AN EVALUATION SYSTEM FOR REGIONAL DEVELOPMENT[*]

Leonard Apedaile, Victor Matthews, and Leonard Stewin[**]

Introduction

One of the major problems in studying economic and social development within a region is the dynamism of economic, sociological, political, and technical conditions. If deliberate intervention to facilitate regional development is to be effective, means to sensitize the ongoing program to these changing conditions and to ensure appropriate modifications of the initial proposals must be established. Developing these means is the primary goal of the evaluation system discussed in this paper.

Public intervention into economic and social systems may vary from un-supervised revenue transfers for regulating incentives to complete caretaker management of all social and economic activities.[1] Regardless of the type of public intervention, the various implications and effects of intervening must be known. This knowledge provides a basis for modification and improvement of developmental effects. To provide such a basis, any evaluation system must meet nine objectives.

Objectives of the Evaluation System

Assuming that specific goals have been previously delineated and that conscious, goal-oriented measures have been devised, the first objective is to provide documented performance feedback into the development process. This feedback ensures that unquestionably important consequences to alternative policies are not ignored [7] and that negative effects of the intervention are not neglected [12, p. 97]. This objective comes first because of the tendency

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[**]Departments of Agricultural Economics and Rural Sociology, Sociology, and Educational Psychology, respectively, University of Alberta.

[1]A distinction is made among the terms intervention, program and project. A collection of projects make a program. A program is the plan of action for intervention. Intervention is an act of public concern rooted in ideological and philosophical motivations of elected government(s).

of development interventions towards disjointed incrementalism in which
slogans, rumors, shibboleths and unanalyzable preconceptions endanger the
future economic and social well-being of people [5]. Only by examining
economic and social change, as well as the quantifiable attitudes of persons
affected by the intervention, can the relative success or failure of the
developmental program be assessed.

Interventions characteristically are composites of several projects
designed to implement specific aspects of the development plans. Whatever the
overall performance of the intervention, the effectiveness of each of these
projects is of paramount concern to administrators. The second objective, then,
is to provide information about the relative merits of individual projects in
terms of tangible and intangible measures, such as organizational efficiency,
time required to attain significant advances, and contributions toward inter-
vention goals. Achievement of this objective means avoiding low payoff projects
and achieving greater intervention efficiency [6, p. 87].

The third objective is closely related to the first in that feedback must
be formulated using objective, data-based evidence. Intervention typically
results from a stream of decisions emitted over time from several levels of
government and from many autonomous governmental agencies. Information feedback
arriving after decisions have been made provides interesting, if sometimes
shocking, reading. Because of this problem, the fourth objective is to provide
timely information to those organizations responsible for decisions in the
intervention process, and the fifth is to express this feedback information in
a form that is meaningful to the various decision makers.

Public intervention generally takes the form of facilitative action to
stimulate the private sector. The gestation periods before payoffs become
measurable and the characteristically long payoff streams delay full knowledge
of the wisdom of the investment. The sixth objective is to develop measures
that are sufficiently sensitive to changes within the gestation period to
enable adequate prediction of the payoff.

One of the early decisions in implementing interventions involves identi-
fying the region in which special legislative provisions will apply. Despite
an array of established regional boundaries, such as municipal districts,
school districts, counties, improvement districts, census divisions, and
agricultural reporting areas, a new area crossing these more traditional bound-
aries is generally selected. Surveys, enumerations, and opinion samples, all
of which are part of a planning input, follow the process of area selection.
By the time evaluation data needs are established, previously existing data
sources have been invalidated by boundary redefinition, and residents have
been surveyed to the point of hostility [9]. The seventh objective, therefore,
is to minimize data needs with respect to conditions of statistical reliability.

Data collection and statistical analysis imply that once a framework has
been established, the evaluation system can be carried out in a quasi-clerical
manner and in more than one intervention region. If a new evaluation system had
to be designed for every intervention, political patience and funding would
expire before evaluation feedback could begin. The design of a transferable

evaluation system could be considered an investment in a reproducible product in which the variable recurring cost would be minimal. Consequently, the eighth objective is that the evaluation system be transferable from inter-vention to intervention. The ninth objective prescribes that the system be routinized so that a minimum of expertise is required to attain the prior objectives.

Nine objective setting standards for evaluation systems have been outlined. They are, in review:

1. To provide documented performance feedback into the development process.

2. To provide documented feedback about the relative merits of individual projects within a development intervention.

3. To provide objective, data-based evidence as a foundation for the feedback.

4. To provide timely information to those organizations responsible for decisions in the intervention process.

5. To provide this information in a meaningful form to the various decision makers.

6. To provide development measures which are sufficiently sensitive to changes within the gestation period to enable adequate pre-diction of the payoff.

7. To minimize data needs subject to conditions of statistical reliability.

8. To provide for transferability of the system from intervention to intervention.

9. To be routine in the application of the system so that a minimum of expertise is required to attain the prior objectives.

