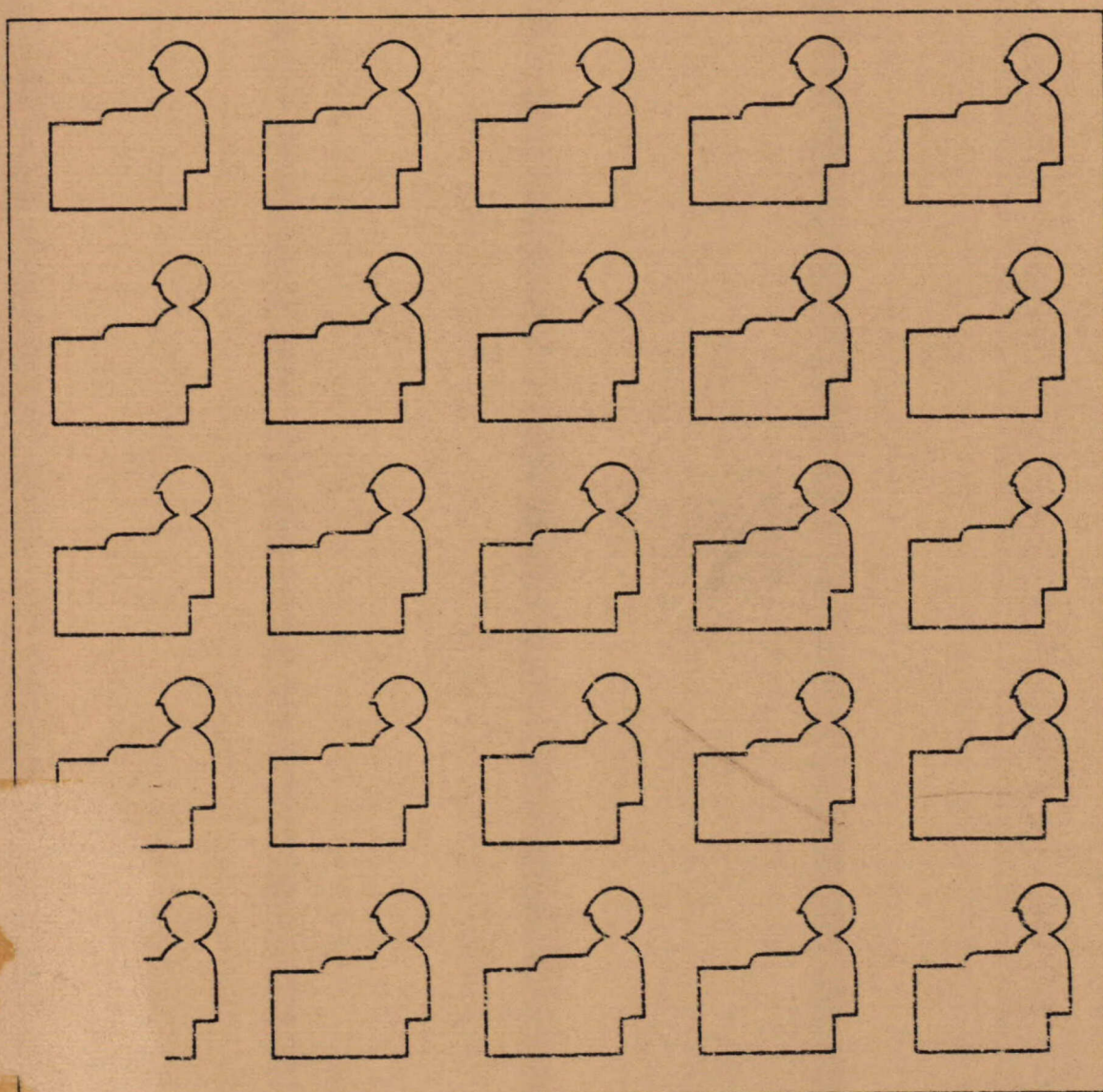


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GUIDE TO COST/BENEFIT EVALUATION
OF THE OCS FIELD TRIALS



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1. Introduction

The purpose of this Guide is to summarize the major steps involved in cost/benefit evaluation of the OCS Field Trials. It is drawn from our report: "Creation of a Cost/Benefit Evaluation Framework for Office Communication Systems", which may be consulted for a fuller account of procedures as well as a discussion of conceptual and measurement problems.

