

1. Cost per capita/per \$1000 valuation/per \$1000 burnable property

These are input measures, unlikely to be correlated with efficiency or effectiveness of the fire department. Studies (e.g. Ridley and Simon, 1938) show no correlation between spending variables and fire losses.

2. Number of fires recorded/by type/by value of loss

These are at least in part workload measures, although in part they are measures of need for fire prevention. Number of fires reflects insurance practices, incendiarism, business conditions, and is not necessarily related closely to fire department practices, although there is a useful cross-checking relationship with the work of fire prevention sections.

The data is useful more for planning, as in planning disposition of men and equipment and fire prevention work, than for control.

3. Fire loss total/% of burnable property

This is the most obvious measure for assessment of a fire

department. The statistic is reported for most cities over 10,000 population by insurance rating bureaus and can accordingly be readily used for inter-city comparisons.

However, the same strictures apply to this measure as to 2.: the fire loss of a city is subject to fluctuations resulting from exogenous factors outside the control of the fire department. Again the measure will be useful for planning and checking department policy rather than in control of the department. Conclusions based on this measure are more useful in making comparisons over time for one department, rather than making conclusions about effectiveness of different departments.

#### 4. Loss per fire

This measure has been proposed (Ridley, C.E. and Simon, H.A., 1938) as a measure of fire fighting effectiveness superior to 2. or 3. It is argued that although exogenous factors affect strongly the likelihood of a fire's starting, their effect on fire spread is much weaker. As a result, loss per fire should be largely under the control of the fire department.

However, again this measure is probably not independent of exogenous conditions: mercantile fires commonly cost more than do residential fires - change in land use proportions will therefore tend to change the expected loss per fire.

#### 5. Injury/Death by fire statistics

These statistics face the same problems in control as do

loss statistics with the added reservation that injury/death statistics are subject to more random fluctuation since the number of deaths/injuries is smaller than the number of fires resulting in loss.

6. Response time to alerts

This statistics has been focused upon by the several operational research applications to fire department dispatching problems. While response time is clearly an important component of fire department fire fighting effectiveness, it in turn ignores many other aspects of fire department operations. Defining the measure itself is more awkward than at first appears in so far as it is necessary to define what constitutes a response - a motor-cycle combination or three ladder trucks? Different cities respond with different equipment and staff to the same type of alarm. There has been no study of the variation of fire loss with response time or response weight.

7. National Board of Fire Underwriter's Grading Schedule

First published in 1904, the NBFU grading schedule is a periodically revised scale used by insurance rating bureaus to assess the risk of major fire losses in a city. The schedule, part of which is appended in diagram, 11.1, is widely used by the insurance agencies; most cities are assessed at least once in ten years and more if major land use changes are occurring. The schedule is less widely used for self-appraisal by fire departments, but nevertheless the connection between

a high rating on the scale and a lower insurance cost is widely appreciated in fire departments. It is a measure of the reliability of loss statistics that insurance companies prefer to avoid experience rating of cities but rely upon the grading schedule.

The schedule includes approximately 110 questions on major aspects of a city's fire prevention capabilities and its fire risk. The questions included are grouped by major sections on the operations of the fire department, on the city's water supply, on the building code; on the city plan and building conditions, on the alarm system, and on various exceptional environmental factors in the city. Of the total rating, 34% is on water supply characteristics, 30% is on fire department, 11% is on fire alarm and communications systems, 7% concerns prevention work, 4% is on building department effectiveness, and 14% is on 'structural conditions': in total 48% of the rating is under the typical fire department's responsibility. Rating of the fire department includes questions on: staffing, qualifications and experience; on equipment, especially pumping equipment; on communication systems, on response methods; on the alarm system, type of boxes and their distribution.

The questions included are intended for use by fire insurance rating engineers rather than laymen. However, there is no reason why the questionnaire could not be administered

by experienced fire department staff or that its results could not be comprehensible to laymen. As such the questionnaire is a model for other departments of government. Using it, it should be possible to impute value to the work of different responsibility units; comparisons can be made between cities (the Municipal Yearbook publishes biennial ratings summaries); and each city can use the questionnaire to keep up with professional practices.

However, there are certain drawbacks to using the grading schedule for control and assessment of a fire department. The questionnaire is intended for assessing protection against major conflagration loss, since the large payout resulting from conflagration is the payout that is likely to bankrupt an insurance firm. However, from the point of view of the metropolitan area, this risk may be less serious - less serious than bankruptcy of an insurance firm would warrant - and the fire department's mission may include more prominently the control and response to minor fires and aiding in traffic accidents and other rescue emergencies. The questionnaire gives relatively low rating to aspects of fire protection that would be necessary for such missions - rescue apparatus, training in lifesaving, prevention against residential fire hazard rather than commercial fire hazard. As such, over-reliance on the grading schedule's result might lead to neglect of these functions.



Secondly, the questionnaire, like most such schedules that could be used for assessing departments, emphasizes a particular technology of service. This is most evident in the grading schedule in the section rating response to fire; the schedule lays down in great detail the minimum weight of response required, on an appropriate scale for a major oil refinery blaze. However, such a response might be awkwardly costly for a fire department facing numerous false alarms - to respond to every alarm with the minimum weight necessary for a high grading is unlikely to be cost-effective. The questionnaire therefore at present suffers from the common defect involved in assessing departments on their technology rather than their output - constraints on policy innovations.

Therefore the use of the grading schedule for control and budgeting should be undertaken with an eye to the misallocations likely to result. However, the questionnaire does remain extremely useful as a tool of benefit-cost analysis: cost of each fire department service is measured and can be compared to the benefits of reduced insurance premiums that will accrue.

#### 8. Prevention Measures

Most fire departments include a section concerned with fire prevention rather than fire-fighting. Such a section typically has responsibility for building inspections, for approving building plans, and conducting education programs.

The problems of assessing inspection divisions such as fire code enforcement sections is one that will turn up frequently in other departments of local government. Controlling the output of such sections is particularly awkward in that there is no obvious standard of quality of an inspection: the same resources can be employed in numerous skimmed inspections or relatively few thorough inspections, picking up and clearing up all violations. Fortunately it is possible to cross-check the work of the department against the records of fires by type of violation causing the fire.

