

The Technical Planning Process -
An Evaluation

William M. Welsh
Junior Fellow
Division of International
Urban Studies
Center for Urban Studies
Wayne State University
June, 1971

TABLE OF CONTENTS

INTRODUCTION	1
Planning Process as a Basis for Study	1
NORMATIVE MODELS OF PLANNING PROCESS	4
SYSTEMS APPROACH AND COMPREHENSIVE PLANNING	7
TOWARDS AN INTEGRATION OF SYSTEMS ANALYSIS AND COMPREHENSIVE PLANNING THROUGH A NORMATIVE MODEL OF PLANNING PROCESS	9
Normative Model of Planning Process	9
Input Stage	9
Values and Goals	11
Requirements of Goal Setting in the Normative Model	21
THE CONVERSION STAGE OF THE PLANNING PROCESS	25

INTRODUCTION

Professional city planners, in both Europe and the United States, agree that ranked high in the myriad of problems confronting the professional field is the persistent disparity between the rapid proliferation of theory, techniques and methodologies of use in planning, and the relative primitiveness of operational city planning practice. This is a particularly pertinent problem in the United States where a highly developed professional specialization has fostered a growing sophistication in the understanding of spatial systems and in the theoretical adoption and refinement of techniques and methodologies developed both in other disciplines and, to a limited extent, within the field of urban planning itself. Though the application of scientific methods to the problems of environmental planning is widely recognized as being in an initial exploratory phase, theoretical developments do contrast with a methodologically deficient practice constrained by the legal, political, and social context of present day U.S.A.

It is crucial for the furtherance of planning as a public, governmental activity, (assuming that this is desirable), that this fundamental dichotomy be resolved or to an extent reduced. There are two basic reasons supporting this general goal. Firstly, and obviously, operational urban planning agencies desperately require a scientific approach in their operations if the output, in terms of meaningful policies, is to achieve a significant "quality of fit" to the action spaces to which they are directed. Secondly, in order to test the utility, adapt and refine evolving theory, techniques and methodologies in the discipline, it is vital that these be afforded the opportunity of integration into the ongoing processes of operational planning, since this is the only effective testing ground for new developments.

Consequently it is the premise of this paper that in order to capitalize on the developing "scientification" of planning, substantially greater knowledge is required as to the relationship between academic postures or theorizing, on the one hand, and the complexity and actual characteristics of the operational context on the other. Stated simply, more knowledge is desperately needed concerning what is actually occurring in the field that reflects the theorizing or evaluation in the literature.

Planning Process as a Basis for Study

In selecting a substantive focus, with related tools, for such an exploratory task, it is believed that the most direct and valid

area is that of the technical work process of planning. Prior to describing what is implied by this term, it will be useful to defend the choice of this approach to exploring the problem defined in the previous paragraph. The concept of planning process as a focus of this paper is based on the following observations.

(a) Substantial effort in developing normative models of the technical process of planning has occurred in the literature in recent years. These inherently both reflect and imply a synthesis of available techniques intended to rationalize the process of planning, and are therefore indicative of the existing state of conceptualization of what precisely is involved in a combined decision-making and technical planning process.

(b) Conceptually, normative models of process provide a framework with which to evaluate evolving techniques which too often have been "adopted" rather than "adapted" from other disciplines into urban planning. A clear indication, for example, of how cost-effectiveness methods relate to the entire process of planning is a necessary prerequisite to evaluation, modification and finally adoption of one particular technique into a task design or process.

(c) The technical process used by a planning agency may reflect their perceptions of planning problems, their professional orientation, attitudes and their level of technical sophistication. It could be hypothesized that the traditional, design dominated professional practice followed a linear work process, culminating in the production of an end state or product, namely the physical master plan for a spatial system, whereas the more recent social science viewpoint is that of a continuous, cyclic, and adaptive process, not necessarily intended to produce a final product. (e.g. Foley, 1964) Thus, professional attitudes and orientation may contribute to the structuring of the technical work process of a particular agency. In order to test such an assumption, greater knowledge of the planner's perceptions of process and the actual process they follow in planning is required.

(d) In many areas of practice, physical planning is viewed as a linear problem solving activity and not as a cyclical process. Simultaneously, new forms of planning activity are emerging, e.g., social planning, which themselves are being defined and described as linear problem solving activities. Given the need to link these various forms of planning into a truly comprehensive, integrated process, it is important that the nature of the individual processes be similar. (Travis, 1970)

(e) Past work in studying planning process within specific agencies or cities has, in general, proved disappointing. There has been a tendency to simply examine activities called "planning" and merely describe them. This has, it is argued, led to basic distortions when preconceptions have not been made explicit, or there has been a lack of rigor used in attempting analysis. Conversely, the literature on planning process has predominantly concentrated on describing what the planning process should be without systematically determining what it actually is. (Friedman, 1969) Consequently, the use of normative models do provide a firmer base for evaluation in terms of a conceptual framework for empirical analysis, and by setting up a norm, or measuring yardstick, help determine the "deficiency rating" of an agency's planning process. In simplest terms, recommendations for improvement of the planning process should emanate from those phases of the process determined to be deficient when compared to the normative model.

(f) Planning agencies operate within a set of boundary constraints, often referred to as obstacles to rational planning, which comprise the wider decision-making environment of planning. The structural characteristics of the social/political environment within which the planner operates may preclude the adoption of a totally rational planning process, or a process corresponding to the normative models. The scarcity of empirical information on this interrelationship between context and process should be remedied if the theory of planning and more critically, the practice, is to ultimately relate optimally to the operational context.

These observations, it is claimed, support the use of normative models in exploring the dichotomy between academic postures or theory and what is going on in the real world of operational planning.

The method used in this limited study, (which is linked to an in-depth, longer term research project to be undertaken by the author), was to use a normative model of process, representing a simplistic "ideal technical process" as an evaluative tool to carry out two basic tasks.

(a) To determine the major departures between the normative and actual process used by one particular planning agency, namely the technical staff of the Detroit City Plan Commission.

(b) To explore the nature of the reasons contributing to these deficiencies or departures from the normative model through further analysis.

This limited type of empirical study could, therefore, be related to a wider research aim, namely as a contribution to understanding more of the pathologies of planning, of which substantially greater knowledge is required.

The failure of planning to attain a leading role as a governmental activity, (or conversely, to remain a vestigial function of city government) could include, among many contributory factors, its failure to adapt optimally to its environment, the resilience of the social/political environment to change, the rigidity of planners attitudes and procedures, or an inappropriate mix between process-oriented and plan form of implementation.

Based on a more rigorous, systematic understanding of the pathologies of planning throughout numerous contexts, a prescriptive theory could be developed which would be superior to existing formulations in that it would be forcibly expressed as a function of its decision-making environment. (Friedman, 1969) Unfortunately, this paper is based on a single case study of one particular agency, and one which forms a cog in a wider public planning system. Reservations regarding this approach will be outlined later in the paper. Assuming this research aim is considered to be a valid area of concern, it is necessary to describe, at length, the nature and evolution of normative models of planning as a process, since this forms the key evaluative tool for the empirical work.

