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TOWARD A THEORY OF INSTITUTIONAL ANALYSIS

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ABSTRACT

This paper provides the basic analytic framework for institutional analysis with particular reference to the acceptance of innovations. A theory of institutions is developed, then assessed in light of various theories of organizations. It is posited that there are six types of institutional entities -- formal and informal organizations, members, persons, collectivities and social orders. Institutions are characterized by function, activity and role. Institutional action consists of exchanges for which the critical datum is information. Such exchanges occur within an institutional arena. Innovation forces institutional action by disrupting existing social meaning. Based on this theory a methodology is developed which enables study of innovation acceptance in various institutional arenas. The methodology involves several steps: (1) Determine study sector and purpose; (2) Preliminary sector exploration; (3) Construct hypothesized institutional arena; (4) Identify perturbation prompter; (5) Devise specific research design; (6) Monitor perturbation; (7) Analyze institutional arena.

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An innovation such as photovoltaic solar energy (PV) must adequately answer questions in four areas if it is to be generally adopted. The areas are:

Technological -- Will it work? Do efficiencies vary under different conditions? Are methods available for mass production? Can quality standards be met?

Economic -- Is it economically viable? Does its viability differ among economic sectors? in different countries?

Market -- Is there consumer interest (personal and/or corporate)? Are there differences among potential consumers regarding the attractiveness of various applications and presentations?

Institutional -- What forces will speed or impede the adoption of the innovation? What are these forces? How do they operate? To what extent are they responsive to deliberate intervention?

The US Department of Energy's Photovoltaic Program is addressing each of these areas. This paper, one of a series considering the institutional questions, establishes a theoretical grounding for the institutional analysis of innovation acceptance and provides a methodology for undertaking such analyses. The first three sections of the paper are primarily theoretical; the fourth and concluding section uses this theoretical development to propose a methodology for institutional analysis. The reader whose interest is the application of the theory can without loss turn directly to the fourth section; the reader concerned with the validity

of the theoretical premises of the methodology will want to carefully review the first three sections as well.

A THEORY OF INSTITUTIONS

Institutions are manifestations of a society's normative formulations; they embody society's judgments about the desirability of actions, events, and products. Institutional assessments do not provide "right" or "wrong" answers; rather they provide a means of establishing (and when established, a way of communicating) whether actions, events, and products are "good" or "bad," "better" or "worse." Such assessments are changeable, non-definitive, rarely formalized, and subject to continual scrutiny and adjustment. These assessments are imprecise and ambiguous. Despite, or indeed because of this fluid quality, institutions have attracted the attention of both the scholar and the practitioner (particularly in planning), providing for each the parameters of and material for societal analysis.

Anthropology and sociology, the disciplines historically involved in studying institutions, begin with societal norms, which are defined as customs that have a binding quality. The extent to which norms are obligatory, by virtue of societal agreement, establishes their status as institutions. To the extent that norms meet a set of conditions as to their breadth and intensity of obligation, they are more or less institutions.[1] Institutions, therefore, are more than norms in that they provide (and in some cases mandate) ways of structuring/acting in/resolving recurring situations such as birth, death, marriage, sporting competition, economic exchange, and education of the young. Institutions are a repository of society's judgments (norms), providing a framework for the examination and resolution of situations

which necessitate (for varying reasons) a determination of relative desirability. The examining/ resolving activity is, in one sense, a measuring process, setting the situation (or context) over and against the institution; both context and institution also dynamically interact with the underlying norm. Thus, the process examines and resolves a a situation in light of a norm structure (institution) and simultaneously examines,modifies,eliminates, and/or retains the norm structure (the institution) itself. It is both subjective and objective.

This norm-centered approach to institutions is, however, incomplete, since it fails to account for the conventionally acknowledged structural qualities of institutions. For example, sex is an institution that seems to be essentially norm-based and very personal. Certainly, it is both; yet it is also highly structured and public, with institutions pertaining to sexual practices (homosexuality, incest, sodomy), context (cohabitation and public fornication), outcome (legitimacy and abortion), responsibility (child custody and support), and administration (courts, police, religious sanctions, and so on). Institutions, then, are partially dependent for definition on societal norms, but they also have form -- they are structural. Robin Williams is helpful here:

> The intention here is to treat institutions as main structural components of social systems and to regard a social system as a network of "flows" or "exchanges" among social units. Institutions define the units of the system, the channels of influence, and the rules of allocation and decision. The units among which interactions occur are concretely specifiable, as for example, individuals, households, labor unions, business firms, churches, schools, voluntary associations, delinquent and criminal gangs, and units of government. The flows consist of: (1) consummatory goods and services; (2) instrumental goods and services; (3) personnel; and (4) 'messages.' For many purposes, it is useful to analyze aggregative as well as unit-to-unit flows; the former may have properties not easily detectable at the levels of the concrete unit. [2]

In brief, an institution has both form and meaning; it persuades but it also constrains; it charts directions and sets contexts.

An institution, as the term is used here, is a discernible entity that carries or is the respository for social meaning. Institutional analysis, therefore, is the study of how and in what forms social meaning is created, transmitted, maintained, and/or changed. Data for institutional analysis are obtained through the study of exchanges among institutions. Social meaning is known (institutions exist) only when exchanges occur. The ability to attach meaning to action (which is the definitive quality of "exchange") along with the retention and reuse of the meanings of actions are primarily characteristics of human society. Society, then, is a constructed, rather than a received entity, and it is these constructs that are institutional manifestations.

Language and memory (unique attributes of humans) are critical to the construction of social reality.[3] Institutions are created by the sharing of language and memories on a social (large) scale. The standardization of language (common definitions) and the retention of meanings (standard useage) lend an appearance of order, stability, structure, and system, along with the opportunity to create operational notions of stability and routine. Although the world is constantly changing, it is made comprehensible and manageable by institutions which exist and seem stable (or routine) because we can "name" or "construct" them.[4] The fact that change in institutional content occurs over time at a measured pace further contributes to an operating premise that the institution (and, thus, society) is stable. Silverman suggests that:

> Social order depends upon the cooprative acts of men in sustaining a particular version of the truth. In conversation, for instance, we find it convenient to accept the prevailing definition of reality within a group and not to question the major aspects of the views of self which are being presented ... The fact that the stock of knowledge upon which action is based tends to change rather slowly reflects the vested interest that we all have in avoiding anomie by maintaining a system of meanings which daily confirms the non-problematic nature of our definitions of ourselves. [5]

If, as previously suggested, institutions are discernible entities, it becomes necessary to provide a format for identification. Institutions are manifested through function and through activities that support or further that function. Since there are uncounted situations (contexts) which prompt the occurrence of a functional activity as well as a variety of ways in which the functional activity can be performed, it is possible to identify a number of roles. Institutions are readily discernible entities when functional activities are realized through application of a specific role. Therefore, the three defining dimensions of an institution are: (1) function; (2) activity; and (3) role. Function is the broadest quality, based on general responsibilities and goals, incorporating research, socialization, politics, service, finance, production, and regulation. Activities are undertaken in order to realize a particular function. Some activities are assisting, analyzing, playing, pricing, and adjusting. Roles are particular action strategies chosen as the style and means for implementing a functional activity, including, for example, integrator, linking-pin,or vendor. Of the three defining dimensions, role offers the greatest discretionary latitude, since role is most responsive to situational shifts. Function and activity are legitimizing

forces for action; they reflect the enduring normative attributes of the institution. Activity and role are the specific normative content of the exchanges between or among institutions. This interrelation is most clearly seen in particular manifestations of given institutions.

Time is the single most powerful force influencing social meaning. Because time does not stand still and cannot be controlled, it offers the opportunity for new situations and exchanges to occur -- in effect, requiring a continuing determination and redetermination of societal institutions. Time is the obvious contradictor of stability and routine. As a definitional imperative to change, time forces decisions regarding the meaning and structure of society, i.e., institutions. Action over time is the process of institutionalization or deinstitutionalization. Resource configurations reflect the allocational outcomes supporting society's institutions (money, space, respect, power, and so on). Particular resource configurations result from exchanges between and among institutional entities, as one specific action always impacts another specific action.