The above objectives suggest that a nonstatistical, descriptive approach to evaluation is inadequate. An elaborate model featuring simultaneous equations or allied multivariate treatment seems equally lacking. Therefore, with these nine objectives in mind, the following proposal for an evaluation system is offered.

An Evaluation System

An evaluation system should be seen as a positioning of elements within a dimensional domain [1]. In addition to the usual dimensions of time and space, regional development programs include those of income, employment, social consciousness, and perceived power. The relative positions of these elements

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within the system indicate an underlying structure which is basic to under-
standing the system; that is, a given system is more than an aggregate of
elements bound together in paired relationships. The basic concept of a
system offered by Buckley [2, p. xxiv] shows that within a complex system
"the parts come to take on properties that they owe specifically to being
components of a larger whole." Therefore, it is necessary to examine the
structure of a system by considering its members in direct juxtaposed elements
belonging to the process of "explanation" rather than "understanding." This is
the notion of relational thinking employed in causal analysis, in which a
given effect is assumed to have a particular cause. Even complex causal
relationships may be reduced to terms of simplified two-member relationships.[2]
The analytical task is to select pairs of facts based upon identity, diversity,
and similarity from a multitude of data. The proposed evaluation system is a
process of explanation in which causal analysis is selectively applied to
relationships grouped as system subtypes or subsystems.

A taxonomic or classificatory approach contributes to systems thinking if
care is taken that pair-wise relationships do not dominate the analysis.
Taxonomically speaking, a subsystem may be conceived of as a collection of
self-contained relationships involving a cause (developmental program) among
causes and an effect (developmental success). Alternately, the subsystems may
be identified as connections of development success criteria, in juxtaposition
with environmental factors exogenous and causal factors endogenous to the
intervention. The evaluation system presented here is based on a taxonomy
which differentiates subsystems according to a success criterion. Within this
taxonomy, each subsystem includes a multiplicity of factors endogenous and
exogenous to the system, and the subsystem analysis should determine the
organization of these factors with respect both to each other and to the success
criterion. Each subsystem has linkages through the dimensional domain into
the other subsystems.

A schematic diagram of the evaluation system includes several subsystems
(Figure 1). The subsystems in this diagram have named success criteria
(spheres A, B, and C) as their core. Factors influencing these criteria or
criteria variables are represented by two orbits of spheres. The inner group
represents an exhaustive taxonomy of factors endogenous to the region, such as
the intervention process, intervention projects, local government policy, and
local private investment. The outer orbit represents exogenous factors, such
as federal counter-inflationary policy, fiscal and monetary policy, foreign
trade agreements, world market conditions, and a broad range of random events.
Although the exogenous factors may relate to more than one subsystem, they are
not shown to be directly related for evaluations of regional development. On
the other hand, more impact may be derived from the endogenous factors taken
together and with the exogenous factors than taken singly within subsystems.

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[2]Relational thinking is the basis for study of causation in which for an effect
a, there must exist a cause b.

Figure 1.   Schematic Representation of the Evaluation System for Regional
             Development Programs.

       Center group of spheres A, B, C, represent criteria variables (CV),
income, employment, achievement motivation, social power.

       Inner group of spheres represent regional endogenous explicative
factors such as the social action process, ARDA projects, endogenous
government, and local private investment.

       Other group of spheres represent regional exogenous explicative
factors such as government policy, foreign markets, and random elements.
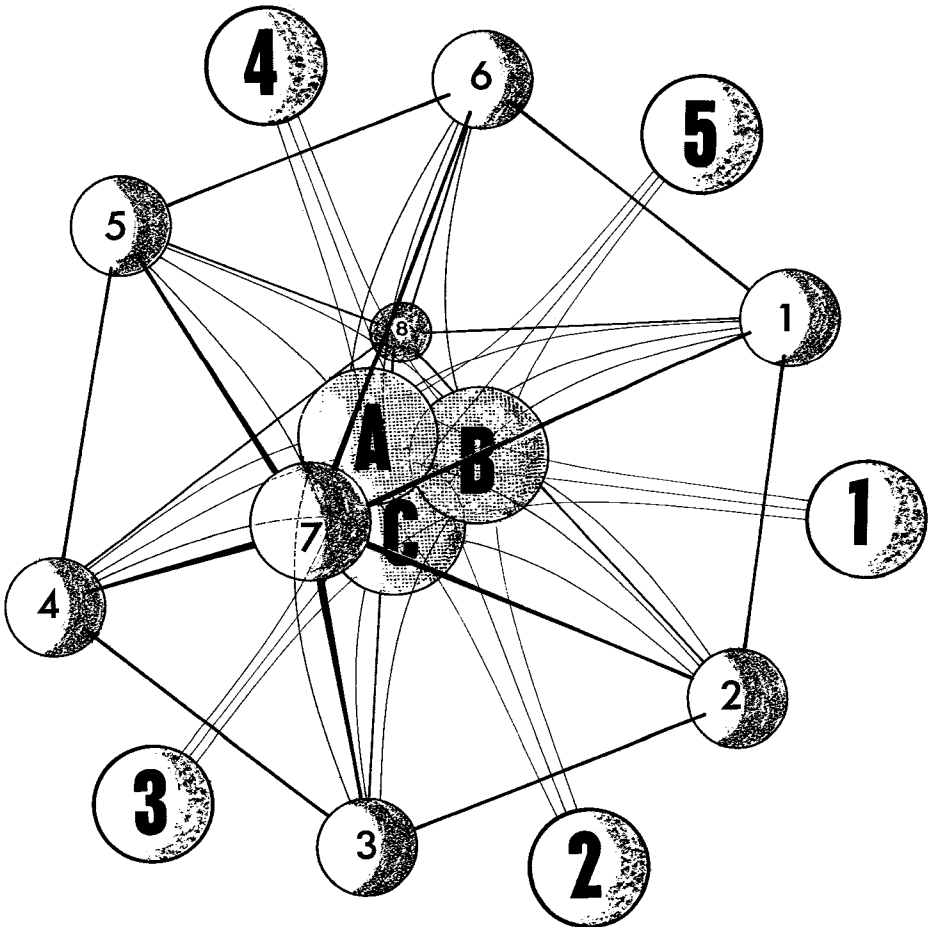
For the sake of clarity, the apparent tangle of lines does not fully represent
the connections among variables. However, the web-like structure, if complete,
would accurately connote the complexity of issues underlying regional develop-
ment or lack thereof.

