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ABSTRACT
        The primary purpose of this paper is to present a
possible means to establish a new social indicators intelligence
system that embodies a relations testing capacity. Major ideas
defined and described include social indicators, theory, model,
policy research, and democratic action. A paradigm covers the
movement from theory to model and action. Three examples are used to
show the inference from model to reality. It was noted that a system
for the construction, collection, and analysis of social indicators
should not be isolated from other intellectual and political
endeavors. It is argued that a single best utilization of social
indicators research exists within the policy research and analysis
domain that will respect the functioning of the democratic system.
(PS)

SOCIAL INDICATORS FOR POLICY

RESEARCH AND DEMOCRATIC ACTION:

A PARADIGM AND SOME EXAMPLES.

by

S. Sismondo

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I - INTRODUCTION

The primary purpose of this paper is to present a possible means for the establishment of a new social indicators intelligence system that embodies a relations testing capacity. The last few pages of the text are therefore a proposal. The preceding material is judged necessary to justify what is being proposed.

Several years of experience in social monitoring under the auspices of the Canada NewStart Program have led me to see the key aspects of social indicators as the institutional framework within which they are analyzed and utilized, and the client system established for them. In this paper the institutional framework and client system are given prime consideration. Before that is done, however, the design characteristics of appropriate social indicators are presented in conjunction with a discussion of their relation to theory and testing models. The conclusions of this abstract presentation are then fed into and schematically organized by what we have named a "paradigm of policy research and democratic action." The paradigm emphasizes the centrality of political components in the envisaged system, and stresses the hereby postulated need for preservation of democratic institutions. Social indicators are designed in the first section with a view to their utilization by policy research institutions to maximize social welfare intelligence within the democratic framework.

The strength of the proposal is in the congruence of social indicators as defined herein and the institutional activities which they are meant to serve, and in the experimental activities outlined in the

last section of the paper. Examples from experience are given which
demonstrate the feasibility of at least parts of what is finally proposed,
and which lead by extrapolation to what is possible to imagine in the
fields of action-research, policy-research, development planning, and
social monitoring.

II - DEFINITIONS AND REFERITIONS

Whether we enjoy it or not we must begin with attention to
definition of terms. Since this paper is concerned with the integration
of five concepts -- social indicator, theory, model, policy research, and
democratic action -- it is inescapable that a large part of it is
concerned with defining these terms. The definitions given are necessary
in order to put forth the argument coherently. They are not meant to
debunk anyone else's definitions, nor to put an end to the current
proliferation of offered alternatives. Acceptance of given definitions is
not absolutely necessary either to comprehension or evaluation of the
later two parts of the presentation. The value of Parts III and IV is
not entirely contingent on total agreement with Part II. There may be,
in other words, different roads to the same results. Yet, if we are to
propose and develop an adequate resolution to social indicators problems
(cf. Part IV) we must give careful consideration to the theoretical and
methodological tools which are utilized by the structure finally proposed.
To this effect follow definitions of the most central concepts of this
discussion and brief expositions of what can be formally derived from
their junctions.

Social Indicator

A social indicator is a social variable. If a social
indicator is to be useful to the policy research structure proposed (cf.
Part IV, again) then it will be distinguished from other social variables
by the following characteristics (cf. Land, 1971):

(a) it exists, at least potentially, in the form
of a time series of comparable observations,

(b) has *formal meaning* in that is represents a
concept, and has *empirical meaning* in that it
possesses empirical referent(s), and

(c) it is necessary to the formulation of policy
either because it specifies, represents,
qualifies, quantifies, or describes,

(i) a policy,

(ii) a desired outcome state, or

(iii) an intermediate concept which is
deterministically related to a policy
on one hand and on the other to an
outcome, or to another social indicator
(which by definition satisfies
condition (c)).

The above definition is founded on the understanding that
chaotic accumulation of partially interpreted data, and of disjointed and
inconsistent sets of hypotheses (which too often pass for theories) are
not conducive to a lucid social scientific discipline. Collecting socio-
logical information is a necessary but insufficient condition to the
creation of a sociological science. What a programme for sociology calls
for is the replacement of each data set by a variable of some abstraction,
for all science involves in one way or another relations between
abstractions. The data are to become simply the range over which the
variable prevails (refers, obtains, exists) or is known to prevail;

predetermining the range is as important a scientific hypothesis as the formulation of the variable's definition -- it is in fact a necessary part of the definition.

Moreover the above definition of social indicator takes issue with the belief that experience is the only means for definition of social scientific concepts (a tenet of operationalism). A social indicator can be defined by its conceptual meaning, that is by its given concept-concept relations (which it must have for the heuristic value of theory), and/or by its operational or empirical meaning, that is its concept-thing relations. The latter (concept-thing) process is better named *referition* than definition (Bunge, 1967a, p. 22).

In our work we need do both: we define a variable by its abstract relations to other variables, and we assign it specified extension and intension. Subsequently we compare our variable to data to determine correspondence. Should we find congruence in the two processes we have determined the degree of validity of the variable, that is we have established how intensionally and extensionally precise it is and we have established that is has a *real referent* (Bunge, 1967b, p. 156). A valid variable, in other words, is one that meets both logical and semantic criteria in the formal sense, and testability in the empirical sense. For example, the concept "Locus of Control" (Rotter, 1954) is defined in terms of its hypothesized relations to learning theory and its unidimensionality is given by intension. If orthogonal and oblique factor analytic models of analysis of questionnaire data (the questionnaire items are definitions by extension) and/or some other procedure for establishing unidimensionality such as Guttman Scaling, smallest space analysis, and so on, fail to yield

a major unidimensional factor with positive loadings of all variables,
the concept is not valid for construction of theory relating to the
population tested. Redefinition is necessary, not only rereferition (!)
as is usually done.

The selectivity-comprehensiveness and abstraction-specificity
dimensions (often treated as "issues" in social indicator literature) are
not useful criteria for definition of social indicators. They do however
help us identify several problems associated with social indicator proposals.

Moving upward in the selectivity-comprehensiveness continuum
by means of consecutive factor analytic or other data reduction procedures
rapidly reaches the absurd construction of indicators possessing *referents*
in the data (although much removed) but no concept-concept relations and
thus no formal *definers*. Clearly such indicators are excluded from my
definition since they fail to meet criteria (b) and (c). Being non-
concepts they are of restricted use to science, since science needs the
heuristic imput of theory and deals exclusively with concepts and their
referents. And such indicators are of no use to policy formulation since
their absence of concept-concept relations places them outside the
language of policy discourse: they can be tied to no theory or model that
explains their existence, range and/or change. Therefore we argue that
construction of highly comprehensive indicators derived from consecutive
data reduction procedures is a useful exercise for undergraduate students
of statistics and programming, but hardly of use to anyone else (save
perhaps to demagogic politicians and to their periodic orations).

Highly abstract indicators, in contrast to highly comprehensive
ones, are of potential use to science, since science is not constrained by

referition. Their use to policy, and thus their inclusion among my social indicators, however, hinges not only on their having seemingly faithful referitions in the data, but also on the existence of their reasonable conceptual referents which pass a test of interpersonal comprehensibility.

An example that does not meet these requirements is the "Grand Utility Function" conception of a social indicator which is an estimate of a mythical univariate cardinal utility function also known as the "Gross Social Product". This highly abstract absurdly comprehensive concept, which wittingly mimics "Gross National Product" (Madden, 1972), may be logically consistent and with sufficient selection skills may be made to fit certain data. In contrast to "Gross National Product" however, "Gross Social Product" has dubious meaning since it has no concept-concept relations and utilizes an obscure notion of utility which will unlikely pass a test of interpersonal acceptance.* "Gross National Product" is logically and semantically meaningful because it is indeed unidimensional, its measurement (with varying degrees of success) has been accomplished, and its conceptual relations to other variables have been formulated. All attempts at aggregation of social utilities, on the other hand, yield multidimensional solutions (necessarily partially ordered) thus leaving

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* In Arrow's (1951) words no such aggregate index of utility can be constructed without violating the so called "non-dictatorship" condition because the complete ordering of a necessarily partial order of social states is impossible without weighting of individual preferences; for the formal proof see Arrow's work. For a more general approach and for further discussion of construction of utility functions (social utility indicators) see p. 36.

measures such as the unified "Gross Social Product" void of conceptual referents. If no unequivocal meaning can be attributed to it, "Gross Social Product" falls into the category of non-concepts, or more precisely into the category of meaningless symbols.

Being now relatively clear regarding the extension and intension of social indicators let me attempt next a typology for social indicators (cf. Land, 1971; Madden, 1972). Five classes only seem to be required:

1. Policy instrument descriptive indicators.

   System parameters. Qualitative policy decisions. Quantitative allocation policies.