The combination of all institutions (definied by function, activity, and role),time, and resource configurations yields an institutional arena, which is the network of social exchanges between and among institutions. These exchanges can be characterized at any given point in time by a particular resource configuration.

Thus, institutions can be understood because they are manifest in action. Given the definitions above, it is necessary to look for function, activity, role, and resource configuration, in and over time. It is also helpful to focus on specific institutional arenas for analysis, studying

the institutional exchanges occurring there. What is not clear in this description is what data are to be collected.

In order to identify and obtain data for institutional analysis, it is necessary and important to distinguish between behavior and action.[6] A simplified distinction is to define behavior as "stimulus responsive" and action as "meaning prompted." Thus, only action will provide useful institutional data. Behavior is without intent or meaning. Meaning can, of course, be attributed to behavior, but the action (that is, the meaning-ness) is in the attributing, not in the behaving. Action is intentional and conscious, a manifestation and/or creation of meaning in an exchange; action is the evidence of institutions.[7] Meaning, then, is the critical element in understanding the distinction between behavior and action.

Social sustained meanings with action manifestations are institutions. Clearly, there must be a shared stock of knowledge that defines and sustains institutions. When actors perform or events occur in unexpected or doubt-creating ways (i.e., contradicting available meaning), "that part of the social order [here read institution] is, for the time being, no more." [8]

It is now possible to pinpoint a critical component for understanding institutions -- information. If an institution ultimately depends on shared, social meaning for its existence, then it will exist (have force) only insofar as information regarding its meaning is disseminated, throughout society at a point in time, and through society over time.

Thus, the additional and critical element for study is the content of the information in exchanges in the institutional arena and, even more importantly, how particular information acquires social meaning -- how it is institutionalized. Information, which both sustains and changes institutions, is the critical datum.

THEORY OF ORGANIZATIONS

In common usage, institutions have been equated with organizations. While it is true that organizations are institutions, not all institutions are organizations. Nevertheless, the study of organizations provides a useful theoretical reference, one which, given the conventional institution-organization equation, must be reviewed for its general scope and contribution to institutional analysis.

Organizational theory generally takes Weber's writings on bureaucracy as its starting point. Organizations are (relatively) definable; they have: (1) identifiable structures and (2) members. Organizational theorists usually choose one of these attributes as a central focus. There are now six major schools of thought in organizational theory, which are summarized in Table I, under a series of analytic categories.[9] This section summarizes Weber's basic theoretical formulations, then briefly considers each major school of organizational thought. The intent of this review is to identify, then appropriate, the organizational theories that are useful in understanding and analyzing institutions.

In his essay, "Bureaucracy," Weber characterizes bureaucracy and officials.[10] He suggests that "officialdom" functions along six dimensions: (1) clear authority; (2) hierarchical structure; (3) official records; (4) expert training; (5) full-time officeholding; and (6) stable rules. A close look at Weber's specific definitions indicates the Weberian influence on the definitions of institutions offered here. Authority is

given and constrained by "the principle of fixed and official jurisdictional areas which are generally ordered by rules ..."[11] The rules [here read institutions] regularize activity; limit the range of authority; and set paths for obtaining the right to authority. Hierarchical structure establishes a stable framework in routine which is possible because of these structural (institutional) supports Official records, like rules, are the clear (written) embodiment of a generally accepted normative structure. Expert training and full-time officeholding can exist only when there are "rules which are more or less stable, more or less exhaustive, and which can be learned,"[12] since without such rules, training programs and job descriptions could not be written. Contemporary focuses on order and stability are generally derived from Weber's formulation of bureaucracy. They emphasize structure, but, such analyses can, obviously, occur only because there is a general institutional support system underlying the framework.

The officeholder aspect of Weber's definition of bureaucracy is often overlooked; this oversight is unfortunate since some of Weber's most important insights on bureaucracy as an institutional invention of modern culture are lost if the position of the official is not considered. Weber first posits that "officeholding is a 'vocation.'"[13] His interest in religion is important to remember here, as it helps explain Weber's use of this term. Religious officeholders (priests, for example) are "called" (from the Latin vocare) to their positions. They hold them as a trust, a matter of normative obligation. Weber imbues a similar standard to bureaucratic officeholders saying "the position of the official

is in the nature of a duty." [14] Equally important, "entrance into an office, including one in the private economy, is considered an acceptance of a specific obligation of faithful management in return for a secure existence." [15] Normative commitment is balanced with environmental stability. This balance is elaborated in the personal position the official acquires as a consequence of office: (1) social esteem -- ascribed to the office, achieved by training and regular career progression; (2) appointment to office, ensuring distribution of responsibility by merit; (3) life tenure, ensuring continuity providing responsibilities are faithfully discharged; (4) fixed salary, by rank; and (5) rule-guided career progress. The essence of Weber is formulation of a well-ordered, stable structure that serves personal and societal needs.

As shown in Table I, there are six major schools of organizational thought: Structural-Functional, Power, Socio-Technical Systems, Human Relations, Organizational Psychology, and Decision-Making. Of these the first three tend toward structural analyses, while the last three focus on the officeholder as a guide to analysis. Each school is summarized over several categories: Leading Theorists; Central Problem; Underlying Assumptions; Unit of Analysis; Property Concepts; and Currency of Exchange. Each organizational school is briefly discussed below. This section then concludes with comments on the utility of organizational theory in analyzing institutions.

Human Relations

One of the oldest schools of organizational thought, the Human Relations approach, is concerned with worker satisfaction. Assuming that the organization is structurally sound and exists in relative isolation from its environment, theorists of this school attempt to determine how the worker as producer can be made happy. A second assumption holds that worker happiness (satisfaction) will yield increased worker production.[16] Early theorists were relatively mechanistic in their view of the worker, but gave way to the social-psychological management approaches of Roethlisberger and Dickson[17] and Mayo.[18] In each case, the worker is seen as an interacting being, found always in groups. The exchange currency is the "reward," with study directed at understanding the relative impacts (effects) of various rewards and reward structures.

Decision-Making

March and Simon, [19] who conducted their studies from Carnegie-Mellon University in Pittsburgh, are the leading theorists of the Decision-Making school. Here, the problem is choice; the unit of analysis is the "Decider." The officeholder is viewed as constantly involved in a continuous process of assessment -- Do the benefits merit the action? Do the costs outweigh the benefits? A similar benefit-cost view is applied to the organization vis a vis other organizations and also to the environment, although the latter is non-specific in form. The "Decider" operates logically, but within a context of bounded rationality, i.e., a constrained spectrum. This premise derives from the school's most basic

assumption that there are unchangeable environmental and temporal limits to the rationality of decision-making. Hence, the formulation of its most famous concept, "satisficing," which means attaining equilibrium at a point where the benefits sufficiently and satisfactorily outweigh the costs. For the Decider, data are the currency of exchange. Quantity is especially important, for the decider must apply his/her own judgment and cannot rely on information or decisions made by others, since that information and those decisions might not represent the best (most satisfactory) choice for him/her.

Organizational Psychology

Argryis,[20] Likert,[21] Lawrence and Lorsh[22] are all theorists rooted in the organizational psychology school. Concerned with the capability of worker, organization, and environment, they use the worker as personality as their primary analytic unit. The organization is assumed to be a system that exists to meet workers' personal needs. Sometimes the converse is assumed -- that an organization will die if it does not meet worker needs. Persons and organizations seek "qualities" within the organization and through its internal and external transactions. The worker as personality is a thinking/believing unit, who can be motivated and who seeks self-actualization. The currency is gratification.

Structural-Functional

The most fully realized of grand theories, structural-functionalism, attempts to understand the nature of order. Notably in the works of Talcott Parsons[23] and Robert Merton,[24] this is taken as

the unit of analysis. Assuming that: (1) systems seek equilibrium; (2) resources are available from the environment (although the environment is also the source of problems); and (3) direction is obtained via goal-setting, theorists of this school have constructed an explanatory framework for the interdependent, patterned, and reliable nature of the social system. Motion (like the constant ebb of the tide) is the currency of exchange. It is continuous and is the basis and reason for all other activity. Motion causes change and problems, thus leading to recurring dilemmas of situation, role, and values. Parsons identifies five pattern variables into which decisions regarding dilemmas always fall.

