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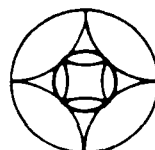
FORMULATING THE ELEMENTS OF INSTITUTIONAL ANALYSIS

by

Elinor Ostrom

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At the Workshop, we have attempted to bring together those aspects of work in different social sciences that help to build a more general method of analysis which can be used across different types of institutional arrangements. Drawing on the work in diverse fields, we are developing a conceptual framework that can be used to analyze the patterns of outcomes in many different settings whether they occur in markets, legislatures, teams, bureaus or firms. The purpose of the framework is to explain aggregated results occurring in many different types of interdependent social, economic, and political situations using the same set of underlying variables.

The framework is a genetic type of theory. By genetic, I mean that a small number of essential building blocks are identified in the framework. These are viewed as being combined and re-combined in many different configurations. Underlying the surface diversity of human life, we are presuming that we can use a single set of analytical variables to construct empirically testable explanations of the choice of strategies and results achieved in diverse settings. Alternatively, one might characterize the framework as a grammatical theory similar in its intent to the universal grammar developed by Chomsky (1957; 1965; 1975) (see also, Campbell, 1982).

The framework shown in Figure 1 is composed of an initial focal unit of analysis called an "action arena," which is itself composed of an "action situation" and a "model of the individual."¹ The framework is not restricted, however, to the analysis of the results at this focal level of analysis. In addition, we are also concerned with how (1) configurations of rules, (2) attributes of goods and of technology and (3) attributes of community understanding combine together to generate particular types of action arenas. When the action arena is examined as an initial focal unit, the variables within it are viewed as the "givens" of a situation. When one examines how rules, goods and technology, and community understanding affect the structure of an action arena, however, the action arena is examined as an intermediate unit of analysis.

[Figure 1 About Here]

The method of institutional analysis is thus composed of two distinct levels of analysis. At the focal level of analysis, one addresses how the structure of a situation and the assumptions made about individual actors, affect the incentives facing individuals, the types of strategies individuals adopt, and the consequences produced. At the contextural level of analysis, one addresses how rules, goods

¹ The notion of an action arena is similar to that of a formal game as used in game theory. A formal game is a unit of analysis applied to various interdependent situations. Formal games are composed of the same set of underlying variables which take on different values when used to analyze different types of situations. The component variables of an action situation are translatable into the component variables of a formal game.

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The purpose of this paper is to clarify what it means to "do" institutional analysis. Institutional analysis can be broadly defined as the examination of how rules, goods and production technologies, and communities of understanding jointly affect the structure of situations in which individuals face incentives, adopt strategies of actions, and produce outcomes for themselves and others. The first section of the paper is devoted to an examination of the need for a conceptual framework for doing institutional analysis. Then, I turn to an explication of the elements of analysis used at both the focal and the contextural levels of analysis. The last section addresses the application of institutional analysis to problems of development.

The Need to Integrate Work in Different Disciplines

The parable of the blind men trying to identify an elephant can be applied to describe the current state of the social sciences. Each discipline focuses on a particular part of a large, complex whole and defines the whole largely with the characteristics found in "its" relevant neighborhood. Economists tend to focus exclusively on behavior in market structures and to dismiss the essential role of political structure in establishing and maintaining these same market structures. Political scientists frequently presume that "the policy process" is contained almost exclusively inside the voting booth and the halls of legislative bodies. Rarely do political scientists examine the effects of laws on individual decision making within firms and across markets.

Specialization is useful when analysts address questions about well-specified and isolable settings. Micro-economists are able to answer many important questions about the effects of various changes in exogenous factors -- such as major upward or downward shifts in factor availability -- on outcomes such as the price and quantity of goods exchanged in highly developed competitive markets. Political scientists are able to answer many questions about how changes in committee structure in a legislative body may affect the type of legislation passed. Economists, political scientists, and other social scientists do not, however, have a general method for addressing such questions as how to help underdeveloped countries, lacking either well-developed markets or political structures, enhance general productivity and democratic institutions. Aspects of a general method are contained in all of the social sciences.

and technology, and the attributes of community understanding produce particular action arenas (and, thus, the resulting patterns of outcomes generated at the focal level of analysis).² Recent developments in the social sciences have concentrated primarily on the focal level of analysis. The addition of a systematic, self-conscious method to conduct analysis of the contextural level, building on work already conducted at the focal level, is an important addition in our approach.

The Focal Level of Analysis -- An Action Arena

An "action arena" contains both a "model of an action situation" and a "model of the individuals" in that situation. A model of the "action situation" can be characterized using seven clusters of variables -- participants, positions, actions, control, outcomes, information, and the benefits and costs assigned to actions and outcomes. A "model of the individual" includes assumptions about four clusters of variables: the way that individuals acquire, process, retain, and use information, the way individuals assign values to actions and outcomes, the way individuals select particular courses of action, and the resources that individuals bring to a situation. Using the set of assumptions made about the situation and about individuals, the institutional analyst derives inferences about the types of actions that will be selected by participants and how these are likely to cumulate into results.