To illustrate the necessity for looking at juxtapositioning, consider two
subsystems of two elements each (a total of four elements). The two success
criteria for the subsystems are societal achievement motivation and gross
regional product (GRP). Suppose that in the first subsystem, intervention
takes the form of social animation, in the second, recreational investment.
The linkage between these subsystems may be the time dimension; that is, a
recreational investment with the same time coordinate as a phase of social
animation could have a reinforcing impact on achievement motivation within
the region for social-psychological reasons [8]. Similarly, the juxtapositioning
or linkage within time coordinates could influence investment expectations
through other elements in the GRP subsystem. Linkages in this framework are
analogous to side effects in the Tinbergen-type policy framework [13].

The Methodological Phases

If it is assumed that the success criteria identifying the subsystems
have been suitably defined, the task of an evaluation system may be summarized
in terms of the following phases.

Phase I

1. Obtain statistically unbiased measures or estimates of the
    variable(s) comprising the success of performance criteria.

2. Obtain comparison bases for the criteria variables by
    rotating their time and/or space dimensions.

3. Document the congruity or incongruity of the criteria
    measures through the dimensional domains.

4. Infer statistical relevance to the congruity.

Phase II

1. Establish the dimensional domain for the factors exogenous
    to the intervention.

2. Establish the dimensional domain for the factors endogenous
    to the intervention.

3. Rank all factors in descending order of their pair-wise
    relationships to the criteria variables according to an
    aprioristic estimate of the probable intensity of causality.

4. Select a probability threshold (although arbitrary, it should
    be at least 50 per cent) and document the actual relation-
    ships with aprioristic probabilities greater than this threshold.

5. Specify documentable linkages through time, and/or space with other subsystems in terms of the secondary impact on the criteria variables vis-a-vis a particular subsystem.

6. Infer policy alternatives on the basis of documented and/or other validated causalities capable of producing desirable values for the criteria variables.

7. Separate the policy alternatives into relevant existing juris-dictional domains defined as clients from outside the evaluation system.

These steps follow standard scientific procedure in that, assuming an ergodic subsystem in the development process, the ultimate evaluative test is the opportunity to falsify the intervention [11]. It is important to note that the success criteria may not pertain according to Phase I of the evaluation because the causal relations implied by intervention may be erroneous. In other cases, however, not only will a rigorous evaluation system document success, but it will also provide positive policy alternatives as feedback into the intervention process.

Criteria Variables

Planned development should facilitate a region's ability to perpetuate self-development [4]. The overall criteria of successful intervention, there-fore, is a region's ability for continuing achievement beyond the initial goals of the program. Not only must the fixed goals be achieved, but the development system must be capable of maintaining performance. In this context, goal achievement cannot be considered a sufficient condition for success. However, goal achievement is a necessary condition and, requires the analytical evaluation of Phase I in the evaluation system.

The number of criteria variables (CV) is initially restricted to minimize complexity and to facilitate the design and testing of system components. The criteria variables are defined qualitatively and include those economic, social, and psychological variables which demonstrably reveal the success of develop-mental programs. There is a close link between the criteria variables and the targets and goals of the development plan. When the plan is specific and the targets appropriate and adequate, they provide the majority of the criteria variables for evaluation purposes. However, if the targets are too general or if they only partially represent the required considerations for a region, criteria variables must be designated as the program evolves. The criteria variables and the planned targets link the evaluation system to the development intervention. The evaluation system being target non-specific thus may be generalized to many regional development programs without ignoring the special nature of each program because relevant criteria variables are chosen in each instance.

