DETERMINANTS OF INNOVATIVENESS IN DEVELOPING COUNTRIES

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Political Science)
in The University of Michigan
1971

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ABSTRACT

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Approached within the framework of cybernetic and structural-functional models, organizational innovation is hypothesized to be a function of systemic motivation to innovate and availability of systemic resources necessary to bring about such innovations.

Motivation is defined as a system's awareness of a systemic need and of a remedy for that need. Innovation, thus viewed, becomes a function of the communications network which enables a system to receive and perceive relevant information in regard to both of these elements.

Resources are defined not only in terms of the amount of material and human resources within a system, but also in terms of the configurations of resources, and the ease with which such configurations may be altered.

Seventeen developing countries were studied as

units of adoption. Their innovativeness was measured in terms of the speed with which they adopted as national policy at least three of six specific policy recommendations of the World Health Organization in the field of public health.

The study showed that:

1) The extent of a country's internal communications media and channels of communication with the outside world are positively correlated with that country's innovativeness.

2) The amount of resources in a country in general, and resources directly related to the specific innovations in particular, are positively associated with the degree of its innovativeness.

3) Of the political indices used to measure the predisposition of a country toward change and the reassignability of its resources, most are predictably associated with innovativeness.

The findings tend to confirm the original hypotheses regarding determinants of innovativeness and also illuminate the role of other factors frequently considered to be important, such as urbanization and size. The results also support the utility of the cybernetic model for the study of social organizations.

TO MY PARENTS

ACKNOWLEDGMENTS

It is extremely difficult to express adequately my gratitude to my Doctoral Committee Chairman, Professor Lawrence B. Mohr upon whose guidance and supportive attitude a large share of credit for the completion of this dissertation rests. I am also indebted to my Committee members, Professors Ronald F. Inglehart, Irwin M. Rosenstock and Jack L. Walker, Jr. for their suggestions and encouragement.

In my long career as a student I have owed a lot to many whose names I cannot enumerate here, but to whom I remain grateful.

Finally, I would like to thank Miss Katherine L. Gorthey, Mrs. Carol Sharifi, and Mr. Farhad Kazemi for editting and proofreading this manuscript.

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CHAPTER I

INTRODUCTION

A. WHY STUDY INNOVATION

If there is anything that can characterize our time as well as the explosion of knowledge, it must be the prevalence and frequency of change in every facet of life. Examination of the amount of knowledge gathered in the past quarter of a century leaves us no other conclusion but to agree with the scholars who contend that man has learned more in this period than in the previous twenty-five centuries. Scientists have not only developed better and more precise techniques and tools for the study of the traditional realms of scientific exploration, but they have also ventured into areas either previously unknown, inaccessible, or beyond the interests of previous generations. A close examination, with the advantage of hindsight, although not diminishing the initial awe of the vastness of this explosion, leads us to wonder if it should not have been expected.

Derek J. Price has examined the growth of science since the late seventeenth century--when the so-called scientific revolution is considered to have originated--

and found that the "size" of science has been increasing according to the laws of exponential growth. This pattern of growth, as against the linear one, indicates that larger organisms grow faster.[1] He also found that the five or six percent per year growth that Parkinson observed in bureaucracies and civil service corresponds exactly to the growth pattern of professional scientists and technologists over the last four centuries.[2] Thus, an examination of the increases in the size of the scientific community should have led any scholar to predict an explosion in the number of people engaged in these fields. The explosion in human knowledge would not have seemed so sudden had this examination been undertaken, even a few decades ago. Probably what would not have been predictable was the possibility that we had reached the so-called threshold of criticality in the expanding process of human understanding. Threshold of criticality suggests that quantitative accumulation of scientific endeavor has reached such magnitude that its effects become qualitatively different from its previously observed consequences.

The same reasoning may be applied to social change. One wonders if the increasing pace of change and the resulting tensions in every facet of life is not soon going to reach such proportions that it would result in a comprehensive metamorphosis of human societies. This idea is not really as far-reaching as it sounds. As Wilbert

Moore has observed, many substantial societal changes are direct results of the aggregation of small variations in the sub-units of a society and the way these units perform their functions.[3] He gives the example of change in the family size and the problems and tensions that grow out of slight variations in what is culturally defined as a desirable number of children. Karl W. Deutsch showed that the seemingly small, even minute annual modifications in the habits of people, their likes and dislikes, and places of their residence, when viewed in terms of decades, result in such social transformations that, without this background, would have seemed unpredictable.[4] This insight should indeed allow us to be prepared for the future, and not be caught by surprise, as the scientists have been. This element of surprise may partially explain the many problems that science is facing now, among which two are worth mentioning: 1. the problems of communication of scientific findings to other scientists and technologists so that they can be utilized; and 2. the problems of conflicts between the prerequisites of scientific inquiry and the prevalent values of the societies --both in the West as well as in the East, in physical-life sciences as well as in social sciences.