2. Non-manipulable descriptive indicators.

   Aggregate descriptions. Structural descriptions (cf. Eberts, 1972; Young, 1972).

3. Goal indicators (socially desired outcomes).

   Defining physical states. Defining psychic states.

4. Quantitative coefficients relating the above three categories of indicators (binary included).

5. Utility functions of goal attainment and preference and indifference functions for differing sets of goal attainments.

Since these ideas have been reasonably well explicated by others (i.e., cf. Easton, 1965, in addition to the above citations) only few words of explanation are necessary. First, all types listed, including (4) and (5), are time series of social statistics. Interestingly, the latter two types are of highly abstract character. Second, the first three types (and in certain instances the fifth also) can be aggregated or disaggregated as theoretical requirements demand, always respecting

constraints imposed by proper semantic interpretation; for instance a system parameter can be conceived as the constant "all current legislation which sets the limits of free enterprise," or could be disaggregated to the variable "the rate of value added tax." Third, it is unimportant whether variables are conceived as quantitative or qualitative (another straw man of social indicator literature); binary treatment of any number of qualitative alternatives can be entertained logically and mathematically. And fourth, a typology is built not for the sake of elegance but to be of use to further argument, so let me explore where it leads to in the discussion of theory and model.

Theory

A theory is a set of hypotheses connected by the relation of deducibility or entailment. It is composed of three types of statements: basic assumptions (i.e. "Canada is a liberal democracy"), definitions (concept-concept relations, i.e. "democracy is the system of government based on the open market place of votes..."), and deducible or entailed statements bound by the laws of logic (i.e. "all individuals x pertaining to the set of Canadians C... have the right to vote R..., $(\forall x)(x \epsilon C \Rightarrow Rx)$), also concept-concept relations. Each element of this set is part of a logical tree 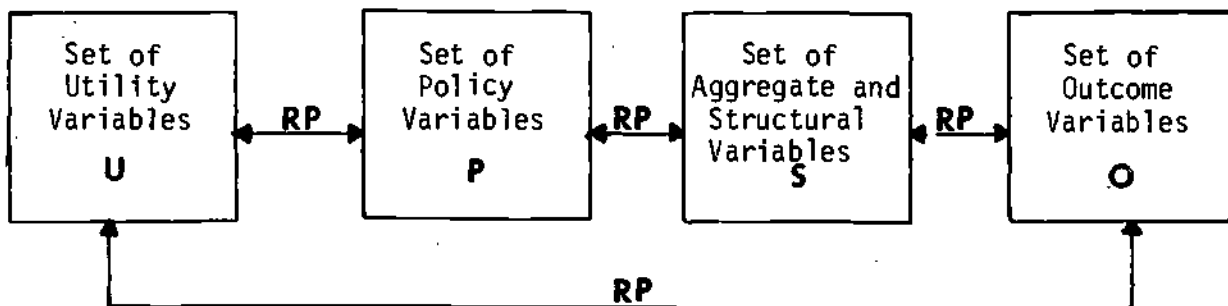which has the following two characteristics: (1) *external consistency*, its statements are consistent with related, but not competitive, theories in the same discipline; and (2) *unity of reference*, its concepts have referents of the same class (i.e. cities, formal organizations). The logical tree has an axiom base which ideally has the following two characteristics (among other *desiderata*):

(1) *primitive independence,* its definitions are derived independently of each other; and (2) *completeness,* it is sufficient for the derivation of all conclusions. (cf. Bunge, 1967a, p. 59).

But the above applies to all types of theory (speculative, normative, and empirical); a theory for my purposes must be defined more restrictively. Empirical theory is of more immediate interest to policy and sociology, and empirical theory also has the characteristics of systematizing knowledge and offering a mapping of certain domains of -- -- reality (I will impose further restrictions on theories pertaining to policy research). A theory, if it is to be empirically relevant must be testable, that is it must be capable of isomorphic translation into relations between its referents. Briefly then a social scientific theory must obey the laws of logical structure and mathematical formalism, must have social-system meaning (a set of referents for each of its concepts belonging to a homogeneous class of objects), and must be testable by its confrontation with empirical refere its in the form of data. The latter two conditions are equivalent to specifying that it includes semantical assumptions in the form of interpretation hypotheses. Namely, what is said of its formal concepts must be capable of interpretation for its objective referents.

We need theory, and we begin by theory, because theory is not an *a-posteriori* ordering of data, it is a producer of hypotheses, and a guide to data collection. Theories are invented, not inferred from data

(cf. Popper, 1963).* Given a policy problem the first issue to be
resolved is the formulation of a theory which connects five classes of
concepts. The five classes are conceptual abstractions corresponding to
the five types of social indicators of the previous typology. Following
is a diagram of theory envisaged for policy research.

Set of Utility Variables U		Set of Policy Variables P		Set of Aggregate and Structural Variables S		Set of Outcome Variables O
	◄ RP ►		◄ RP ►		◄ RP ►	

RP

The arrows simply indicate the existence of relational
propositions (RP's) between variables and classes of variables. Non
quantitative relational propositions are most often of the "if-then" or
"if-and-only-if" types. Quantitative relational propositions are most
often (although not necessarily) translatable to statements of the
functional families representing both gain and growth models:

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* For psychology and cybernetics we are advancing too fast. The mind
that invents a theory or formulates a hypothesis bases its lucubration
on experiential data and inference. Invention can take place
simultaneously with the manipulation of data and is often prompted by
it. I do not allow this argument to alter a conception of the
scientific endeavor which begins with the formulation of an abstract
theory. The existence of mind is assumed and its work prior to
formulating a scientific theory is also assumed but disregarded. The
elaboration of this pre-scientific phenomenon is the subject of
certain speculative domains of pyschology, see for instance A. Koestler,
The Act of Creation.

$$\Delta o_{lt} = \Phi \left[\beta_{k\kappa}(t), \Delta s_{k,t-\kappa} \right]; \quad o_l \in O; \quad s_k \in S;*$$

$$\Delta s_{kt} = \Theta \left[\gamma_{j\kappa}(t), \Delta p_{j,t-\kappa} \right]; \quad p_j \in P;$$

or,

$$\frac{do_l}{dt} = \Phi \left[\beta_k(t), \frac{ds_k}{dt} \right]$$

$$\frac{ds_k}{dt} = \Theta \left[\gamma_j(t), \frac{dp_j}{dt} \right]**$$

The value of the variable parameters (β) and (γ) constitute time series named *coefficients*, or the fourth type of social indicator in the typology above. Relational propositions should as often as possible be of the logical family:

$$\Delta u_i \Rightarrow \Delta p_j \Rightarrow \Delta s_k \Rightarrow \Delta o_l, \text{ for some } (i, j, k, l),$$

where the relational $\Rightarrow$ signifies: *implies, entails, gives rise to,* or *determines.* A probability will be attached to the conditional. Thus statements will be read: "It is possible, with probability p, that the conditional $\Delta p_j \Rightarrow \Delta s_k$ holds."

The importance of this digression lies in dispelling fears that this conception of theory for policy research implies exclusively causal relations. This last straw man of social indicator literature

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* Read: change of an output variable (o_l) through time is equal to a function of time-lagged changes of structural variables (s_k) and the associated coefficients (β_k) which are in turn time-series.

** Read: the rate of change of a structural variable (s_k) over time is equal to a function of rates of change of policy variables (p_j) and their associated coefficients (γ_j).

must also be placed in the correct perspective. Causality, more than
mere temporal precedence, implies in one or another way a relation of
production. Production of social phenomena cannot be described at an
aggregate-sociological level since it is only the activity of individuals,
firms and organizations. For instance, the proposition "reduced taxes
promote increased consumer demand" can be treated as a causal proposition
at the individual unit of analysis by merely asking an individual "What
prompted your increased spending?" and obtaining the response "decreased
taxes." The same proposition ceases to be causal at aggregate units
since it cannot be shown that a collectivity as a production unit has made
the same decision; what we can infer from a questionnaire response and the
subsequent construction of a demand function is a deterministic *law*
statement with a certain probability: "there is a probability q that
decreased taxes will stimulate increased spending with a particular
distributive lag." What can be shown to be causal at the molecular level
can only be shwon to follow consistent *law statements* at the molar level.
To put it another way, to impose causation to a sociological proposition
based on aggregates implies its transformation to a set of biophysical and
psychological propositions.* For the purpose of policy analysis we are
content to discover relational propositions of a deterministic type other
than cuasal.**

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* There are sociologies for which these comments do not apply, especially
  those that do not deal with aggregates, i.e. small group theory, or
  theory of organizations.