The Working Parts of an Action Situation

Whenever two or more individuals are faced with a set of potential actions that jointly produce outcomes affecting themselves, and potentially others, these individuals can be said to be "in" an action situation. Typical action situations include:

- o buyers and sellers exchanging goods.
- o legislators reviewing a proposed bill within a committee.
- o bureau chiefs and officials bargaining over the budget to be allocated to the bureau and the level and type of output to be produced.

² The term "contextural" is used rather than "contextual" to build upon the noun "contexture" which is defined as "the way in which a thing is put together; structure; composition." The second level of analysis is more than examining the context of an action arena -- it is the analysis of the variables which "put together, structure, or compose" the action arena itself.

- o superiors and subordinates in a bureaucratic structure bargaining over the distribution of work assignments and rewards to be allocated.
- o a group of neighbors constructing a playground on a vacant lot.
- o citizens voting in an election.

Scholars in diverse fields have similarly attempted to identify a focal kernel of human interaction that exists in many different types of settings. John R. Commons (1957) identified the "transaction" as a fundamental unit of analysis involving five persons (two buyers, two sellers, and a judge). Alan Newell and Herbert Simon (1972) chose the term "task environment" to describe the structure of the situation in which they studied individuals as information processing entities. Both of these concepts are similar in their intent to the term "action situation" that we use in our framework. Other similar concepts include that of a "collective structure" (Allport, 1962); a "double interact" (Weick, 1969); a "practice" (Rawls, 1968); the "logic of the situation" (Popper, 1967); a "well-defined social episode" (Harre, 1974); and an "action scheme" (Kochen and Levy, 1956).

An action situation is an analytical construct. It is a way of looking at the world used by an analyst to isolate key variables thought to affect individual behavior. The world being examined is always much richer than can be represented: By picking the most relevant aspects of "real world" action situations, however, an analyst should be able to isolate the key factors affecting the choice of actions and the cumulative effects on outcomes. The concept of an action situation is no more analytical and less real than the concept of an "organization" or, any of the other terms used by social scientists to place conceptual bounds on complex patterns of human behavior.

We presume that we need to learn how to analyze relatively simple forms of human organization using the same types of variables to analyze many different forms that universally appear in all societies. One finds exchange arrangements, work teams, committee or council deliberations, reciprocity arrangements, and superior-subordinate command relationships in all societies. Each of these types of arrangements can be analyzed in terms of:

1. The number and type of participants.
2. The number and type of positions which participants hold.
3. The set of actions available to participants in positions at various stages of a process.
4. The level of control that participants have over the action to be selected at a particular stage of a process.

5. The potential outcomes to be affected and how they are linked to actions.
6. The information that participants have available about the structure of the situation.
7. The benefits and costs that are likely to be assigned to actions and outcomes.

These seven types of variables are necessary and sufficient to describe the structure of most simple but interesting actions situations. The number of participants and positions may vary, but there must always be participants in positions to have any structure to analyze. Similarly, there must be sets of potential actions that actors are authorized to take. Information about the situation may vary, but all participants must share some information about the situation before an analyst can even state that the participants are in an action situation. The costs and benefits assigned actions and outcomes can be thought of as the external incentives and deterrents in a situation. How these affect actions, and thus, results depends also on the resources and valuation patterns of participants.

Not only can action situations be characterized by these variables, but a change in any of these variables produces a different action situation. Three participants trying to decide whether to go to the opera, a football game, or a movie is a different situation than two persons deciding as among the same options. In a three-person situation, coalitions of one subgroup against another are possible while no coalitions are possible in a two-person situation. Changing the set of alternative actions or the information conditions also fundamentally alters the structure of the situation. Using these seven types of variables, an analyst can build a wide variety of models of elementary human interactions. An exchange arrangement and a command arrangement can be constructed from the same types of variables by changing the values of some of the variables.

Complex social arrangements -- including national markets, large corporations, national governments, industries, and many other complex units -- are composed of many types of action situations which are linked together in both simultaneous and sequential fashion. One of the important lessons to be learned from the recent literature on the way firms are organized in Japan is that the overall performance of a large corporation is strongly affected by the way the more elementary teams of workers are organized and how they are linked together. The recent work of Oliver Williamson (1975) on "M-Form" versus "U-Form" types of organizations also attempts to examine various ways of linking elemental work units together to examine the effects that different linkage mechanisms make.

When explaining strategies and cumulated results within a focal level of analysis, these working parts are the "givens" with which one works to describe the structure of the situation. One assumes that the individuals within a situation cannot change the structure of the situation in the short run. While the structure of the situation

remains constant, participants attempt to act in light of the opportunities and constraints of that situation and their resources and values.

A Model of the Individual

In order to derive inferences about likely actions in a situation (and, thus, about the pattern of joint results that may be produced), an analyst must make assumptions about the characteristics of the individuals in a situation. Minimally, these involve assumption about four types of variables:

1. How individuals process information.
2. The way individuals assign values to actions and outcomes.
3. The way individuals calculate choices.
4. The resources available to individuals.