As for social change, it is still possible to eliminate the element of surprise for future generations if we

adopt a harder outlook. The truth of the matter is that it is only in recent years that social scientists have become actively interested in societal change; and even then, most of what they have concerned themselves with has been all but indulgence in self-satisfying observations from the vantage point of hindsight. There has been little work done to understand the processes of social change, and this has probably been due to the handicaps that their conceptual framework has imposed upon them. On the other hand, there are those who argue, and somewhat convincingly, for societal and institutional reforms based on their futuristic predictions. And yet, there seems to be no way of implementing such reforms, because we have no conceptual or practical means of doing so.

> "Societies were once viewed as natural entities, which we find untampered with... and which change their character...without any one man or group of men having planned the change. Recently, we have come to view society as more open to deliberate reconstruction, and its processes as subject to guidance.. . Over the last twenty years, our collective ambition has risen. We decided to change, by design and in accord with guidelines laid down nationally, the relations between the races.... We face numerous other problems which afflict the society.... <u>But the sad truth is that we do not know how to guide societal change in the desired directions</u>, and hence ten and fifteen years after various programs have been initiated, many of the problems we set out to solve will still be with us." 5

And yet, there are those, including Etzioni, who

argue that we do know more than we think we do. Zetterberg, for example, suggests that "there is a body of reasoned sociological knowledge, summarized as principles of theoretical sociology, which is superior to our common-sense notions about society,"[6] and which can be applied to specific situations to improve social practices therein. The reason why social practitioners are not "consciously and systematically" using this body of knowledge in their profession is lack of a codified handbook of social diagnosis -- similar to that available to the medical practitioners.[7]

There are other reasons why social scientists are not aware of the availability of theory and results of research by other scholars. Probably what Katz has called "academic inbreeding" is the most important cause of disciplinary barriers among social scientists, that makes them not only unaware of what is being done in other disciplines, but also uninterested to find out. This is a psychological predisposition which eliminates even the possibility of relevance of what others are doing to their own little and limited preoccupations.[8] This lack of communication among scientists, and their ignorance of what others are doing, whatever the reasons may be, is indeed a very important factor in the non-existence or the very poor quality of theoretical and conceptual models, explanations and forecasts of social change.

The most important source of innovation is the utilization of scientific findings and application of such findings to the problems facing us; for this, more than any other single factor, will determine our ability to undertake the necessary reforms in the social institutions and social relations that new societal aspirations of mankind require. The discussions of the previous paragraphs show, on one hand the tremendous expansion of human knowledge, and on the other, the great escalation of human aspirations and demands for reforms and re-construction of societal structures. Yet it is almost common knowledge that few if any of the social reforms and programs undertaken are based on scientific findings. One reason may well be the meagerness of any relevant body of social knowledge. Another is the fact that the relevant materials are never sought, communicated, or perceived as relevant by the societal decision-makers.

> "The tragedy is that the magnificent efforts to discover knowledge are not accompanied by a similar effort to make sure the knowledge is effectively and promptly communicated." 9

Thus, while new scientific insights remain useless due to lack of communication and relay systems, human problems, in increasing numbers and severity, either remain unsolved or are approached very haphazardly. The study of innovations and innovativeness can be useful to the design

of systems in which the transition from theory to practice is made possible, where the best known methods are used to design reforms, and to carry out such reforms in the most effective manner.[10]

Modernization in Developing Countries

What makes the study of innovations, innovativeness, social change, and social changeability more relevant, if not urgent, in our time is the fast spread of modernization, Westernization and economic development among the underdeveloped countries. In this movement there is much more involved than just a desire to purchase or to imitate the production of Western goods or technology. There is indeed a very fundamental shift in the viewpoints and assumptions underlying the actions of the leaders of the developing countries.