Once the criteria variables are identified, quantitative measurement may

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be undertaken. At least two independent measures must be made, one in the time and space dimension relevant to the intervention program, and the other in an independent time and space dimension to provide a basis for comparison.

Base measurements of the criteria variables provide an evaluative per-spective. Although the estimates for the nation, province, and region may not be strictly comparable, qualified comparisons may be made. Unqualified com-parisons require base measurements for the region itself before the intervention begins. Therefore, the evaluation system should be implemented concurrently with the definition of the intervention region to avoid contamination of the baseline measurements by aroused expectations. This preoccupation would not be so urgent for physical resource measures, production data, and regional accounts. However, social variables, especially psychological expectations, motivation, values, consumption propensities, migration, and other behavioral parameters, are extremely sensitive to rumors and news of intervention plans. Local involvement in programming and planning intensifies the probability of early aberration in baseline information. Evaluations begun after inter-ventions are conceived will be necessarily limited in their conclusiveness.

The interrelationships of the criteria variables may be mathematically defined to provide indices for change in economic and social variables. These indices would summarize the qualities of the criteria variables. For example, one index could be the distribution of income levels over geographic subareas and technical skills. Similarly, the various aspects of employment, power over the environment, and ambition would constitute three indices. The final index would compile all criteria variables into one score of economic and social change (Figure 2).

Inference by statistical or other means from interrelationships among criteria variables and from comparisons with base measures poses certain difficulties. The principal difficulty is selecting an appropriate level of significance. The great variance associated with economic and social variables suggests that confidence levels of 90 to 95 per cent could only be achieved through an obvious incongruency with the base values (CV') or through large relative changes within the criteria variables themselves. In such cases, statistical considerations such as bias and efficiency would be of peripheral concern. The real problem exists because of the evolutionary character of development in which changes are small, yet subject to the usual high variance. Therefore, the best approach would seem to be variation of the level of signi-ficance from 70 to 99 per cent, depending on the situation desired test power and the nature of the particular variable. Discretionary selection based on a theoretical understanding of the variable in question could be a realistic way of dealing with variance disparity. Even so, the problem of drawing in-ference has not been resolved in this evaluation system.

Factors Influencing Criteria Variables

In an open system, such as any possible region of Canada, many forces may act upon the criteria variables. These forces include:
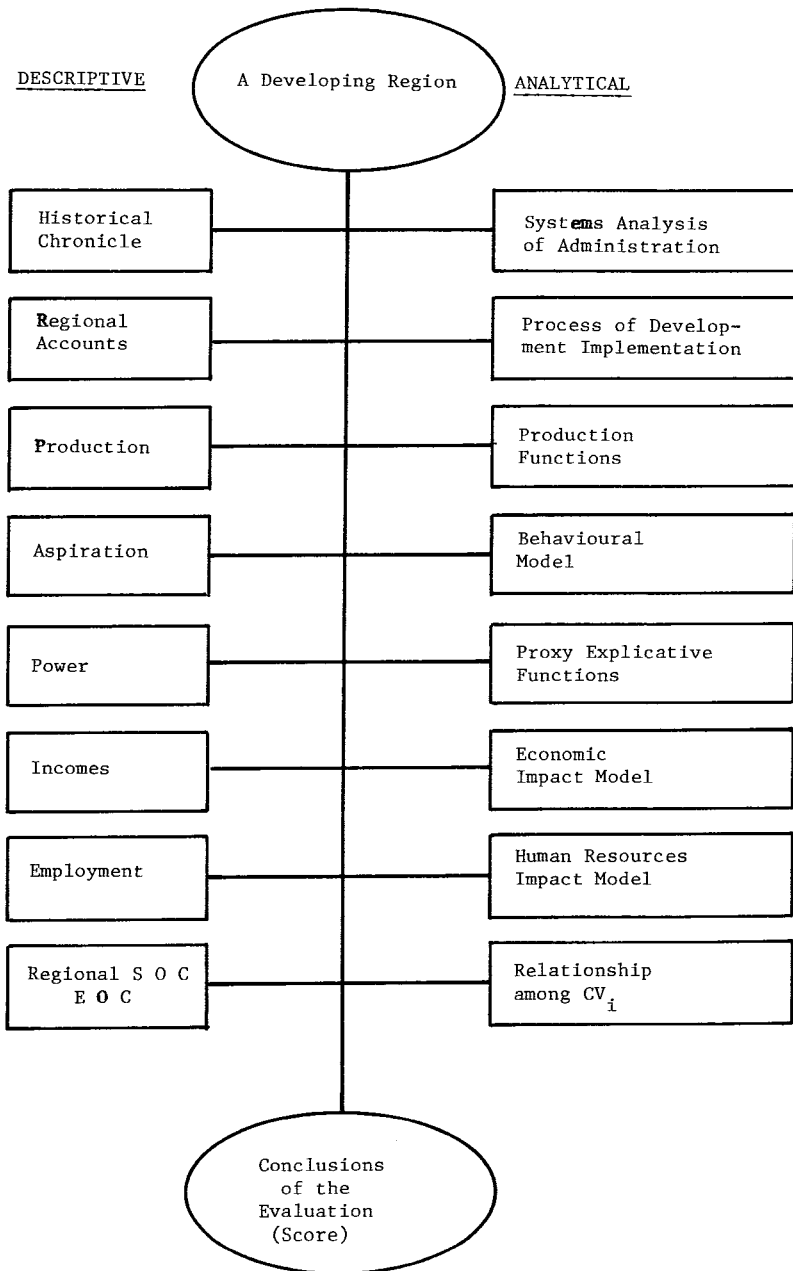
Figure 2. Descriptive and Analytical Components of the Evaluation System
Categorized by Criteria Variables (CV) and Emphasizing the
Possibility of Generating an Evaluation Score.