** Some might feel this point is only minor and leads to confusion within
   the terminology normally accepted by sociologists. Failure to
   distinguish between causation and determination is, however, incorrect,
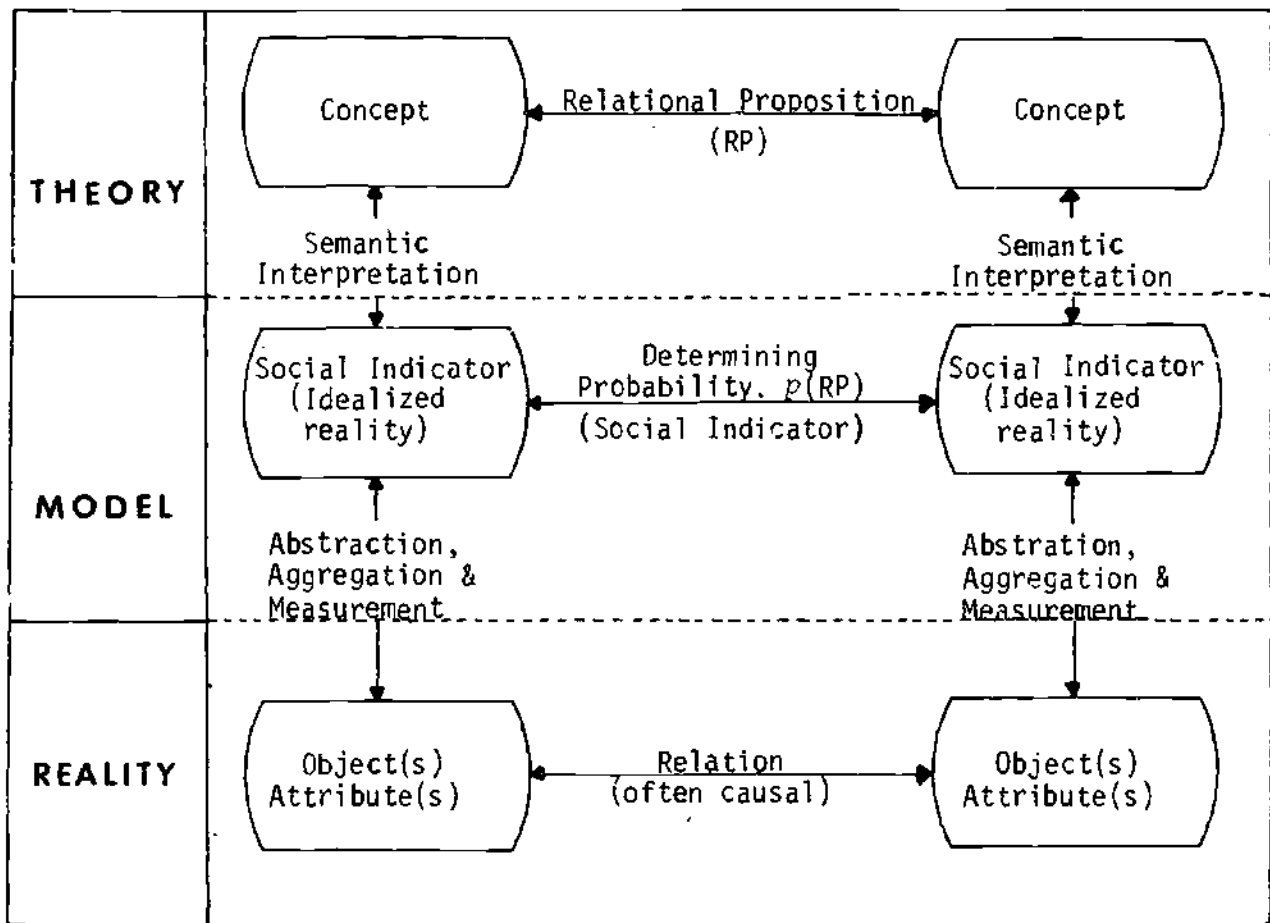   and leads to confusion in interdisciplinary discussion.

Model

The specification of initial theory is essential to the orderly conduct of research and to rendering a social indicator system meaningful at the outset (cf. Anderson, 1972). Without theory data collection is pointless and data uninterpretable (Madden, 1972). Theory lends a social indicator its *informative value* which is derived from its logical and semantic relations (cf. Land, 1971). And theory renders the research process economical in cost effective terms by suggesting the complete range of models (and therefore data) required at the outset of any particular policy research enterprise (Madden, 1972 & Sismondo, 1973a).

But theory is insufficient: from the condition of testability we derive the need for creation of models (sometimes, in other disciplines, referred to as "working models") for without specified models concepts and their relations are not measurable and thus theory is untestable. *Model* is interpreted theory, theory for which semantical meaning for some of its concepts (partially interpreted theory) or for all of its concepts (fully interpreted theory) have been found. There are various statistical, physical, psychological and ontological rules of interpretation, and the application of each will yield different models for the same theory.

As can be seen in the next diagram, model stands between theory and reality. It is a set of idealized representations of reality and has the necessary properties for mathematical manipulation (a definitive advantage over reality); on the other hand it mirrors theory by means of a set (often partial) of data sets and relations between them isomorphic to the concepts and relational propositions of the theory. It mirrors concepts by means of their indicators, proxies, and other

symbolic representations of reality, and it mirrors relational

propositions by such mathematical devices as "conditional probabilities

with various shapes of distributed lag." Diagramatically thus:

THEORY	Concept ← $\underline{\text{Relational Proposition}}$ → Concept (RP)	
	↑ Semantic Interpretation ↑ Semantic Interpretation	
MODEL	Social Indicator (Idealized reality) ← $\text{Determining Probability, } p(RP)$ → Social Indicator (Idealized reality) (Social Indicator)	
	↑ Abstraction, Aggregation & Measurement	↑ Abstration, Aggregation & Measurement
REALITY	Object(s) Attribute(s) ← $\underline{\text{Relation}}$ → Object(s) Attribute(s) (often causal)	

A unifying thought: *Social indicators are social statistics*

which permit the mirroring of theory into models by lending measured

referents to concepts of the theory and measured probabilities to the

relational propositions of the theory.

Policy Research

From among all endeavors that are generally considered to be research, policy research can be identified because it includes all the following activities:

(a)   the study of preference-indifference relations and/or utility functions among population segments for the purpose of:

i)   pointing to conflicting values, both present and potential,

ii)   identifying alternative courses of action to minimize such conflict,

iii)   clarifying relations between official goals and population goals, competing and complementary goals, and among sets of goals and sets of means;

(b)   the quantification of outcomes (and otherwise qualification of outcomes) of alternative courses of action, including both outcomes with positive and negative utilities; and,

(c)   the discovery of the *laws*, or *rules*, which mediate policy decisions and outcomes.

Policy research begins with the specification of a set of problems brought about by changing values (represented by changing utilities) among population segments and/or the specification of one or more courses of action to be followed for the satisfaction of population objectives. Such specification is in all instances initiated by a policy making body, be it political or managerial.

One part of the ensuing research consists of the analysis of values in relation to other values and in relation to specified courses of action. One type of problem considered in this category of research is, for instance, the study of social implications of singling out

particular objectives, and of implications of the means suggested for their attainment (cf. Etzioni, 1971). The hypotheses of this research are of the general logical forms:

Relations: $u_i \, R \, u_j$; $u_i, u_j \in U$;

Relations: $u_i \, R \, p_j$; for some $u_i \in U$ and $p_j \in P$,

and the feedbacks,

Relations: $p_j \Rightarrow \Delta u_i$; for some $p_j \in P$ and $u_i \in U$.

The second part of policy research consists of determining effects of policy alternatives on three types of variables: those specified by outcomes $\{O_l\}$, those which mediate change to those outcomes $\{S_k\}$, and others of both $\{O_l\}$ and $\{S_k\}$ types which are unspecified in the formulation of the problem as conceived by policy making bodies, but can by hypothesized subsequently to be related to the problem at hand through the vantage point of appropriate theory. The hypotheses of this research are of the general logical forms:

$$p_j \Rightarrow s_k \Rightarrow o_l, \text{ and}$$

$$\Delta p_j \Rightarrow \Delta s_k \Rightarrow \Delta o_l, \text{ for some } (j, k, l),$$

where the variables in O can have positive or negative utility values. An additional product of this research is the discovery of unintended consequences of variables in P on variables in both the S and O sets.