NORMATIVE MODELS OF PLANNING PROCESS

Planning is an activity constantly being defined and redefined, but it is sufficient to consider planning, any form of public planning, as "the guidance of change within a social system". Planning, by definition, involves a confrontation of expected with intended performance, the application of controls to accomplish the intention when expectations are not met, the observation of possible variances from the prescribed path of change and the repetition of this cycle each time significant variations are perceived. It is therefore a "process" i.e., a continuing development involving many changes.

The evolution of physical planning as a process emanated from the teaching of Patrick Geddes who initially prescribed the dictum of survey-analysis-plan. Though a unitary and product oriented concept, the rudiments of a process were established and remained the fundamental guide for physical planning activity and indeed the basis of master plan formulation in established planning systems, e.g., planning under the 1947 Town & Country Planning Act in the U.K.

Implicit in this simple logic, (planning theory consisted of little more than an exercise in the logic of decision-making) were key preceeding stages of goal and objective formulation, derived from client value-systems, (too often those of the professional plan maker, however), and an assumed follow-up implementation phase.

Normative models of planning process also owe a great deal to models of rational decision making. Though unnecessary to detail these, the key works specifically related to planning include Banfield (1955) and Meyerson (1956). (For the counter theory of 'disjointed incrementalism' see Lindholm 1963). Banfield summarized the process of rational decision making as comprising the following stages.

1. The decision-maker considers all of the alternatives open to him; i.e., he considers what courses of action are possible within the conditions of the situation and in the light of the ends he seeks to attain;

2. he identifies and evaluates all of the consequences which would follow from the adoption of each alternative; i.e., he predicts how the total situation would be changed by each course of action he might adopt; and

3. he selects that alternative the probable consequences of which would be preferable in terms of his most valued ends. (Banfield 1955)

Recognizing that all alternatives could never be documented and that rationality is always bounded, Banfield nevertheless set up a process as one towards which strides could be made. Meyerson went further in outlining the constituent operational elements of such a process and was instrumental in the adoption of middle-range programs of the C.R.P. type.

Later in this paper, a somewhat revised process accepting the difficulties inherent in the pure rationality process is described as the basis of the normative model for use.

The application of scientific method in planning, subsequently introducing innovations into the conceptual form of process, gained momentum during the latter part of the 1950's. The term scientific method, however, must be viewed liberally, since many of the innovations were restricted to urban sub-system planning, notably transportation systems, with little concern for the interrelationships and trade-offs with other sub-systems. Up to this point, to quote

Dyckman, "City planning was highly aware of the information requirements of good planning decision, without having adequate means for digesting the needed information, and for incorporating it into decision." The middle and late 50's saw great strides in the technology of analysis and operational simulation. The widespread availability of high speed digital computers made the use of forecasting and testing methods feasible. Parallel developments in decision making analysis aided the professional planner to identify the point in the decision in which he must operate and also clarified the flow of information and decision. (Dyckman 1961)

The application of rigorous methods also pressurized planning to explicate the entire process of planning more effectively, in that formerly implicit stages such as objective formulation had to be made explicit if scientific methodology was to be applied. For example, scientific methods for prediction and evaluation would be of negligible use unless objectives, against which alternative solutions could be evaluated, were to be made clear, and where possible, given operational values.

Limitations in the technology of analysis, which did not facilitate the quantification of fundamental measures of system effectiveness beyond the simplest cost minimization criteria, developed regrettably, within planning, a tendency to follow trends as opposed to innovatively adapting trends. However the planning process, at least in conceptual terms, experienced rapid reevaluation through advances in analytical capabilities. Stages which gained new impetus and more rigorous attention included:

- prediction both crude aggregates of the total system and more detailed predictions of specific sub-system characteristics and needs
- the elaboration, testing, and evaluation of alternative solutions by quantification methods together with
- simulation of alternatives in the projected system to determine impact and trade-offs
- feedback from the resultant action into the reassessment of problems as a basis for recycling the entire process.

Attempts were also made at scientifically defining and structuring sets of objectives including the reconciliation of inconsistencies and in providing operational values or objective functions for alternative permutations of goals. This, however, remains the most

perplexing and methodologically suspect stage of planning process. The mechanics of aggregating individual values to form the basis of goal formulation, and the problem of time discounting, (comparing the values of the present generation with those of the unknown future) present possibly insoluble problems given the existing capability of planning technique, as well as a derth of testable theories of spatial systems for that matter!

SYSTEMS APPROACH AND COMPREHENSIVE PLANNING

Urban planning is concerned with complex and interacting systems - spatial, social, economic, and political. The systems approach to planning, which forms the basis of scientific application and much of the normative theory of planning also provides the essence of normative models of process. After all, systems thinking is not new to planning. It has only been modernized by the availability of space-age accoutrements. It is one aim of this paper to determine whether or not the systems approach is in any way applied in the work of one particular agency. Before doing so the relationship between systems analysis and comprehensive planning must be clarified.

The literature of innumerable operating planning agencies proliferates with references to the systems approach to planning and with glib mention of such facets as the optimization of objectives, the elaboration and evaluation of alternatives incorporating a measure of cost-benefit analysis, the prediction of the system's future behavior, etc. What is never quite clear is whether these references to the new science of planning methodology are supported by technical application in the actual processes used. The documents may reflect little more than the planners innate drive for professional legitimacy through the veneer of a jargon.

The systems analysis methodology is often claimed to be incorporated within the comprehensive planning process, yet although there are acknowledged similarities between the processes of systems analysis and planning, serious and fundamental differences require resolution before the planning process can claim equal rigor as that of systems analysis. The seminal differences revolve around the problem solving nature of systems analysis as opposed to the inherent preventive ethos of planning, the evaluative methods with respect to alternative reduction and the extent to which variables involved in alternative building are quantifiable.

As a result of its mathematical orientation, systems analysis is predominantly concerned with problem situations, usually immediate problems which have to be resolved within the present state of the system under consideration. Planning on the other hand is concerned with future systems, precise knowledge of which is, at best, sketchy. Secondly, planning problems are invariably multilateral, whereas systems analysis can most readily deal with problems of a unilateral nature. Furthermore, since urban planning deals with highly complex and interacting systems, optimal solutions must consequently involve the designing of an optimum relationship between and among the numerous sub-systems of housing, transportation, etc., and the relationship of governmental, social, and economic systems in carrying out action.

The optimization of a systems analysis problem, on the other hand, normally involves a single dimension only, and the optimization of one system may frequently result in the sub-optimization of other sub-systems.

