CHAPTER IX

The Criterion of Efficiency

IN THE PRECEDING TWO CHAPTERS attention has been concentrated on the way in which the organization brings its influence to bear on its individual members. Through the system of authority and the other types of communication that have been discussed, the organization provides the individual with some of his principal premises of decision: it specifies his fundamental value-premises—the organization objectives—and it supplies him with relevant information of all sorts that is necessary if he is to implement these values. It is time now to turn to the "internal" aspects of decision, and to see how the organizationally supplied premises are synthesized by the individual into a completed decision. Crucial to the synthesis are the decisional premises that the individual himself supplies, and the most important of these, aside from the information that originates with him, are the criterion of efficiency[1] and the individual's organizational identifications or loyalties. These will provide the subject matter of this and the following chapter, respectively.

Because the criterion of efficiency is rather more complicated in its application to noncommercial than to commercial organizations, a large part of this chapter will be taken up with the problem of extending the concept of efficiency so that it becomes applicable to the former as well as to the latter.

THE NATURE OF EFFICIENCY

The criterion of efficiency is most easily understood in its application to commercial organizations that are largely guided by the profit objective. In such organizations the criterion of efficiency dictates the selection of that alternative, of all those available to the individual, which will yield the greatest net (money) return to the organization. This "balance sheet" efficiency involves, on the one hand, the maximization of income, if costs are

[1]The theory of efficiency, along the lines developed here, has been proposed in C. E. Ridley and H. A. Simon, *Measuring Municipal Activities* (Chicago: International City Managers' Association, 1938).

considered as fixed; and on the other hand, the minimization of cost, if income is considered as fixed. In practice, of course, the maximization of income and the minimization of cost must be considered simultaneously—that is, what is really to be maximized is the difference between these two.

It will be seen that the criterion of efficiency is closely related to both organization and conservation objectives, as those terms have been defined in Chapter VI. It is related to the organization objective in so far as it is concerned with the maximization of "output." It is related to conservation objectives in so far as it is concerned with the maintenance of a positive balance of output over input.

The simplicity of the efficiency criterion in commercial organizations is due in large part to the fact that money provides a common denominator for the measurement of both output and income, and permits them to be directly compared. The concept must be broadened, therefore, if it is to be applicable to the process of decision where factors are involved that are not directly measurable in monetary terms. Such factors will certainly be present in noncommercial organizations where monetary measurement of output is usually meaningless or impossible. They will also be present in commercial organizations to the extent that those controlling the organization are not solely directed toward the profit motive—i.e. where they are concerned with questions of the public interest or employee welfare even when those factors are not directly related to the profit and loss statement. Moreover, nonmonetary factors will also be involved in the internal operation even of purely commercial organizations where specific activities are concerned whose relation to the profit-and-loss statement cannot be assessed directly. For example, decisions in a personnel department cannot always be evaluated in monetary terms, because the monetary effect of a particular personnel policy cannot be directly determined.

The Cost Element in Decision

In both commercial and noncommercial organizations (except for volunteer organizations) the "input" factor can be largely measured in money terms. This is true even when the organization objectives are broader than either profit or conservation of the organization. That is, even if the organization is concerned with the cost *for the community*, this cost can be fairly valued in terms of the goods and services that the organization buys.[2]

This point may not be entirely evident in the case of the evaluation

[2]For an elaboration of this point, and statements of the qualifications that must be appended to it to make it strictly accurate, the reader is referred to the literature on welfare economics. See, for example, A. C. Pigou, *The Economics of Welfare* (London: Macmillan, 1924).

of the services of employees. The tasks to which employees are assigned are not all equal with respect to agreeableness, hazard, and the like; and, to the extent that they are not, the money wage (unless this accurately reflects these elements—which it usually does not) is not an accurate measure of input in an organization where employee welfare takes its place among the organization objectives. In such cases, organization decisions must balance not only money input against output, but money input against output *and* employee welfare.

There are other cases, too, where input is not accurately measured by money cost to the organization. An industrial concern, for example, which is not penalized for the smoke and soot it distributes over the community has a cost factor, provided the organization objectives include concern for community welfare, that does not appear in the accounts.

When the decision is being made for a public agency that embraces among its objectives the general stability and prosperity of the economy—the Federal government, for example—still other considerations must enter in. In the case of a private business, interest on invested capital, at the market rate, must be included in calculations as a cost. In the case of government, if the effect of spending is to employ investment capital that would otherwise be idle, the interest on this capital is not really a cost from the standpoint of the economy as a whole. Moreover, the "output" of government investment may include effects of this investment on the level of income and employment in the economy, and these effects must be included in the measurement of product.

Likewise, when a private business employs an unemployed person his wage is an ordinary cost; while when the government employs such a person it makes use of a resource that would otherwise not be utilized, and hence the wages of those employed do not involve any real cost from the standpoint of the community.