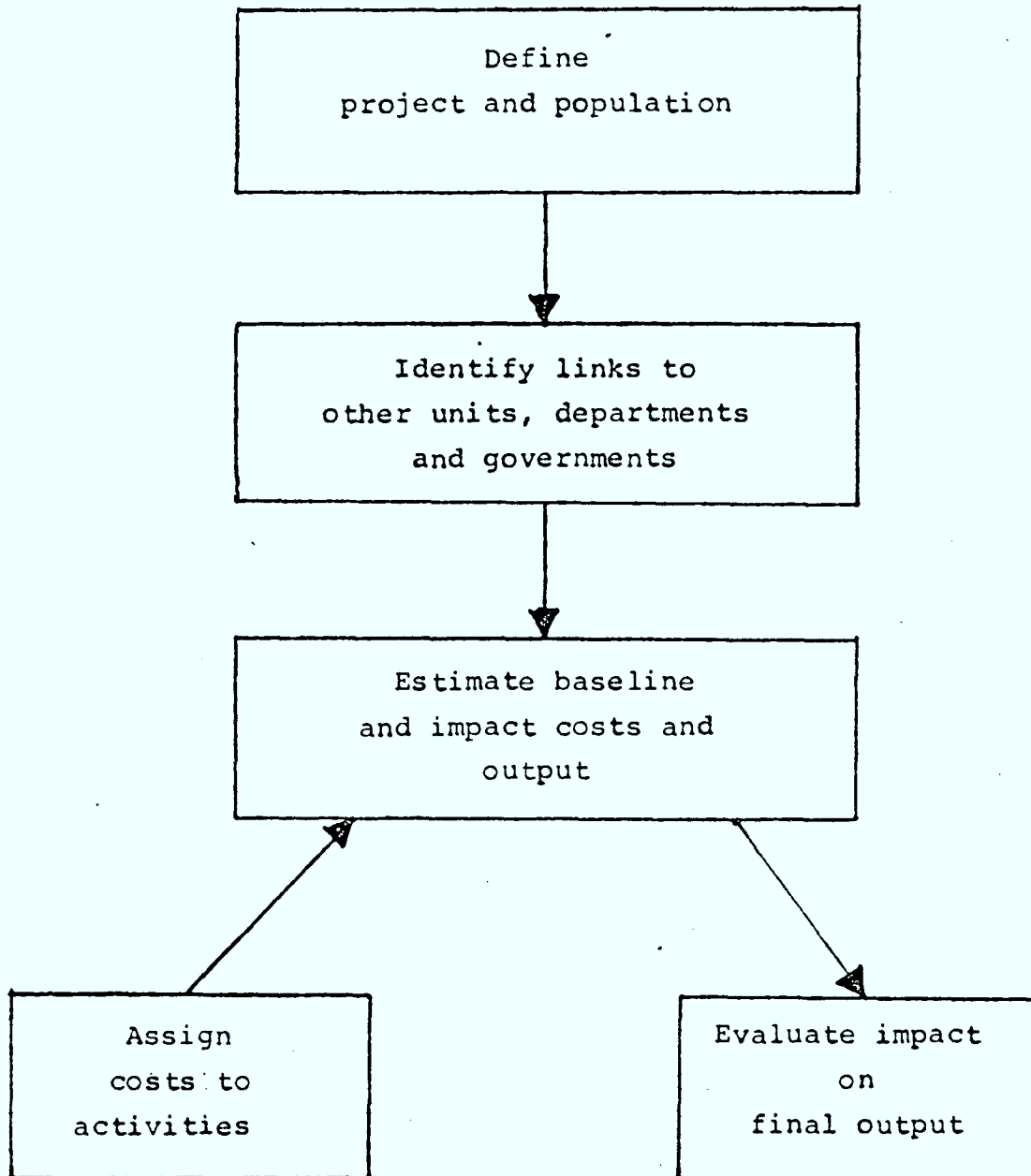
2. Major Steps

The cost/benefit analysis of any project must provide answers to the following questions:

- what is the project?
- who benefits?
- how do we assign incremental cost to the project?
- what are the project's effects?
- how do we evaluate the impacts of the project?

We have transformed these questions into a sequential set of activities. The diagram shows these activities schematically. Each of the principal steps forms the subject for a succeeding section. We illustrate each step with examples from the Field Trials.

Flow Chart for Cost/Benefit
Evaluation



3. Project and Population Definition

There are several ways in which the Field Trials may be defined for cost/benefit evaluation. We assume that we are concerned with those changes in the allocation of resources which affect the performance of its functions by the productive entity delimited by the Field Trial site, which we shall call "the unit being analyzed" or "the unit of analysis". Other assumptions are possible, however.

The definition has two implications. First the organizational units must be identified. In two of the cases described above - National Defence and Customs and Excise - the definition of the site corresponds with groupings of discrete organizational units at the Directorate level. At Environment, the Trial cuts across units, primarily at the Director level. Therefore, the analyst might assume that the unit of analysis is represented by all of EPS and DMSD together, or only those jobs where OCS equipment is directly employed, or some other grouping.

Second, the set of effects to be associated with the project must be identified. In future, the manager faced with a decision on recommending Office Automation (OA)

or some alternative will not need to consider costs associated with introduction of a new type of system. Similar systems will have been introduced in other governmental units and private firms and he will benefit both by procedures developed by/for users and by "learning curve" reductions in production costs and consequent lower system acquisition costs. On the other hand, since such transitional costs are in the past, he will not be able to count the benefits of the learning experience from the introduction of OCS, either to his unit or, as external benefits, to government generally or to the manufacturers of the systems. Such benefits and costs are also excluded from the evaluation of the individual Field Trials. They would rightly be included in an evaluation of the OCS Program as a whole, however.

There are a range of populations definable as the recipients of the benefits of the various Field Trials. If we accept as the relevant population for the services of the Department of National Defence the entire population of Canada, this aspect of the problem of measurement is relatively easily disposed of.

For the other two departments the problem is more complex. There are a range of potential of actual changes to the environment from man-made causes with which EPS is con-

cerned. These do not individually involve all residents of the country. There are a multitude of types of environmental problems and of geographically-defined areas where they prevail.

At the Customs and Excise Field Trial, identification of the relevant population is simple conceptually but measurement is somewhat complicated. The relevant population would appear to be those firms becoming liable or no longer liable for payment of excise duties as the result of changes in products they manufacture or in products covered by the Excise Act. This population in transition fluctuates in size and composition. It could be identified to a reasonable approximation with the aid of departmental data, however.

4. Links to the Department and Other Government

For the purpose of evaluation, changes resulting from the project in the rates at which resources are converted into service flows of other units of the Department or of other agencies of government are treated as external effects which need not enter into the calculation of net benefits. Appraisal of these effects

needs to be made, however, for two reasons. First, resource allocation and budgeting in the federal government involves a hierarchy of responsibilities. The net benefits of the project will be compared with its external effects by some decision-makers and they should have available if possible an estimate of these magnitudes.

The second reason why external effects should be measured is that any unit within a department, whether it be relatively small with few types of outputs, as in the case of the Customs and Excise site or much larger and with a more complex set of outputs as at Environment and National Defence, has a host of linkages with other units in its own department and elsewhere. It must be considered whether these linkages affect the rate at which the outputs of the unit of analysis are converted into final output. If so, appropriate measurements must be made.