-- newcomers to the region holding influential positions within
   the structure of that region.

-- the importing of most consumer goods and exporting of regional
   products.

-- the importing of most technical innovations.

-- the "foreign" or external nature of governmental services.

-- the changing value system promulgated by the mass media.

-- the presence of a publicly financed development program
   within the region.

It is important that the evaluation system identify and interpret the unique
contribution of the development program. This identification requires that
the relative impact of other factors be statistically controlled while the
contribution of the developmental program is determined.

To attain this goal the "ideals approach" seems appropriate. With this
approach all possible explicative factors (EF) are identified as, for example,
in Figure 3. They are classified as endogenous to the intervention, autonomous
yet endogenous to the region, exogenous, and random. Within each of these
categories are several areas of influence requiring analysis, resulting in
suggestions for at least two levels of policy adjustment. As an operational
strategy, a ranking in descending order of a priori importance of explicative
ability should be made. The explicative factors are considered in the ranked
order and examined to determine the manner in which each factor influences
the criteria variables (CV). The influence can be shown in general functional
form

$$CV = H~[EF],$$

where H is the functional operation. Such a functional belongs to the process
of explanation and, therefore, causal analysis. Within the vector EF lie the
factors comprising the intervention. The main question to be answered by
studying such a functional is whether these factors could conceivably be
responsible for the observed CF vector. In more detail suppose that for the
ith criterion variable, there exist three explicative factors:

$$CV_i = H_i~[EF_1, EF_2, EF_3]$$

If each EF is hypothesized to influence CV_i in two ways, these ways may be
represented using a function operator h:

$$h_{ij1}~(EF_j) \text{ and } h_{ij2}~(EF_j)$$
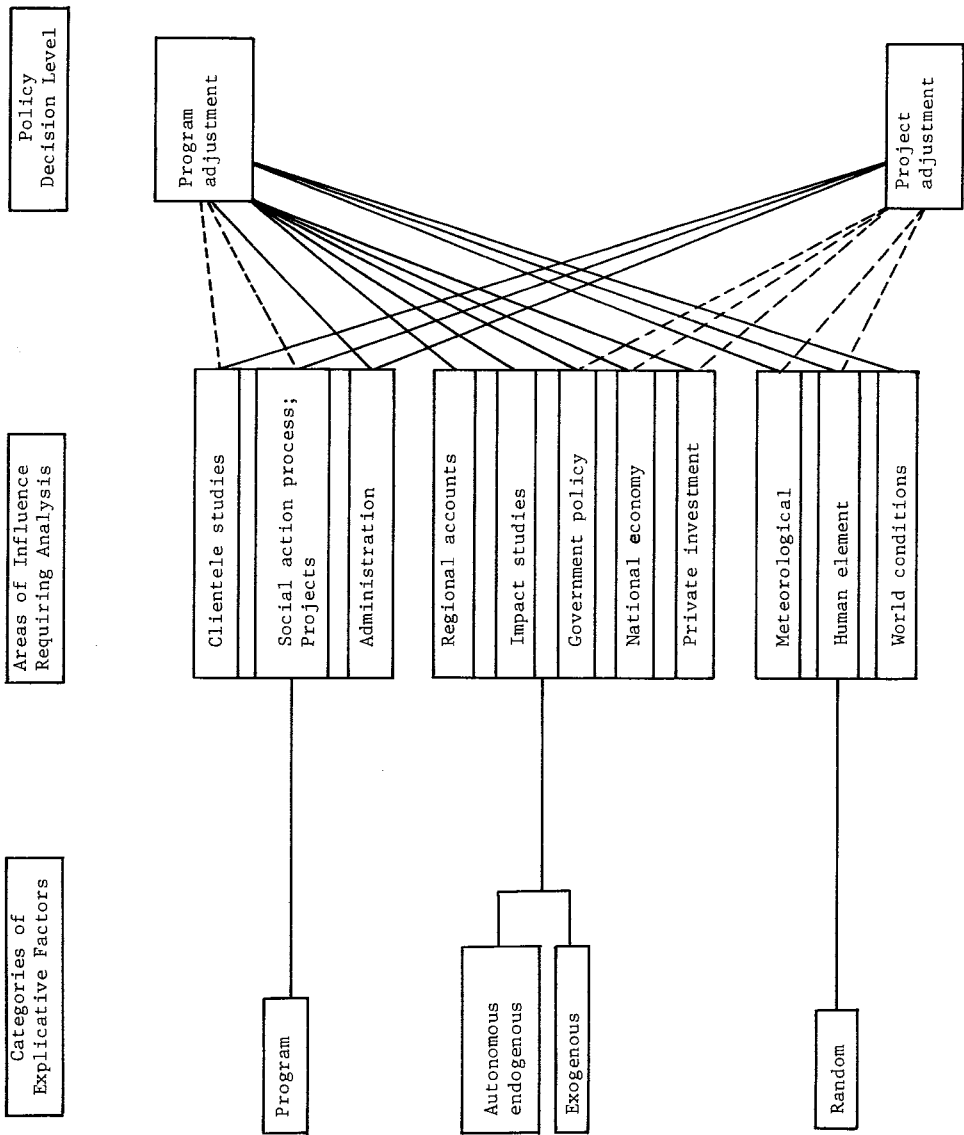
The whole expression looks like