Power

Often classed as a derivation of structural-functionalism, power theory -- where Etzioni is the most prominent scholar -- is concerned with the compliance of organizational participants ("members").[25] Though the organization has a formal, functional definition (and non-members have no place in it or in the analysis), the unit of analysis is not the system, but the individual "member." Power theorists assume a scarcity of resources, and, in many respects, assume away the environment since it is non-formal, and thus non-organizational. They further assume a hierarchy of involvement by members within the organization. Members are calculative. Unless they are responding to a directive (the currency of exchange) which is the basis for finding congruence with their calculations, members will be non-compliant and resistant to socialization.

Socio-Technical Systems

Organizational stability in the face of changing (and potentially disruptive) environmental and technical demands is the problem for this school of thought. For theorists such as Trist and Emergy, the organization is the unit of analysis. It has a strong survival impulse, especially with regard to defining its domain of safety.[26] These theorists see power resulting from the acquisition of information and control. They view the organization as being uncertain and volatile. Organizations are artificial creations and therefore are resource dependent, thus making resources the currency of exchange, with information and control as subcurrencies.

This brief summary of organizational theory indicates that the problems each school of thought poses are, at root, institutional; they are problems of the meaning-structure as it affects and is affected by the primary unit of analysis. Because of this base (of institution and meaning) it can be said that all organizations are institutions. Because organizations are institutions, the material for organizational analysis is one part of and also companion to the broader realm of institutional analysis. Specifically, there are structures, actors (both persons and aggregates of persons, including organizations), and currencies of exchange. These categories, which make organizations comprehensible, are helpful in institutional analysis. Their application in the institutional arena can be seen in the summaries and comparisons of Table I.

TABLE I Primary Schools of Thought in Organizational Theory

	POWER	STRUCTURAL/ FUNCTIONAL	SOCIO-TECHNICAL SYSTEMS	HUMAN RELATIONS	ORGANIZATIONAL PSYCHOLOGY	DECISION-MAKING
LEADING THEORIST(S)	Etizioni	Parsons Merton	Trist, Emery	Roethisberger and Dickson, Mayo	Argryis, Likert Lawrence and Lorsch	March and Simon
CENTRAL PROBLEM	Compliance	Order	Stability	Satisfaction	Compatability	Choice
ASSUMPTIONS REGARDING ORGANIZATIONS AND THE ENVIRONMENT	*Hierarchy of involvement *Scarcity of means *Environment amorphous -- behavior is formal, in organizations	*System seeks equilibrium *Environment source of both problems and resources *Goal directed adaptive, integrative, production	*Environment/ technology interface creates demands *Power from information control *Survival impulse is domain defining	*Happiness leads production *Vacuum	*Personality-organizational exchange *Organization as system *Quality seeking *Transactions	*Environment limits rationality of decision-making *Satisficing *Boundary defining
UNIT OF ANALYSIS	Organization Participant	System	Organization	Worker as producer	Worker as personality	Decider
PROPERTY CONCEPTS	*Calculative *Universals are non-agreement and imperfectability of socialization power	*Interdependence *Patterns *Reliability	*Volatility *Uncertainty *Organization as artificial, resource dependent creation	*Group interactive	*Self-actualization as a motivation *Thinking/ believing	*Assessment capability-individual and organization *Positive benefits needed *Logic
CURRENCY OF EXCHANGE	Directive	Motion	Resources	Reward	Gratifications	Data

First, understanding the assumptions of a school of organizational theory gives an indication of the terrain, the ground to be covered. Important here is the recognition that assumptions are the means for expressing the normative dimension, the meaning-structure, that makes the theory possible. They are referents for interpretation, providing basic definitional context for the enterprise. So, within the institution of theoretical sociology, assumptions are the currency of exchange.

Second, there is (must be) exchange. Organizations, as institutions, cannot exist in the absence of exchange. These interactions are the "flows" to which Williams made reference. In order to understand an exchange, it is necessary to look at both the content and the structure -- the norm and the form.

Third, there are definable entities, including the basic unit of analysis as well as the set of assumptions about the structure of that basic unit. The unit has defining (constraining) properties, which give it form (that form itself also has meaning) which, in turn, is the vehicle for expressing and realizing meaning. As with exchanges, attention must be paid to both structure and content.

Fourth, there is time. While for some theorists, action occurs in a vacuum (without reference to environmental constraints), the factor of time cannot be ignored. Time introduces at least the possibility of uncertainty and the potential need for action. Each theory is directed toward: (1) defining the means for creating a clearly identifiable and (relatively) enduring organization; (2) understanding routine and stability; and (3) creating and preserving existing stability as well as

transmitting and transforming information into new routines and stability. The exchange is the moment in time when the unit acts to ensure continuity. Focused in that event is the totality of the meaning-structure which is recreated in each exchange.

This brief review suggests several analytic categories -- structure, environment, actors -- useful to the study of organizations and thus to the study of institutions. However, this material leaves unanswered several of the questions implicit in the institutional discussion in the first section especially identifying the possible range of institutional forms; establishing a means for obtaining and understanding information; and recognizing that change is a constant occurrence.

THE ELEMENTS OF INSTITUTIONAL ANALYSIS

The earlier discussion suggested that institutions can be identified by function, activity, and role. Exchanges over time, between and among institutional entities, yield a variety of resource configurations. The combination of all these items is the institutional arena. Further, organizations are institutions (though not all institutions are organizations), and organizations can be understood by considering structure, environment, and actors. However, the analytic categories used to understand organizations are insufficient for institutional analysis. Therefore, it is only reasonable to seek a sufficient basis for institutional analysis. Such a basis can begin to be established by defining, more precisely, the institutional entities through an understanding of the nature of information, especially in the context of time.

Organizational theory is a beginning point in defining institutional entities. Much of organizational theory is directed toward definitions of inclusiveness and seeks a formal outcome, hence the emphasis on either structure or members and the concern, in some of the literature, with organization-environment relations. Since organizations are institutions, from an organizational focus, three institutional entities can be obtained: (1) formal organizations; (2) informal organizations; and (3) members. An organization may be defined as a distinct entity comprised of elements with varied separate functions that contribute to the whole and to combined functions (e.g., a corporation). A formal organization is one

which follows or adheres to accepted forms, conventions, or regulations; is official or legal; is intended to achieve certain goals; and has clear lines of authority (e.g., General Motors). An informal organization is one where actions are not performed according to prescribed regulations or forms; it is unofficial (e.g., a sewing circle). Whether formal or informal, an organization has members, who are defined as single human beings with attributes that are a consequence of belonging to a formal or informal organization (e.g., Stanford Professor James Smith).

These organizationally defined institutional entities do not account for all institutional entities. There are in addition: (1) persons; (2) collectivities; and (3) social orders. A person is a single human being with separate, intrinsic attributes (e.g., Jane Jones). A collectivity is an indistinct (amorphous) entity with members characterized by a condition or quality of collective focus (e.g., the Women's Movement). Finally, a social order is a societal disposition without specific members (e.g., the rule of law or the tradition of service).

Though it is characteristic of analytic approaches that categories are to be mutually exclusive, it is obvious that this exclusivity does not apply to institutional entities. Since each institution takes form as a manifestation of social meaning, institutional entities are simultaneous and interwoven. Because institutional entities are constructed (given social reality) within human society, it is possible for all forms to be simultaneously known and manifest in or through one individual. For example, Stanford (a formal organization) Professor (a member) Jane Jones (a person) supports the Women's Movement (a collectivity) by

organizing luncheon meetings of women faculty members (an informal organization) around the issue of affirmative action (a social order).

Information is the medium, the conductor, of social meaning. Information, the data gathered during exchange, provides evidence as to whether or not social meaning is sustained or changed. Acquiring these data is yet another consideration of institutional analysis. Since time is the prompter for change; it is passing time that provides the opportunity for new situations and/or exchanges to occur which necessitate a continuing determination (or definition) of societal institutions.