5. Baseline and Impact Costs and Output

Cost/benefit analysis frequently is limited to evaluation of anticipated, rather than realized impacts. Within the framework of the Field Trials there will be an evaluation of impacts at the respective sites. These studies may make it possible to measure actual resource

consumption and outputs for the units being analyzed after installation of OCS. Inasmuch as the full adjustment to OCS may extend over a long period, it might not be satisfactory to treat the results of direct observation as representative for the whole period over which costs and benefits are to be calculated. Some form of prediction, even if it involves, most simply, extrapolation from those impact evaluations, would likely be appropriate. Furthermore, for the baseline calculations continuation of the status quo can rarely be assumed over a period comparable to the useful life of OCS equipment. Even at the Customs and Excise site, where work activities, procedures and caseloads remain fairly constant, a department-wide system is being seriously considered which would replace the OCS system now being employed in the Field Trial. This alternative might well be incorporated in the baseline and if so, would require some type of a priori estimates of effects. Estimates would tend to be based upon two complementary types of data: technical information about the performance of the system and estimates of the human response which determines how, and to what extent the system is utilized. Assuming also that continuation of the status quo is taken as the baseline it would therefore be

necessary to perform the following steps for establishing that baseline:

- identify significant linkages between the unit and the production of final output
- calculate the resource requirements necessary to produce the corresponding outputs for the baseline situation; and
- partition the resource flows according to their contributions to the individual final outputs.

These steps would be repeated to examine the project effects and to assess its impacts.

6. Cost of Activities

In the Federal Government, an accounting framework which works towards the accuracy and consistency needed for cost/benefit analysis is based on the concept of an activity element. An activity element is a work process (or project) occurring within a responsibility centre and producing a single type of output. Ideally, an accounting structure based on the concept of an activity element simplifies the decision-making task at the higher levels of allocative control.

Implementation of the activity structure approach is not a straightforward task since invoices do not arrive allocated to departmental activity elements and objectives. A responsibility structure performs a number of activity elements that fulfill, partially or completely, a set of departmental objectives.

The cost classification scheme of the Federal Government is a four-tiered system based on the standard, reporting, economic and line objects of expenditure.

The key to relating this scheme to an activity structure is the appropriate allocation of the economic objects to the different activity elements so that aggregations to a higher level in the classification structure by activity are accurate and consistent among levels and over time. For example, the economic object "rental of voice communication equipment" would be allocated between activity elements "park patrol" and "maintenance of facilities" under the activity "management of a public park".

In the Financial Reporting System the breakdown by activities is not routinely available. It could be accomplished at the Responsibility Centre level with appropriate allocation, however.

7. Evaluation of Impact on Final Output

For evaluating benefits it is necessary to estimate how much the relevant population would be willing to pay for the results of the project. Many units of government produce outputs which are used solely as inputs by other units. We therefore have included a step - discussed in Section 4 above - for linking such intermediate outputs to services provided to the public.

As an initial step in attempting to evaluate output, the order of magnitude of the potential impact attributable to the project in relation to the baseline value should be assessed. If the proportionate impact is likely to be very small, the characteristics of demand for the output need not be evaluated. Even if willingness-to-pay for additional units of output declines with increased production, the assumption of a constant value per unit, at the level of the last baseline unit produced, will not cause significant distortion. The Tax Interpretations unit at Customs and Excise, for example, probably holds a monopoly on the service it provides - advice and rulings on liability for excise taxes. Potentially the changes resulting from the Field Trial could have a significant proportionate impact on output.

The Field Trials present examples of three prominent types of government output, for which an extensive evaluation literature exists:

- Customs and Excise reduces the risk of payment of a penalty by firms liable for excise duties;
- National Defence reduces the risk of loss of life and limb, property and national autonomy;
- Environmental Protection Service reduces air and water pollution as well as the risk of loss of life and limb.

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