Another major difference between systems analysis and comprehensive urban planning concerns the key process of evaluating alternatives. In a systems analysis problem cost-effectiveness methods are utilized which rely, for their success, on a measurement of resource expenditure as well as measurable results from this expenditure. In planning, however, alternative evaluation has not reached as significant a level of rigor as that achieved in systems analysis through cost-effectiveness techniques. Alternatives are usually evaluated through the exercise of simple logic together with cost measures, where attainable, or else selected criteria, such as the conservation of recreational land or the level of population capable of being accommodated in a regional strategy for example, may be regarded as the principal criterion of evaluation.

Finally, systems analysis and planning differ in the degree of quantification used in their respective processes. In systems analysis the inter-relationships that exist among sub-systems within a system must have a proclivity for measurement. To attain the desired level of optimization, minimization, or maximization in the relationships between variables, it is necessary to have a mathematically defined understanding of the inter-relationships involved. (Catznesse and Steiss 1968)

Planning, on the other hand, has not yet proceeded beyond the stage of determining those elements and relationships in a spatial system which are capable of quantification. Mathematical modeling has achieved limited success, for example, in quantifying specific

relationships between such elements as population, housing, and transportation, but innumerable other more subtle sub-system relationships have to date defied measurement of statistical significance.

TOWARDS AN INTEGRATION OF SYSTEMS ANALYSIS AND COMPREHENSIVE PLANNING THROUGH A NORMATIVE MODEL OF PLANNING PROCESS

Physical planners have, almost universally, been primarily concerned with the content of plans and in the development of the product. As a consequence they have tended to neglect the reality of planning as a continuous process. Both systems analysis and planning are activities concerned with a process. A systems viewpoint, specifically the methodology of systems analysis, could provide a more coherent basis for a revised methodology of planning since planning is attempting to understand and adapt extremely complex inter-relationships between and among environmental systems. Thus, the model to be outlined in this section is considered as a normative yardstick with which to assess the actual planning process of the Detroit City Planning Commission staff. In essence, the model reflects the current level of sophistication in delineating a possible comprehensive planning process.

Normative Model of Planning Process

As a result of the breadth of the field being described, it is not possible to treat all the stages in the normative process equally. This would require several volumes, not a limited research paper! Consequently those sections where the disparities between present day practice and the literature are observed will receive considerably greater coverage.

The process has three basic stages following the initial acknowledgment of system malfunctioning. These are an input stage, a conversion stage, and an output stage (refer to diagram of planning process).

Input Stage:

The takeoff point for the process would be the definition and clarification of current and future problems associated with the system under review and in making the inter-relationships among these problems as explicit as possible. In this context, the planning process would differ from established systems analysis in the sense that it is imperative that potential problems be determined.

Considering the present limitations of planning technology, precise quantification of problem interactions is probably not attainable but, nevertheless, even crude estimates have utility if planning is to escape from its traditional preoccupation with solving, in an essentially unrelated fashion, a mixed bag of past problems.

The second step, prediction is considered by many professionals to be possibly one of the major contributions that planners working within present political restraints can make to improve the quality of decision making. Based on the assumed comprehensive identification of interactive problems established in stage one, the system under scrutiny would be projected through several stages of future development. The nature and magnitude of those problems identified in stage one could thus be determined in conjunction with changes in the degree of causal relationships. The criticality of problems associated with specific inter-relationships of which particular sub-systems would be defined as points in time and new problems would also be revealed.

Prediction at this point in the process would essentially be an extrapolation of past trends into the future to determine the potential behavior of the spatial system if no intervention was to take place.

Further explanations of the usefulness and criticality of this prediction stage will follow at a later stage of the paper.

These projections would also provide the basis for evaluating the impact of numerous alternative policies on the projected future state of the system.

The third step involves the identification of parameters of constraints which establish the boundaries for feasible action. This stage is extremely difficult and complex in the field of urban planning. Unlike situations, as in linear programming, where boundary conditions can be identified and attributed with numerical values, identifying parameters or constraints for a planning problem presents severe difficulties. Assumptions have to be made concerning the dimensions of the action space, and these will also be referred to later.

The fourth stage, the process of formulating and structuring goals and objectives, is the crux of the entire planning process. Planning, by any definition, must incorporate a concept of a purposive process, keyed to the achievement of preferred, ordered ends, whether these ends are expressed as directions or rates of change,

or as finite end states. Accepting that man controls his destiny, ends are not given and irrevocable, but are subject to analysis and choice. As stated by Davidoff and Reiner, "since choice permeates the whole planning sequence, a clear notion of ends pursued lies at the heart of the planner's task, and the definition of these ends thus must be given primacy in the planning process." (Davidoff and Reiner 1965)

The clarification and commitment to high order ends or goals, the uppermost level of Chapin's "hierarchy of policy decisions", is of paramount importance, since this will ultimately determine the myriad of lower level policy decisions, e.g. Decisions on the development policy for particular sub-systems such as transportation, are contingent on strategic, or system-wide goals, for example decisions on the degree of motorization and balance between transit/expressways. Stated simply, therefore, a structured set of high order goals are required for the formulation of specific sub-system objectives and as a framework for the making of day-to-day environmental management decisions. But the responsibility for setting public goals in a democracy is as diffuse as the authority to govern. Perhaps for this reason few goals are consciously aimed at through a methodical procedure. (Young 1968)

Values and Goals

The choice of ends or goals is inextricably linked with the values of individuals. This lies at the base of goal-setting problems. Davidoff and Reiner, in their key paper "A Choice Theory of Planning", suggest that the role of the planner is, through initial recognition of his client group or groups, to identify the distribution of values among people and to discern how values are weighted against each other. This identification of values enables the planner to explicate which future conditions are desired at the present time and which conditions may be desired by future generations. The values clarified by this process are then subjected to factual analysis based on prediction and simulation, revealing the costs and benefits associated with specific values. In this way values are structured into weighted hierarchies, through the joint influence of the planner and clients. Value hierarchies are then translated into alternative sets of measurable goals and criteria. By transforming values into explicit goal statements, the process of end clarification is completed enabling the search for the most appropriate means to begin. This will lead to further modification of goals as feed-back on the ramifications of alternative means will undoubtedly lead to re-examination of ends in a constant cycling of the ends-means chain.

This neat oversimplification fails to discuss many of the serious methodological and theoretical gaps in integrating values into the goals formulation stage of the planning process. Stages of initial value identification, subsequent measurement and evaluation of value structures lack the ready availability of tested techniques. It has been suggested nevertheless, that a combination of methods, applied to a defined client grouping, (assuming indeed that this is attainable), can be instrumental in identifying possible value groupings. Market analysis, public opinion polls, anthropological surveys, illiciting of leadership responses from the community, press content analysis, and studies of laws, administrative behavior and budgets, are, though certainly an advance on intuitive assumptions, difficult to accept without reservations. Their validity depends upon the assumptions and checks built into their individual usage and, where used in combination, the question of relative weighting given to individual technique results becomes critical. Similarly, attempts to construct a sounder theoretical base for values investigation remains elementary. Work such as Michelson's in Boston have attempted to clarify and test hypotheses concerning the relationship between "dominant" values and responses to other kinds of stimuli, but much more empirical testing is required before a satisfactory stage of theoretical development can be claimed.