The study of innovation offers particularly useful clues for understanding information as well as for maintaining and/or changing social meanings. Barnett distinguishes between "configurations" and "innovations." [27] A configuration is the linkage or fusion of two or more previously unjoined elements. An innovation is this same fusion on a mental plane, a complex commingling of perception, cognition, recall, and affect. Innovation, by definition, involves social meaning, but innovation is not an institution. Innovation demands change and involves the new, while institutions <u>are</u> socially sustained (existing) meanings and meaning carriers. In simple terms, an innovation is unusual, an institution conventional. Yet, both have social meaning for which information is the medium. How does an innovation become an institution? What is the nature of the information used in the process of turning an innovation into an institution?

An innovation can be an idea (human flight), a product (floridated toothpaste), or a process (program budgeting). In each case, the innovation

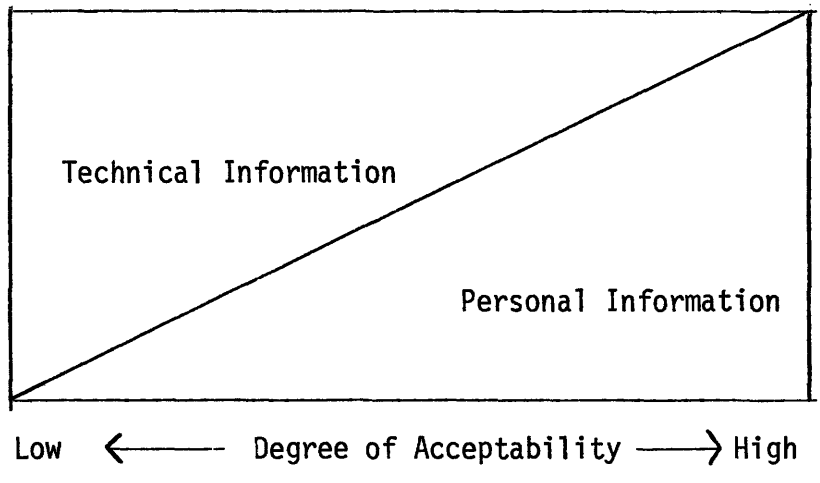
is an innovation because it is perceived as new.[28] Thus,for innovation, the emphasis in meaning is on the apparent disjuncture with routine and stability; for institutions the meaning emphasis is on the apparent routine/stability. For institutionalized meaning, the pattern of an institutional arena is intact; for innovation meaning, the pattern is disrupted.[29] An innovation disrupts shared social meaning, altering, in some respect, functions, activities, roles, and/or resource configurations.

Innovations, then, are recognized in exchange. There are two types of information exchanged about innovation: technical and personal. Technical information deals with the intrinsic characteristics of the innovation, while personal information focuses on the source. The degree of acceptability (the speed of institutionalization) of an innovation depends, in the first instance, on the type of innovation information encountered. There will be a higher degree of acceptability if the information is personal because such exchanges are more nearly routine and more likely to be linked with stable ongoing meaning. That is, an innovation will be viewed more favorably (be perceived with and as having recognized meaning) if it is encountered through an existing institutional entity. The existing entity will have a known meaning; this recognizable meaning will have the attributes of routine and stability. It is this mediated stability that enhances the acceptability of the innovation.

In discussing organization development and change, Lawrence and Lorsch suggest that there is an increasing "complexity and difficulty of

effecting behavior changes as one moves from a desire to alter customary interaction patterns in an organization to shifting role expectations, changing values, and orientations (such as toward time) to the most stubborn variable: changing basic motives."[30] In short, the less connected an innovation is with a known meaning source and/or action, the lower its degree of acceptability. In terms of the two types of information (as illustrated in Diagram 1), the greater the proportion of personal information on innovation, the greater will be the degree of acceptability of the innovation.

DIAGRAM 1: Innovation Acceptability (As a Function of Information Type)



While, at any given time, the appearance of an innovation in an institutional arena can be via either personal or technical information, it is important to recognize that the innovation itself does not appear in unvarying form. Because an innovation involves social meaning, it is

subject to change or modification, appearing in different forms at different times; each form must be comprehended during information exchange. It is equally important to recognize that an innovation does not uniformly affect all institutional entities. Not all entities encounter (have exchanges with regard to) an innovation at the same time. Thus, the innovation itself can be different (intrinsically as well as in terms of its social meaning) for different entities depending on when in time it is encountered.

Diagram 2 presents, in highly simplified form, the over-time effects of changes in the form of an innovation on the institutional acceptability of that innovation. Assume, for purposes of illustration, three stages of development; each stage is initially recognizable because the innovation displays different objective characteristics. In the first stage, there is an undifferentiated innovation. The innovation is undifferentiated because there is no accumulated and sustained body of knowledge (shared social meanings) regarding it. Except for the institutional entity introducing the innovation, there is no prior institutional meaning; the innovation is initially perceived in a single form. The attachment of multiple social meanings (differentiation, which is a critical element of institutionalization) will occur more rapidly (acceptability will be higher) if the information is personal. As time passes and information is exchanged, the innovation changes in both its objective and institutional forms. It acquires some social meaning; it modifies objectively (technological change) in response to its acquired, differentiated social meaning.

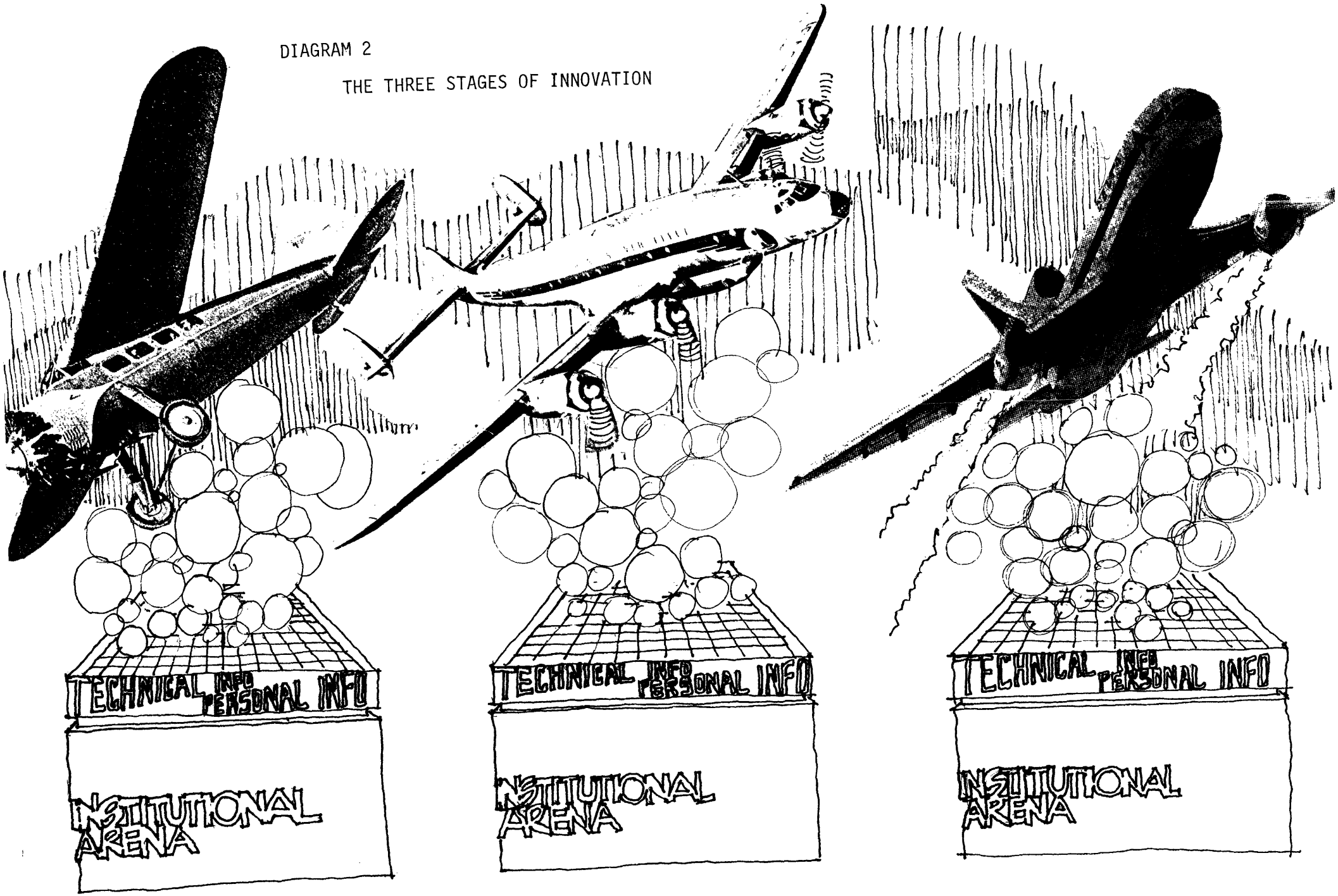
Referring to the diagram, the airplane began as a means of heavier-than-air human flight; it developed in its first stages as a single-person means of transport for military, postal, and entertainment purposes. In its second stage, the airplane (now multi-engined, designed for commercial travel) was still encountered by many institutional entities as an undifferentiated innovation. Institutions actively involved in exchange during the first stage will be more likely to encounter the innovation in its second stage via personal information. For these institutions, there will be a sustained and shared social meaning, and, thus, an increased probability that the innovation will be institutionalized -- there will be a greater tendency on the part of these institutions to accept the innovation. For these institutions the innovation is differentiated; for others encountering it for the first time,the airplane is, despite its changes/improvements, an undifferentiated innovation. A comparable process of exchange, again viewing the innovation as differentiated to some and undifferentiated to others, occurs in the third stage, where jet airplanes are used for supersonic and space travel.