At the most general level, an analyst puts himself into the position of each of the participants in a situation and tries to reason through the objectives that the individual would pursue, what resources they would bring to the situation, how much knowledge they would have, how they might learn from experience over time, and what type of calculation process they would adopt. Having done this, the analyst infers the likely behavior of different participants and how they would or would not be led to stable results. The assumptions about the individual are the components of an analytical engine that activates (i.e. gives motion or is a moving part) an action arena enabling analysts to predict the results likely to occur.

The most fully developed, explicit model of an individual is the extreme rational choice model used in microeconomic theory and in game theory. Even though this model makes "unrealistic" assumptions about information processing capabilities of individual, and about the evaluation and calculation processes, this model has been useful in generating verifiable predictions in a variety of tightly constrained action arenas. These predictions have considerable empirical support in those "real-world" situation which come closest to approximating the tight constraints of such models. Given the simple structure of some highly repetitive, competitive market situations, the limited capacity of human beings to code (develop appropriate language structures), store, and process information may not be exceeded. In such constrained and simple situations, it is analytically useful to assume that individuals have complete information relative to the tasks they face and the way the action processes are organized.

The extreme rational choice model is, however, an inadequate behavioral model for applications to more complex situations. Institutional analysis is not limited to the use of any single pre-defined model of the individual. Considerable work in cognitive

psychology, experimental gaming, and management science uses models of the individual involving different assumptions about the information processing capabilities and valuation procedures than the extreme rational choice model. These efforts draw intellectual inspiration from the work of Simon, Kahneman, Tversky, and others.

In more open and complex situations, we presume that individuals are adaptive, learning and fallible organisms who seek multiple, and at times, conflicting objectives. These assumptions lead us to generate propositions at the theoretical level which differ rather markedly from the conclusions derived from much of modern administrative theory which implicitly relies on a different model of the individual. When one presumes that humans make errors, one is led to a type of theory which stresses the necessity for redundancy. When one presumes that public officials may have interests that differ from those they represent, one is led to a type of theory which stresses the importance of countervailing powers.

The Prediction of Results

Depending upon the analytical structure of the action situation and the particular model of the individual used, an analyst makes strong or weak inferences about results. In tightly constrained actions situations, where participants are motivated to select particular strategies, or chains of actions, which jointly lead to stable equilibria, an analyst can make strong inferences and specific predictions about likely patterns of behavior and outcomes. Many situations, however, are not so narrowly constrained. Within more open situations, participants may adopt a broader array of strategies, and change their strategies over time as they learn about the results of past actions. The institutional analyst, examining these more open, less constrained, situations makes weaker inferences and predicts patterns of outcomes that are relatively more or less likely to result from a particular type of situation. Even weak inferences have an importance in specifying general tendencies. Predicting what will not occur may be all that an analyst can do, but such predictions are still useful.

Many useful analyzes have been conducted at this focal level. Besides the predictions concerning various types of results in markets structured in different ways (i. e., monopoly, oligopoly, monopolistic competition, perfect competition), important and practical implications can be derived in many other types of arenas. For example:

- o In superior-subordinate, command arenas -- information and control loss will cumulate in an exponential manner as the number of linkages in the system are increased unless redundant channels are built into the system.
- o In committee or legislative arenas -- policy outcomes will be biased toward those preferred by participants in positions with agenda control powers if only simple majority rule mechanisms are utilized.

- o In open-access, common-pool resource arenas -- as demand approaches the sustained yield of the resource, participants will be lead to increase their individual demands which will cumulatively lead to overproduction from the resource.

What is rather amazing is the number of different types of arenas which can be constructed at a focal level using only the seven types of variables characterizing the action situation and relatively simple models of individual actors. The same underlying set of variables can be used to analyze seemingly different types of arrangements. Further, complex multi-layered institutional arrangements can be constructed from these simpler analytical units. The focal level of analysis is sufficient when the primary aim of an analysis is that of prediction. Most of the existing analytical theories in modern social science concentrate analysis at this level.

While considerable work on institutional arrangements can be conducted at this level, the initial focal level is not, however, fully adequate as a source of explanation for results. For those scholars and activists who are interested not only in gaining predictions for empirical testing but also in understanding how situations are constructed so that they can be changed -- for the reformers of the world of which we are a part -- starting with the elements of an action situation as GIVENS is not sufficient. If the beneficial results of a perfectly competitive market are dependent upon the presence of a large number of buyers and sellers, what factors affect the entry and exit of participants from a market? If the results depend upon individuals being able to transfer ownership over property in a relatively low cost transaction, what physical and legal factors affect the clarity, simplicity, and cost of property transactions? If the results depend upon owners being able to exclude others from use, how is the presence, reliability, and honesty of a police and court system related to the use of market? Similarly, how does a culture of mutual trust or of mutual distrust affect the capacity to engage in market relationships?

The Contextural Level of Analysis --
Rules, Goods, and Community Understanding

It is to questions of this type that the types of variables identified as part of the contextural level of analysis -- rules, goods and production technologies, and community -- are needed. The seven types of variables used to characterize the action situation can be thought of as structural variables existing fairly close to the surface of our observations. We can measure how many participants are engaged in an activity at a particular period of time. We can find out which outcomes are produced in a time frame and which actions various participants thought they possessed. We can observe the objective benefits and costs in the form of payments of goods in exchange for money and of taxes assessed on actions, on outcomes, or on both. The visibility of variables at this level can be deceptive.