A third part of policy research consists of uncovering regularities in the behavior of variables within social systems so as to

formulate probabilistic laws governing their change, an activity not unlike searching for the rules one does not know of a game one is playing.* Engel's law "as family income increases a decreasing portion of it is spent on food purchases" is an example of what one is looking for, albeit simple, and the corresponding variable "income elasticity of demand for food" is of the type for which one is searching. Techniques utilized for this analysis vary greatly according to subject treated and include "gaming," "path analysis," "simulations" and the like. The logical structure of hypotheses is complex and can become more so as techniques advance (especially as problems of statistical identification are solved). For instance, working out of general systems theory notions (cf. Rapoport in Buckley, 1968), Eberts (1972) proposes a macro-structural set of rules to increase community problem solving capacity which is geared to simplify and render more precise policy analysis, and which includes a variety of statements regarding conditions of growth, limits of growth, and equilibrium states of various sociological variables. Among the many propositions of his theory we find these:

$$(\forall x)\ (Qx_t > Qx_{t-1}) \iff (Fx_t > Fx_{t-1})\ \text{and}\ (dM/d\Pi < \Phi x)$$

---

* It should be clear from the previous discussion that I am not here proposing mindless search for regularities in huge matrices of data expecting the speed of computers to be adequate replacements for scientific mind. Rather, following the route "theory-hypothesis-interpretation-test," it is proposed to improve our theoretical understanding of the more fundamental mechanisms *determining* patterns of change. Correlating empty and full squares on the board during a chess game is most unlikely to reveal the rules of the game to the observer who is ignorant of them; simulating results of hypothesized sets of rules is a more promising approach.

If X is the set of all rural communities or non-metropolitan urban areas x, Qx is the capacity of x to resolve its collective political-economic problems (outcome variable), Fx is the capacity of x to distribute information to its sub-units (organizations, organized population segments), $dM/d\Pi$ is a rate of net migration, Φx is some determined function of Fx and Π (population size); and,

$$(\forall x) \ (Lx_t > Lx_{t-1}) \Rightarrow (Fx_t > Fx_{t-1}) \text{ and } (Dx_{t+1} > Dx_t), \text{ but,}$$

$$(\forall x) \ (Dx_t > Dx_{t-1}) \Rightarrow (Fx_{t+1} < Fx_t),$$

where Lx is the exchange of information between x and all other communities in the set X, and Dx is the complexity of occupational structure within x. Note here that because of the presence of L, X is not only a set but an "organized set" that is a regional system in the usual terminology. Note also that D and F would, according to this theory, find equilibrium levels or not depending on the curvature of the functions and according to a cobweb model.

Returning to the typology of social indicators presented (p. 7) we see that "structural" descriptors are essential to a form of analysis leading to dynamic formulations of community growth and equilibrium. In the example above the unit of analysis is carefully defined by Eberts to leave no doubt that it is a structural edifice called "community" he is discussing, but not simply a "set" nor a "sample" of individuals. Had he not done so, he could not define his variable L in terms of intercommunity phenomena, and later examine the effects of ΔL on variables defined as relations between components of community (namely organizations), without violating at least one definition of theoretical construction (homogeneity of referents).

This example suffices to demonstrate the need for the inclusion of this class of indicator among social indicators for policy research. Structural characteristics are affected by central policies of social systems and these variables promote change in the functioning of community (community structure). Clavel (1972) has even stated that it is these variables that determine the "rules" under which a system operates, using a metaphor from the theory of games. In turn, theories relating individual (and aggregate) behavior to community structure and change are necessary; useful examples are density theories of migration, opportunity theories of entrepreneurial behavior and the like.

I could not over-emphasize that policy research as defined here is pro-active, not merely reactive. It seeks alternatives for the future and attempts to "evaluate" their consequences before they become instituted. As methodology advances (notably simulation techniques), and as data banks of structural information grow, it becomes more possible to foresee pro-actively and therefore less interesting to evaluate reactively. A strategy of pro-active policy research imposes further conditions on the nature of theory and model which can be fruitfully utilized within its context.

Social indicators were defined (p. 3) and a typology was constructed (p. 7); policy research was also defined (p. 15), and a certain parallelism was established between the typology of indicators and the definition of policy research. Theory and model were defined (p. 9 and p. 13), and it remains to summarize the characteristics of theories and models that render them "adequate" to policy research.

We can derive from the preceding discussion the following criteria (cf. Eberts and Witton, 1970):

(a) the concepts used in the theory should be handily operational; that is, indicators for them in corresponding models should be readily apparent and experientially meaningful to the clients of the exercise;

(b) the theory should be dynamic; that is, it should express the concepts in their sequential, as opposed to "point-in-time" relations (models should deal with change in variables);

(c) the theory and models should be deterministic; thus, minimally, changes in some variates should precede others in time; relatively high correlations between variables should exist, even when "controlling" for other variables; alternate "explanations" of relations should be eliminated; and it should be demonstrable that changes in the state of determining concepts can and do alter the state of the effect concept according to specified laws;

(d) the theory (not necessarily the model) should satisfy a condition of relative closure: that is, principal variables for understanding community dynamics and community morphogenesis should be included in the theory, and the variables should feed into each other; initial exogenous variates should be probability functions of other (lagged) variates in the theory.

(e) the theory should include variables manipulable by policy makers: that is, variables viewed as exogenous in a given time frame should be such that public decisions directly and predictably affect their value.

Four summary thoughts: (1) *Policy research is a scientific enterprise, it includes formulation of theory, its translation to operational models, the measurement of five classes of social indicators variables, the estimation of models, and the testing of theory.*

(2) *It is a category of scientific enterprise di.'fering from all others only in that initial problems are defined as policy problems by policy makers rather than by researchers (jointly passed the initial stages) and in that its findings are to be intelligible and implementable within the standard terminology and tools of policy making.* (3) *Social indicator research is the challenge to translate social scientific concepts to operational entities for the construction of estimated models of use to policy makers; it is essentially a task of semantic interpretation which only incidentally entails logical and mathematical problems.* (4) *Social indicator research is a sine-qua-non for rendering sociological insight fruitful to solution of both system problems and aggregate individual problems in systems.*

Democratic Action

At the core of my definition of democratic action is Schumpeter's (1942, p. 269) conception of democracy as a process and method: *The democratic method is that institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people's vote.* In disagreement with Schumpeter I will add that democratic action is both action enhancing the capacity of the social system to act in accord with his definition, and action which enhances *the involvement of the individual in the design and policy processes which affect his or her future, regardless of formal memberships,* (recognizing) *that all organizations* (are) *seen as political in nature, in that they affect the future course of society.* (Thayer, 1971, p. 3). The notions of pluralism,

competitive political parties, and pressure group activity are included in the concept of democratic action.

The object of this paper can be seen as the examination of policy research procedures that strengthen possibilities for democratic action rather than hinder them. Policy research seems in general terms vell designed to enhance democratic processes. Each research procedure potentially strengthens the capacity of policy makers to reach intelligent decisions. Its three functions parallel normal activities of governors:

Value research   Campaigning, "meeting the people".

Evaluation research   Designing programmes, listening to feedback.

Rules research   Getting expert advice, legislating.

Whether the research product is utilized in favor of or against progress of democracy depends largely on the client and not much on the researcher (provided the two are not the same and provided policy-makers are accountable to forces other than research -- two assumptions of the discussion that follows and two criteria for the design of an appropriate research system). But it is the methods and institutions of research which, under the control of researchers, have the capacity to hinder or enhance democratic action. Therefore the remainder of this paper deals with institutional settings and practices of policy research attempting to structure their conformity to sound theory, and to sound democratic action.

III - <u>FROM THEORY TO MODEL AND ACTION -- A PARADIGM</u>

If what has been put forth thus far constitutes a theory of
social research process applied to resolution of policy concerns, and if
we are true to our form, the next step is to construct a model, a somewhat
idealized representation of what real life activities patterned in the
theory would be like. For this purpose I present the diagram on the next
page entitled "General Paradigm of Policy Research and Democratic Action."
In a schematic way it organizes the major ideas and concepts presented in
the preceding discussion.

The first feature of the diagram is the delineation of limits
to the proper domain of researchers. The point made here is that research
should in no way interfere with the actions of duly constituted government
other than exchange with it data and more digested information. A well
documented problem is that researchers mixing the scientific and the
advocatory roles lose professional credibility. This does not imply that
researchers are not to exercise advocatory citizen rights; they should
definitely do so, but must reamin conscious of the difference between
their scientific and political lives. A social scientist who uses his
professional prestige and status to sway public opinion on issues that are
essentially non-scientific or for which he has no scientifically based
responses damages democracy by substituting personality cult and demagogy
for dialogue among the people. Beyond the individual case which is,
after all, not so important to the rest of us, is the issue of policy
research institutes which, in the absence of exacting supervision, jump to
positions of policy advocacy and policy-making (a dream of the technocratic