These comments are not intended to defend any particular concept of the role of government spending in a modern economy—a subject that evokes sufficient controversy among the various competing schools of modern economists—but merely to point out that the criterion of efficiency cannot be applied to decisions in governmental agencies without consideration of the economic effects that the activities of these agencies may have. In the language of the economist, the problem of efficiency in the public agency must be approached from the standpoint of the general, rather than the partial, equilibrium.

Positive Values in Decision

While the negative values involved in decision can usually be summarized in terms of time or money costs, the positive values present a somewhat more complex picture. As we have seen, in a commercial enterprise, money value of output plays somewhat the same role as cost of production (input) in summarizing the value element involved. From a positive standpoint the kind of product manufactured is a valuationally neutral element. Not so in the case of public services. Hence, some substitute must be found in public administration for money value of output as a measure of value.

This substitute is provided by a statement of the objectives of the activity, and by the construction of indices that measure the degree of attainment of these objectives. Any measurement that indicates the effect of an administrative activity in accomplishing its final objective is termed a measurement of the *result* of that activity.[3]

Definition of Objectives. The definition of objectives for public services is far from a simple task. In the first place, it is desirable to state the objectives so far as possible in terms of values. That is, only if they are expressions of relatively final ends are they suitable value-indices. When objectives are stated in terms of intermediate goals, there is a serious danger that decisions governed by the intermediate end will continue to persist even when that end is no longer appropriate to the realization of value. The proliferation of forms and records in an administrative agency, for instance, frequently evidences a failure to reconsider activities which are aimed at some concrete end in terms of the broader values which that end is supposed to further.

On the other hand, however, the values which public services seek to realize are seldom expressible in concrete terms. Aims, such as those of a recreation department—to "improve health," "provide recreation," "develop good citizens"—must be stated in tangible and objective terms before results can be observed and measured. A serious dilemma is posed here. The values toward which these services should be directed do not provide sufficiently concrete criteria to be applied to specific decisional problems. However, if value-indices are employed as criteria in lieu of the values themselves, the "ends" are likely to be sacrificed for the more tangible means—the substance for the form.

Further difficulty arises in the lack of a common denominator of value. An activity may realize two or more values, as in the case of the recreation department mentioned above. What is the relative importance of the various values in guiding the department's activities? The health department provides an illustration of the same problem. Shall the department next year redistribute its funds to decrease infant mortal-

[3]Ridley and Simon, *op. cit.*, p. 1.

ity or to increase the facilities of the venereal disease clinic? Observations of results, measured in terms of value-indices, can merely tell the extent to which the several objectives are realized if one or the other course of action is taken. Unless both activities are directed toward exactly the same value, measurement of results cannot tell which course of action is preferable. Rationality can be applied in administrative decisions only after the relative weights of conflicting values have been fixed.

The question of who should construct the system of values or preferences which underlie the administrator's decisions has already been discussed in Chapter III. We wish here only to emphasize that somewhere, sometime in the administrative process weights actually are assigned to values. If this is not done consciously and deliberately, then it is achieved by implication in the decisions which are actually reached. It is not possible to avoid the problem by hiding it among the unexpressed premises of choice.

Accomplishment a Matter of Degree. Defining objectives does not exhaust the value element in an administrative decision. It is necessary to determine, in addition, the degree to which the objective is to be attained. A city charter or ordinance may define the function of the fire department as "protecting the city from damage due to fire"; but this does not imply that the city will wish to expand the fire-fighting facilities to the point where fire damage is entirely eliminated—an obviously impossible task. Moreover, it begs the question to say that the fire department should reduce losses "as far as possible," for how far it is possible to reduce losses depends on the amount of money available for fire protection and fire prevention services.

Value questions are not eliminated from the fire protection problem of that city until it has been determined that (1) the fire department should aim to limit fire losses to x dollars per capita, and (2) the city council will appropriate y dollars which, it is anticipated on the basis of available information, will permit (1) to be carried out. Values are involved, then, not only in the definition of objectives, but in the determination as well of the level of adequacy of services which is to be aimed at. Attainment of objectives is *always* a matter of degree.

The processes of "policy determination," as they take place in our governmental institutions, seldom cope with these questions of degree in determining the objectives of governmental services. It will be urged in later sections of this chapter that extension of policy determination to such questions is of fundamental importance for the maintenance of democratic control over the value elements in decision. It will be shown that a large measure of this procedural reform can be attained by a modification and extension of budgetary techniques.

Distributive Values. Thus far, the discussion has centered on values which are "aggregates." That is, the community measures its fire loss in terms of total dollars of destruction during the year. It does not distinguish the loss of $1,000 in Smith's store from a loss of $1,000 in Jones' store. The police department, in attempting to reduce the number of robberies, does not give a robbery on Third Street a different weight from a similar robbery on Fourth Street.