The inspection bureau should as a minimum collect statistics on

- a. number of inspections performed
- b. number of violations detected
- c. number of violations cleared up

These statistics will be useful for at least for planning purposes. For checking the quality of work of the prevention division, these measures should be compared against 2. given above with a record of violations used in detecting fires.

c. Measures Used In Budget Reports of 17 Large Cities

	1940's	late '50's	late '60's
1. fires by type	11	17	17
2. value	2	4	6
3. cause	-	-	1
4. alarm type	10	12	17
5. fire loss total	10	17	17
6. % burnable	6	9	7
7. loss per fire	7	13	12
8. response time	-	-	-
9. rating	6	8	6
10. insurance premiums	3	5	5
11. inspection no.	11	14	15
12. no. violations	-	-	2

The table shows that most fire departments do give a fairly full accounting in the budget of the output measures suggested, although in some cases it seems that the purpose of the full accounting is to overwhelm budgeteers with detail. Again, however, there are relatively few cities that quote the higher level output measures - fire loss % burnable grading schedule rating - in budgeting. However, as will become clear in other departments, the fire department's reporting is generally far superior to that of other departments.

### iii. Education Department

a. Most cities spend 30% to 70% of their revenues on the provision of public schooling. Gains in efficiency in education would therefore have major revenue implications for cities.

Education poses the problem of devising production measures in particularly acute form. Firstly, there is little agreement on what constitute the objectives of education and disagreement is always likely to prevail. The model of the product - the ideal pupil - ranges from the most extreme authoritarian to the most permissive models; the type of skills to be communicated is the subject of only a vague consensus; the relationship of teaching methods to type of pupil encouraged is only partly known. There is only a vague consensus therefore on objectives or production function. Secondly, the educational process is strongly affected by agencies outside the school system. The consensus is that approximately 80% of academic achievement depends on socio-economic factors (Firman, 1966; Kiesling, 1971; 'Coleman Report', 1966). Separating out these effects is a major difficulty in the way of management control design. Work on formal methods to separate out these effects as opposed to using managerial intuition to estimate variances has only recently begun (Kiesling, 1971).

There is moreover strong professionalism in education posing obstacles in the way of outside audit of education. Resistance to use of production measures in evaluation and appraisal of managers is strong. Even though professionals will be interested in achievement

tests, rarely will they agree to be evaluated personally on these measures.

However, opposed to all these factors there has been a continuing interest in public education measurement. Education has always been a focus of citizen interest and citizens have usually been powerfully grouped enough to override professional objections. The most startling examples of this have come in the late '60's with the performance contracting movement (Lessinger, 1971) - school systems contracting with private firms to provide education, particularly to backward pupils, contracts involving reward systems of the type given in the model of Chapter III, and production measures of the much-criticized standard achievement test type.

From the performance contracting era, back to the surveys of school systems organized in the 1920's and 1930's (Caswell, 1929; Mort, 1930; Ridley and Simon, 1938, p.42-43), there have been continual attempts at implementing output monitoring systems, with management appraisal and control in mind. Title I of the 1965 Education Act specifically requires evaluation of the impact of its monies on pupil achievement in order to evaluate the programs: with increasing shares of revenues of school districts coming from the Federal government it may well be that increasingly output will be monitored as a prerequisite for Federal funding. Such has been the amount of research going into evaluation that it does seem that Carpenter and Rapp's (1969) comment on the introduction of management control measures is valid.

"We believe that the crux of the problem is not so much to develop new measures but more to assemble information

checks in scattered locations throughout the system in such a way that best use may be made of it." (1969, p.3)

More than in any other area of government operations in management control of education it is clear that a battery of measures must be used. While attempts to (Becker, 1964) assess the value of investment in education through the human capital approach, i.e. measuring discounted salary flows expected for a particular graduate from the school system, do have some application, such measures are neither timely enough nor sufficiently uncontroversial for use in management control except possibly as a minor check on quality of output.

b. Statistics

1. Primitive statistics. These comprise workload measures appropriate to education. Such measures are relatively easy to collect and to audit; however, they rarely control for factors outside the competence of the schools.
  - a. numbers of pupils in school system
  - b. curriculum hours per subject instruction
  - c. school days/year
  - d. number of graduates admitted to college
  - e. employment/salaries received by graduates
  - f. drop-out rates; juvenile delinquency rates
2. Academic achievement tests.

In contrast to the unrigorous measures of pupil skills and intelligence included in the above measures, quite sophisticated tests of achievement and mental ability have been devised. (Burros,

1960). In addition there are a wide range of sociometric tests for measuring attitudes.

- a. grades and grade point averages - relative measures like other achievement tests.
- b. achievement tests - a list is given in Burros (1960). Several of these tests are widely used and the distribution of results is published. Test score norms are available for some tests for socio-economic classes.
- c. attitude tests

The degree of professional acceptance of these tests varies widely. Few of the attitude tests would be acceptable; some of the achievement tests would not be accepted either.

However, tests such as the SAT, or the Iowa Reading test, or the Stanford Reading Test, or the Lorge-Thorndike Intelligence tests, are widely accepted as measuring achievement in the areas tested. At the elementary levels it seems that such tests would be accepted as the quality measures. Such tests have been standard for the performance contracts of the last four years. At high school level and even in the normal elementary school rewards based on such tests would cause misallocation of resources to concentrate on training pupils to pass these tests.

### 3. Appraisal Forms

As discussed above, in Chapter IV, appraisal forms offer a possibility for control of avoiding these distortions - a

carefully balanced questionnaire of sufficient complexity discourages managers from over-concentration on particular production lines. Education has produced a great diversity of such appraisal forms (Mort, 1930; Kentucky - Bureau of School Service, 1964; National Education Association, 1966; National Study of School Evaluation, 1970).

The appraisal forms vary greatly in their content and measures used. They demonstrate that the questionnaire must be very carefully checked to avoid bias. Two of the questionnaires in particular are strongly biased in favor of a particular production technology or a type of product. The National Education Association appraisal form on examination proves to be heavily in favor of particular staffing patterns, providing teachers with high salaries, secure tenure, ample classroom space and few pupils. The Mort appraisal form likewise stresses equipment and curriculum content. It is doubtful if either questionnaire would be acceptable to professionals or to school boards. The Kentucky Bureau of School Service and the National Study of School Evaluation questionnaires are much less evidently biased. Both in addition to including questions on staffing standards and school plant give heavy weighting to achievement tests. The National Study of School Evaluation allows for socio-economic differences in the pupils, and includes other production measures such as extra-curricular participation, drop-out rates, jobs obtained and numbers



performing at or above grade point level. Both of these, it seems, could be used in an evaluation scheme. The Kentucky Bureau of School Service in fact has a contract with the state to carry out a performance audit, using the questionnaire and its developments.

#### 4. Looser Evaluation Methods

Disagreement over the objectives of education runs through the weighted appraisal form of output measure. Conceptually, as discussed in Chapter IV, the appraisal form could be constructed of the non-exclusive type to allow a school district to emphasize very different outputs from another school district but still to rank highly.