Less "visible" at the contextual level of analysis are the rules in use by those who are participating in a situation, the attributes of goods and production technologies involved in the activities they are undertaking, and the shared understandings and values of those participating. A more visible variable, for example, the number of participants in a situation, results from the operation of several less visible variables: (1) entry and exit rules, (2) the costs involved in undertaking a particular type of production process, and (3) the shared values in a community.

The difference between these two types of variables is most important when one wants to construct or change an institutional arrangement. One does not just go out and "construct" a market by placing so many individuals in a marketplace and telling them to engage in buying and selling activity! Constructing a market is not like constructing a road. A road can be constructed by expatriots and exists (at least for a while) even if those who will use the road have little cognitive understanding how to build a road. (Maintaining a road or other physical infrastructures is a different story. Many development failures have involved constructing roads or other physical assets without understanding the need for institutional infrastructure to maintain them.)

Constructing a market involves the establishment of a rich set of rules regarding the capabilities and constraints on the actions that individuals holding positions of buyers, sellers, judges, police officers, and potentially, health and safety inspectors, license clerks, zoning officials, or even traditional tribal councils may undertake. For those rules to be operative, they must be known and understood by most of the participants. Once participants are familiar with the operation of a market, the knowledge of the rules may become relatively subconscious or tacit. But, the market "game" cannot be played effectively for long without most participants presuming that you are not allowed to leave the market with goods before you pay the clerk.

The type of market that will evolve when a set of rules is used by participants over a period of time depends on many cultural factors as well as on the overt rules used. So, in many African countries, tribal divisions are still strong enough that private firms employ members of only one tribe or are composed only of members of an extended family unit. These cognitive beliefs about who one can trust and with whom one should do business will affect the type of market arrangements that can evolve -- at least in the short run. Finding mutually productive ways of relating across strictly family or tribal lineages may help open up different types of market arrangements in the longer run.

A brief analogy may help. When a game manufacturer "sells" a game, the things inside the box are usually an instruction sheet giving the "rules of the game" and the physical environment in which these rules are to be utilized. We cannot say that the game is being played until the playing board and pieces have been arrayed in the way specified in the instructions and participants have started to learn

the rules and utilize them in their play. Family customs may affect the way a particular game is played within a household. If those customs lead to a substantially altering of the basic rules of the game, the family devises a new game for itself. One cannot predict the patterns of activities and outcomes likely to ensue unless one can assume that the initial rules will be followed or one can determine which rules are being followed. Given the importance of the variables at this level of analysis, let us examine them somewhat more closely.

Configurations of Rules

Rules refer to prescription about what actions (or states of the world) are required, prohibited, or permitted. Weber (1947) identified the set of rules to which actors had reference when selecting actions as the order (Ordnung) which underlies a field of social action. Weick (1969: 62) defined "organizing" as the "set of rules by which elements interact in predictable fashion with predictable results. Organizing is the grammar by which the vocabulary of elements in an organization is made meaningful." All rules are the result of implicit or explicit efforts to achieve order and predictability among humans by creating classes of persons (positions) who are then required, permitted, or forbidden to take classes of actions in relation to required, permitted or forbidden states of the world. As Atkins and Curtis (1967: 217) so aptly phrased it, "rules of every sort share at least one common property: They all may be said to rule in something or other, while ruling out something else."

For each variable in the action situation, there is a type of rules which has some effect on that variable in a situation.

1. Boundary rules set the entry, exit, and domain conditions for individual participants.
2. Position rules establish positions, specify procedures by which participants are assigned into positions, and define who has control over tenure in a position.
3. Scope rules specify which outcomes can be affected and set the range within which these can be affected.
4. Authority rules prescribe which positions are authorized to take which sets of actions and how a series of actions are ordered, processed, and terminated.
5. Information rules affect the information individuals have about the structure of the situation by establishing information channels, stating the conditions when they are to be open or closed, creating an official language, and prescribing how evidence is to be processed.

6. Aggregation rules affect control by prescribing the formulae for weighting individual choices and calculating collective choices at different points in a process.
7. Payoff rules prescribe how benefits and costs are to be distributed to participants in positions given their actions and those of others.

To illustrate how these types of rules affect complex action arenas, the types of rules involved in structuring a competitive market are listed on Table 1. The simple statement, "let us assume a highly competitive market," presumes that participants act with reference to a complex set of rules similar to those shown on Table 1.

[Table 1 About Here]

Substantial changes in any one of these rules affect the structure of a market and the resulting inferences that can be made about equilibria and market performance. Only a few key changes, and one would no longer call the action situation a market at all. A change in the aggregation rule, for example, allocating goods to consumers based only on the choices made by officials, transforms the resulting action situations into something other than a market. (This is the rule that the military uses to assign uniforms to recruits!) Changes in boundary and position rules affect the number of participants who enter and exit. This, in turn, affects whether the resulting market is competitive, oligopolistic, or monopolistic. Market performance is dramatically affected by these structural attributes.