Figure 3.   Analysis of Attribution of Regional Performance to Explicative Factors

$$CV_i = H_i \, [h_{i11} \, (EF_1), \, h_{i12} \, (EF_1), \, h_{i21} \, (EF_2), \, h_{i22} \, (EF_2), \, h_{i31} \, (EF_3),$$
$$h_{i32} \, (EF_3)]$$

or

$$CV_i = H_i \, [h_{ijk} \, (EF)]$$

where the subscripts are:

i = 1 through n, (n = 5 or 6)   = number of criteria variables
j = 1 through m, (m = 3 or 4)   = number of explicative factors
k = 1 through r, (r = 1, 2 or 3)   = number of ways in which the jth
                                     explicative factor may influence
                                     the ith criterion variable.

The analysis of this functional should allow for comparisons of the explicative factors (EF_j) according to the function operators (H_{ijk}) and the functional operator H_i. Clientele studies are a practical way to estimate these relationships. Usually intervention projects are oriented to well defined groups of people like welfare recipients, commercial farmers, large corporations, or Metis communities. A clientele study samples the relevant clientele to document the way projects influence their well being. Explicative factors are easier to identify and the clients of the evaluation discover why their projects succeeded or failed.

Understanding the manner in which the explicative factors affect the criteria variables leads both to a re-ranking of the explicative factors and to a decision about the relative ability of particular factors to explain variation within the criteria variables. Making interpretive decisions about the relative ability of particular factors to explain variation in a causal or explanatory manner is currently a rare talent. Ideally, as in the case of fertilizer, animal nutrition, or hail suppression, technical relationships having a low degree of probabilistic behavior exist. However, as noted earlier, economic, social and psychological relationships, even well-known, are subject to high probabilistic variation [10]. Therefore, any decision as to the influence of explicative factors on criteria variables must be stated in probabilistic terms. Both the ways in which these types of probabilities are calculated and the levels considered to be acceptable indications of influence need considerable investigation. Who should carry out such investigation and who is interested is the subject of the next section.

Authors and Clients of Evaluations

Evaluation is an integral part of the planning, programming, budgeting, and administration of interventions. Broadly speaking, the clients of evaluation are the policy or decision makers at the various stages of development planning. When the decision making is decentralized, clients may be classified accordingly. Consider a hypothetical, two-way classification of levels and types of decisions. The classification is a three-level continuum representing a progression from

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short run to long run decisions. The three levels of responsibility are the
federal and provincial governments and regional staff. The hypothetical rates
of participation in the continuum of decision making at the various levels are
numbers ranging from one to ten. These numbers add to ten across horizontal
levels representing the total contribution of decisions by the three levels.
There are also the types of decisions grouped under four general categories.
Administration, programming, budgeting, and planning. Evaluation is directed
to these kinds of decisions, as well as to their authors.

The relative contribution of each level of responsibility for decisions
should be a good indicator for identifying the evaluation client. Each level
is really a shareholder with a stake in the outcomes of decisions. The
relative contribution to any decision by a particular level or shareholder is
defined as the ratio of the participation rate of that level to the highest
participation rate for the decision category. For example, within the extreme
right-hand decision category of Figure 4, the contribution of the provincial
government relative to the federal is 3/7 (43 per cent). If the participation
threshold were 50 per cent, then only the federal government would be a client
for this kind of evaluation. In neither case would the regional level be
considered a major shareholder or a client.