However, looser appraisal methods have been preferred. The University of New York (1968) handbook is oriented towards these looser appraisal methods, being a list of different possible questionnaires and tests ranging in type from child's readiness to attend school to standardized achievement tests and staffing tests. Choice of tests and their relative weighting is left to the school. A major project is being undertaken by the Center for the Study of Evaluation (Hoepfer, Nelkin, et al., 1971) in developing a do-it-yourself educational self-evaluation guide aimed at helping school principals rather than district superintendents. The materials of the guide cover "how the principal can select the information he needs regarding student performance that will reflect the views of

parents, teachers, school board members", "how the principal can select the tests that will give him the kinds of information he needs....how the principal can interpret the test data in light of his school's particular and unique characteristics....how the principal can decide where to place his resources to get the greatest improvement in his school...." (Center for Study of Evaluation, p.8, 1971)

##### 5. Statistical Models for Accountability

Much interest has been focused in the past decade on the possibility of using statistical models to explain variation in pupil performance. (Firman, 1966; 'Coleman Report', 1966; Kiesling, 1971; Barro, 1970, Hanushek, 1970). The potential usefulness of such models in management control has been most forcefully stated by Hanushek, 1970:

"the development of a production function will lead to....the separation of teacher effects on performance, school effects on performance and district effects on performance...." (p.13)

As a method of explaining variances, the models represent a considerable advance over previous intuitive methods. The models have led to the formation of the consensus that school performance is dominated by outside influences. However, the problem of actual measures of performance remains - few professionals will agree to be evaluated solely on the standard achievement tests drop-out rates and continuing education rates used in the most sophisticated accountability models yet devised.

The diversity of measures available is such that no school system need shrink from building its management control system around production measures presently available. The model of Chapter III suggests that a system can still perform efficiently even where output standards are derived internally and changed periodically - comparability between systems is not essential.

c. Statistics Reported in Budget Reports of 17 Cities

Measures	'40's	'50's	'60's
Cost per pupil	4	8	8
Number of pupils	13	16	16
Number of hours of instruction	1	-	7
Number of graduates	2	2	4
Teachers/class	-	2	-

These statistics were those which were discovered most frequently in the budget reports and were adjudged to have workload use or possible implications for quality. Clearly, in most cities the budget process makes formal use of only the lowest level output measures.

#### iv. Library

a. Libraries are a part of the education, cultural and recreational missions of a government. At the management control level the missions of the library itself are those of

- a. circulating books
- b. maintaining a reference collection
- c. acting as an information center

with subsidiary missions in, e.g. children's library, films/music, presenting special exhibitions.

The state of management control reporting is probably more promising in libraries than in virtually any other city department. Partly this reflects the production-line operations that are the bulk of library work, partly it reflects the strength of professionalism in libraries. In the library field, there are several major published assessments of libraries, notably the Enoch Pratt Free Library Bulletin's assessments annually of 20 or so major city libraries which cover library operations in very full detail. The American Library Association (ALA) also publishes a set of statistics annually for over 500 library systems. These comparisons and the standards published by the ALA and various state and library research agencies form a full basis for management control reporting in city libraries. However, typically the management control process as presented in budget documents has lagged behind in the use of these appraisal tools.

#### b. Statistics

##### 1. Expenditures per capita

While commonly quoted in budget documents, this is unrelated

to performance.

2. Number of books in circulation

This is the most commonly quoted library output measure.

However, its use in management control is restricted because

- a. It is strongly affected (like other library use statistics) by socio-economic trends in the area served
- b. It ignores 'quality' of circulation

3. Number of books in stock

This is also a commonly quoted output measure.

4. Number of registered borrowers

On ALA standards this represents the number of persons registered for borrowing in the last 3 years. The measure suffers from the defects of lagging behind actual usage and of ignoring the ancillary service - information, reference, provided by the library

5. Number of users

This measure involves an attempt to avoid the restrictions of the number of registered borrowers measure. Some libraries have a turnstile entry system that measures all entrants to the library, i.e. not only borrowers but also browsers, persons using the reference section, newspaper readers and by an extra collection system, telephone enquirers. These figures are generally unlikely to be reliable or sufficiently sound on audit to provide for inter-library comparisons although they may be useful for trends in library use estimating.

6. Response time to service

This covers a blanket of measures of response to service -

such as availability of book on search, time required to search; number of successful answers in reference/information section. Such measures will usually require an expensive collection system and will not be free from tampering or feedback effects on their incorporation in a management control system. However, the measures could be collected on a sampling basis by a periodic inspection of the library's service, without undue loss of reliability or expense.

7. Quality of Stock Measures

All the above measures neglect the issue of the educational quality of the materials provided by the library. This is a continuing source of debate in the library profession for it is generally necessary for a library to choose between popularity and supplying much fiction use and lower popularity and more non-fiction. In other words, libraries are a merit good. There is a trade-off between popularity and educative value, not only in book circulation but also in sections such as film and music.

a. Ratio of Fiction/Non-Fiction in Circulation

Again tends to be affected by socio-economic factors

b. Comparisons of Book Stock with ALA Checklists

ALA produces lists of recommended books (samples) for various classes of library services. In 1966 a similar list was issued for non-book materials.

## 8. Multi-variate Measures of Library Performance

All the above quantitative measures seem to be deficient in

- a. measuring non-book, non-circulation activities of a library
- b. including factors which are outside the libraries' competence

If used for control in the strong fashion of Chapter III, it is likely that such measures would produce serious biases in resource allocation.

However, in the field of librarianship the strong professionalism has meant that many tables of standards have been published. In particular the ALA has published standards of general library service approximately decennially for the past forty years: 1943 - Standards of Postwar Library Service; 1956 - Standards of Public Library Service; 1966- Revised Standards for Public Libraries. The standards are not in the form of multi-variate scalar criteria and no attempt is made by the ALA to weight the achievements of different criteria. The standards include recommendations on: staffing patterns and training; the major product measures given above; square footage per 1000 population; circulation rates; % circulation per 1000 population served; facilities provided; stocks provided. In this respect of measuring production the checklist is much more adventurous than similar standards in other areas. The checklist, however, does include 'standards' for expenditure

per capita of population served. The 1966 standards are in many respects less useful than the 1956 standards in that they do not adjust the standards for different sizes of population served.

Wheeler in his 1971 article (Library Journal, 1971, p.455) gives a fairly clear discussion of the use of these measures in budgeting. It seems that the ALA standards are thought of as standards to which every library should conform. Wheeler complains that libraries which are over standard will suffer in budgeting; however, he is happy to use the cost per capita standard to argue for larger library budgets.