Nevertheless, questions of "distributive" value enter into almost every administrative decision—if in no other way than in an assumption of "equal weight" like those cited above. A playground built on the West Side will not serve children on the East Side. If chess classes are offered at the social center, there may be no facilities available for persons interested in social dancing.

Many distributive questions are geographical, but they may involve social, economic, or innumerable other "class" distinctions. The importance of such considerations in administration can be appreciated when it is recognized that agencies for assessment administration, administrative tribunals, and even welfare agencies are concerned primarily with questions of distributive rather than aggregate value.

As will be shown later, distributive questions are also of great importance when the work of an organization is specialized by "area" or by "clientele." In these cases, the objective of the organizational unit is immediately restricted to a particular set of persons, and interjurisdictional problems of the greatest consequence may arise.

A Common Denominator for Value—the Criterion of Efficiency

A fundamental problem involved in reaching a decision is the discovery of a common denominator between the two values which have been mentioned: low cost and large results. How is the choice made when the two conflict? Four relations are conceivable between choices A and B. If I_A is the input for A, and I_B for B, and O_A and O_B are the respective outputs, then these four possible relations may be expressed as follows:

1. I_A is less than I_B, and O_A is greater than O_B.
2. I_B is less than I_A, and O_B is greater than O_A.
3. I_A is less than I_B, and O_A is less than O_B.
4. I_B is less than I_A, and O_B is less than O_A.

In cases 1 and 2 the choice is unequivocal; but not so in cases 3 and 4. That is, when possibility A involves a larger cost than possibility B, but produces a smaller result, B obviously is preferable. But when possi-

bility A involves a lower cost as well as a smaller result than B, cost must be weighed against result before a choice can be made.

The path to the solution of this difficulty has already been indicated. Underlying all administrative decisions is a limitation—a "scarcity"—of available resources. This is the fundamental reason why time and money are costs. Because they are limited in quantity, their application to one administrative purpose prevents the realization of alternative possibilities. Hence, the administrative choice among possibilities can always be framed as a choice among alternatives involving the same cost, but different positive values.

An administrative choice is incorrectly posed, then, when it is posed as a choice between possibility A, with low costs and small results, and possibility B, with high costs and large results. For A should be substituted a third possibility C, which would include A *plus* the alternative activities made possible by the cost difference between A and B. If this is done, the choice resolves itself into a comparison of the results obtainable by the application of fixed resources to the alternative activities B and C. The efficiency of a behavior is the ratio of the results obtainable from that behavior to the maximum of results obtainable from the behaviors which are alternative to the given behavior.

The criterion of efficiency dictates that choice of alternatives which produces the largest result for the given application of resources.

It should be noted that this criterion, while it supplies a common denominator for the comparison of administrative alternatives, does not supply a common numerator. Even though all decisions be made in terms of alternative applications of the same resources, the problem still remains of comparing the values which are attained by the different courses of action. The efficiency criterion neither solves nor avoids this problem of comparability.

Note on the Term "Efficiency"

The term "efficiency" has acquired during the past generation a number of unfortunate connotations which associate it with a mechanistic, profit-directed, stop-watch theory of administration. This is the result of the somewhat careless use of the term by overenthusiastic proponents of the "scientific management" movement. Nevertheless, no other term in the language comes so close as "efficiency" to representing the concept described in this chapter. The term has therefore been employed, with the hope that the reader will understand the criterion in the sense in which it has just been defined, and will be able to dissociate from it any unfortunate connotations it may have had in his mind.

Until practically the end of the nineteenth century, the terms "efficiency" and "effectiveness" were considered almost as synonymous. The Oxford Dictionary defines "efficiency": "Fitness or power to accomplish, or success in accomplishing, the purpose intended; adequate power, effectiveness, efficacy."

In recent years, however, "efficiency" has acquired a second meaning: the ratio between input and output.[4] In the words of the *Encyclopaedia of the Social Sciences:*

> Efficiency in the sense of a ratio between input and output, effort and results, expenditure and income, cost and the resulting pleasure, is a relatively recent term. In this specific sense it became current in engineering only during the latter half of the nineteenth century and in business and in economics only since the beginning of the twentieth.[5]

The use of the term by leaders of the scientific management movement added still a third meaning. Again quoting from the *Encyclopaedia of the Social Sciences:*

> The foundation of modern scientific management may be dated from F. W. Taylor's paper, *A Piece Rate System*, in which he described his pioneer method of establishing standards of job performance at the Midvale steel plant. When such standards were set, it became customary to refer to the ratio of actual performance to the standard performance as the efficiency of labor, a use somewhat different from that of the mechanical engineers, who apply the term to the ratio of actual output to an actual input.[6]

Harrington Emerson, another pioneer in the scientific management movement, and one who preferred the term "efficiency engineering," is reported to have defined efficiency as "the relation between what is accomplished and what might be accomplished." In this connection, he speaks of the "efficiency percent of the employee."[7]

It must be noted that there is a difference in computing an output-

[4]An early application of the engineering concept to the social field is that of F. Y. Edgeworth, who on p. 2 of his *Mathematical Psychics* (London: Kegan Paul, 1881) defined efficiency essentially as it is defined in this study: ". . . efficiency being thus defined: one engine is more efficient than another if, whenever the total quantity of fuel consumed by the former is equal to that consumed by the latter, the total quantity of energy yielded by the former is greater than that yielded by the latter."