After determining the client, the authorship of evaluations must be
settled. Two groups are possible: an in-house evaluation team or an indepen-
dent evaluation team. Logically speaking, the less vested interest evaluators
have in the decisions being scrutinized, the better. However, access to
internal processes and a feeling for program soul are not usually available
to personnel outside a program. Wherever tactics, efficiency, and cost
effectiveness are concerned, especially in a day-to-day decision context,
evaluations may be conducted by administrators themselves or by specially
established in-house groups responsible to the ultimate vested interests.
But when the criteria variables concern regional performance and decisions
relating to policy and strategy, greater depth of evaluation is needed and
more time is available between decisions. Freedom from ego involvement,
political interests, or concern for personal advancement is required. Outside
independent evaluation teams or evaluation procedures maximize the probability
of refuting established policies.

The role of the outside evaluator thus becomes clear. For reasons of
feedback timeliness, his primary concern should be the performance of the
region and the inference of responsibility for said performance (or lack
thereof). The issue is not that of competence among program personnel, but
rather that of the structure and organization of the administrative and
planning units. It is not that of case performance, but rather the degree of
problem penetration and regional change through intervention. Basic assump-
tions, goals, and policy are the subject matter for outside evaluation. This
subject matter is relevant at the higher levels of responsibility, which are
consequently, the principal clients for outside evaluation.

In the hypothetical client classification, the shaded areas represent the
interaction of client and decision category. The numbers in each cell could be
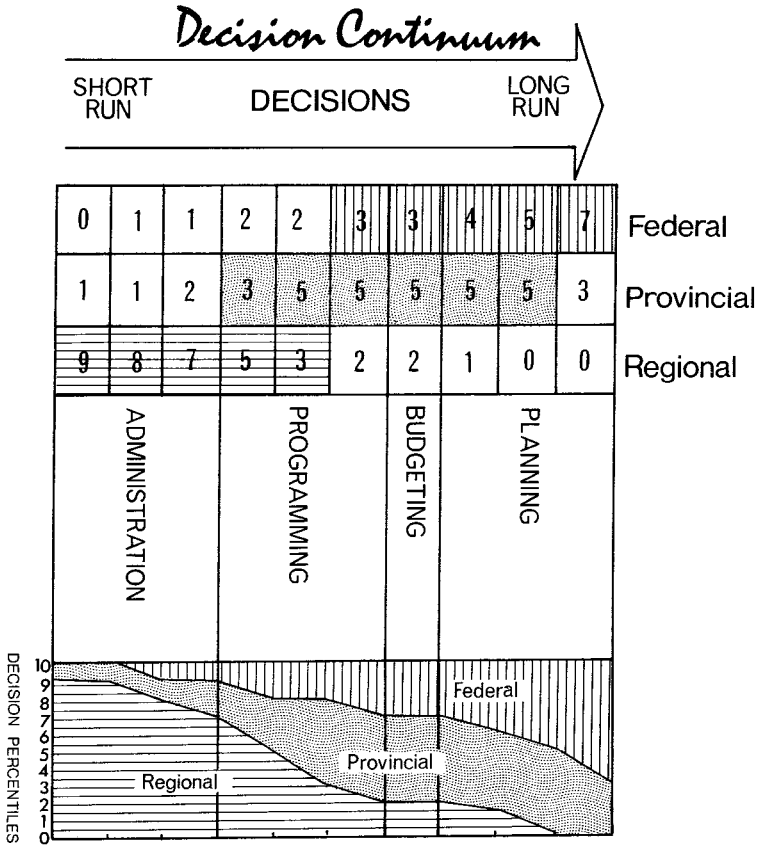
Figure 4.   A Hypothetical Client/Decision Classification for Evaluations of Regional Development Interventions.

used to decide who should evaluate and for what decision level. Ideally, feed-
back from evaluations could be harmonized with the periodicity of decision
making. However, the decision sequences are not as differentiated in reality
as the ten cells imply, nor are the major categories of decisions arrived at in
discrete fashion. Rather, interventions characteristically evolve so as to
require an integrated stream of feedback available to decision makers as they
need it. In spite of this continuous nature of decision making, it seems
clear from the diagram that outside evaluation would have both the provincial
and federal governments as clients for basic programming, all budgeting, and
all but extremely long run planning decisions. Administrative decisions and
part of the programming could be evaluated by an in-house group at the provincial
level with the regional level being the sole client for the administrative
component of the evaluation. [3]

Summary and Conclusions

The evaluation system is summarized in Figure 5, showing an operationally
oriented flow chart which may be compared to Figure 1. The systems nature of
the evaluation is illustrated, pointing out the connections among the pro-
cedural aspects of the proposed evaluation system. The diamond-shaped decision
points correspond to the crucial kinds of conclusions most sought after by
clients of the evaluation. These conclusions are about what happened, why it
happened, and whether clients are better off. The other results contribute to
planning, programming, and administration. This step-by-step analytical
procedure forms the basis for the routinizing and transferability of the system.

The rationale for this system is the multiple dimensionality of regional
development, encompassed by both the developmental program and the evaluation
system. This paper defines the scope of action, priorities, and type of
analysis for an evaluation system for regional development. The purpose is to
guide and integrate interdisciplinary research concerning developmental
programs. Research should flow from this system into a broader and broader
set of subsystems. The product must be a simple, workable evaluation system
that conforms to the objectives outlined at the beginning of this paper.