Such a use of the checklist is unfortunate - it overlooks the possibility of using the checklist as a weighted output vector, the weights being provided by local policy. However, it is possible that the situation implied in the Wheeler article may change as more and more of the checklist ratings are published in professional journals.



c. Statistics Reported in Budget Reports of 17 Major Cities

Measure	early '40's	late '50's	late '60's
1. Number volumes in stock	17	17	17
2. Number borrowers registered	13	17	17
3. Number of borrowers as % of population served	2	5	8
4. Cost per volume circulated	-	2	11
5. Number of square feet per capita in library	-	-	1
6. Fiction/non-fiction ratio in circulation	2	9	15
7. ALA book stock checklist	-	-	-
8. Number of calls on reference service	6	10	11
9. Non-book materials - stock size, number of borrowers	1	4	8
10. Number of ALA standards met; number exceeded; number not met	-	-	-

It seems on the basis of this table that libraries do conform to quite good reporting standards by comparison with other city departments and that in contradistinction to other city departments the standard of reporting has been increasing. It was noticeable in the budget reports that even in those cities where it was clear that the budget process was exceptionally conservative library departments still continued to report quite fully and even to use these statistics in arguing for the budget rather than present arguments by 'intended use'.

v. Recreation Department

a. The recreation department of a city has functions ranging over a variety of individual programs from the provision of open space, playgrounds and swimming pools to the provision of facilities and leadership for drama groups, concerts, and play groups. The recreation department's activities compete with the activities of private entrepreneurs, dance halls, cinemas, amusement parks and racing stadiums. Consumption of recreation is strongly dependent upon the socio-economic class of the consumer.

The mission of the recreation department is to provide recreational facilities as a merit good, to subsidize the consumption of merit recreation over its private market level. Efficiency and effectiveness in this mission can be construed as providing this merit recreation at the lowest subsidy cost per consumer.

While assessment of recreational consumption is quite easy, control on the quality of recreation consumer and its numerous side-effects, as with, say, open-space provision is likely to be so weakly developed that only the most informal management control model, based around a program budget, as discussed in Chapter III, is likely to succeed.

b. Statistics

1. Benefits at market price

Several attempts have been made to assess the benefits of recreational provision in terms of yield at market price. It seems doubtful whether such comparisons are valid for market prices ignore the considerable spillover effects from

recreational programs.

2. Juvenile delinquency statistics

A major argument used to support provision of recreational facilities is the supposed effect of recreational provision in reducing juvenile delinquency (Ridley and Simon, 1938, p.21). However, no connection has satisfactorily been demonstrated.

3. Attendance statistics

The basic consumption figures for several major recreation programs is the visit and its duration. The visit has two parameters: the size of the clientele, i.e. how many different people patronize the program, and the intensity of use, how many visits are recorded. For programs where entrance is controlled the latter statistic alone can be collected. For registration programs such as drama programs, both sets of statistics can be collected.

Public open spaces, playgrounds and gardens pose a much more acute problem in data collection, for here access is not controlled. The National Recreation Association (1966) has developed sampling techniques to estimate attendance at summer playgrounds from peak attendance counts. Such statistics are, however, likely to be contested strongly in any management control use.

4. Quality measurement

Engaged in the production of merit goods, it cannot be assumed by the recreation department that attendance at its facilities

is the sole measure of success. If this were assumed, then the recreation department would be a major producer of amusement arcades, sporting events and rock concerts. Assessment of quality of recreational provision represents a quite difficult matter for tastes in recreational consumption vary quite considerably between people and between decision-makers in different cities.

a. Schedule for Appraisal of City Recreation

This was an appraisal form published by the National Recreation Association in 1940. It was of the multi-variate weighted questionnaire form with approximately 500 questions relating to each major program in a city - park space, facilities and staffing for non-open space activities.

Demand for the questionnaire was reportedly rather disappointing and the questionnaire was generally used as a checklist for offering new ideas for departments. The form was discontinued and has not been maintained.

b. Range of Activities Available (proposed by Mushkin and Cotton, 1970, p. 337). This measure neglects the types of activities provided.

The conclusion must be that even more than education there will be little chance in recreational programs of devising absolute measures of output or of developing data that are susceptible to audit for the full range of departmental programs.

However, as in education, using a form of the National Recreation

Association type In conjunction with a program budget will still provide a skeletal management control program. In almost all cases the work to develop and implement such a system remains to be done.

c. Statistics Reported in Budget Reports of 17 Major Cities

Measure	Early '40's	Late '50's	Late '60's
1. Number of patrons	-	3	5
2. Number of visits	4	3	4

On the basis of the limited inquiry and admitted weak state of present conceptual development of output measures, it seems difficult to criticize these statistics. Typically, however, the budget reports were bald statements of intended use with minimal indication of programs to be supported.

## vi. Welfare Department

a. The welfare department of most cities is dominated by a patchwork of responsibilities for welfare work. On the supply of welfare services side there are many different types of programs, many different agencies, public, private and volunteer-private; on the financing side, income comes not only from the city but also from state, federal and private sources. Typically the welfare department will be quite closely linked to these other agencies.

The areas of service for the welfare agency usually includes

1. family care and counselling
2. care of children
3. probationary work
4. legal aid/medical assistance
5. psychiatric/home help work

In addition programs are provided in various types of institutional care. Here the programs given above will be discussed. Usually such services are linked by being organized on a case work basis with a case covering the provision of possibly all of these services.

In general the management control process for the welfare agency is not too difficult to organize. However, there are problems in auditing production measures.

## b. Statistics

1. Number of cases - total for agency
2. Cases per worker

These two statistics are the fundamental volume statistics for

casework. The second has implications for the efficiency of deployment of workers.

However, both statistics pose audit problems, stemming from the definition of a case. Typically, a social worker after starting work with an individual will come to offer services to persons in the individual's family or household. Often there will be a great deal of complexity in separating out when a particular individual can be said to be receiving a service, especially in the absence of definitions of services. The professional definition of a case (Polansky, 1960) is "a family or person for which the organization keeps separate record". Obviously such a definition could not be used in management control: the unit depends upon the definition given by management. For an effective management control system, the definition of a case should be agreed upon beforehand either on an individual, a household or a family basis. Here a household basis is proposed, but no national standard has been agreed upon. In the absence of agreement, case figures are unlikely to be comparable across agencies, either between agencies or over time.

### 3. Costs per case

Although an efficiency statistic superior to cases per worker, since cases do require resources such as travel or financial aid other than staff time, no agency is at present likely to have a sufficiently reliable cost accounting system to maintain comparability.

4. Types of service given

Caseload statistics, while useful volume measures, still pose problems in that different types of service provided have different values and require differing amounts of resources. A management control system based solely on caseload output measures would probably bring about misallocation of resources between services. Accordingly, some measure is required of the usefulness of the services given.

Here a multi-variate measure of some type is required. Ideally this would be a weighted questionnaire, weights proportional to the relative value of the services conferred; however, no such questionnaire has been developed. Checklists of services have been developed though - particularly Ridley and Simon (1938, p.38) mention a National Welfare Association checklist of 56 services. While the social work profession may not be able to agree upon the relative values of different services, it seems that agreement may be reached on what constitutes a service. For management control such a checklist could, aggregated into major services, provide a summary of departmental operations.