Assuming values are identified, the problems of measurement and evaluation remain. Again Davidoff and Reiner argue that the purpose of measurement would be to provide a base for evaluating the progress, through planning action, in narrowing the divergence of the "stock of valued entities", possessed by the individual, from his own goals, or else the divergence of his stock of valued entities from a level determined by others. The second would be through the use of planning standards.

The measurement of values must embody considerations of their transferability, e.g. whether the value has a low transfer cost such as wealth, or a high transfer cost as with health; whether the value is fundamentally internal to the individual or "other directed" such as affection; and whether possession is a yes/no phenomenon, for instance survival, or whether it exists in discrete lumps as with the degree of health possessed by the individual; and finally, whether or not the value is subject to restrictions of finiteness.

Thorough analysis of value groupings, including their definition, distribution, and measurement, would optimally produce value hierarchies, stratified into various levels of importance. More fundamental and perplexing difficulties arise however, when the

resolution of conflict and inconsistencies among values is considered. In essence the problem is to develop pluralist goals from a complex pluralist value structure.

Numerous methods designed to reduce or eliminate inconsistencies in values have been proposed. These include assigning exchange prices to several goals allowing for their joint pursuit, posing alternatives and analyzing the implications of these alternatives as an aid to effective bargaining, and making the meanings of values explicit to provide clearer basis for their evaluation. Even accepting the merit of these as techniques, however, it seems extravagant to claim that they can effectively resolve conflict. Final resolution may ultimately involve the use of laws, coercion, etc.

Later in the paper the use of a predictive approach, involving a cycling of alternatives in a constant learning approach, to discover the implications of alternative attitudes, values and assumptions is attained and accepted as a means of partially resolving conflict and inconsistencies. Undoubtedly this section of the normative planning process, as briefly outlined, probably represents the widest departure from present practice. The complexity of value groupings and their resistance to satisfactory definition and measurement rules out the possibility of planning reaching optimality in the goals-values relationship. (Indeed it has been suggested that such a search for optimality may be wasteful and unnecessary). Yet, though the process of evolving goals from clarified value hierarchies faces overwhelming difficulties, particularly with respect to safely predicting value shifts through time, failures in tackling this key take-off point of defining ends remain extremely basic. Significant improvements would be forthcoming given modest changes in procedure and a basic shift of emphasis away from a growing sophistication in exploring means to a greater rigor in examining and defining ends.

Consequently, in evaluating a planning process, it is infinitely easier to scan for evidence of entrenched deficiencies in planning practice with respect to goal setting. The most common of these include the following selected from the planning literature.

Possibly through a combination of professional attitudes and a remoteness from grass roots pressures, British planning has only recently awakened from an astounding shyness to begin with a systematic search for ends. (Lichfield 1968) Other writers have observed that U.S. planning, stemming as it does from British experience, has shared a similar malaise. For example, in reviewing thirteen major land use and transportation programs in the U.S., Boyce and Day

state that "In general, it may be said that of all the elements of the plan making process, the experience in the formulation of goals and objectives is the most obscure." (Boyce and Day 1970) Evidence suggests that a vast proportion of planning agency time has traditionally been devoted to survey and analysis which, operating in a directionless vacuum, cannot fail to be unstructured, non-purposive, and ultimately therefore, wasteful. This reliance on survey and analysis has produced the effect that goals and objectives frequently emerge from a discovery of facts, yet facts fail to reveal or suggest a desirable or normative future. Consequently, too often planners predict the nature of the future, then initiate measures to attain that future, and in doing so thereby limit human aspirations.

This draws attention to the question of the planner's role in establishing goals and, in this context, the debatable, covert selection process practiced in many professional spheres. From the preceeding discussion of values, goals can be viewed as value statements which, it was observed, are not objectively verifiable. Goals cannot be selected and rejected outright, therefore, on the basis of some supposedly superior technical knowledge or expertise. Yet this is precisely the behavior of planners in setting up the planning process. They engage, implicitly, in rejecting alternative ends, rarely stating those rejected or the reasons for rejection and as a consequence ultimately impose, albeit unconsciously, their values on others. Aside from the ethical objections to this practice, it is unlikely to produce desirable or acceptable solutions. In other words, to quote Gans, "planners do not monopolize wisdom about goals and values." It is the responsibility of the planner to explicitly scrutinize all alternative ends and to utilize skills to determine and make available the detailed implications of all alternatives for the informed choice of the community at large.

Where goals are stated at the outset of the planning process, several regrettable characteristics prevail. In one of the few detailed empirical studies of planning process, Altshuler discovered in his observations of planning in Minneapolis-St. Paul that comprehensive planning goals remained at a superficial, vague level of generality. This resulted in several deficiencies, possibly, he argues, endemic to the practice of comprehensive planning. (Altshuler 1965)

Firstly, planning goals, because of their generality and the ambiguous link to the mass of standards or more specific objectives of the plans, failed to provide a meaningful basis for discussion between planners and the public at large. Interest groups and

individuals could not foresee the relevance or implications of planning goals on their own particular situations and consequently failed to respond. On the other hand, business leaders and other individuals whose immediate interests were influenced by public policies to a degree, displayed an understandably lower threshold of interest, and proved willing participants in discussions of planning goals. This biased representation of local involvement constituted a dilemma for comprehensive planners committed to the ideal of ensuring that planning proposals are formulated in the interests of the entire community. Unless goals are specific enough to activate all groups, then representation in the discussion stage will remain biased and sectional with undetermined effects on the modification, through interest group pressure, of planning objectives. (A profile of participation in Detroit planning issues will be referred to later in the paper to illustrate this problem).

A further defect of the goals normally found in planning agency work concerns their ineffectiveness as evaluative bases for the choice among alternative means. In simplest terms, in deciding between alternative policies to achieve a specific objective, the criteria of choice would be the extent to which each policy achieves the goal, the final decision taking into consideration the corresponding cost implications of each alternative. In order to achieve an effective testing mechanism, the original goal must be explicitly stated in a form capable of measurement, by detailing the constraints and performance criteria that a solution must satisfy. Failure to carry this out will reduce the crucial process of alternative generation and testing to a crude, valueless exercise.

In effect, the process of policy testing against goals can be infinitely more complex. Policies interact in a complex manner so that the predictable effects of policy decisions are not mutually independent. e.g., Policy A in combination with policy B may, and most probably will, produce effects which differ from the sum of the effects of policies A and B taken individually.