These seven types of rules provide initial guidance to the institutional analyst concerning the types of rules which need to be specified in order to make explicit the underlying rule structure of a situation. A rule configuration can be produced as a result of a series of questions asked about each of the variables in an action situation. In regard to the number of participants, an institutional analysis would ask: Why are there N participants? How did they get there? Under what conditions can they leave? Are there costs, incentives or penalties associated with entering or exiting? Are some participants forced into entry because of their residence or occupation? A similar set of questions about each of the variables in an action situation yields a set of working rules that affect the structure of the situation.

The rules structuring action situations operate in a configural manner. The effect of a change in one rule depends upon, or is "conditioned by" (Ashby, 1962) the other rules in use. A change in scope rules, for example, such as increasing the standards for smoke stack emissions, may lead to the elimination of many firms if boundary rules require them to face competition from firms not subject to the same regulations. However, if boundary rules protect such firms from "external" competition, the prices of the goods manufactured will rise, but the number of producers may stay relatively constant after

such a change in scope rules. Thus, the effect of a change in one rule -- the scope rule -- is conditioned by the type of boundary rules in effect.

Similarly, the effect of a change in aggregation rules in a legislature depends upon boundary rules and the resulting number of participants involved. The marginal decision making costs resulting from the use of unanimity rules may not be very high if restrictive entry rules keep the size of the group small. But under open entry rules, the number of participants may become large. If so, the use of a unanimity rule will lead to high decision making costs. Buchanan and Tullock (1962: 279-280) point out that the effects of permitting vote-trading in legislative bodies is dependent upon the aggregation rules in force. They posit that an authority rule allowing vote trading combined with an aggregation rule of unanimity leads to Pareto optimal results while a vote trading combined with simple majority rules will not necessarily lead to Pareto optimal results.

Goods and Production Technologies

While all of the variables of an action situation are affected by the rule configuration in use, many of these same variables are also affected by the nature of the goods being exchanged or transformed and the production technologies involved. Attributes of goods and of the production technologies are most likely to affect: (1) the set of actions available to participants, (2) what outcomes can be produced, (3) how actions are linked to outcomes, and (4) what information is made available to participants about the processes involved. The same rules used to organize a hierarchical work team yield different action situations depending upon the types of goods and services being produced. How individual actions are linked to outcomes and the divisibility of outcomes will both, for example, be affected by whether work teams are producing radios in a factory or are producing local police services in a city.

Let us examine some of these attributes and how they affect the variables in an action situation.

1. **Exclusion** - when an outcome is produced and participants in a situation can be excluded from benefiting from (or being harmed by) that outcome, the good is said to be characterized by exclusion. On the other hand, exclusion is costly or infeasible when all participants (or a significant subset) are affected by an outcome whether they have contributed to the effort to obtain the good.
2. **Jointness of consumption** -- when the outcomes of a process are consumed by participants using the same facility or resource system simultaneously or sequentially, the good is characterized by joint consumption. Examples of joint consumption include crossing a bridge, boating on a lake, fishing from an ocean fishery, etc.

3. **Co-production** -- when the outcomes of a process cannot be produced without the active cooperation of several different owners of input resources, the outcomes are subject to co-production. Examples include: (1) education where both teachers AND students must engage in an educational process for students to acquire new skills and (2) health, where both doctors AND patients must exchange information and patients must understand and follow advice given by a doctor before that doctor's advice can affect the outcomes.
4. **Serial production processes** -- when most of the steps in a production process must occur sequentially, difficulties occurring at any one step adversely affect the entire outcome. Serial production processes are likely to experience problems of bottlenecks and delays. Parallel process -- where some of the operations may occur simultaneously -- are far less sensitive to problems of reliability and delay.
5. **Measurability of outcomes** -- when the outcomes of a process are easily measured -- such as is the case in the production of most private, marketable, goods -- owners, consumers, and workers can all more easily comprehend how different inputs are related to outcomes. Incentive systems are easier to establish and maintain. When the outcomes of a process are difficult to measure -- such as national defense or local crime prevention -- the contribution of any one participant to outcomes is extremely hard to determine. Shirking is far more difficult to detect when outcomes are difficult to measure.
6. **Degree of choice over consumption** -- when the mere existence of a good (or bad) forces individuals to consume it, the individual receives the outcome whether they wanted it or not. Congested streets, for example, inconvenience all who are using them whether they like it or not. During the Vietnam war, many citizens in the U.S. were forced to live with a policy which they strongly opposed. When it is extremely costly for individuals to avoid consuming particular goods, one can expect higher levels of conflict than when individuals can exercise substantial choice about whether or not to consume particular goods.

Many other attributes of goods and production processes may also be of considerable importance in the understanding how rules are related to the incentives facing individuals participating in action arenas. Among the other attributes which may be important in the analysis of particular action arenas are: (1) the variability of input factors over space and/or over time, (2) whether an outcome must be produced in large step-levels or can be produced in small, incremental steps, (3) whether the goods produced are durable or

nondurable, and (4) whether all participants value the outcomes positively or whether some participants assign a negative value to an outcome which others value positively.