5. Percentage of staff time spent per case

Rather than enter the awkward ground of identifying and auditing service-given reports, it might be possible to leave service mix to the discretion of the professional, simply accepting efficiency as maximizing the total service to the individual.



Measuring total time spent on the individual case - i.e. excluding travel time, time in conferences - per professional might be such a statistic. The problems of collecting and auditing such time statistics are formidable. Although such statistics of time allocation have been collected in a social work agency (Mcleod, 1972) the data was collected in a non-threatening system with no incentives to falsify statistics, since the data was to be used not primarily for internal efficiency but for service pricing.

6. Agency impact measures

The value of services provided (4. above) rests in part upon the improvements produced in the recipients of service. Several social work agencies have at times conducted work to determine the nature of these improvements, if any (see Wolins, 1960). However, as in many other departments separation of these effects is so complex as to be unreliable even with the large research projects discussed by Wolins. At best such projects are likely to demonstrate to professionals the disutility or exceptional success of a particular service. In many services, provision of service is either compulsory - probation, for example - or carried for maintenance of individuals with no likelihood of long term amelioration.

Accordingly, for value of services it is probably best to rely upon professional judgements as to services that should be provided and to rely upon professional judgments to maintain the quality of services provided.

Conceptually, it is not difficult to develop measures for management control systems in social work; however, the fundamental problem lies in auditing these measures. Professional case relationships make any close audit of performance difficult. However, as in most professions, a management control system could use measures of the type given it and rely on peer review to monitor the measures of output.

c. Statistics Published in Budget Reports of 17 Major Cities

Measure	Early '40's	Late '50's	Late '60's
Number of cases	2	5	4
Cases per worker	-	3	-
Cost per case	-	3	4
Services given	-	-	-

Even in the few budget reports that did quote these statistics, in all cases the statistics, where discussed, were used as statistics of need to justify expansion of service.

## vii. Public Health

a. Cities commonly provide a variety of health maintenance and disease prevention programs ranging over city hospital systems, home help programs, dental clinics, immunization programs and drug control clinics. Usually these programs are grouped under a Public Health department. Typically control over the individual programs by the Public Health department is quite weak, and the programs are for budgetary purposes autonomous. At the management control level, each program requires a separate set of output measures. Rather than discuss such measures for every program a fairly typical program is chosen and the necessary management control measures discussed.

Public health work is of considerable historical interest for the development of performance measures for from 1920 to 1955 public health work was an area with a very generally accepted national appraisal method which could serve as an appraisal model for other areas of government.

## b. Statistics

### 1. Mortality indices/ morbidity indices

While these are extremely sensitive indicators of the state of general health, they are not suitable measures for management control of public health departments. Like education systems, public health departments have only weak effects on the phenomena that they seek to affect. No attempts have been made to separate out these effects, but they do seem to be weak. In the short-run especially, health depends upon socio-economic

trends and is affected by epidemic cycles, while in the long run trends in income, public cleanliness and the private consumption of medical care are all reflected in health care statistics.

A second defect of these statistics is that reporting is often inadequate. This is generally not true for mortality and natality statistics but it is probably the case for infant mortality statistics and especially true for morbidity where even the rudiments of collection of data are often absent.

One approach to correcting this has been the use of an adjusted mortality index, including deaths from only those diseases on which public health work is likely to have an impact. Such an index and its use is discussed by Ridley and Simon (1938, p. 28).

## 2. Typical Program Statistics

The individual public health project is typically highly mission-oriented, often directed against a particular illness or to help a particular target population. Objectives are accordingly well-defined. The following statistics would be sufficient for the management control of a typical disease screening and treatment program:

- a. number of cases screened
- b. number of cases detected
- c. number of cases treated
- d. number of successful treatments
- e. number of repeaters - not necessarily with implications for

the success of the program as a health care program. With some adjustments these statistics could be collected for such programs as venereal disease control programs, immunization programs, alcoholic and drug control programs. With some checks on quality, the program could be extended to health inspection programs.

### Multi-variate Measures

#### 3. Appraisal Form for City Health Work

From 1920 to 1955 the American Public Health Association supported an appraisal form for city health work. The form passed through six editions before it was discontinued in 1955: the discontinuation seemed more the result of professional reluctance to undergo appraisal than any internal defect of the appraisal form. (Vaughan, J.F., 1972; Ridley and Simon, 1938).

The form was a weighted questionnaire. It included questions on the major outputs of public health departments: inspections performed, hospital days provided, counselling services maintained. Quality checks on the questionnaire were fairly limited although types of tests applied and even mortality rates for the city were included. However, in actual practice the questionnaire was used in survey work by APHA staff who exercised their judgement in considering quality. The form had considerable circulation, and the APHA maintained a consulting service, using the form for over 500 surveys. Ratings of major cities were published periodically. A study quoted by

Ridley (1927) showed a high correlation between these ratings and a mortality index. In short the questionnaire was one of the best validated questionnaires developed to date for measuring the absolute level of performance of a city department.

c. Statistics Used in Budget Reports of 17 Major Cities

Measures	Early '40's	Late '50's	Late '60's
1. Death rates	11	6	2
2. Infant mortality rates	4	7	5
3. Number of cases	2	5	3
*4. Number successes	-	5	2

\*for any single program

### Service Departments

Most organizations will have some support departments - responsibility centers that do not directly serve the clientele of the organization or work in its production line but that service other departments. In a city, such departments include finance, planning, legal offices, data processing as well as administrative staff.

In business organizations as well as governments, such responsibility centers are usually controlled on an expense center basis - they are controlled on total budget size and their output is assessed on a subjective basis. In part this is justified. Often such departments are small and can therefore be directly controlled; many perform operational control tasks of an extremely routine nature; some part of the work of such departments is commonly staff work. For such staff work there is one overriding measure of success in the city government - the vote. However, for other departments, the objectives of the organization are clearly defined and efficient performance is agreed upon. Here one such department of government is discussed - finance. Other departments, such as planning and legal offices, do include more staff functions than finance and are correspondingly less easy to evaluate. Others such as data processing are considerably more easy to evaluate.

viii. Finance Department

a. The finance department of a city generally includes the following offices:

- |                                 |                          |
|---------------------------------|--------------------------|
| 1. Assessment of property taxes | - Assessor's office      |
| 2. Collection of tax revenues   | - Treasurer's office     |
| 3. Disbursement                 | - Treasurer's office     |
| 4. Budgeting                    | - Finance/Mayor's office |
| 5. Auditing                     | - Auditor's office       |
| 6. Purchasing                   | - Auditor's office       |
| 7. Capital funds management     | - Finance office         |
| 8. Cash management              | - Treasurer's office     |

These functions are almost identical to those in the finance and comptroller's offices of business firms. As in most business firms the finance function in cities is run on an expense center basis - no attempt is made to control the function on the basis of its production or its contribution to the mission departments of the city.