GENERAL PARADIGM OF POLICY RESEARCH AND DEMOCRATIC ACTION
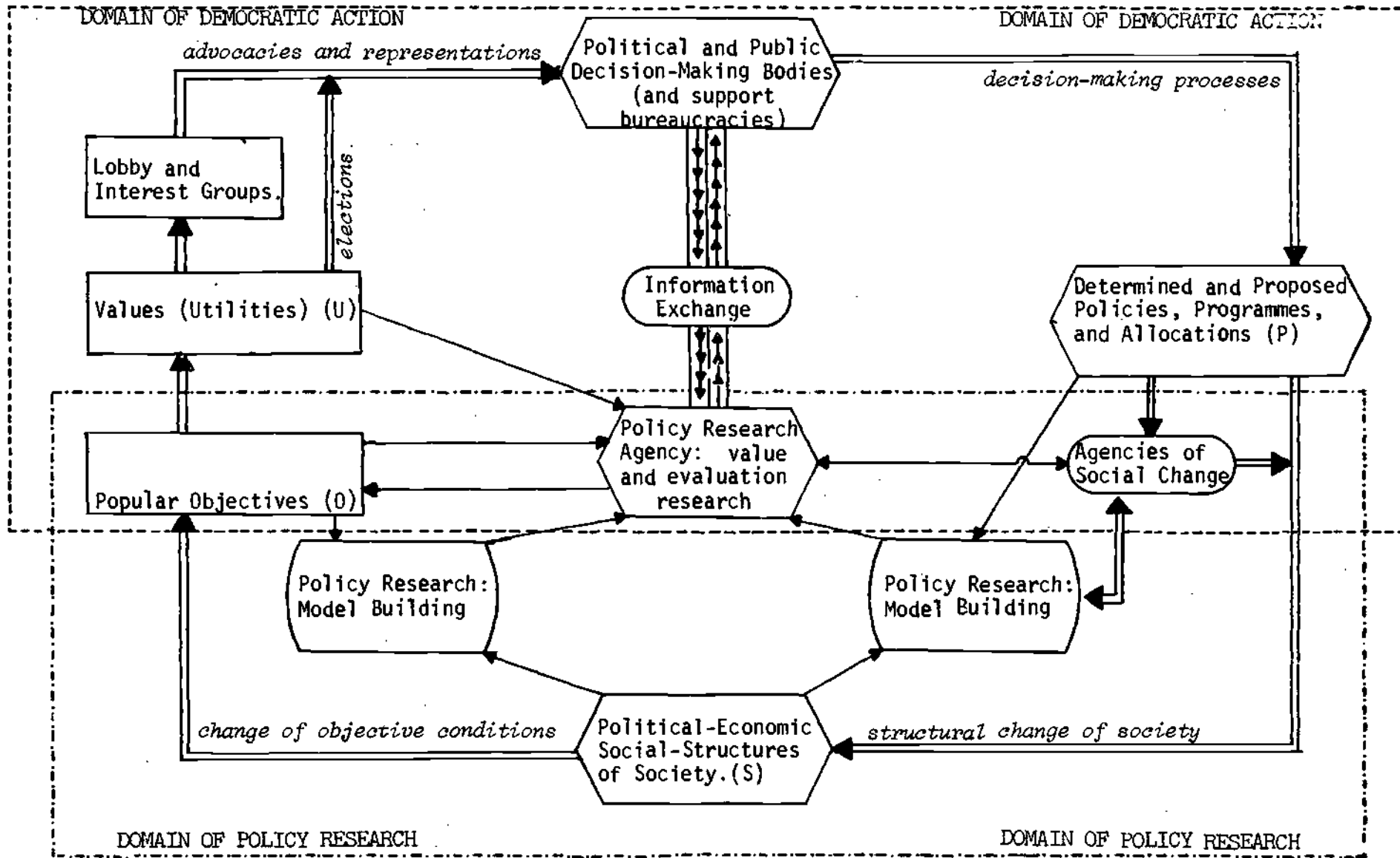
Primary flow of influence and determination.
Primary flow of social indicator data.

vision). Our* conception of policy research includes the concept of
multiple accountability, including accountability to the democratic
process that creates and supports institutions within which policy
research can be conducted. The replacement of that process by a vision
of technocratic shortcircuiting of election-appointment-decision-election
routines is inimical to what Schumpeter called democracy and therefore, by
definition, not what we mean by policy research.

The second feature of the diagram is the schematic represen-
tation of formal democracy. Objectives of the people are translated to
mandates for policy-makers through the mechanisms of election, and
specialized interests are made known and advocated through representations
of lobby groups. Decision-making bodies, armed with mandate and centuries
old know-how provided by bureaucracy determine and propose policies.
Their principal business is to mediate and arbitrate between conflicting
interests, proposing and imposing solutions as the case may be, attempting
to maximize general welfare and response to specialized concerns, without
alienating any population segment to the point of stalemating the business
of society (i.e. avoiding the "general strike"). Together with formal
democracy, in the "domain of democratic action" are two other sets of
activities -- those of agencies of social change, and those of agencies
of policy research.

_____

Agencies of social change are those special organs of government designed for the solution of personal and collective problems in the field. Among these we would situate, to mention some examples, manpower training and placement agencies, poverty programs, area redevelopment agencies, and industrial growth commissions. That such institutions are instruments of government for the manipulation of structural change in society is self-evident -- their mere presence *in loco* drastically alters patterns of communication and power relations both between and within regions affected. What may not be self evident is the critical relations that such agencies must maintain with their counterparts in policy research. A small double headed arrow is placed between the two types of agencies symbolizing two way data flow. With the advantage of theoretical frames and data collection capacity research agencies can monitor and evaluate activities of other specialized agencies, can intervene with analysis at key points of program design, and can make their staff available for consultation both with program staff and clients of the action agency. In exchange, action agencies provide testing grounds for theory and design through experimental and pilot projects.

The Canada NewStart Program is an example of this type of action-research. After seven years of operation the experience yields mixed results, but strong support for the concept of agency interaction as described. We have learned also that future inter-agency action-research systems would probably benefit by interlocking directorates and, better yet, directorate arrangements under which senior staff of agencies are appointed board members of other agencies. Properly managed liasons of this type are conducive, in our experience, to better program design

and richer research analysis. The union is synergistic since entirely new horizons of regional action are opened by the coalescence of diverse competencies, often to the obvious advantage of client populations.

Policy research agencies influence popular objectives by (a) disseminating concepts through survey research, (b) depth discussion with community leaders regarding perceived and unperceived problems of the collectivity, (c) aiding plan formulation for social change agencies, (d) utilizing its own dissemination capabilities (publishing), and, most of all (e) by engaging in deep exchange with bureaucracy and politicians. The latter process is symbolized in the diagram by a large two-way road of information exchange; the influence of this exchange, which defines the primary role of policy research, and which constitutes a viable mechanism of democratic participation, is felt on population objectives through the long route: "decision-making → policies → action agencies → structural change of society → change of objective conditions → change of popular objectives." Thus policy research institutes can participate constructively both in the formal democratic process as well as in the less formal participatory means.

The more obscure part of this diagram is the model building function which is conducted by monitoring structural change and change of objective conditions ("quality of life" change). Mechanisms for such monitoring are sample surveys (mostly for the latter), and structural surveys (mostly for the former). Structural surveys or inventories have been conducted by such diverse methods as key informant interviewing, business community surveys, or aerial photography. Specialized field teams for data collection are necessary and they are represented in the

diagram by the two rounded boxes labelled "Policy Research: Model Building." A powerful connection can be made between agencies of social change and model-building research teams.

Consider for instance an experience partially tested in Kent County. Information offices are staffed by local residents who receive considerable training, with a view to creating better information flows between isolated communities and more central places. Information officers are responsible for translating "people-conceived problems" into "researchable questions," they bring to a central team of economists, sociologists, and other analysts, the "needs of the people;" the same individuals are responsible for disseminating "findings" to the isolated populations. Being well aware of conditions in local community the same para-professional information agents assist in periodic data collection of structural and individual character for the construction of time-series in regional data banks. The following advantages did accrue in our case (cf. page 40 and following): (a) democratic participation was enhanced, (b) data collection procedures simplified, (c) quality of data received improved, (d) local communities gained access to high-powered "think-tanks," (e) unemployed individuals were trained and hired in para-professional positions, (f) community problems were resolved in collaboration between "people" and "professionals," (g) regional solutions and area-wide planning became possible and participatory, and (h) local problems gained importance in the eyes of central policy-making bodies through the mediation of the (quasi) policy research institute.

Finally the diagram proposes the major flows of social indicator data which are deducible from the preceding discussion. Data

sets P, S, O. and U flow to research institutions from various sources, O data flows to the population either through media or through action agencies, and all the above social indicator sets plus the (β,γ) set flow to political and public decision-making bodies.

Being a model, what has been presented is an idealized version of policy research with strong democratic action components. It is conceived as a multidisciplinary regional unit rather than either a unidisciplinary unit of a national unit. Its applicability to other action-research systems (such as NASA) remains unexplored in this paper; I have limited the scope in the interest of remaining relevant to socio-economic development concerns.

Again, to be true to form, the next logical step is to find referents in reality mirroring concepts of the theory and exemplifying mechanisms of the model. This is the intention of the next section. One "micro-example" is presented, following that, one "macro-example" is discussed, and finally a proposal concludes the paper.