The same set of rules used in organizing the production, exchange or consumption of one type of goods will yield a different set of outcomes when used to organize the production, exchange, or consumption of other types of goods. The close relationship between the nature of the goods and the operation of a rule system is relatively well understood in economics. When goods are subject to exclusion and are individually, rather than jointly, consumed, the rules underlying a competitive market as illustrated in Table 1, lead to incentives which result in relatively optimal patterns of outcomes. The same set of rules, used in organizing the production and exchange of goods which are difficult to exclude and/or are jointly consumed, leads to entirely different results. An extensive literature on "market failure" illustrates the problems of relying on market institutions when goods cannot be excluded and/or are jointly consumed.

The relative importance of rules as contrasted to the nature of goods and production processes varies dramatically across different types of action situations. Rules almost totally constitute some games, such as chess, where the physical attributes of pieces are relatively unimportant. Little about the size of a chess board or the specific shape of the pieces contributes to the incentives and strategies of participants. Chess is played on computer screens, in formal gardens, and with a wide variety of different boards and pieces. This is not the case in regard to many other games. Imagine, for example, switching the balls used in American and European football. The strategies available to players in these two games, and in many sports, are strongly affected by the physical attributes of the balls used, the size of the field, and the type of equipment.

Attributes of the Community

In addition to the effect of rules and the nature of goods and production processes, attributes of the community in which action arenas are occurring also affect the structure of interactions. The first attribute of the community important for institutional analysis is the level of common understanding existing among those who are interacting within a particular type of action arena.

Individuals cannot play a game without sharing a similar view of the range of allowable actions, the distribution of rights and duties among players, of likely outcomes, and of the preferences that other participants are likely to have. Common understanding does not imply equal distribution of information among members of a community. Some common knowledge of the institutional constraints is necessary, but participants may vary in their level of knowledge of the particular states of particular variables.

Rule-ordered transformations do not provide the level of predictability that physical mechanisms can provide. Part of the ambiguity arises from the problems with human language. Because words are "symbols that name, and thus, stand for classes of things and relations" (V. Ostrom, 1980: 10), words are always simpler than the phenomena to which they refer. Stability in rule-ordered transformations depends upon shared definitions of the words formulating the rules. Even if all community members conscientiously try to implement a confusing law, it will yield irregular behavior if individuals interpret the law in a variety of manners.

Changing circumstances aggravate the instability in rule-ordered transformations. Vincent Ostrom (1980:1) has observed this problem when he wrote:

the exigencies to which rules apply are themselves subject to change. Applying language to changing configurations of development increases the ambiguities and threatens the shared criteria of choice with erosion of their appropriate meaning.

Predicting behavior, therefore, on the basis of rules is necessarily imprecise, with the degree of imprecision depending on the existence of mechanisms for resolving conflict interpretations of rules. Such mechanisms enhance the shared meaning of rules and reduce variation in behavior. When individuals frequently interact directly with one another in particular arenas, the level of common understanding is higher than when individuals participate infrequently and in widely disparate locations.

A second attribute of the community affecting the structure of action arenas is the level of agreement among members when evaluating actions and outcomes. This is especially important in situations that force consumption of particular goods or bads upon individuals in a community. Lack of agreement usually distorts the distribution of cost among community members, causing ferment among those assuming disproportionate burdens.

Community agreement about institutional arrangements is always important. Agreement about the moral correctness and the fairness of rules constraining actions reduces the need for enforcement. Otherwise, individuals seek to evade and change the rules. Individual actions become less predictable and the order of the system breaks down, causing authorities to invest heavily to monitor community members' actions and to impose sanctions on members taking unauthorized actions.

A third attribute of the community relevant to institutional analysis is the way resources are distributed among members of a community. A competitive market is defined as a situation of nearly equal distribution of resources among producers. No single producer poses enough resources to manipulate market prices or to influence market transactions.

Individuals controlling disproportionate resource shares for participating in an action arena fundamentally affect the structure of the arena. The situation differs from the equal distribution situation, even when the rules and the attributes of goods remain the same. Thus, if a few firms gain market control, a market arena changes from involving many, relatively equal, actors (a competitive situation) to one involving a few, relatively unequal actors (an oligopolistic situation). Outcomes are affected by this change. Outcomes in legislatures and other political organizations also change when power distributions are unequal.

Institutional Analysis and Problems of Development

This approach to institutional analysis raises some fundamental questions for the way one would approach problems of development. Using this approach, we can begin to identify and understand some of the fundamental building blocks of human organization. Two of the key types of building blocks identified in this approach -- rules and community -- are basically cognitive in nature! One cannot say they are operative, until real people in real situations learn the rules and meld them with their cultural heritage into an ongoing activity with predictability and meaning for the participants. While we can treat rules and community as types of variables in an analytical scheme -- as we do in the framework -- these variables do not operate in the world unless they are part of the cognitive frame of the participants.