Contrary to DeTocqueville, Marx and other historian-social scientists who believed the course of history to be unchangeable, and the role of human activism to be only that of speeding the inevitable,[11] many leaders of the underdeveloped countries are convinced that social reforms do not happen by themselves, and that social processes, if left to themselves, do not indeed result in the materialization of the inevitable. While realizing that there are certain underlying processes in humen societies, they have chosen to learn the pattern of these processes, and

to utilize them in their efforts to steer their societies. In this search they have abandoned the comfortable position in terms of which events are made to appear inevitable because they have already occurred. A very common example of this viewpoint is demonstrated in the economic theories utilized by most planners in the developing countries, as well as in the developed nations. The active view of political decision-making is very similar to this practice, and is meant to achieve a balanced growth and transformation of the social institutions in the desired direction and the solution of problems before they "get out of hand."[12]

The most encompassing of all social evolutions in the non-Western countries are modernization and industrialization.

> "Historically, modernization is the process of change toward those types of social, economic and political systems that have developed in Western Europe and North America from the seventeenth century to the nineteenth and have then spread to other European countries and in the nineteenth and twentieth centuries to South American, Asian and African countries." 13

Modernization is characterized by some degree of social mobilization and social differentiation.[14] The former denotes the process in which "major clusters of old social, economic and psychological commitments are eroded or broken and people become available for new patterns of socialization and behavior".[15]

Social differentiation, which may be regarded as the end result of social mobilization, consists in the specialization of roles in the society, use of the technological tools of an industrial economy, centralization of political power with a universalistic franchise of political rights, and a "non-ascriptive" system of social status.[16]

Thus, both modernization and industrialization require far-reaching changes in values, institutions, organizations, and motivational patterns of the developing societies. For example, values of mobilized resources, nationalism, and social mobility, as well as achievement orientation of social status systems have to replace the existing traditional patterns.[17] Therefore, when a government, explicitly or implicitly, decides to modernize its society it requires the knowledge and the skills which would conceivably help it bring about such fundamental changes. This is precisely what is involved in innovation.[18]

Even if the political and/or administrative leaders of traditional societies do not make any commitment to modernize, the very process of social mobilization, which can occur regardless of governmental policies, would force such governments to make reforms in order to cope with the problems facing a socially mobilized people. To underline the necessity of such reforms, a few of the political

implications of social mobilization can be summarized here. It enlarges the politically relevant strata of the population; it expands the range of human needs that the governments are called upon to fulfill; it increases the role of government in the economy; it generates pressure for administrative and political restructuring of the existing system; it calls for a broadening of the bases of origin and support of the political elite; it generates a fervor of nationalism, and it results in increased political participation by the general public.[19]

Thus, change and reform are inevitable and leaders of developing countries having realized this fact, are indeed searching for the theoretical conceptualizations, and practicable recommendations necessary to introduce controlled and determined social change in their countries. This is happening with an increasing awareness that

> "at the bottom, the popular acceptance of a government in a period of social mobilization is most of all a matter of its capabilities and the manner in which they are used--that is, essentially a matter of its responsiveness to the felt needs of its population. If it proves persistently incapable or unresponsive, some or many of its subjects will cease to identify themselves with it psychologically; it will be reduced to ruling by force where it can no longer rule by display, example and persuasion; and if political alternatives to it appear, it will be replaced eventually by other political units,... which at least promise to respond more effectively to the needs and expectations of their people." 20

B. THE STUDY OF INNOVATIONS

In the previous pages an attempt was made to place the study of innovations within the wide range of studies of social change. It was pointed out that small changes may have very great consequences, and that in the modern world, societal changes are often direct consequences of purposeful human action. Furthermore, innovations and social change may be studied at various levels and with different objectives, and all such studies may potentially be valuable tools for administrative and political leaders involved in societal programs and reforms.

Historically, the students of innovation have largely been a subgroup of the scholars of diffusion research. They were distinguished from the others mainly in terms of their specific interest in and their concentration on the characteristics of adopters of innovations, and the immediate processes preceding or following adoption. The academic background of these scholars has been as varied as their approaches. Rogers presents an excellent examination of the development of the traditions of diffusion research.[21] There is no need to describe it here, but it is interesting to note that this tradition regards innovation as an on-going, many-faceted process that lends itself to study and research at several different points.

Katz, et al. have defined this process, in

sociological terms, as "the (1) acceptance, (2) over time, (3) of some specific item — an idea or practice, (4) by individuals, groups or other adopting units, linked (5) to specific channels of communication, (6) to a social structure, and (7) to a given system of values, or culture".[22] With the exception of very few writers who have either edited other works or have written introductory articles or books on the subject,[23] most writers have focused on one or a few of the above facets of the process of diffusion. The reasons are the vastness of each of these points and the fact that we have not yet exhausted all profitable designs of research in each area.