IV - FROM MODEL TO REALITY -- THREE EXAMPLES

The case of the teacher budget

Under criteria which can be termed *strictly pedagogical* a series of rural schools dispersed one each in a set of rural communities should be replaced by a minimum number of centralized and larger schools. Assuming budget constraints the rationale for centralization has been documented by numerous researchers. Larger schools are more cost-effective in that fixed costs per student are lower, permitting lower

student-teacher ratios, higher quality of senior staff, and better distribution of labor between professional, para-professional and non-professional school staff. The outcome of such centralization strategies is found to be *higher pedagogical performance.* A constraint to centralization is imposed not only by the costs of busing but by findings demonstrating the intellectual capacity of students to decrease as a function of increased time spent commuting to and from school. A reasonable maximum of twenty minutes busing in each direction is recommended by experts.

The government department responsible for schools in Kent County, New Brunswick, has faced the issue of centralization during the last decade and has progressed slowly in that direction. Expanding budgets permitted the creation of a centralized multi-purpose high school without major disruption of the balance of the system. In the process, however, busing time much exceeded the recommended maximum for some students, and new constraints arose due to bilingual requirements of the area (the discussion that follows assumes that bilingual schools can be established sharing buildings and infrastructure, a fact documented by successful examples in Montreal). The policy is now under revision.

Kent County was favored by a research and action agency which combined some of the characteristics and *desiderata* outlined in previous pages. This first example of social indicators and policy research is an account of what transacted, albeit informally, between the research agency and the highest administrative level of authority over the school budget.

A density of model of the school age population of the county
was constructed on the basis of data available in the Master Social
Indicators File. Given a school administration which sees its role
solely in terms of maximizing pedagogical outputs for a given cost it is
uncomplicated to compute optimal location for schools given a twenty
minute transportation constraint. The solution yields five centralized
schools located in or near five villages in the county. Those who would
attach utilities of one to pedagogical outputs and utilities of zero to
all other outputs would be satisfied with the solution. Our administra-
tion was not. Since it perceived itself as reaching for more than one
value -- pursuing and responding to a combination of utilities, as it
were -- the school administration raised new issues requiring fresh
theoretical and empirical treatment. If there are no schools in the
villages where the students reside, it was asked, would this not have a
detrimental effect on community life, and perhaps produce duller children
counteracting the objectives of the system?

This question led to the introduction of a second criterion of
allocation which might be named *community integration criterion*. A theory
was formalized which treated the school as a mechanism of community
integration, and the centralization problem was analyzed anew. The
school was conceived as one service item in a Guttman scale of differen-
tiation. It was thought that communities which possess integrative agents
at higher positions in the differentiation scale would not suffer
dramatically from the loss of a school but migh benefit significantly
from the introduction of larger schools (rising levels of differentiation
and generation of new growth). Communities which possess no integrative

agents at higher levels of differentiation would suffer from loss of
their school. Using differentiation data at hand (Master Social
Indicators File), the scales were computed and the following two solutions
emerged: (a) sixteen communities (the least differentiated) require
schools, and six do not; or, (b) the administration should centralize
schools according to other criteria while making sizeable budgets
available to church and other community groups for the conduct of
integrative functions (sports, hobbies, meeting halls, etc.).

Pedagogical and integration criteria point to differing
solutions, the first leads to schools in or around the larger villages,
the second to more and smaller schools located in the smaller villages.
Since policy responds to combinations of values and utilities, authorities
are led to seek compromises presumably dependent on the weights attached
to each utility. One such compromise at this stage of discussion might
be the decentralization of primary schools and centralization of
secondary schools with concomitant planning and budgeting of subsidiary
community activities. The same structural analysis of differentiation,
incidentally, pointed to community recreational deficiencies, opening new
planning issues for educational and other authorities.

Aware that education expenditures absorb over half the
operating budget of the Province, the administration thought it necessary
to ask another question: We save money, but at what costs, to whom?
What are the multipliers of our expenditures in differing localities?
Could this question of *financial utility* be the determining factor of
location? Optimizing income multipliers for the county as a whole led
to a solution not dissimilar to that suggested by strictly pedagogical

criteria. Optimizing income multipliers for each village, on the other hand, called for decentralization. An optimal solution could be found at this point depending on the utility weights assigned to each of four criteria -- pedagogic, integrational, county-financial (equivalent to tax-base), and village financial.

Further dialogue, with classical sociological and economic theory having taken us as far as it could, led us to the formulation of more comprehensive theory. Multipliers of the school system are not only monetary, they are also informational and political. Principals and teachers are among the best educated in the community and are bearers of information and influence to and from the community. They are linked to large institutions and bureaucracies such as universities, government and professional associations; their presence in rural community is more significant than either their formal roles or their incomes. Our reasoning said that, if we can show the school to be a dynamic linkage of the community to the outside world, we could introduce a fifth criterion which might lead to a more complete statement of the school location problem.

Borrowing heavily from sociological theory of linkages (Eberts, 1972), it was hypothesized that increased linkages would lead, with time lags, to increased community income and increased equality of income distribution; further positive effects on community would follow according to the theory. Variables representing major types of inter-community linkages were factor analyzed covering data from three points in time. From among six factors which maintained orthogonality over the time period studied, four factors included school related items with positive loading (λ) and regression coefficients (β):

	λ	β
Linkage Factor 1.		
Number of teachers working in village.	.69553	.095
Libraries and information centers.	.74139	.301
Linkage Factor 3.		
Government employees working in village.	.58632	.345
Linkage Factor 4.		
Professionals in Associations.	.72750	.447
Linkage Factor 5.		
Number of teachers working in village.	.61144	.365

(Orthogonal Varimax Rotation; criterion: eigenvalues > 1.0)

Income and income distribution measures for 22 villages were regressed against linkage factor scores (L) and change of linkage factor scores (ΔL_{1971-K}).* Following are four linear regression equations showing the relation of linkage (L1, L3, L4, L5) and change of linkage $(\Delta L1, \Delta L3, \Delta L4, \Delta L5)$ to average family income change (ΔFAY), average per-capita income change (ΔEAY), change of median per-capita income (ΔEMY), and change of equality ratio of personal income (ΔERF).** Standard errors for β coefficients are given in small figures, the R^2 value is the proportion of income variance accounted for by the combination of linkage variables in each equation.

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* Factor scores are normalized and change of factor scores are computed by holding the factor structure constant as it appears in the inter-mediate time point and varying the data matrix for the different time points, thus:

$$\dot{F}_{j,t+1} = \sum_i \beta_{ji,t} V_{i,t+1}$$

** Equality ratio is a function of deviation controlling for income level attempting to summarize equality of control of resources. Income measures control for inflation (constant 1969 dollars), and for economies of scale of larger families. For computational details pertaining to this section see: Huang, 1972.

$$\Delta FAY_{71-69} = +854 +265(L3_{69}) +604 (L5_{69})$$
$$\phantom{\Delta FAY_{71-69} = +854 +}134 \phantom{(L3_{69}) +}151$$

$$R^2 = .651 \quad F = 8.374$$

$$\Delta EAY_{71-69} = +425 +109(L4_{69}) +133(L3_{69}) +246(L5_{69})$$
$$\phantom{\Delta EAY_{71-69} = +425 +}40 \phantom{(L4_{69}) +}36 \phantom{(L3_{69}) +}45$$

$$R^2 = .809 \quad F = 11.322$$

$$\Delta EMY_{71-69} = +304 +93(L4_{69}) +62(L3_{69}) +167(L5_{69})$$
$$\phantom{\Delta EMY_{71-69} = +304 +}38 \phantom{(L4_{69}) +}34 \phantom{(L3_{69}) +}42$$

$$R^2 = .666 \quad F = 5.322$$

$$\Delta ERF_{71-70} = -.012 +.288(\Delta L1_{71-70}) +.301(\Delta L4_{71-70}) +.545(\Delta L3_{71-70})$$
$$\phantom{\Delta ERF_{71-70} = -.012 +}.097 \phantom{(\Delta L1_{71-70}) +}.104 \phantom{(\Delta L4_{71-70}) +}.127$$

$$+.218(\Delta L5_{71-70})$$
$$.122$$

$$R^2 = .746 \quad F = 5.143$$

School budgets, it is possible to conclude, are deterministically tied to community income and income distribution. In fact the first three equations relate levels (in standard deviations) of various linkage variables to changes of income in dollars.

Following the theory further it is possible to construct a more comprehensive model which relates change of these budgets to other community structure variables such as differentiation and fluidity (Eberts, 1972). The major limitation to doing so now is the Master

Social Indicators File which only spans three years and covers a small number of communities (n = 22). Monitoring the system over a longer period of time would allow testing broader models and yield time series of coefficients; these in turn would permit the formulation of tighter theories and lead to an understanding of changing structures in growing systems.