Each stage and the process, separately and as a whole, can be characterized in the broad sense as a process leading from unknown to convention, from innovation to institution, from no social meaning to shared social meaning. Different institutions will encounter the innovation at different points in time. That encounter will have a greater degree of acceptability insofar as it is mediated by personal

information. However, at each stage, because of these time, resource, and information differences, the process of institutionalization of innovations is not necessarily cumulative. Though it seems clear that sometimes this institutionalization is cumulative, it is too early in our research to delineate when and how such accumulation might occur.

DIAGRAM 2

THE THREE STAGES OF INNOVATION



innovation 1

innovation 2

innovation 3

A METHODOLOGY FOR INSTITUTIONAL ANALYSIS

Thus far, the theory posited here states that institutions are characterized by function, activity, and role; that there are six types of institutional entities; that institutional action is characterized by exchanges for which the critical datum is information; that resource configurations result from exchanges; that time is the force for institutional change; that innovation entails changes in social meaning; that in information exchange about innovation there are two types of information -- personal and technical; and that the combination of these elements yields an institutional arena. Using this theoretical framework, it is possible to begin to build a methodology for institutional analysis.

1. There is an institutional arena. Within that arena exchanges occur between and among institutional entities which are stability-seeking and routine-establishing. These entities include: formal and informal organizations (the US Department of Transportation; a gang); members (an IBM executive); persons (Sally Ferguson); collectives, whether known or unknown to members (the Environmental Movement); and social orders (the importance of education).

An institutional arena is conceptually defined and/or bounded. Its dimensions are established by the normative content of a society. It is discernible because institutions are manifest in identifiable entities. Stability is sought, and routine is established

because: (1) the meaning-structure is compelling only if it endures; (2) meaning takes on "meaning" only if shared; and (3) sharing is possible only over time. Institutional entities are readily defined in their formal organization and member manifestations; persons, informal organizations, and collectivities are less easily identified; social orders are least easily comprehended.

2. The institutional arena can be visualized (conceptualized) as shown in Diagram 3. Institutions are manifest along three defining planes: (1) function; (2) activity; and (3) role. Function is the broadest parameter, including, for example, financial or research. Activities are undertaken in support of a function and might incorporate such approaches as assisting, analyzing, and advocating. Role is the particular implementation strategy adopted by an institutional entity with regard to its function and activity. Examples are vendor or linking-pin. Any particular institution can be placed into the institutional arena, within which exchanges occur over time. The placement and exchanges of institutional entities in an arena at any one point in time constitute the resource configuration. The particular structure of a given institutional arena is simultaneously stable and changing; it is also identifiable. Information in exchanges is the key source of data for institutional analysis.

3. Innovation is a deliberate and substantive alteration in an institutional arena. Innovation can be an idea (irrigation), product (television), or process (double-entry bookkeeping) that is perceived

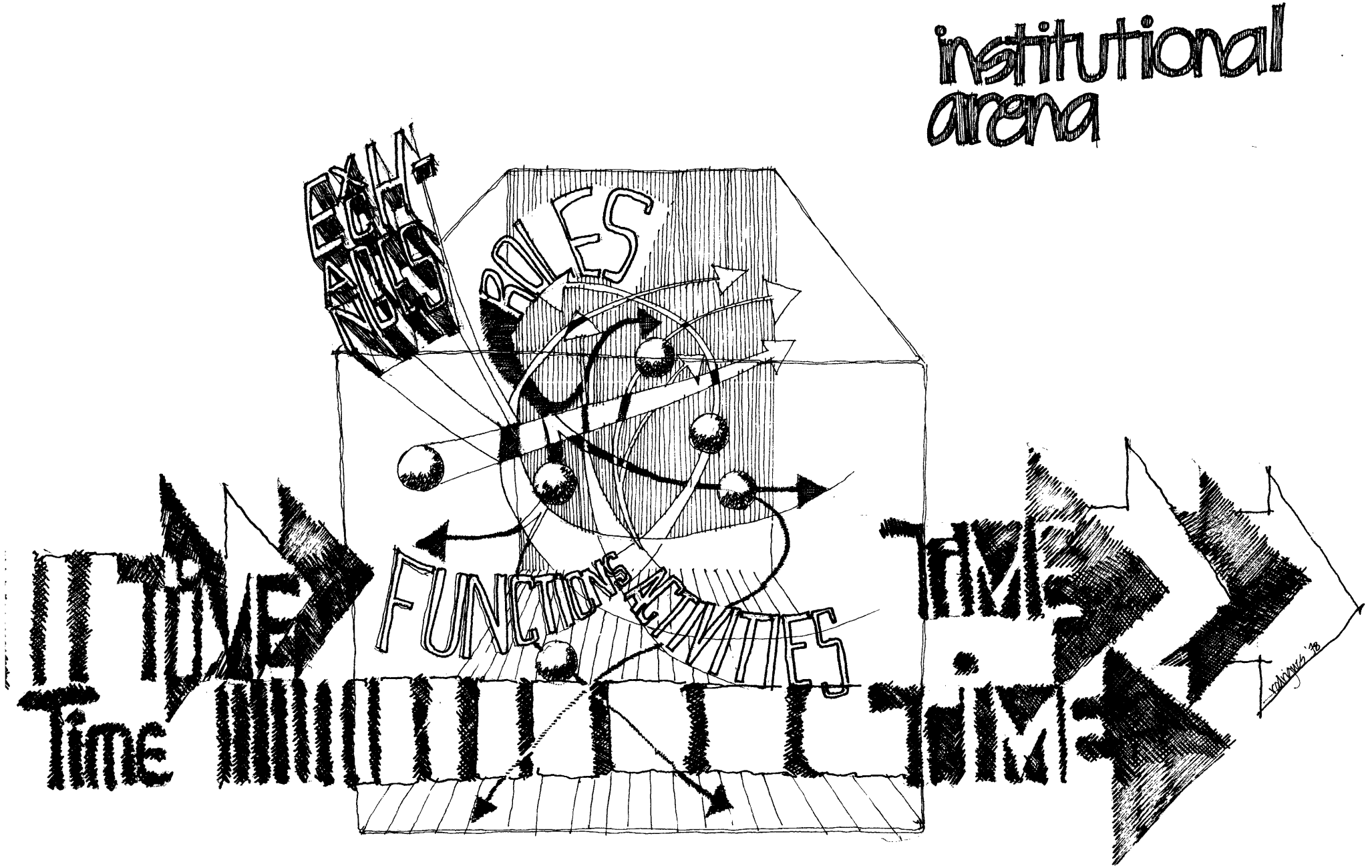


DIAGRAM 3 THE INSTITUTIONAL ARENA

as new. Any innovation disrupts shared social meaning. There are two types of information about innovation: Technical (What do you trust?) and Personal (Whom do you trust?). Innovation acceptability is likely to be higher on the basis of personal information because such exchanges are more likely to link to routine, stable meaning.