This is not necessarily the case in either the business firm or the city. The finance department does provide services to other departments and have definite dimensions along which its performance can be measured.

The chief difficulty lies in separating out the different levels in measurement. Clearly the tax rate for the city is a policy choice for the legislature and the amount of debt supported capital expenditure is usually a matter for the legislature. Much information that should be maintained to support these legislative decisions - credit rating,



bond rating, average tax burden in the city - obviously comes under the heading of information for social indicators. Otherwise it is a problem that research in finance is advancing rapidly and bringing many of the decisions in the finance function into the operational control sphere. This is particularly true of operating cash management where (Brigham and Weston, 1971, ch. 11) there are now programmable models for the whole cash management problem and several large businesses have the cash management function entirely computerized with the only human inputs being desired credit rating and imputed stretched payables cost. Although at present no city has reported using such a system, it may be that major cities will start to use these optimizing models quite shortly. For the present the field is in flux.

b. Statistics

1. Assessments

Most cities at present rely heavily on the property tax as a source of revenues. In this function it is usually a legal requirement that assessments match as closely as possible market value of property. Accordingly the ratio of assessments to fair market value should be collected by sampling periodically.

Likewise the assessor's office should report number of appeals against assessment and number of appeals granted.

In addition as a workload measure for the department number of parcels assessed and number of parcels in the city should be reported.

## 2. Cash Management

This includes cash for the operating requirements of the city. The finance department here is responsible for collecting revenues and for disbursement, and for raising short term loans and investing short-term revenue surpluses.

As mentioned above this area is the subject of an integrated cash management theory allowing optimization of the cash flow - i.e. minimization of the costs of maintaining an adequate cash balance for the city. The chief data required for this are the accounts receivable schedule; the accounts payable schedule; and the interest costs and yield on short-term security. A city not using these cash management models should probably report at least interest costs as a percent of operating expenditures, average age of accounts receivable, average age of accounts payable, with internal disbursements broken out by department.

## 3. Budgeting

As the chief tool of management control, budgeting itself is subject to management control.

Firstly a budget involves a revenue forecast; the accuracy of this can be checked quite accurately each year. Secondly a budget should be timely and as far as possible finalized before the beginning of the financial year. Although it is ideal if budgets forecast revenue accurately, it is not necessary that expenditures be forecasted accurately since unforeseen

circumstances may arise which will cause each department to increase or decrease its spending. Nevertheless, as a minimum each department's spending variance should be monitored even in budgets not based on output measures.

As a measure of the volume of work required in budgeting, the number of responsibility centers submitting budget estimates to the finance office should be reported. Fourthly, since most cities are required to present balanced budgets, the balance of revenues and expenditures should be reported.

#### 4. Auditing

In most cities the audit function, the prevention of fraud, has fairly limited operational functions. Prevention of fraud is construed as the principal function of the audit division rather than the detection of inefficiency.

As a minimum the audit division should report percent of city's cash vouchers audited for fraudulence or negligence, percentage of these found to be in error, value of errors detected, and total vouchers audited. In addition the delay between issuing a voucher and its audit should be reported.

There are at present fairly adequate models for optimizing the audit function in a city.

#### 5. Purchasing

The efficiency of any purchasing function is measured as the ratio of price actually paid to price which could have been paid for materials of the same quality. The most satisfactory

Index would therefore be percentage cost - ratio of price paid to market prices. For a purchasing department, the ratios would have to include prices paid plus departmental overhead. However, this index is idealized; rarely can it be computed or market prices measured objectively enough, partly because of the variable volume of purchases, partly because of the need to compare quality.

Surrogate measures are available. These include number of purchase orders - which should be minimized; average amount of each order and contract, maximized; number of regular and emergency requisition, emergency minimized; average number of competitive bids per contract, maximized; value volume of purchases, as a workload; value of rejections as a percentage of total purchases; in the case of a purchasing department, the mission departments should reject few purchases, the purchasing department should reject more; percentage of purchases made under published specifications agreed to by mission departments; ratio of cash discounts to total purchases, maximized; ratio of cash discounts to discounts offered, maximized; average number of days to fill requisitions, minimized.

These measures should provide accurate control on the efficiency of purchasing by a purchasing department and some control on departmental purchasing efficiency in a decentralized government.

It should be noted though that the purchasing problem is

part of the general area of research in requisitioning and inventory control models and as such is increasingly an area of programmable decision-making.

#### 6. Capital Funds Management

The amount of debt supported by a city is normally a matter of legislation or policy. Accordingly, reports on statistics such as economic activity or gross product of the city are social indicator statistics. However, the city should raise its debts efficiently - it should raise its volume of debt at a price consonant with debts of its risk. The city should therefore publish the statistics that go into its bond rating and credit rating - viz. debt burden total/gross product/gross tax revenues average repayment schedule in order that comparisons with other cities can be made.

#### Multi-variate measures

The measures described so far suggest how diverse the functions of the finance departments in a city are. Yet these measures alone have not measured several of the most important contributions that the finance department can make to a city - for instance, in management accounting the preparation of costs by programs and by responsibility center. Such outputs are unlikely to be assessed for the finance department without the use of a questionnaire measure with test questions of the type: "can the full program costs of each school be identified in conformance with cost accounting principles?", or "are economic forecasts for the city accurate to within 5%?".

As yet no such questionnaire has been prepared. The ICMA volume on the finance function ('Municipal Finance Administration', 1962) is notable in the ICMA series for recommending few of the performance measures suggested here. The reports suggested are financial statements and asset statements of little use in management control. This is disappointing in that the finance function is one on which a strong professional consensus with little pressure from outside groups should prevail. This consensus in turn could be expressed in terms of definite standards and objectives to be monitored.

c. Statistics Published in Budget Reports by 17 Major Cities

Measure	Early '40's	Late '50's	Late '60's
1. Number of parcels	16	13	15
2. Number of appeals	2	3	3
*3. Interest costs on short term cash	-	1	-
4. Revenue estimate accuracy	-	-	-
5. Vouchers audited	9	5	12
6. Purchasing measure	-	-	-
7. Average repayment schedule	-	-	-

\*Note: These statistics could in some cases be calculated from the city's financial statements. Here is presented only the case where the finance department specifically separated out the statistic, for presentation in the budget reports.

It appears that the standard of management control reporting is uniformly bad in finance departments. Even the format of financial

reports is generally such that the efficiency of financial management cannot easily be estimated. Several cities publish no separate reports for interest on short term debts versus interest on long term debts, in the financial reports. The typical budget statement for the finance departments is one page per department with at most a statement of numbers of staff employed.