This introduces another contentious assumption underlying much of the goal making in urban planning practices. It is widely accepted that goals to be pursued in the planning process are strongly hierarchial in nature and that trade-offs between them can largely be neglected. A series of sequential decisions follow from this assumption which ordinarily result in the selection of one alternative. The sequential decisions relate to the goals hierarchy in declining order of importance for individual goals and the decisions necessary to achieve the first goal will be frozen regardless of

their effects on subordinate goals. This reduces the dimensionality of the action space being considered, and, since each decision in the sequential process must be judged on its own merits, this assumes that interactions with other decisions can indeed be neglected, though this is highly improbable. (Harris 1967) The net result is that this type of sequential decision making, stemming from the assumption that goals are hierarchial in nature, effectively bars the testing of unusual and fruitful combinations of policy, where the benefits derive from the active combination rather than from the individual policies. A method of reducing this barrier is discussed in a later section.

This intriguing problem aside, the essential point of weakness is the non-operationality of many planning goals. To be operational, a general goal statement must be translated into guides and criteria that can be used in the formulation and evaluation of public investment policies. Following implementation, this base also provides a yardstick for assessing the impact of the chosen policy or policy combinations. For example, consider the following goal, selected from the Detroit master plan (para. 201. 0101):

"to introduce green areas, to assure all people living within the city of an opportunity for physical recreation and pleasant leisure in the out of doors".

As a goal of planning this is of negligible use in aiding the formulation of policies and in testing alternative solutions unless supported by more precise criterion. The precise meaning of green areas, physical recreation, pleasant leisure, require more rigorous definition before the process of criteria formulation can be undertaken. (This is not to mention the questionable conceptualization of leisure needs implied in the phrasing, i.e. What about indoor leisure facilities and "non-green" area recreational facilities in the urban context?). Assuming more precise explication is achieved, standards for various forms of outdoor recreation must be formulated and criteria for possible solutions determined.

Criteria for action programs even in relation to the above goal certainly exist, but unfortunately usually within a conglomeration of mixed performance levels, often operating implicitly, in sub-sector planning, which is developed in isolation from other levels or forms of planning, e.g. public utility services, highway planning, educational planning. Minimum standards of service provision are intermixed with utopian goals, optimal objectives and maximum community aspirations in a incoherent body of intransigent

planning aims. Functional and organizational integration of this network is prevented because the precise level of specificity or generality attached to individual goals is rarely explicitly understood. A further weakness of objectives in many public service systems is that objectives are frequently framed in terms of input rather than output criteria. This is to say that the performance of the system is measured by what is put in rather than what is coming out and consequently they fail to gauge system performance as a means to the achievement of wider social ends. Doctor-patient and pupil-teacher ratios are classic examples. Teitz suggests that "... measures of this type are particularly attractive in situations where the system outputs are diffuse and the objectives imprecise." This ultimately results in goals being distorted away from social ends for which they were established and towards internal organizational and administrative ends. (Teitz 1968)

These defects may be symptomatic of a more serious and fundamental problem. This concerns the interdependence of the goals and objectives with the action and outcome spaces related to the planning process, and the difficulties of attaining a relevant definition of these spaces. In the classical decision making sense, it is assumed that the decision maker can identify and structure the relevant action space, given his objectives and the constraints on his action. This implies that the action space is restricted by the known objectives. Consequently the action space identification and description becomes crucial to the formulation of objectives.

In a real world situation, this is an extremely complex task, and action spaces can be described through different analytical viewpoints. Thus a view of transportation and land use which assumes that transportation facilities would have little effect on trends of urban development would give rise to limited objectives, (based on a limited perception of the action space) than a view which acknowledged the interactive nature of transportation links and urban growth. (Harris 1967)

Thus there is a complex interaction between the objectives of the decision makers and their perception of the action and outcome spaces. This difficulty of defining action spaces frequently results in decision makers, eager to make objectives specific, measurable, and operational, building in bias to objective formulation by searching for actions which are feasible. It is extremely difficult to trace this effect, but it is possible to minimize its effects by conceptualizing the planning process as a continuous cyclic learning process in which objectives are in a constant state

of flux through considering information produced by prediction and simulation of numerous propositions. (Boyce and Day 1970)

One final criteria which could apply in assessing a goal setting process is that of facilitating the integration of physical with other forms of planning activity, e.g., social and economic planning. Once again, what may be required is a suitable form of integrating concept. Perloff, in discussing the linkage between social and physical planning, contends that concepts used by physical and social planners, e.g., emphasis on land use and control and on social pathology respectively, have been more divisive than integrative in their effect. Integrating concepts would be "... concepts that provide an intellectual and action base for collective collaboration between physical and social planners in the attack on critical urban problems." In both cases, physical and social planning objectives have been too narrowly conceived to provide common ground for planning and action. In striving for a better integration of programs, through the formulation of sounder conceived goals and objectives, Perloff suggests concentrating on "the bundles of decision areas which are the characteristic of the major decision units in the community: the households, businesses and governments." This recognizes that various functions are naturally linked in the urban community and decisions of all three of these groups are interrelated. Human resource development goals for the community, evolving from this understanding, would then form the base for integrating physical and social planning, (Perloff 1968), e.g. the goal of employment for all and a minimum family income, if accepted, has important implications for physical planning objectives. Traditional planning goals have emphasized a separation and compartmentalization of land uses, particularly the separation of industrial uses from housing. Furthermore, American cities have, in their attempts to attract 'clean' industries back into the city, neglected the provision of jobs for the unskilled since most of the new industries are research and skilled crafts. Yet both these aims can be viewed as working against the aims of the recent poverty programs. The bulk of the poor, the unskilled, the unemployed, reside in the central city whilst planning policies encourage the out migration of unskilled employment opportunities. Combined with the lack of public transport to growing suburban employment centers, the central city's poverty problem steadily worsens and physical planning has ultimately aggravated the problem being attacked by social planning.

Thus from the perspective of re-defined human resource goals, physical planners perhaps should re-examine among others the traditional industrial location and urban renewal practices, and consider

ways in which physical planning policies can complement social policies for the alleviation of central city problems. For example, transportation planning should consider the effect of policies on employment opportunities for the disadvantaged, and urban renewal should incorporate labor-intensive industrial uses and service employment requiring relatively few skills.

Frequently, many of the difficulties inherent in goal setting, including lack of operational objectives, ambiguous generality, confusion, inappropriateness for political consideration and choice, are attributed to the much challenged ideal of comprehensiveness in planning. It can be confidently argued, since planning practice is by no means unimpeachable, that this is indeed the root of the difficulties. However, it is suggested that the weakness lies, not in the ideal of comprehensiveness, but rather in the lack of organizing concepts for its operation.