[5]"Efficiency," *Encyclopaedia of the Social Sciences*, 5:437.

[6]*Loc. cit.*

[7]Horace Bookwalter Drury, *Scientific Management* (New York: Columbia University Press, 1915), pp. 114, 115.

input ratio in the physical and in the social sciences. For the engineer, both output and input are measured in terms of energy. The law of conservation of energy tells him that the output of useful energy cannot exceed the energy input. Hence arises the concept of "perfect" efficiency—that is, a situation in which output equals input. In the social sciences, output and input are seldom measured in comparable units; and even when they are, as in a comparison of cost of fire protection with dollar losses from fire, there is no "law of conservation of energy" which prevents the output from exceeding the input. Hence, the concept of perfect efficiency, if it is used at all, must be redefined. As a matter of fact, the concept of perfect efficiency will not be required in the present study. Actual problems, as they present themselves to the administrator, are always concerned with *relative* efficiencies, and no measure of *absolute* efficiency is ever needed. Moreover, the theory does not require a numerical measure of efficiency, but merely a comparison of *greater* or *less* between the efficiencies of two alternative possibilities. Under these circumstances, the definitions of efficiency as ratio of output to input and as ratio of the actual to the maximum possible amount to the same thing.

An Economic Analogy

It can be seen that the criterion of efficiency as applied to administrative decisions is strictly analogous to the concept of maximization of utility in economic theory. It is not asserted here that the criterion of efficiency always does dominate administrators' decisions, but rather that if they were rational it would. There is no assertion that such rationality is a common characteristic of actual behavior. On the other hand, the doctrine of maximization of utility has been commonly set forth in the economic literature as an explanatory doctrine as well, that is, as descriptive of actual behavior in the market. This difference between the two propositions should be kept carefully in mind.

The analogy between the two propositions extends also to the assumptions which underlie them. The first of these is that there is a scarcity of applicable resources. A second assumption is that the activities concerned are "instrumental" activities—that is, activities that are carried on for the positive values they produce, in the form of some kind of "result." Third, both propositions involve the comparability, at least subjectively, of the values in terms of which results are measured. (This assumption has already been discussed in the previous section.)

The broad scope of the analogy will become increasingly clear as the discussion proceeds. It will be seen that the problem of administrative decisions can be translated into a problem in the theory of production,

and that concepts and theorems developed in economic theory have wide applicability to administrative decisions.

CRITICISMS OF THE EFFICIENCY CRITERION

Criticisms of "efficiency" as a guide to administration have been frequent and vociferous.[8] One group of criticisms need not concern us here, for they refer to definitions of the term different from the one proposed here. In this category must be placed attacks on efficiency which equate the term with "economy" or "expenditure reduction." As we have used "efficiency," there is no implication whatsoever that a small expenditure—or, for that matter, a large expenditure—is *per se* desirable. It has been asserted only that if two results can be obtained with the same expenditure the greater result is to be preferred. Two expenditures of different magnitude can, in general, be compared only if they are translated into opportunity costs, that is, if they are expressed in terms of alternative results.

"Mechanical" Efficiency

Others have objected to "efficiency" on the ground that it leads to a "mechanical" conception of administration. This objection, too, must result from the use of the term in quite a different sense from that proposed here. For a mere criterion of preference among possibilities does not in any manner limit the administrative techniques which may be employed in attaining the possibilities, nor, as we shall see in the next section, does it in any way reduce the role of the administrator's judgment in reaching decisions. Furthermore, the efficiency criterion is in the most complete accord with a viewpoint that places the social consequences of administration in the forefront of its determining influences.

"The Ends Justify the Means"

Two other lines of criticism assert that the criterion of efficiency leads to an incorrect relationship between "means" and "ends." On the one hand it is alleged that, in the interests of efficiency, ends are taken to justify any appropriate means. As we have noted in Chapter IV, the terms "means" and "ends" must be employed carefully in order to avoid contradictions; and for this reason we have preferred to talk of the value and

[8]See instances cited by Marshall E. Dimock, "The Criteria and Objectives of Public Administration," in *The Frontiers of Public Administration*, ed. Gaus, White, and Dimock, pp. 116–133.