Though an innovation is, by definition, new, there is a strong tendency to try to handle it in a routine manner. It is much easier (as well as more stable and more routine) to identify whom one trusts (These exchanges happen constantly.) than to decide what one trusts. (The technical information about an innovation is neither stable nor routine.) Thus, when an innovation is encountered, the basic responses, in order of probability, will be to: (1) respond to personal information; (2) seek personal information; (3) avoid technical information; or (4) respond to technical information. These responses are offered in descending order on the stability scale.

Moreover, it is almost definitionally impossible for institutions to handle initially the technical information of an innovation. Technical information implies "objectivity," a standard obtainable only after extensive public scrutiny establishes institutions (shared meaning forms) of such stability that they are "universal" bases for "objectivity." [31] Where technical information is trusted (acceded routine status), it can be called institutionalized. The basic problem with innovations is that they generate new meaning-

structures which are institutionalized (routinized, stabilized) by more, also often new, entities. Until these institutions created by the innovation are broadly accepted, they are not compelling. (They are not universally accepted objective standards.) When new information and new institutions are directly encountered (as opposed to mediated through personal information), they are resisted (perceived as neither objective nor universal). When they are encountered through personal information (more routine/ stable institutional exchange forms), they are more likely to be accepted.

4. Institutional action is risk averse; innovations will be avoided. Innovation institutionalization occurs through a process of repeating stages; each stage is a series of cycles processing (changing) the innovation from unknown to convention. The innovation has a different meaning and form in each cycle and for each institutional entity. These definitions grow out of previous cycles and are changed through encounters (exchanges) with new institutional participants. Each stage is begun by deliberate prompting. Successful innovation institutionalization is mediated through previously created institutional forms, notably personal information. Innovation diffusion is a naming/incorporating/routinizing process; it is one of the processes of institutionalization.

Using these propositions about institutions and innovation, it is possible to carry out an institutional analysis. Once again, Robin Williams is helpful:

> There are three main problems in the study of social institutions. First, one must describe and analyze the normative structure itself: the existing patterns, their causes and interrelations, the sources and mechanisms of institutional integration, and consequences of the norms. Second, one must discover the processes of change in institutional patterns: their causes, mechanisms and results. Third, one must study the relation of individual personalities to the normative structure; this is the area of social psychology dealing with culture-and-personality problems and facing the complexities of social control and or motivations for conforming, innovating, or dissenting. [32]

Diagram 3 provides a useful (albeit simplified) operational framework. It attempts to show dimension on the institutional arena which, as has been noted several times, is composed of institutional entities characterized by functions, activities, and roles. Each of these is manifest and discernible. The process of change occurs over time in the exchanges between and among entities. The data collected from the exchanges are informational. The pattern of exchange reveals the resource configurations. Time past represents the institutional stock drawn on; time present is the recognition of continuity or change; time future necessitates determination of desirability.

Specifically, then, the functions, activities, roles described below require attention. There are at least the following functions:

1. Research -- consideration of what is and/or what might be
2. Socialization -- transmittal of norms through formal and informal mechanisms

3. Service -- providing for the present and future use of desired and/or needed resources

4. Political -- formal determination of structures and modes of behavior

5. Financial -- establishing standards of exchange for scarce resources

6. Production -- creation of resources

7. Regulation -- administration of formal structures for behavior.

There are at least the following activities:

1. Investigating -- studying through close examination and systematic inquiry

2. Reporting -- presenting, usually in a formal or organized manner, an account of events, proceedings,and/or transactions

3. Experimenting -- testing hypotheses under controlled conditions

4. Analyzing -- studying available information with regard to past or potential action

5. Educating -- making known by active instruction

6. Contemplating -- considering by reflection

7. Resting -- enjoying relief from disturbance

8. Endorsing -- approving publicly and definitely

9. Playing -- participating in recreation

10. Assisting -- providing conceptual or process support to help the recipient carry out his/her activity

11. Controlling -- constraining or directing action

12. Supplying -- assembling for use

13. Making -- constructing, forming, or shaping

14. Marketing -- direct buying and selling

15. Financing -- providing direct economic assistance

16. Pricing -- establishing the rate and basis of exchange

17. Informing -- making known

18. Adjudicating -- settling judiciously

19. Legislating -- official rule-making

20. Promulgating -- announcing one's own decisions or activities

21. Advocating -- pleading in favor of or for the cause of

22. Enforcing -- carrying out with the availability of sanctions

23. Adjusting -- intervening to achieve some prior balance

24. Assuring -- providing external confidence at a secondary level.

There are at least the following roles:

1. Vendor -- a purveyor in the public marketplace of goods and/or services

2. Linking-pin -- a connector of actions among institutions

3. Plunger -- the ultimate initiator, trying out new ideas/things simply because they are new, generally with limited regard as to risk

4. Early adopter -- the actor who adopts an innovation after a Plunger has paved the way

5. Integrator -- a combiner (or blender) of actions into a whole

6. Protector -- a shield of a special interest, preventing injury or harm from external forces

7. Translator -- a conveyor and usually an interpretor of information from one source to another

8. Sponsor -- an actor who takes responsibility for, provides support for, or plans and carries out a project or idea

9. Seer -- a predictor

10. Legitimator -- an actor giving status, authority, and/or credibility

11. Watering hole -- a meeting or gathering for information discussion (exchange)

12. Instigator -- a deliberate disruptor of routine to initiate change

13. Follower -- an actor accepting/adhering to actions of others

14. Administrator -- an actor managing or supervising the routine, maintaining the status quo

15. Listening post -- a front-line collector and sometime seeker of information.

Of the three planes defining the institutional arena, the role is the most variable and the most responsive to particular or changing conditions, in part because a role is a situation-specific strategy of the function/activity responsibility realization. Role is the first locus for institutional alteration. By comparison, function and activity are more stable. [33]

The parameters discussed above define the institutional arena. With these definitions and hypotheses as a base, it is possible to conduct an institutional analysis. In the broadest sense, the product (the analysis) will be a description of the particular institutional arena -- its resource configuration, constituent institutions, and characteristic exchanges.

The difficulty is encompassing the dynamic nature of the arena in a medium (writing and graphic representation) that is essentially static. This task is further complicated by the intricacies of collecting data in a constantly changing situation. The methodology devised for this project attempts to mitigate these problems.

At a given point in time a relative homeostasis of the chosen institutional arena is postulated to establish an arbitrary base data point. This postulation is necessary for establishing researcher perspective as well as a starting place for data collection. In this research approach, the guidance of the qualitative methodologists is vital -- most especially recognition of the social role of the analyst. As Bruyn points out, in such instances, "the scientific interests of the participant observer are interdependent with the cultural framework of the people being studied." [34] Equally important, he notes that the researcher fulfills a role which is a natural part of the cultural life of the observed; this point is confirmed by the fact that the functions and activities suggested in this paper are plausible and findable in any institutional arena. In short, the researcher is an institutional entity, with a function (or responsibility), performing activities to reach his/her objective. This institutional responsibility requires ongoing recognition of that institutional role by the researcher, and demands a rigorous understanding of the participant-observer research imperatives for both detachment and involvement. [35]

The data identification and collection processes also present

particular problems, especially for the institutional analysis of innovation acceptance. It is reasonable to assume at least a relative accuracy of data about "normal" phenomena by attending carefully to the exchanges characteristic of an institutional arena. However, identifying sources of data on innovation acceptance, which by definition are "routinely" available, is confusing and complex. There are several possible solutions. The most desirable is observing the actual introduction of a real innovation. The exchanges prompted by an innovation are clearly not "routine," rather they can be characterized as "perturbations," even if the response is avoidance. It is thus possible to be relatively confident that institutional responses to an actual innovation are "what would happen." [36]

A second, less desirable, alternative is an inquiry into previous institutional actions when a comparable innovation was introduced. While this approach can lead to a complete picture, it is limited by its dependence on individual actors' recall about an innovation after it is institutionalized. This alternative presumes an assumption of considerable stability in innovation handling within the institutional arena and/or requires difficult, perhaps impossible, judgments regarding current institutional arena actions in response to the "new" innovation.