Planning goals have taken on a comprehensiveness because as Dyckman has suggested, "the main gaps in rationality which institutionalized planning has been asked to fill are the presumed deficiencies of other decision mechanisms in dealing with the future, and the extensive repercussions of limited goals. Specifically, these deficiencies are the alleged undervaluing of the future by short run decisions, and the lack of attention to 'neighborhood effects', or system wide consequences by the behavior of parts. Institutionalized planning is thus obliged to be both long range and comprehensive." (Dyckman 1961)

Planning, in aspiring to comprehensiveness, therefore attempts to co-ordinate, integrate and decide on the basis of the total public welfare, and with a longer term perspective than that of the private and public decision makers whose planning actions tend to be sectional and shorter range. This commitment to the total public interest has been substantiated by Altshuler who determined that the planners of Minneapolis/St. Paul believed that "city planning was comprehensive and for the common good, not for any lesser objectives". The feasibility of comprehensive planning, it must be deduced, therefore, lies in the validity of the planners claim to interpret the public interest. A claim which has already been disproved in the preceding discussion of values and goals. In addition, the growing application of decision making science has further eroded the logic of comprehensiveness. However, as stated, these criticisms have been directed at a practice devoid of any underlying conceptual framework for its operation. Friedman, in answering criticisms of the comprehensive ideal, offers such a framework. Within the systems view of

planning, and which is in concord with the normative model under review.

In Friedman's words, "comprehensiveness in city planning refers primarily to an awareness that the city is a system of inter-related social and economic variables extending over space. To uphold the principle of comprehensiveness, therefore, it is sufficient to say that functional programs must be consonant with the city wide system of relationships, second that the costs and benefits of the programs must be calculated on the broadest possible basis, and third, that all 'relevant' variables must be considered in the design of individual programs." (Friedman 1965)

Without expanding on Friedman's statement, it follows that if the planner defines the units or components of his system in such a way to maximize the freedom of the public and private decision makers to optimize their systems within his components and provided that specialists understand this relationship, comprehensive planning goals can be regarded as "performance requirements for a spatial system of interacting activities."

The mainstream of comprehensive goals would thus be performance criteria for the system wide series of relationships, giving direction and defining the scope available to determine lower-order operational objectives in the planning of sub-systems.

System wide goals would specify the desired nature and intensity of sub-system interactions through time and space. They would explicate the performance criteria for system interaction between, for example, the residential system and the education system; e.g. the criteria for the distribution of educational facilities in relation to residential uses; between the residential system and the employment system, e.g. the location of industry in relation to the distribution of homes, and so on. Criteria for system-wide objectives need not be precise but could outline an acceptable target range within which any solution devised by the sub-system planners would be valid. For example, in relation to the development of a particular shopping complex, a range of floorspace affording the developer sufficient flexibility to optimize his investment rather than a specific target, and an approximate target provision for servicing and parking, which would indicate the relationship of the floorspace factor to transportation servicing requirements, rather than a specific level of servicing. (McLoughlin 1969)

Sub-system objectives would then be internal to the sub-system and would be prescribed by the appropriate specialists working within

the constraints imposed by the system-wide goals. Conceptualizing goal formulation in this manner may minimize the "neighborhood effects" of change in individual systems referred to previously.

Further and more precise explanation of a systems ordering of objectives would require considerably more time and space, but it is sufficient to draw attention to the definitional relationship of comprehensive planning goals consisting of directives for system wide management and sub-system objectives emanating from the discernible functional needs of elements within the overall system.

Essentially, the points of criticism and limited suggestions contained in this discussion of goals and goal setting, highlights a theme which will recur throughout the discussion of the normative planning process. It is the concern of the planning process to internalize the identification of its purpose scope and assumptions. Implicit in this internalization lies the keys to the improvement of the process itself. Since the process is designed to increase the rationality of decision makers actions, a major function of the process will be the provision of information. This information facilitates a process of learning, regarding not only what decisions are required, but also what information is needed to make those decisions. Secondly, the process is fundamentally cyclic, with numerous rounds of dialogue between decision makers and planners to allow learning to occur and to make more decisions and to reconsider old ones.

Thus the process is a cyclic, learning process in which objectives and preferences are identified, programs and policies prepared and evaluated and decisions taken in a series of cycles in response to the constantly changing needs of the system being planned. This, as will be explained in the next section, leads on to an emphasis within the planning process, a prediction and simulation, which relieves some of the stringent conditions suggested here for specification of goals in the internal stages of the process.

Requirements of Goal Setting in the Normative Model

The preceeding sketchy, though wide-ranging, discussion fails to introduce specific methodologies for more scientific goal-setting in urban planning. This would require substantial coverage as it constitutes a research field of considerable depth. The question of goal setting methodologies cannot be by-passed however without cursory mention of currently developing techniques which are contributing to force a trend towards explicitness. In particular,

the development of planning, programming and budgeting (PPB) systems explicitly relates the contribution of inputs to various outputs, and these outputs are (at least approximately) explicit statements of goals. In a field such as urban planning all goals cannot be made explicit and measurable, but procedures which are equivalent to those used in PPBS are being developed. Examples are Lichfield's planning balance sheet and Hill's goal-achievements matrix.

In maintaining a synoptic view of the overall planning process in this paper, numerous performance criteria are relevant for the goals formulation stage of the planning process. Thus the major characteristics of the goals and objectives formulation stage in the normative model would include the following.

1. The initial step in the formulation of general planning goals should be a legitimate search for relevant values concerning the environment, and their distribution patterns among the client group or groups. To date only three U.S. cities have, with mislabeled results, attempted to develop goal statements through examination of public values. These are Chicago 1964, Los Angeles 1966-67 and Dallas 1967. If, as in the case of the Detroit City Plan Commission, the client group is the public at large, this may prove to be a technically difficult and politically delicate task. Consequently, it is imperative, at the very least, that the value premises of the plans and programs be explicit and not implied.

2. Utmost care must be taken to ensure that the values inherent in goal statements are not solely those of the professional planner. (Planners are at present rather ineffective in articulating society's goals as distinct from their own ideas about society's goals!) Where appropriate, empirical investigations should aid the determination of people's needs and desires, be it through the political process, effective public participation, and observing what people do where they have choices, (though this should not be through the market type study alone).

3. It is vitally important that goals and objectives, particularly at a general level in the initial stages of the planning process, are determined through a participatory democratic process. Indeed public participation should permeate the entire planning process. This raises questions of conflict resolution, communication and public participation. First, planners must be able to communicate in comprehensible language, translating complex technical information into readily understood terms. This problem would also be lessened if experts were to be made available to the community, and here universities can perform a useful role as is being recognized.

Second, there is a need to make all relevant information about planning issues available to the public as well as to planning teams. Thirdly, effective public participation will require the creation of an institutional framework which ensures the articulation of society's goals and the provision of machinery for effective communication and conflict resolution. The present institutional machinery does not succeed very well in this respect. Clearly an elected council, or worse, an appointed commission, cannot, as suggested by Friend and Jessop in a U.K. context, have the necessary requisite variety, i.e. be sufficiently complex, to effectively represent the community. The more institutions there are representing the 'public interest' the more likely it is that the interests of specific community groups are communicated to the planners. Certainly the U.S. situation differs in the complexity and degree of representation in the planning process than in the U.K., but it is not formalized and the appropriate mechanisms do not exist for meaningful participation in goal setting. Methods developed in the social sciences are beginning to emerge as useful avenues to a more systematic attempt to discover the goals of the population and may be considered useful tools in this part of the normative planning process. These include those developed by Lamanna, Tullock and Coleman.