The procedure I have illustrated can be enlarged further by introducing new objectives. As additional objectives surface they are related to policies, community structures, and output variables by theory, and empirical models derived from theory are tested as completely as possible given the comprehensive social indicators data file accumulated for the region. This policy research strategy leads to the possibility of limited simulations; the administration may now ask, with a certain confidence of obtaining meaningful answers, what effects on five classes of outcome variables are likely to result from particular imagined distributions of schools. In addition to the all-important simulation possibilities it would be more difficult, but nevertheless calculable, to obtain optimal allocation solutions, given the five utility functions considered in the problem.

The formal structure of the argument for processing utility data is as follows. The optimal allocations arrived at by equal consideration of five utility functions will necessarily be either trivially equivalent (in exceptional cases) or non comparable (as a rule). The node of the problem is that the policy maker must choose between non comparable optimal states, and this implies with certainty the ranking of given alternatives in terms of policy criteria; this requirement in turn

implies acceptance of value axioms. Clearly no such ranking is possible without violating Arrow's "non-dictatorship" condition.* Such a violation, however, takes different form in the totalitarian order than in the democratic decision making order I have proposed throughout this discussion. Since this paper deals with policy research for democratic action it is understood that utility data is processed so as to maximize the opportunity of government to weight according to majority rule (Schumpeterian vision of democracy), or according to consensual rule (participatory vision of democracy), or more realistically according to a combination of the two. But the democratic concept recognizes the inescapable existence of a residual power of the state for the purpose of weighting under circumstances that preempt participatory, majoritarian, compromised, and negotiated solutions.

Therefore the policy research task would be more formal and complete should a survey of population be carried out with the objective of ascertaining ranking of utilities among the people. These are necessary conditions, under democratic rule, to lend assurance to the policy-maker to the effect that his priorities correspond to popular wishes.

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* Note that the decision not to violate the "non-dictatorship" condition already implies the explicit or implicit acceptance of one value axiom: every individual preference function should be equally weighted in the social preference relation. In this paper explicit value axioms are recognized as part of the theoretical structure of the argument presented.

Needless to say, the school allocation problem would differ substantially from one region to another for at least two reasons. (a) the β coefficients and μ multipliers would be different in different regions; and, (b) utilities attached to each outcome class would be dramatically different between regions -- i.e. a poverty afflicted region would stress the income multipliers of government budgets more than an affluent region, which would likely press for the pedagogically more sound solution. We may state in more general terms that social indicator systems of regional scope lead to more precise solutions to real problems than similar research systems with national or centralized scope. The latter would tend to be more *political* and *reactive* while the former would tend to be less *political* and more *pro-active*. Alternatively and if such a comparison makes any sense at all, I would say national policies of such concerns as school distribution violate the *non-dictatorship condition* more drastically than regionally based policies.

Two political thoughts: (1) *democratic methods to create social preordering: (including majority and consensual rule) do not provide magic solutions nor definite and unequivocal answers to the difficult task of evaluating individual preferences, but provide a reasonable framework (accepting democratic value axioms) in which solution to this problem of harmonizing often conflicting interests can be attempted;* and (2) *decentralized social indicators systems strengthen possibilities of decentralized decision making; decentralized decision making is more akin to democracy since it is likely to reflect more accurately the utility mix of the population affected.*

Summarizing this example, we have engaged in dialogue with a client body toward the resolution of a perplexing allocation problem. In doing so we have correlated theoretically and empirically five types of social indicators (although incompletely) according to the paradigm outlined earlier: (a) six classes of output variables (pedagogical, integrative, county-financial, village-financial, community growth, and equality) have been related to community structures (school plants, personnel, linkages, multipliers, differentiation) by means of partial empirical models derived from more general theories borrowed from the literature; (b) community structures have been related to policies of centralization, decentralization, and other budget manipulations; and (c) policies were related theoretically to a vector of five utilities corresponding *grosso-modo* to the objectives or output variables. Completion of the task would require empirical verification of the utilities, their weights and trade-offs, and the design of corresponding mixed-strategy policies. In the process described, various additional dimensions of the problem came to light, mostly suggested by extension of the theories utilized. And, most of all, the process was only in a minor sense evaluative of previous policies; it was in a major sense pro-active, leading to policies which deal more precisely with needs of localities and their people. The process was protracted and informal, hinging on the prior existence of an adequate social indicators source and constructive relations between government and research institute.

An Action-Research Agency in Kent County

The second example is that of New Brunswick NewStart, an action-research, area development agency, with the double mandate to develop human resources and their utilization in Kent County, and to conduct research of an interdisciplinary and regional nature regarding processes of growth and adjustment in the same area. Evaluation of activites undertaken is understood to be a focus of the research.

NewStart approaches the model for organization of policy research that was described in the general paradigm although it falls short in several respects. First, I will describe the congruence, later the divergences.

NewStart is a policy, it conducts programs, and allocates federal funds to the promotion of growth in one small area of Canada. It is an agency of social change affecting structural characteristics in its target county. Its presence has been shown to have at least the following effects: (a) increasing information flows between the county and the outside; (b) increasing information flows between remote villages and the decision centers of the county (i.e. through the function of information centers described earlier; (cf. p.28)); (c) promoting new enterprises of private and collective nature; consequently (d) increasing income in the area; (e) increasing participation in local decisions; (f) increasing equality of access and opportunity between population segments in the area; (g) increasing the capability of local structures and leaders to mediate needs of the population with higher governmental authorities; (h) increasing the capability of governments to relate to the county's needs in a planning sense (i.e. example of school location, among many others); and

(i) increasing numerous other aspects of quality of life. (Sismondo, 1972, 1973b).

The data base for research activities consists of five parts: (1) an inventory of households which is updated by recording migrations and vital statistics, and which constitutes the main sampling frame; (2) census data and other published statistics which are used from time to time esoecially in matters regarding business activities; (3) an annual inventory of businesses, occupations, institutions, organizations, and structural characteristics collected and coded by village, constituting over two hundred social indicator raw-data series, and producing other reduced, aggregated, and combined social indicators of the first and second type (government policies such as departmental personnel budgets are captured in this data set as well as structural descriptions of each community); (4) an annual panel survey of household heads, representative of each village, yielding over two hundred social indicator raw-data series, and again producing other series in reduced and aggregated forms, covering the second and third type of social indicators; and (5) surveys of lesser scope, conducted as needed, especially for market analysis, measurement of values, and other special requirements. As data become available in suitable aggregation at the community level they are entered in the Master Social Indicators File, data at the household level are also stored and referred to from time to time.

Research within the corporation serves essentially four functions, the combination encompasses all the activities specified in the general paradigm beginning with "Agencies of Social Change" and ending with "Popular Objectives." A brief description of the principal functions follows.

First, research is responsible for program design; analysis
of objective conditions in each locality, combined with a theoretical
statement of the impact of determined structural change on those
conditions, and combined with value orientations of program staff, leads
to the definition of planned social change interventions to be executed.
Second, research is responsible for evaluation; the impact of each
intervention is estimated through a period of time with hypotheses of
change derived from the same theoretical statement which determined the
nature of intervention. Thus objectives of the program are predetermined
and evaluation becomes synonymous with model testing; relations tested
are between P and S indicators and between S and O indicators. The
verification of these relations yields both program evaluation and model
testing. Feedback relations exist between the first two functions of
research: findings of preliminary evaluations may suggest alterations of
program, and unintended consequences of programs observed by program
staff may suggest alterations of the model and its scope. Third, the
junction of tested operational models leads to verification of the
theoretical body which initiated the action-research process; the
objective is clearly that of formulating a comprehensive area development
theory from which future program and policy decisions may be more
completely derived. Fourth, research is responsible for furnishing
local populations with access to various forms of social science
intelligence including market studies, feasibility analyses, social and
recreational planning, and the like.

New Brunswick NewStart enhances participation and is favorable
to democratic forms of decision making because it is also an action agency

responsible to the people affected, including leadership and populace, and because it is capable of disseminating its research findings to all sectors of society, thereby enhancing social intelligence in the system and equalizing access to that information between population segments.