A third alternative is creating events to introduce an innovation into the institutional arena. Such experimental prompting must contend with the "gnat on the elephant" problem, that is, having an innovation that is sufficiently large so that it will cause significant perturbations

(be taken seriously) in the institutional arena and will result in exchanges of sufficient number and importance to allow a reasonable analysis to be performed. However, creating a sufficiently sized "gnat" can also entail difficulties that are best labeled "poisoning the well." If the experimentally introduced innovation is too atypical (either by itself or in the manner of its introduction), it may prompt perturbations that are characteristic only of institutional actions responding to "experimental gnats." The experiment poisons the data well!

It is only after these data prompting issues are handled satifactorily that investigation can begin. As noted earlier, exchanges are the primary locus of data, and information is the currency of exchange. Indeed, institutional entities depend on their exchange ability to maintain their existence. Thus, the researcher must identify the entities; define the involvements in innovation-related exchange; and identify those exchanges providing evidence of actual (as compared with hypothesized) function/activity/role leading to characteristic resource configurations. Methodologically these tasks involve a series of steps.

First is construction of a hypothesized institutional arena. There are two parts to this task. The general sector to be studied must be assessed to determine its traditional function and activity components.[37] Since broad sectors are definitionally highly aggregate, it is reasonable to assume relative stability in components over a reasonable length of time. Preparing material on the general sector might best be termed

"backgrounding." A continuing part of the work begun in this paper is the development of a precise methodology for gathering general sector information and guidelines for presentation of these materials. This overview assessment will provide a function/activity framework from which to begin the second part of the task -- construction of the hypothesized institutional arena of the study where institutional entities, their functions, activities, and roles are identified. Context-setting interviews with trusted observers are helpful in devising a particular institutional arena. It is vital to the later work of institutional analysis that the hypothesized institutional arena be prepared in a detailed format for it is against these hypotheses that the collected data will be analyzed.[38]

Once a hypothesized institutional arena has been constructed, it is possible to consider available and viable means for observing and recording exchange data. This portion of the research design requires a thorough understanding of the nature of the perturbation-prompting phenomenon; a preuse delineation of available field research time and personnel; and a clear view of the general purpose as well as the specific goals of the study. These three pieces of information interrelate to establish the framework and the parameters for data collection. For example, if the intent of the study is understanding the utility and the effects (positive and negative) of potential system intervention (for example, the introduction of a product innovation) and a demonstration innovation is to be introduced with considerable fanfare, then the research design would first describe the

system that exists prior to the demonstration (notably the nature and locus of roles and the resource configurations). Field researchers would monitor perturbations occasioned by the demonstration innovation. Such monitoring begins at the moment of innovation introduction and continues through in-depth interviews with actors who embody the various institutional functions, activities, and roles. It seems preferable, at least at this point in our knowledge of institutional anlaysis, for field researchers to conduct these interviews in teams (one to interview; one to observe), using a pre-tested survey instrument composed of open-ended questions. Participant observation continues through attendance at social and professional functions -- both previously scheduled sector gatherings and those occasioned by the innovation; monitoring of general sector publications; and site-specific interviewing to identify the speed and spread of information on the innovation.

The analysis in this example would consist of comparing the pre- and post-demonstration institutional arena behavior to learn how the institutional arena handles/is modified by/modifies the innovation. Institutional arena behavior can be analyzed and then projected by identifying those aspects of exchange that are most contributive to "successful" introduction of the innovation. (Success here means institutionalizing the innovation.) By the same token,it may well be equally useful to identify detrimental elements, i.e., those activities, roles, and exchanges that are obstructive to innovation acceptance. Such an analysis will lead to conclusions regarding: (1) existing potentially

facilitating exchange patterns -- the entities involved and their functions/activities/roles; (2) existing potentially resisting exchange patterns -- the entities involved and their functions/activities/roles; and (3) missing functions/activities/roles.

The entire analysis can then be summarized.[39] The focus and style of the final presentation will depend on the original general purpose of the study as well as on the specific goals, which will facilitate audience identification and thus have some influence on content and presentation. Diagram 4 presents in summary form the steps in Institutional Analysis.

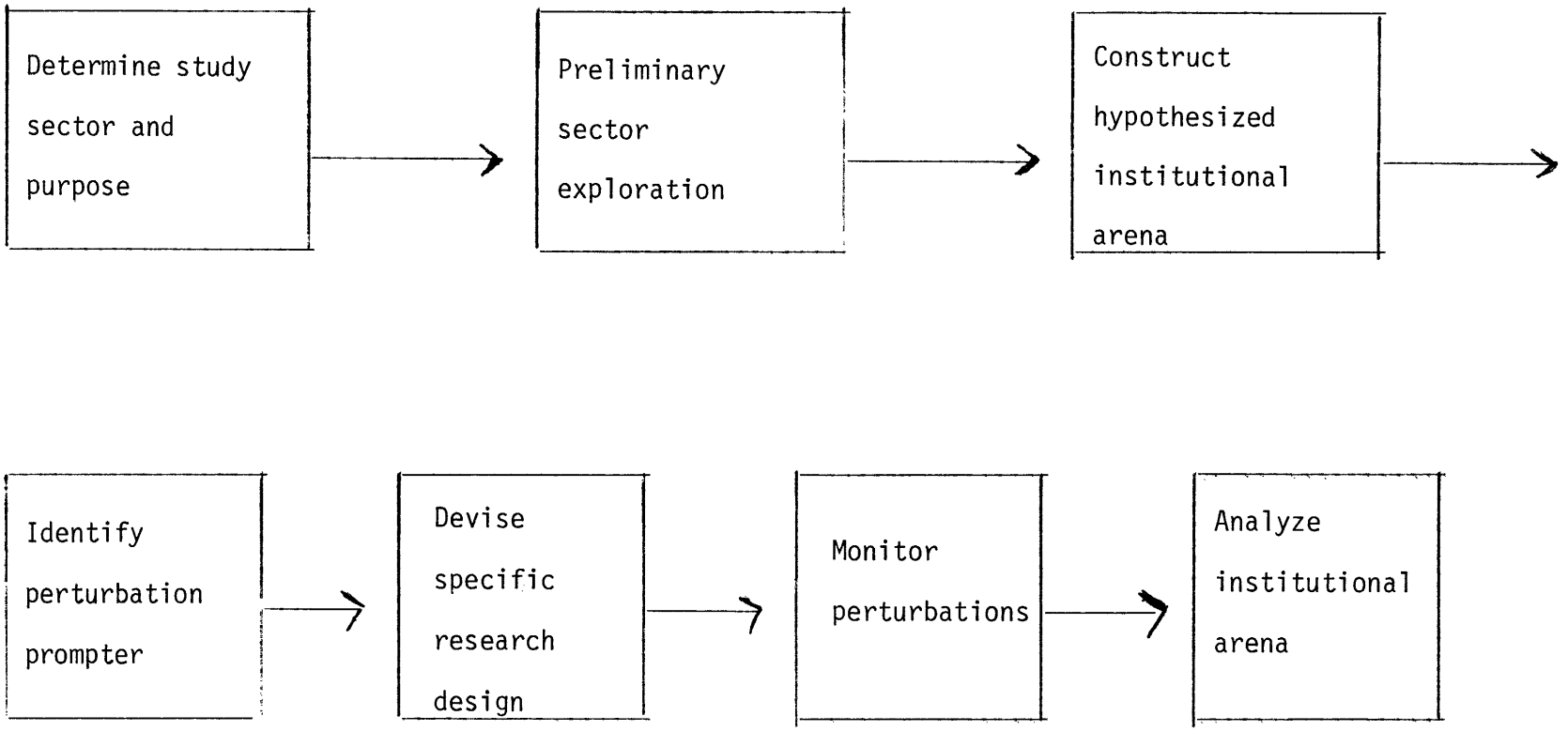


DIAGRAM 4 Steps in Institutional Analysis

FINAL COMMENT

Institutional analysis is a complex and confusing undertaking, made more difficult because of its normative and fluid qualities. It seeks to plumb to the depths of societal structure and action. Moreover, the act of institutional analysis itself is not separate from that which it is studying, further complicating the task.