4. Physical planning goals should stem from a higher order set of the authority's goals which should have as their essence the development of the authority's human resources. These can be general goals for human welfare, e.g. a more equitable distribution of real income, and would provide the "umbrella" for the formulation of physical and other forms of planning goals. As suggested, much of the confusion surrounding the linkage between physical and social planning could be dissipated if fundamental welfare goals are viewed as organizing concepts for the formulation of mutually reinforcing social and physical planning goals. This requirement is especially pertinent to a situation of severe social problems as in Detroit.

5. Goals and objectives should be stated in relation to differing levels of aspiration. A simple classification would be into normative or utopian levels, optimal levels, and maximal and minimal levels. The normative, or utopian goals, essentially the product of nonbounded thinking, would obviously differ from optimal goals in the sense that they would not be bound by the constraints established by the problem. Aside from clarifying the degree of generality associated with the various goals, this classification is important if the planner is not to circumscribe human aspirations and indeed if planning is to be truly democratic. If the community is to exert any influence over the enumeration and choice of possible futures, then goal formulation must operate on the principle that

"all things are possible given the willingness to meet their costs". Choice will ultimately be made as to the desirability to meet costs through the dissemination of information, provided by the planners, on the broad distribution of costs and benefits associated with proposed alternatives.

6. Goals and objectives in planning should relate directly to the functional needs of environmental systems and sub-systems to avoid unnecessary interaction between actions on individual systems. Alexander and others go much further in suggesting methods whereby goals to be satisfied by a planning process may be explicitly listed through knowledge of the technical nature of the problem. The interactions between pairs of goals are set out in matrix form. Numerous methods are employed partly using graph theoretical procedures to decompose the matrix in a hierarchial fashion, so that, at any level, the interaction between goals or decisions in a subset is greater than the interaction between subsets. This then provides a basis on which the designer seeks to find a satisfactory or optimal solution to a subproblem where interdependencies are important and then proceeds to resolve the joint problems which arise between sub-problems. There are many weaknesses inherent in this construct, especially when a large number of design decisions are inextricably interrelated. For the present discussion, however, these need not be covered, and it is sufficient to stress that goals should be ordered to minimize potentially disruptive interactions between goal sets. (Alexander 1964)

7. Since planning deals with decision making areas characterized by a high degree of uncertainty not only as regards the future but also concerning the complexity of the present, planning goals should not be irrevocably fixed but should reflect this inherent uncertainty. It is suggested that tentative goals should be specified as output targets in a process similar to PPB procedures; programs specifying these targets will be based on different time horizons. These will have specific degrees of "firmness"; each target might be expressed as a range of possible values and a probability distribution will be associated with each range. Goals and objectives must be capable of modification as a result of later stages in the planning process which will predict the distribution of costs and benefits associated with the achievement of each goal and through subsequent cycles of the process.

8. Physical planning goals should be as explicit as possible, stated in clear and unambiguous terms if they are to provide useful directives for the formulation of specific program objectives, guides and criteria with which to evaluate alternatives. They must be lucid enough to be understood by the layman and clear enough to facilitate

meaningful public response. This applies even to hypothetical goal sets for the initial round alternative investigation.

The author makes no apologies for dwelling on this stage of the planning process. It is evident, even from this limited discussion, that the present state of practice with respect to value identification and measurement, goal articulation and the development of appropriate sets of accounts to ascertain the movement towards these goals, is woefully inept. Technically, better methods could evolve from the social sciences, but in no way can this automatically guarantee improvement. The whole question of interaction between the political structure of the planning context and the articulation of democratic goals requires intensive analysis. It is frequently argued, persuasively, that political leadership fears an explicit statement of goals, measurement of progress, and wider public involvement, when the power and resources to affect improvements in the environment are inadequate. Analysis of this interaction in the context of Detroit - its political leadership, its planners attitudes, its composition of influence groups and its corresponding record in articulating goals could form a separate, parallel study to this essentially technical analysis internal to one particular agency.

THE CONVERSION STAGE OF THE PLANNING PROCESS

Returning to the normative model, following the articulation of goals (however tentative) the planning process moves through to the conversion stage. That is, essentially converting into specific outputs, knowledge of problems and their interaction through time, of probable future conditions if intervention does not take place, and knowledge of preference functions. The output would be in the form of specific recommendations for action. The conversion stage, in short, is the search for appropriate means through the detailed consideration of alternatives.

Conversion consists of three linked and overlapping stages. These are in simplest terms:

1. The formulation of alternatives
2. The evaluation of alternatives
3. The simulation of alternatives in the projected system.

Owing to the difficulties of treating each of these categories in isolation, the entire conversion stage will form the basis for discussion.

Though an acknowledged stage in the process of planning, relatively scant critical evaluation of methodologies employed in this stage has taken place. A notable exception is the work of Day and Boyce of the Institute of Environmental Studies at the University of Pennsylvania, from which many of the comments in this section are drawn. This work is concerned specifically with land use/transportation programs at metropolitan scale and subsequently relates to a specific type of planning process. However, considering the relative sophistication of transportation land use studies, it provides some interesting insights to the technical difficulties of plan making.

The importance of alternative formulation, testing and simulation to the improvement of the planning process is self-evident if one accepts the desirability of imputing scientific method into a formerly intuitive process. Dyckman concisely expresses this when he observes that "... the hope for planners in making planning decisions more scientific is in the ability to approach experimental or 'practice' decision". (Dyckman 1963) It must be stressed, however, that creativity is also a key requirement in the formulation of alternatives, providing that the creativity is well-founded on a deep understanding of the policy space in which the process is proceeding.

As with goal formulation, present practice is extremely limited in its capability to determine optimal solutions through the conversion stage of the planning process. The obstacles to optimality in any projection of environmental systems, not surprisingly, are immense. Planning's attempts for seeking out optimal, necessarily short-cut the complexity of the policy making problem. Harris suggests two fundamental difficulties in designing optimum solutions. First, owing to the possibility of inventing new elements, the design space is not bounded and in fact has an unknown dimensionality. (Harris 1967) Consequently, planners can never claim that a recommended policy is unequivocally the 'best'. The second reason, referred to earlier in the section on goals was that the predictable effects of decisions, if they become settled policy, are not mutually independent. Some policies reinforce each other, others conflict. Difficulties of evaluating alternative means therefore revolve around this combinatorial aspect of exploring consequences of alternative bundles of policies. This is especially true where the policies available to the planner usually contain a mixture of binary (yes/no) and continuous variables. Thus where all policy variables are continuous, the connection of policies with outcomes is rarely independent and linear.