An understanding of the importance of and cognitive nature of rules and community in affecting human behavior is rather essential for any program of institutional development to be engaged in by AID or other donor organizations. Institutions are just not constructed like physical structures are constructed. Humans are capable of constructing their own organizational arrangements and do so all the time. We do have usable theories that can help all of us construct better rather than worse arrangements. There is a science and a technology of institutional design, but it is a different type of science and technology than that related to explaining and constructing physical objects. We need a different process of technology transfer when related to institutional development as contrasted to physical development.

That fundamental building blocks of institutional arrangements are cognitive in nature also raises some difficult questions concerning the stability of institutions over time. Institutional arrangements are tools that individuals use to accomplish objectives of importance to them. Effective use of all tools requires that the use of the tool itself be relatively unconscious or tacit. A master artisan pays primary attention to what he or she is trying to accomplish. The tools being used are almost extensions of the self.

This tacit knowledge of tools in general, and institutional arrangements as particular tools, represents a threat to the continued knowledge about how to use particular types of tools. The transmission of tacit knowledge is more difficult than the transmission of knowledge that has systematically been converted into a written and formal science. It is still the case that good cabinet makers initially learn their skills by working with master cabinet makers. World class athletes all have coaches who continuously help them to preserve or enhance their skills by monitoring their performance and making more conscious the tacit skills acquired by the athlete.

All societies face the problem of reproducing themselves by teaching new generations how to construct and use the institutional tools they use in structuring human organization. So-called "primitive" societies tended to reproduce themselves relatively well over very long periods of time by stressing adherence to a small set of well defined rules and cultural values. Modern societies are characterized by a much richer set of rules and cultural values which are context specific. Thus, the set of rules used in one context differs from the set of rules used in another context. Those rules used most frequently by individuals in their everyday life are likely to be transmitted from one generation to the next without great variation. But, those rules which are more infrequently used are subject to a greater degree of uncertainty across generations.

Modern societies are more dependant for their reproduction on formal education and training than are traditional societies. If a population is literate and if the theories about institutions that are taught in formal educational settings are relatively valid, modern societies can reproduce themselves in a stable fashion over a long period of time. However, if the population is largely illiterate, many individuals will have little understanding of the procedures used to accomplish key objectives in their lives. Registration of land and property rights, for example, may be successfully accomplished only by those with sufficient education that they know how to operate (and maybe even manipulate) within a modern system.

An even more difficult problem occurs when the theories about institutions that are taught in formal educational settings are untested and/or invalid. Given the relative inattention paid to theories of institutions in the last half century of the social sciences, we are at a rather difficult juncture in which many of the "common sense" theories of institutions may be valid only under very constrained circumstances.

During this past era, scholars studying the development process have presumed that centralized, hierarchical structures are necessary to achieve modern economic growth and stability. Formal education in the US and in developing countries has characterized integration and centralization of political systems as desirable features while characterizing fragmentation and decentralization of political systems as pathological. Thus, efforts have been made to increase the use of hierarchy over the use of other types of institutional arrangements involving high levels of independent among the participants.

Hierarchy is an important type of institutional arrangement that is well suited for many tasks. It is the optimal set of institutional arrangements for some activities. All institutional arrangements are subject, however, to limits. And, thus, there are limits to the effective use of hierarchy as there are limits to the effective use of various types of polycentric, decentralized arrangements. Formal education in political science and public administration has, however, stressed the limits of polycentric arrangements and stressed only the presumed universal benefits of hierarchy.

Hierarchical designs tend to concentrate power in the hands of those individuals who have only highly aggregated and potentially distorted information about time and place specific events in a society. If decisions about when seeds and fertilizer will be made available, which seeds and fertilizer will be used, and the prices to be charged for seeds and fertilizer must all be made by one central authority, it is impossible to take into account all of the differences in local regions within a particular country. The wrong seeds will be provided to some areas. Seeds and fertilizer will be provided too late to others.

Hierarchical institutional designs tend to eliminate redundancy from institutional arrangements. Given the fallibility of humans, however, failures are to be expected. Failure must not be thought of as occurring rarely and correctable simply by training people better. The more fully interconnected are the actions of individuals, the more likely malfunction will occur somewhere in a system. "Redundancy is a means of keeping the system running in the presence of malfunction" (Campbell, 1982: 73).

Engineers and physical scientists are certain to build redundancy into all physical control systems. The dominant social science theories of institutions have stressed the elimination of redundancy in the design of social control systems. Given this advice, it is not surprising to see the type of institutional arrangements which have been put into place in many less developed countries. Following this advice to build highly centralized political and economic systems may, however, have contributed to the level of institutional failure that has characterized much of the less developed world. A different approach to institutional analysis is needed if failure is not to reproduce failure in a continuing tragedy for those involved.