NewStart is limited in its policy relevance and its capability of democratic action by at least two principal factors. First, contact with officials and planners other than its own funding agency and its own agency of social change are informal, and in no way regular or necessarily influential; in order to complete the information cycle envisaged in the general paradigm it would be necessary to give the policy research agency the benefit of a multi-departmental board of directors, and perhaps the additional status of an area planning commission. In this way it would be possible to engage in more thorough dialogue between technicians, representatives of the people, and policy makers. Second, the shortcoming of NewStart stems from the fact that its mandate for data collection is incomplete in terms of the social indicators typology presented earlier. The absence of systematic data collection on government policies affecting the area limits the scope of impact-models considered within the theory; as a result large portions of the theoretical body remain untested, and the relevance of it for regional policy analysis remains obscure to many departments which could otherwise become clients of the system. This limitation, coupled with the absence of a formalized body of clients, hinders potentiality of totally integrated area development planning. Finally, the fact that social indicators of the fifth type (utility functions of goal attainment) are not systematically collected and analyzed truncates the policy research process precisely as

was indicated in the description of the school allocation research. Decisions, both in-house and external, are ultimately made on the basis of utility mixes of program staff and political bodies, without the benefit of comparison to utility mixes of the population affected. Circularly we are driven to our definitions: *social science research, if it is to be of direct policy relevance and congruent to democratic action, need be the product of analysis of the full range of social indicators: utilities, policies, structures, objectives, and their observed relations through time.*

Social Indicators for Regional Policy -- A Proposal

The proposal advanced herein assumes that a set of policy-makers representing regional, provincial, and federal concerns can be found to share the principal objectives put forth in the preceding pages. The objectives, briefly restated, are: (1) to establish a policy-oriented socio-economic research capability and intelligence system with the capacity to forecast intended and unintended results of regional policy decisons (a managerial and scientific objective); (2) to establish a policy-research mechanism for verifying periodically the degree of congruence between values pursued in the design of policies on the one hand and utility functions of the affected region's population on the other (an objective with a view to strengthening democratic processes); and (3) institute means for public participation in regional planning and regional action agencies by enhancing feedback systems among policy-makers, citizen groups and researchers (also an objective toward enhancing democracy).

The definition and choice of a region for implementation of this proposal will reveal a certain portion of implicit theory, for the criteria defining what constitutes a region are dependent on the social scientific *weltanschauung* adopted. We have already shown (p. 17) that a programme of research based essentially on the dynamic conception put forth by Eberts requires a universe of study which is in effect nothing less than a complete regional system of a given order. Central place theory is useful to clarify this view. The regional system to which the highest order central place belongs is vast, and includes lower order central places stepwise down to farming areas serving the major city or lower order cities, or constituting the market for the same. To deal adequately with the regional system defined by the City of New York, a model of social change should be capable of entertaining data from large parts of the United States, if not of the Western Hemisphere. A city of lower order, say Syracuse (N.Y.), defines a region comprising several counties and half a dozen smaller cities of the next (lower) order. Just as Eberts' view of social structure and change determines the nature of the observation universe required for research under his framework, (it does not, however, restrict the level in the hierarchy which can be studied since it is a system theory), other conceptions of structure of the social system may lead to different conceptions of the notion of region, and therefore to various choices for implementation. Furthermore, the delineation of specific regions is not unchanging; change of relations between members of the hierarchy of regions are expected to occur. according to the theory, and therefore the boundaries of one region may grow or decline as a function of technological change. Highways and

passenger vehicles have greatly expanded influence areas of certain
cities, and have toyed with boundaries of lower order places as a child
does with pastels.

Thus, for our purposes it is insufficient to state the
delineation of geographic boundaries as an *a-priori* function of
homogeneity of variance, be it in the P, S, O, or U variables. While
homogeneity of certain variables is certainly necessary (e.g. the system
must operate under the same or very similar legislations), what is
necessary is to define a system by human-ecological criteria (e.g. K.A.
Fox's Functional Economic Areas) and/or physical-ecological criteria
(e.g. The Tennessee Valley, the Catchment of the Mississippi). What is
sought is a system whose exchanges with the outside world can be readily
inventoried and quantified; but also, a system for which major policy
decisions are made by coordinated public and private bodies -- in brief,
a system which is generally recognized as a political-decision-making
unit, and especially so by the principal policy-makers of influence in
the region.

A pilot project of the indicated nature would of necessity
observe a size constraint in terms of fiscal and political feasibility.
In my experience it could be initiated in an ecological region perhaps the
size of three to five counties and with the inclusion of one or more small
cities.

Exchanges between components of the selected region and the
rest of the world become the policy variables of the system under study,
some will be political and others economic, some will represent
manipulable variables and some will not be manipulable, some will be

static and others will change with time as a function of change in the larger system. The monitoring of exchanges between this and other regions (especially capital cities and large commercial centers) is the greater part of the construction of a data bank of the first category of social indicators -- the P variables. Experience thus far indicates that approximately one hundred data series cover the essential quantitative aspects of government policies and business relations for rural regions. These have been listed elsewhere (Sismondo, 1973a). Qualitative variables of interest, especially organizational, can be added to the set of P variables as required without difficulty. Cooperation of authorities concerned minimizes the cost of obtaining data for the set of P variables; most information required is regularly compiled by departments of government in detailed internal budget reports.

Within the region selected it is desirable to establish five interrelated institutions: (1) the policy-research agency proposed; (2) an action oriented regional development authority with discretionary powers in the areas of human resources development, industrial incentives, and technological innovation in production and distribution; (3) a regional planning research unit (could be part of the policy-research agency) with responsibilities for location, environmental and zoning analysis; (4) a system of information centers for equalizing and maximizing access of the less organized population segments to both information resources and decision-making (could be part of the regional development authority); and (5) a coordinating committee of community leaders and notables serving as an advisory board to both regional development authority and policy research agency.

In large measure this package has been tested in Canada with reasonable success. Conceptually what the tested system lacked was the all important permanent link with outside agencies and policy-makers which I have described in the general paradigm. Therefore this proposal seeks to close a political gap by suggesting the necessity of constituting a broad board of directors, overviewing both action and research, and drawn from prominent positions in the would-be client bodies -- i.e. departments concerned with development activities on a permanent basis: education, transport, industry, agriculture, health and welfare and so forth.

As was indicated throughout this paper the policy research task begins with the formulation of theories connecting changes of P variables to changes of S and O variables, i.e. changes of policies to structures and outputs. Theory will evidently be borrowed from the literature and represent the best guess of direction and strength of relations. Stemming from theory is the description of S and O social indicators which have to be collected in the target area periodically. A review of major policy oriented theories of social change indicates that less than two hundred social indicator time-series (raw-data) fulfill the initial requirements of the research system (Sismondo, 1973a). Clearly the data can be variously combined to produce an indefinite number of reduced indicators to satisfy requirements of an indefinite number of models.

The S and O sets of indicators are collected locally by various means including aerial photography, sample surveys, telephone polls, and so forth. The unit of aggregation varies with problems

studied; community and neighbourhood are viewed as prominently useful to
this endeavor; at times, however, policy problems posed require
aggregation and disaggregation to levels of minorities, institutions,
households, and members of the working force.

Values and utility research is an integral part of this
proposal. It is more difficult to envisage the permanent accumulation of
time-series of U variables; data collection and analysis of this type of
social indicator is necessarily to be dictated by short-term requirements
of policy problems investigated.

An incremental approach to implementation of the system viewed
here is necessary for at least four reasons: (1) experimentation is
required in methodology, particularly model building is likely to have a
slow start; (2) gradual achievement of consensus of political and bureau-
cratic structures is necessary so as to place the initial work under a
minimum of stress while assuring the creation of receptive audiences as
results appear; (3) experimentation is required with administrative
structures and relations of research team with various action oriented
agencies; and (4) exploration is necessary in the demand for products
since no assurance can be given that all analysis performed is well
received; conversely, policy issues of relevance need time to be
formulated and translated to theoretical and empirical terms. Results
are also viewed incrementally. At first it is possible only to
investigate static relations with payoffs chiefly in the areas of
theoretical and model construction; only after a considerable backlog of
data has been processed does it become possible to respond pro-actively to
policy oriented problems. With only few exceptions social indicator

series begin with the creation of the proposed agency. Therefore considerable political commitment and foresight is necessary for the acceptance and support of such an incremental strategy of implementation (without which the proposal is senseless).

In conclusion it is argued herein that a system for the construction, collection, and analysis of social indicators should not be conceived in isolation of other intellectual and political endeavors. Through logical analysis, through a paradigm of the political and the research worlds in interaction, and with the support of three examples, it is argued that a single best utilization of social indicators research exists within the domain of policy research and analysis, that will respect the functioning of the democratic system. The optimal organization suggested has a regional focus, is allied to action-oriented agencies, is an auxiliary and semi-autonomous branch of government, is thoroughly multidisciplinary, maintains a future orientation, and is accountable to people, people's organizations, and government.

It is not implied that other scientific endeavors are of lower priority. It was stated in the first section that other domains of science and theory exist, namely speculative and normative, which do not require empirical referents such as social indicators. Furthermore not all empirical endeavors are necessarily policy oriented, and thus are not affected by the constraints imposed in the section dealing with policy research. And lastly, subscription to ethical principles contradictory to the given definition of democracy would lead the beholder to vastly different conclusions at least in the solution to the problem posed if not in its formulation.

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