It is disappointing that reporting is so poor since comparisons between cities would otherwise be prolific - i.e. any city could find a large sample of other cities with similar financial characteristics and histories for efficiency comparisons. However, in all cases reporting ignores this, and in many cases reports appear designed to avoid this.

## CHAPTER VI

### Conclusion

An efficient organization is an organization which is producing the maximum value possible with the resources available to it. The problem of efficiency in an organization is crucially related to translating the goals of administration and clients through the various sub-units in the organization. It is essential to this that the sub-units in the organization be rewarded in congruence with the goals of the organization. In particular, they should be rewarded on the basis of the ratio between the contribution they make to achieving the goals of the organization and the resources entrusted to them. In a small organization the terms of this ratio can be known on the basis of quite informal assessments. In a larger organization, informal information will not be sufficient, and more formal measures are required of contribution to the goals of the organization and resources employed.

The techniques of cost accounting to measure resources employed are well understood. In a business firm, contribution to the goals of the organization can be measured by virtually the same techniques. However, in non-profit and government organizations, measuring contribution to the goals of the organization is a very inadequately explored technical problem. In actual non-profit and government organizations the efficiency problem is solved only by using informal information. The technical problem is to find suitable formal measures



to supplement this informal information. The criteria for suitable formal measures have been discussed in Chapter IV of the thesis - they are quite stringent.

PPBS contributed nothing to the solution of this problem. Ideally, the goals of government would be fixed and consistent like the goals of a profit-making firm, and the sub-goals of government departments would all be mapped into these major goals. PPBS was concerned with establishing this ideal state of fixed, consistent goals. In doing so it overlooked the possibility that even before the millenium when governments pursue consistent goals departments can be measured by their contribution to the achievement of the inconsistent goals that do exist. In Chapter III, it was suggested that the management control process, Anthony's (1965) name for the process by which administration ensures efficient managerial performance, can be based on measurement of progress towards inconsistent goals, and it can be based on quite informal structures of rewards and information flows. In Chapter IV methods of measuring contribution to organizational goals were reviewed. While highly sophisticated methods are available for measuring total contribution to organizational goals, components of contribution to goal achievement may be measured with quite primitive methods, and yet, as Chapter III showed, the primitive measures may still be useful complements in the management control process.

Chapter V reviewed, for each of the major departments of local governments, some commonly proposed measures of contribution to the goals of local governments. It was shown that for many departments, in

particular for fire, police, library and for finance departments, a measure of contribution to each of the goals for the department is available. For other departments at least some of the goals had corresponding measures.

Technically, therefore, it is feasible for local governments to measure their production. The first four chapters of the thesis stressed the normative implications of this: local governments should measure the production of their mission departments and support departments. The first four chapters went further than this: it would be more rewarding at present to install management control systems in local governments than to install PPB systems.

Yet Chapter V suggests a disappointingly different reality. With few exceptions, measures suitable for use in management control systems are absent from the budget documents of large cities, documents on a crucial element in the management control process.

This is especially disappointing. It reflects a darker side to the budgetary process, sketched by Wildavsky (1970), Lindblom (1963) and other incrementalists. There is a strong reluctance within the executive to accept control and appraisal. In Chapter V, the departments that stand out as reporting well - libraries, occasionally fire departments, and education - are typically departments associated with vigorous professional maintenance of public service and are not necessarily those departments that have the most readily available set of performance measures. Public health formerly had such a professional system. With a recent decline in interest in maintenance

of efficiency standards and a fragmentation of professional review, the result has been a decline in reporting standards that is particularly clear in the budget reports of the '40's and '50's. (See Vaughan, 1972). Other departments for which measures are even more readily available, finance and police for example, have virtually no use of management control reporting.

The conclusion is pessimistic, but the priorities remain clear. Analysis may occasionally offer radical gains in service against great resistance, but the major gains in government will come from an efficiency push in the area of incremental decisions.

BIBLIOGRAPHY

- Alkin, A.C., 1969. "Evaluating the Cost-Effectiveness of Instructional Programs," Center for the Study of Evaluation Report No. 26, University of California at Los Angeles, Graduate School of Education.
- American Library Association, 1958. Public Library Service: A Guide to Evaluation with Minimum Standards.
- American Library Association, 1962. Interim Standards for Small Public Libraries: Guidelines towards Achieving the Goals of Public Library Service.
- Anthony, R.N., 1965. Planning and Control Systems: A Framework for Analysis, Harvard University.
- Anthony, R.N., 1970. Management Accounting: Text and Cases, Irwin.
- Arrow, K.J. and Hurwicz, L., 1964. "Decentralization and Competition in Resource Allocation," in Pfouts, R. (ed.), Essays in Economics and Econometrics, University of North Carolina.
- Barro, S., 1970. "An approach to accountability measures for the public schools," RAND P-4464, RAND Corporation, Santa Monica.
- Bauer, R.A., 1967. Social Indicators, M.I.T. Press.
- Becker, G.S., 1964. Human Capital: a Theoretical and Empirical Analysis, with Special Reference to Education, National Bureau of Economic Research.
- Bellman, A., 1935. "Measuring Police Effectiveness," Journal of Law and Criminology (26), pp. 71-114, May 1935.
- Buros, O., 1965. Sixth Mental Measurement Yearbook.
- Brigham, H. and Weston, M., 1970. Managerial Finance.
- Carswell, H.L., 1929. City School Survey, New York.
- Hoepfer, R., Nelkin, I., and others, 1971. "Report on the field testing of the CSE elementary school evaluation kit: needs assessment," Center for the Study of Evaluation Report No. 70, September 1971. University of California at Los Angeles, Graduate School of Education.
- Charnes, A. and Stodry, A., 1963. "Further Exploration in the Theory of Multiple Budgeted Goals," working paper, Sloan School of Management, M.I.T, No. 12-63.