In conclusion, there seem to be two basic steps for an evaluation. The
first is to ascertain performance in terms of stated intervention targets or
other perspectives. Second, no matter what the outcome, the clients of an
evaluation want to know why in terms of the intervention philosophy, strategy,
and projects. Outside evaluators should be used where possible, especially
for generating feedback into major policy decisions. Current operating decisions
may be substantially aided by in-house evaluation.

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[3]These conclusions apply strictly to evaluation of regional interventions. Quite
naturally other evaluation possibilities exist for overall performance of govern-
ment agencies and departments. Even if performance is within the context for
regional progress, in-house evaluation may have a large role to play in monitoring
departmental efficiency much in the context of internal auditing.

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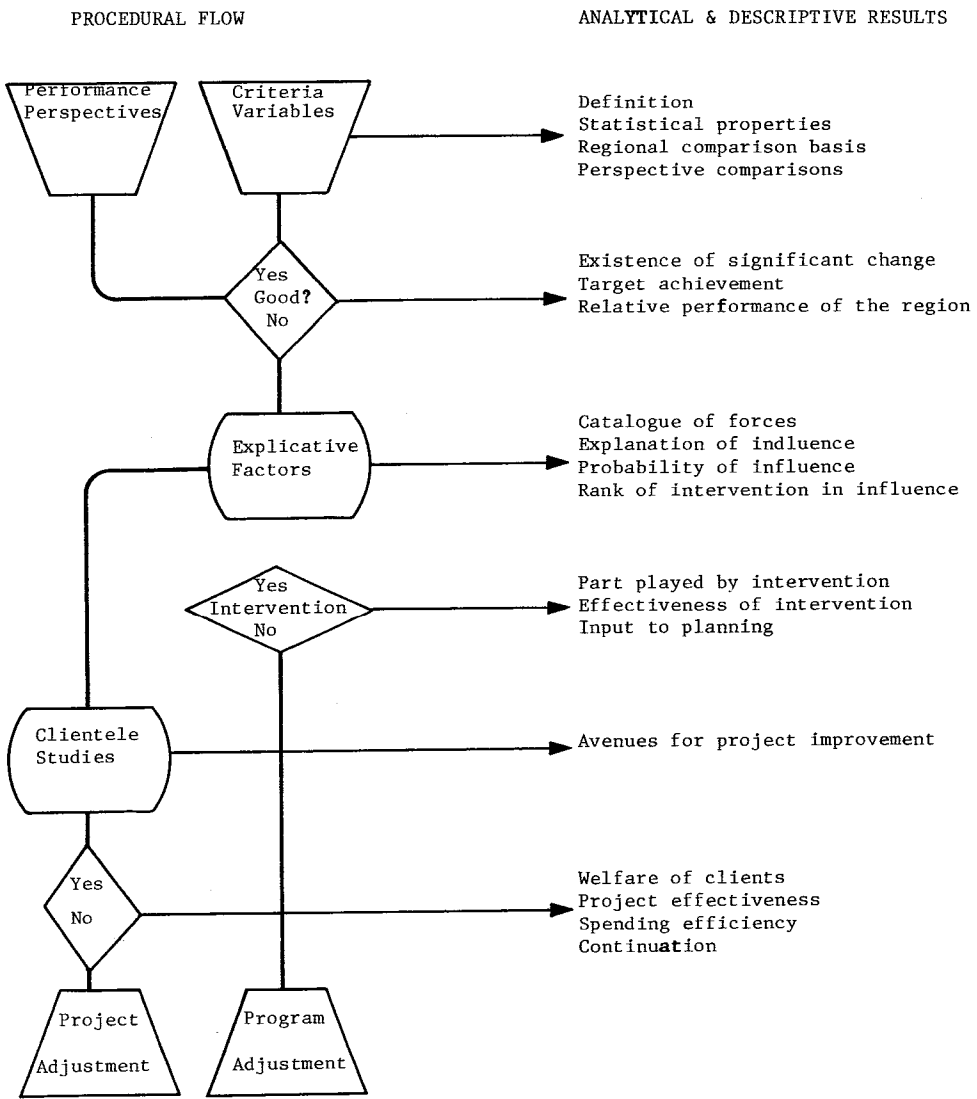PROCEDURAL FLOW   ANALYTICAL & DESCRIPTIVE RESULTS

Figure 5. Connections of the Procedural Aspects with the Anticipated Results
of the Proposed Evaluation System.

The most fundamental conclusion is that a multidisciplinary team approach is the only way to assess adequately the economic, social, and psychological dimensions of regional interventions. Indeed, aspects of the institutional structure of planning and administration and ecological concern belong at the head of a list of items for evaluation. Future evaluations should start with a team approach when a region is first delineated. Failure to do so jeopardizes conclusiveness of results and risks misleading the people in a region and clients at all levels of government.

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