The accepted short-cut to overcoming these difficulties is to choose widely separate alternatives and to examine their implications. This has been the vogue in metropolitan or regional scale plans where alternative spatial forms, e.g., mono-nuclear, poly-nuclear, corridor configurations of growth are set up as propositions for testing against selected, and frequently limited, criteria. This practice leads to the sequential type of decision making also referred to in the goals formulation discussion, resting on the assumptions that (a) goals are hierarchial in nature, and (b) that the latitude available to the designer is limited. This consequently prevents exploration of interacting policy bundles.

In addition to this inability to deal with the combinatorial aspect of policy variables in the formulation and evaluation of alternatives, the empirical examination of alternative formulation for land use transportation studies by Boyce and Day raises several other shortcomings in planning's capability to reach reasonable decisions through alternatives. Prior to briefly indicating these the reasons stated for considering alternatives in the programs analyzed are interesting and serve to point out further complexities. These were as follows.

1. To confirm a single plan that had been recommended or implicitly accepted as being best, e.g., Washington 2000 plan.
2. To discover or verify some expected advantage inherent in one pattern of development such as lower costs, or an advantage in the most efficient utilization of a particular sub-system investment, e.g., Pittsburgh and the maximum usage of sewage collecting facilities or Chicago and an assumed advantage of increasing travel by transit, as opposed to extending expressways.
3. To discover and document societal values about urban development and life-style.
4. As methods of provoking public discussion on critical issues, e.g., transit vs. highways.
5. As an educational aid to impress on the public the value of planning per se, and thereby hopefully to increase the commitment to planning by illustrating that alternative futures were possible through planning.
6. To identify needed changes in government structure, powers and financing by illustrating what could be achieved by supporting the prescribed changes.

Though these justifications for the use of alternatives apply to metropolitan scale, land use/transportation planning, they could conceivably apply to any policy making process at any spatial scale, and indeed, to any form of planning.

At this juncture, however, it is pertinent to point out a warning against the possible manipulative use of alternatives in the purposes outlined. Clearly uses (1) and (2) are highly suspect since they set out with preconceptions and thus incorporate bias. There is, however, a more deep-rooted danger in using alternative formulation as a means of provoking public discussion and as an educational tool, etc. This concerns the planners tremendous responsibility in what amounts to circumscribing the action space of a problem and in taking short-cuts through analyzing relatively few, widely separated alternatives.

The complexities of a total environmental system's interacting variables probably means that there are thousands of alternatives with associated, and unpredicted, costs and benefits, which cannot, because of analytical deficiencies, economic and time resources, be considered. The planner, in selecting a few of these for detailed consideration excludes a wide class of combinations from further study, and must be conscious of this in his alternative formulation process.

Furthermore, the tremendous complexity of alternatives in land use/transportation programs results from the attempt to depict several activity, facility and service systems, both private and public, operating at different dimensions in space, time and activity. Programs attempting to study the inter-relationship of several systems have virtually been overwhelmed by the unmanageable complexity of alternatives. Even where programs have focused on one system such as transportation, and examined the alternatives available to that system given assumptions about other systems, the complexity has been barely manageable.

In summary, the major defects of the programs analyzed by Day and Boyce were:

1. Plan concepts and elaboration methods centered on unitary, physical forms, and failed to consider among other omissions the social impact of physical plans.

2. Methods for evaluating alternatives were too slow and too elaborate and tended to limit the number of alternatives developed.

3. Alternatives proved too complex to be considered as simple planning alternatives in a selection type decision process.

4. Ranking methods for selecting alternatives proved to be ineffective because of the difficulties of specifying a full set of relevant and compatible objectives prior to evaluation.

5. Evaluation methods did not discriminate between economic efficiency and broader considerations of plan effectiveness, nor between plan advisability and feasibility.

6. Often the evaluation/decision process neglected the key policy problems or the relevant scale of objectives and policies, but conversely concentrated on in meeting narrower technical and institutional requirements.

Because of these difficulties, it is questionable if the simple linear progression from a common set of objectives to alternative sets of plans and policies to evaluation and selection embodied in pure rationale models, is tenable. What is needed, and what is considered pertinent to this conceptual analysis of normative process is a conceptual framework for the conversion stage of the planning process which acknowledges the difficulties and intransigencies inherent in the design problem. It is proposed that the revised process outlined by Day and Boyce in their "guidelines on the use of alternatives in the continuing planning process", can be incorporated, in principle, for the conversion stage. This is firstly outlined before the implications it has for other stages are examined.

Briefly, Day and Boyce, concluding that the process of alternative formulation evaluation and selection in land use/transportation studies fell critically short of expectations, constructed a revised method devised to overcome the difficulties encountered in the programs analyzed and intended to serve restated purposes underlying the conversion stage.

The restated purpose was generally, '... to explore and learn about the effects and implications of a wide range of diverse assumptions about objectives, attitudes, possible policies and programs often in response to specific problems,' adding that alternatives' primary function is as a learning device for planners and interest groups in a continuing dialogue about an evolving situation. Among the major aims to be attained through the exploration of alternatives would be the better understanding of inter-system relationships, assessing the compatibility and feasibility of selected sets of objectives, plans and policies and testing the effects of

different assumptions regarding technological advances and socio-economic change. The principle for developing alternatives remains traditional. The evaluation of alternatives would help determine what sets of objectives are feasible and desirable as well as indicating the necessary programs and policies needed for achieving them. Thus the implications of assumptions, objectives and policies would be scrutinized to sharpen and detail the issues of choice for ultimate decision makers, including all political, economic and social interest groups.

However, the methods of preparation, through to evaluation, from explicit sets of objectives, would differ from the linear process. Firstly, objective sets would be in the form of performance criteria or design criteria and initially these would be tentative hypotheses. Refinement would occur through cycles from the initially generalized nature. Instead of a simple linear progression, the process would operate as a series of cycles each beginning with a formulation of standards, design criteria and proposed policies for each alternative, proceeding to the elaboration and evaluation of alternatives consistent with the level of detail of the inputs. At the end of each cycle, decisions would be taken, on the basis of the information presented, as to what aspects of the alternatives should be subject to further investigation and also to determine what decisions can be made at that particular point in the process. Numerous cycles would be used until conflicts are resolved in a final solution be it a combination of various elements from different alternatives.

The process, as chosen, therefore emphasizes the need for alternative formulation to be viewed as an aid in a mutual learning process in which each cycle builds on what has been learned in previous cycles. Obviously, as the cycles advance, the level of detail as regards inputs, increases and more formal evaluation techniques are employed with simulation and allocation methods being used in the latter cycles.

Clearly the major implication this approach has for the planner is that it places a tremendous emphasis on his ability to determine and evaluate the consequences, not only on one system but also in terms of inter-system trade-offs of many alternatives and to develop suitable performance indices related to alternatives for the perusal of decision makers.