- Carpenter, M.B. and Rapp, M.L., 1969. "The analysis of effectiveness of programs in elementary and secondary education," RAND P-4035, RAND Corporation, Santa Monica.
- Coleman, J.S. and others, 1966. Equality of Educational Opportunity, United States Department of Health, Education and Welfare, Office of Education, 1966. ("The Coleman Report")
- Coleman, J.S. and Karweit, N.L., 1970. "Measures of School Performance," RAND R-488-RC, RAND Corporation, Santa Monica.
- Crecine, J.P., 1967. Governmental Problem-Solving: a Computer Simulation of Municipal Budgeting.
- Dahlberg, J.S., 1966. The New York Bureau of Municipal Research: Pioneer in Government Administration, New York University.
- Firman, W.D., 1966. "The Quality Measurement Project in New York State," Science Education (590), pp. 259-279, April 1966.
- Fisher, W.H., 1971. "The Anatomy of Inflation: 1953-1975," Scientific American (225,9), pp. 13-21, November 1971.
- Forrester, J.W., 1968, in Myers, C.A., The Impact of Computers on Management, M.I.T. Press, pp. 275-281.
- Glaesch, E.T., 1936. "Evaluation Research in Social Work," mimeo., New York School of Social Work.
- Hanushek, E.A., 1970. "Developing local educational indicators: the prospects," RAND P-4434, RAND Corporation, Santa Monica.
- Hatry, Harry P., 1969. "Criteria for Evaluation in Planning State and Local Programs," pp. 94-118 of Hinrichs, H. and Taylor, G.M., Program Budgeting and Benefit-Cost Analysis, Pacific Palisades, California.
- Head, Louis P., 1927. "Measuring the efficiency of a city's government: the Munro criteria applied to Dallas," reprint of 15 articles appearing in the Dallas News, January 7-February 11, 1927.
- Heal, G.M., 1969. "Planning without Prices," Review of Economic Studies (pp. 46 and 347-362), July 1969.
- Hinrichs, H.H. and Taylor, G.M., 1969. Program Budgeting and Benefit-Cost Analysis, Pacific Palisades, California.
- International City Managers' Association, 1967. Municipal Fire Administration, Chicago.

- International City Managers' Association, 1964. Local Public Library Administration, Chicago.
- Kendrick, J.W., 1961. Productivity Trends in the USA, National Bureau of Economic Research, Princeton University.
- Kiesling, H.J., 1971. "Multivariate analysis of schools and educational policy," RAND P-4595, RAND Corporation, Santa Monica.
- Lange, Oskar, 1936. "On the Economic Theory of Socialism," Review of Economic Studies, 1936.
- Leonard, W.A., 1950. Police Organization and Management, San Francisco.
- Lessinger, L., 1970. Every Kid a Winner: Accountability in Education, New York.
- Lindblom, C.E., 1963. A Strategy of Decision: Policy Evaluation as a Social Process," New York.
- Malinvaud, E., 1967. "Decentralized Procedures for Planning," in Malinvaud, E. and Bachrach, M.V.L. (eds.), Activity Analysis in the Theory of Growth and Planning.
- Marvin, K.E. and Rouse, A.M., 1970. "The status of PPBS in federal agencies: a comparative perspective," pp. 801-816 of Volume 3, Analysis and Evaluation of Public Expenditures: the PPB System, Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States.
- MacLeod, R.K., 1972. "Program Budgeting Works in Nonprofit Institutions," Harvard Business Review, January, pp. 46-55.
- Mort, P.R. and Carl, F.G., 1937. A Guide for Self-Appraisal of School Systems, New York.
- Municipal Administration Service, 1930. "Public Reporting," publication number 19, Chicago.
- Mushkin, S. and Cotton, J., 1970. "Systematic Analysis and Grants-in-Aid in a Federal System," pp. 332-356 of Vol. 1, Analysis and Evaluation of Public Expenditures: the PPB System, Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States.
- National Fire Prevention Association. "Fire Records of Cities (U.S. and Canada)," published annually in Fire Journal, Boston.

National Educational Association of the United States, 1966. "Profiles of excellence; recommended criteria for evaluating the quality of a local school system," Office of Professional Development, Washington, D.C.

\_\_\_\_\_, 1960. "Evaluation Criteria," National Study of Secondary School Evaluation, Washington, D.C.

National Recreation Association, 1966. "Estimating Attendance at Summer Playgrounds."

\_\_\_\_\_, 1940. "Schedule for Appraisal of City Recreation."

Nove, A.A., 1966. The Soviet Economy. London.

Oppenheimer, A.N., 1966. Questionnaire Design and Attitude Measurements, New York.

Parratt, S.D., 1938. "A Scale to Measure Effectiveness of Police Functioning," Journal of Criminal Law and Criminology (29), Jan.-Feb., 1938, pp. 739-756.

Polansky, N.W., 1960. Social Work Research.

Ridley, C.E., 1927. Measuring Municipal Government, Syracuse.

Ridley, C.E. and Simon, H.A., 1938. Measuring Municipal Activities, Chicago.

Sawhill, I.A., 1970. "The role of social indicators and social reporting in public expenditures' decisions," being pp. 473-488 of Vol. 1, Analysis and Evaluation of Public Expenditure: the PPB System, Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States.

Schick, A., 1966. "The Road to PPB: the Stages of Budget Reform," Public Administration Review (26,4), pp. 243-258.

\_\_\_\_\_, 1970. "Systems for analysis: PPB and its alternatives," being pp. 847-874 of Vol. 3, Analysis and Evaluation of Public Expenditures: the PPB System, Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States.

\_\_\_\_\_, 1971. "Budget Innovation in the States," Brookings Institute.

Spicer, R.G.B., 1934. "Criminal Statistics as a Guide to Police Efficiency," Police Journal (7). pp. 209-215, April 1934.

- United States Department of Health, Education and Welfare, 1962.  
Statistics of Public Libraries, 1962, OE-15051.
- United States Department of Justice, Federal Bureau of Investigation,  
1968. "Police Department Rating," mimeo, unnumbered memorandum.
- United States Congress, 1969. "Innovation in PPB in State and Local  
Governments," papers submitted to the Subcommittee on Economy  
in Government of Joint Economic Committee.
- University of Kentucky, Bureau of School Service, 1962. "The measure  
of a good school: a guide to evaluation of school systems,  
adapted particularly for use in Kentucky school districts,"  
Lexington, Kentucky.
- University of State of New York, State Education Department, Office  
of Research and Evaluation, 1968. "Assessment and Evaluation  
Handbook," Albany, New York
- Upton, L.D. (ed.), 1912. Efficiency in City Government, being a  
special volume, Annals of the American Academy of Political  
and Social Science.
- Vaughan, H.F., 1972. "Local Health Services in the United States: the  
Story of the CAP," Journal of Public Health (103), pp. 95-111.
- Webb, E.J., Campbell, D.T., Schwartz, R.D., and Sechrest, L.B., 1966.  
Unobtrusive Measures: Non-Reactive Research in the Social  
Sciences, Bloomington, Indiana.
- Wolins, M., 1960. "Measuring the Effectiveness of Social Work,"  
chapter 13 of Social Work Research, Polansky, N.J. (ed.).
- Wheeler, J.L., 1970. "What Good are Public Library Standards?,"  
Library Journal, Feb. 1971, pp. 455-465.
- Wildavsky, A., 1970. "Rescuing policy analysis from PPBS," being  
pp. 835-864 of Vol. 3, Analysis and Evaluation of Public  
Expenditures: the PPB System, Subcommittee on Economy in  
Government of Joint Economic Committee, Congress of the United  
States.