Nonetheless, because society is a deliberate creation, there are strong motivations and important reasons to understand and perhaps improve societal processes for constructing reality. This paper is one effort at defining both the components and process of such an undertaking. It is, necessarily, only a beginning and has within it the evidence of the work which remains to be done. It is, however, a first step, one that has begun to prove its utility as the basis for institutional studies conducted as part of the Photovoltaic Program. While further refinement is crucial, a path has been charted which leads not only to further development in theory and methodology, but also to clear and useful insights for the more successful introduction of photovoltaic solar energy into the institutional arenas of contemporary society.

NOTES

1. Robin Williams suggests six tests for assessing the institutional character of a norm: "(1) widely known, accepted and applied; (2) widely enforced by strong sanctions continuously applied; (3) based on revered sources of authority; (4) internalized in individual personalities; (5) inculcated and strongly reinforced early in life; and (6) objects of consistent and prevalent conformity" (p. 37). Robin Williams, Jr., AMERICAN SOCIETY, New York: Alfred A. Knopf, 1970 (3rd edition).

2. Ibid, pp. 553-554.

3. Peter L. Berger and Thomas Luckmann, THE SOCIAL CONSTRUCTION OF REALITY, Garden City, NY: Doubleday and Company (Anchor Books), 1967.

4. This discussion should be interpreted as an argument in support of a Grand Theory (a la Parsons) or of particular theories of end-state, systematic equilibrium-seeking, though both areas are relevant to the present inquiry. This statement merely attempts to establish stability/routine seeking as a descriptive reality. The position does not hold that these institutions do not change, rather this argument suggests that only if one freezes time (which in decisionmaking is a human trait and, therefore, a theoretically supportable analytic stance), there is standardization and meaning-retention which create the possibility of perceiving, then acting as if, routine and stability are continuing realities.

5. David Silverman, THE THEORY OF ORGANIZATIONS, New York: Basic Books, 1971, p. 134.

6. For a longer analysis, see,Silverman, op.cit., Chapter 6.

7. "The distinguishing characteristic of action is precisely that it is determined by a project which precedes it in time. Action then is behavior in accordance with a plan of projected behavior; and the project is neither more nor less than the action itself conceived and decided upon in the future perfect sense," Alfred Schutz, COLLECTED PAPERS (Vol. II, p.11), in Silverman, op.cit, p. 144.

8. Ibid, p. 134.

9. Excellent summary treatment in longer form can be found in Nicos P. Mouzelis, ORGANIZATION AND BUREAUCRACY, Chicago: Aldine, 1967 and Silverman, op.cit.

10. All citations here are from H.H. Gerth and C. Wright Mills (eds.) FROM MAX WEBER, New York: Oxford University Press, 1958.

11. Ibid., p. 196.

12. Ibid., p. 198.

13. Ibid.

14. Ibid., p. 199.

15. Ibid.

16. Because Frederick Taylor is the only major representative of the scientific management approach to organizational theory, that approach has not been characterized as a separate "school." Taylor posits an assumption that is the reverse of the human relations school, i.e., that increased production leads to worker satisfaction (happiness). F.W. Taylor, THE PRINCIPLES OF SCIENTIFIC MANAGEMENT, New York, 1913.

17. Fritz J. Koethlisberger and William J. Dickson, MANAGEMENT AND THE WORKER, Cambridge: Harvard University Press, 1939.

18. Elton Mayo, THE SOCIAL PROBLEMS OF AN INDUSTRIAL CIVILIZATION, Cambridge: Harvard University Press, 1945.

19. James G. March and Herbert A. Simon, ORGANIZATIONS, New York: Wiley, 1958.

20. Chris Argryis, INTEGRATING THE INDIVIDUAL AND THE ORGANIZATION, New York: Wiley, 1964.

21. Rensis Likert, NEW PATTERNS OF MANAGEMENT, New York: McGraw-Hill, 1961.

22. Paul R. Lawrence and Jay W. Lorsch, DEVELOPING ORGANIZATIONS, Reading, MA: Addison-Wellesley, 19__.

23. Talcott Parsons, THE SOCIAL SYSTEM, Glencoe: The Free Press, 1951.

24. Robert Merton, SOCIAL THEORY AND SOCIAL STRUCTURE, Glencoe: The Free Press, 1949.

25. Amatai Etzioni, A COMPARATIVE ANALYSIS OF COMPLEX ORGANIZATIONS, New York: Free Press, 1961.

26. F.E. Emery and E.L. Trist, "The Causal Texture of Organizational Environments," HUMAN RELATIONS, 18, pp. 21-32.

27. H.G. Barnett, INNOVATION: THE BASIS OF CULTURAL CHANGE, New York: McGraw-Hill, 1953, p. 181.

28. Everett M. Rogers, DIFFUSION OF INNOVATION, New York: Free Press, 1962; Zaltman, Duncan and Holbek, INNOVATIONS AND ORGANIZATIONS, New York: Wiley,1973; Ronald G. Havelock, PLANNING FOR INNOVATION, Ann Arbor: Center for Research on Utilization of Scientific Knowledge, University of Michigan, 1970; Rogers, in particular, uses this definition; see Rogers. For other discussions, see Zaltman,and Havelock.

29. Deutsch defines information as "a patterned relationship between events." See, Karl W. Deutsch, THE NERVES OF GOVERNMENT, New York: The Free Press, 1966, p. 84.

30. Lawrence and Lorsch, op.cit., p. 87.

31. A related discussion is found in Michael Teitz, "Toward a Responsive Planning Methodology," in David Godschalk (ed.), PLANNING IN AMERICA: LEARNING FROM TURBULENCE, Washington DC: American Institute of Planners, 1974, pp. 86-110.

32. Williams, op.cit., p. 41.

33. It is pertinent to cite Williams here: "Institutional norms usually tend to be relatively stable, although permanence is a correlative rather than a defining criterion of their institutional character." Ibid., p. 37.

34. Severyn T. Bruyn, "The Methodology of Participant Observation," in William J. Filstead (ed.), QUALITATIVE METHODOLOGY, Chicago: Markham, 1970, p. 307.

35. For further discussion on this point, see: Filstead, op.cit., Glenn Jacots (ed.), THE PARTICIPANT OBSERVER, New York: George Brazilla, 1970. H.W. Smith, STRATEGIES FOR SOCIAL RESEARCH, Englewood Cliffs: Prentice-Hall, 1975.

36. An example of this type of study is Alvin Gouldner, WILDCAT STRIKE, New York: Harper, 1965.

37. We are here assuming that some prior determination has been made regarding the rationale for and general orientation of the study. For the studies undertaken on this project, six general criteria were identified. All must be satisfied for a field test to be worth detailed institutional analysis. These criteria are:

1. Is the proposed test in an economic sector where it will have clear impact?

2. Is the proposed test located in a logical test market area?
3. Is the institutional arena roughly comparable with other similar applications?
4. Does the test raise interesting institutional issues?
5. Is the test appearing in the institutional arena in a typical way?
6. Will the test contractor behave institutionally in a manner consistent with the particular test appearance?

The final four criteria are institutionally based. The first focuses on economic sector impacts, and the second on consumer purchase impacts. The full set assume the presence of a product innovation, such as PV. In other studies, a broader range of criteria would be necessary. For a discussion of the application of these criteria, in the Nebraska PV field test, see T.E. Nutt-Powell, et.al., "Photovoltaics and the Nebraska AgCom."

38. For an example of a hypothesized institutional arena prepared by staff in this project, see T.E. Nutt-Powell, et.al., "Photovoltaics and the Nebraska AgCom."

39. Again, for an example of a completed institutional analysis, see Nutt-Powell, et.al., Ibid.