Figure 1

A Framework for Institutional Analysis

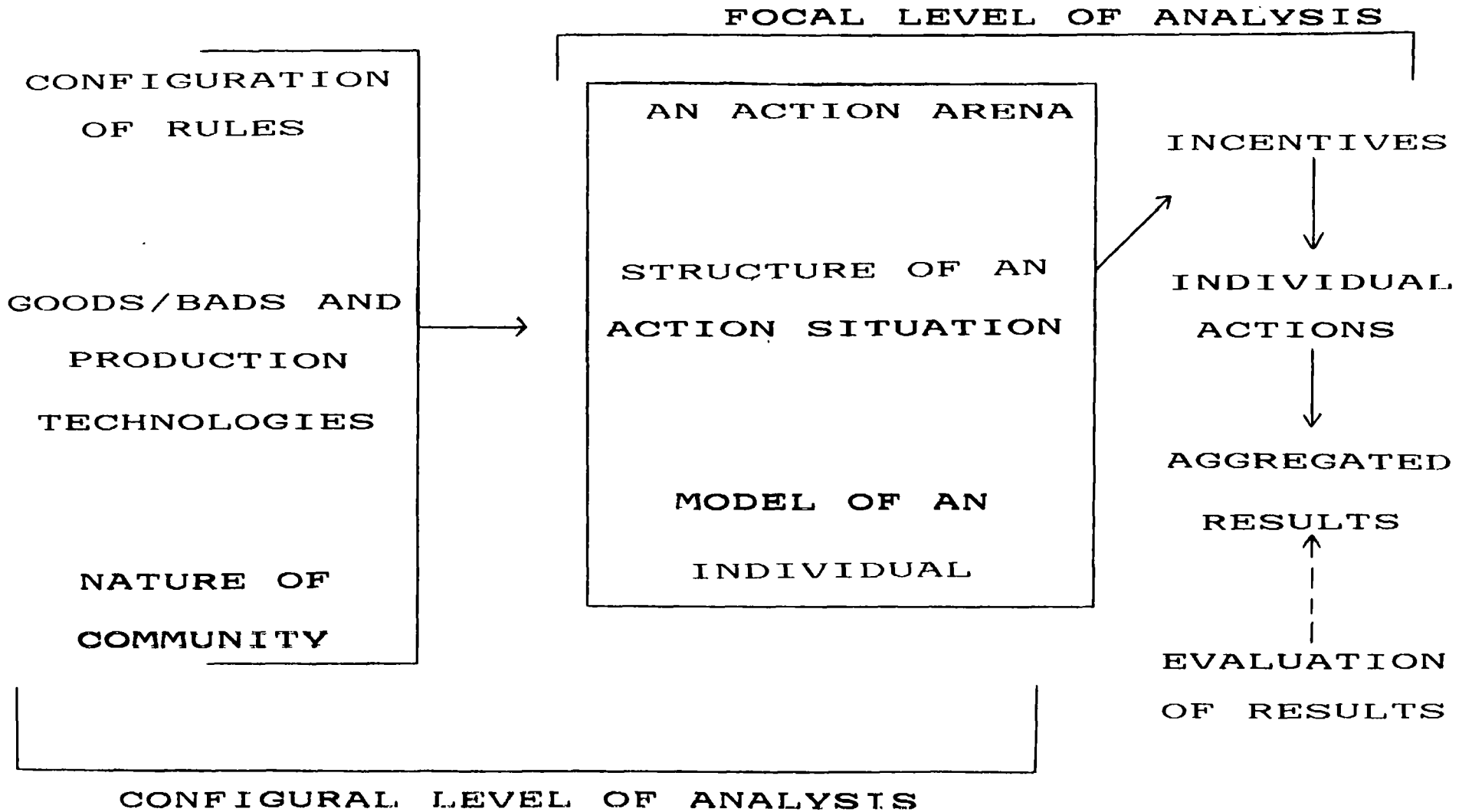


Table 1

Working Rules of Competitive Markets

BOUNDARY RULES

1. Buyers and sellers may enter and exit at their own initiative.
2. Licensing requirements for sellers or buyers are minimal.
3. Buyers and sellers must own or borrow resources to enter.
4. Exit is forced on sellers if long-run profit is less than zero and on buyers if they do not have sufficient funds to buy.

SCOPE RULES

1. Participants can exchange their own or borrowed resources and goods but not resources owned by others.
2. Participants are limited in terms of costs they can externalize on others -- rules regarding what is an allowable externality vary from market to market.

POSITION RULES

1. Positions of owner, seller, buyer, employer, police, judge, and jury are defined.

AUTHORITY AND PROCEDURE RULES

1. Seller authorized to decide how much to offer for sale at what price.
2. Buyer authorized to decide how much to offer to buy at what price.
3. Police authorized to arrest those suspected of unlawful use of resources and goods owned by others.
4. Judges authorized to determine rights and obligations of buyers and sellers in civil proceedings and of suspects in criminal proceedings.

INFORMATION RULES

1. Prices of current offers to sell and buy are available to all participants.

2. No participant is authorized to force information from other participants concerning preferences or costs.
3. Seller may have to provide specific information on content of goods.

AGGREGATION RULES

1. Whenever any two participants agree to an exchange, that transaction is authorized.
2. Police can make an arrest on their own initiative.
3. Aggregation rules for judges and juries vary depending on type of case.

PAYOFF RULES

1. Seller retains profit, if any, after payment for input variables, taxes, and interest.
2. Buyer retains consumer surplus, if any, after payment for goods.
3. Suspects pay fines, or spend time in jail, if judged guilty of criminal acts.
4. Buyers and/or sellers pay damages and costs to other parties if ordered to do so by judge.

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