Most writers on the subject have also given their own definition of innovation or of the process of diffusion. When such definitions are taken out of the context of research requirements of conceptual operationalization, they are more or less reduced to the definition given by Katz, et al., stated above.[24] These definitions usually have two common features. First, they distinguish between innovation and invention — adoption and creativity. Innovation is mostly regarded as introduction of something new to a situation — regardless of where it came from, who initiated it, when it was originally created, or what its original form was.[25] Secondly, these definitions tend to be adopter-oriented, with occasional secondary attention to one or two other aspects of the overall process.[26]

There seems to be no need to venture a new definition of innovation here, especially since, as will be explained later, the focus of this study is not very much different from those of previous studies by Mohr and Walker. Thus, adopting the definition offered by Mohr, we consider innovation to consist of "successful introduction into an applied situation of means or ends that are new to that situation."[27]

Nation-states are the subjects of the present study; their innovativeness is the dependent variable, and certain of their characteristics form the independent variables. In the following pages we shall discuss: (1) units of adoption in general, (2) social collectivities as adopting units, (3) governments as adopting units, and (4) the sociological viewpoint of this study.

1. Units of Adoption

Elihu Katz enumerates three types of adopters of innovations (innovators): (a) individuals, (b) informal groups, and (c) formal organizations.[28]

Examples of the adoption of innovations by individuals are numerous. New drugs, new farm machinery, new teaching methods, and new practices--such as public health measures of personal hygiene--are innovations whose adopters are often individuals.[29] Decisions made

by a group of children to adopt a new game, or by office workers to comply with a new norm, however tacit they may be, are examples of small informal groups' decisions to innovate.

Examples of formal organizations' adoption include such phenomena as adoption of decentralization policies, introduction of new techniques and technology into the production system, new patterns of labor-management relations and the like.

2. Social Collectivities

"A collectivity," as defined by Etzioni, "is a macroscopic unit that has a potential capacity to act by drawing on a set of macroscopic normative bonds which tie members of a stratification category."[30] This is the minimum definition of a social collectivity, and it implies: (a) one single unit of adoption, and not a collection of individual behaviors, and (b) the existence of some sort of normative bond which supersedes individual differences and enables the group to act as a unit.[31]

However, not all collectivities are similar. One differentiating trait among groups is the nature of interaction among their members. When such interaction takes place primarily between persons, regardless of their respective positions within the group, the interaction is informal, and the group is referred to as an informal group. In formal organizations, on the other hand, the

interaction is characteristically among positions, regardless of who occupies them.[32] Thus, size is not perfectly related to the formal-informal continuum. However, there are several other properties that seem to be associated with size (including the tendency to become more formal as the group grows in size) which have led many scholars to consider size as an aspect of meaningful distinction. From an analytical point of view, and for the sake of clarity and rigor, it seems much better to distinguish among social collectivities on the basis of more relevant and more precise characteristics. In this instance, the dimensions of formal-informal, complex-simple, and differentiated-nondifferentiated are most suitable and relevant.

Many classifications and categorizations of formal organizations have either emphasized the types of primary bonds which tie the organization together, or the primary beneficiary of the organizations' operations. Etzioni's typology of social relations into normative, utilitarian and coercive is well known and needs no elaboration here.[33] Blau and Scott classified formal organizations on the basis of the primary beneficiary of the organizations' functioning.[34]

Katz and Kahn have also proposed a typology which is based on the first and second order functions of the

organization. The first order functions are those of production, maintenance, adaptive functions, and management-politics, which involve coordination and control functions.[35]

The following pages contain a brief discription of this paper's basic approach to social collectivities, based on several models of structural-functional and cybernetic systems.

The starting point of this approach is the observation that

> "all social systems, including organizations, consist of the patterned activities of a number of individuals. Moreover, these patterned activities are complementary or interdependent with respect to some common output or outcome; they are repeated, relatively enduring, and bounded in space and time.... The stability or recurrence of activities can be examined in relation to the energic input into the system, the transformation of energies within the system, and the resulting product or energic output." [36]

Thus, organizations and other social collectivities are systems which have structures and functions. However, theirs is not a fixed physical structure. It is a structure of events and thus, "inseparable from the functioning of the system."[37]

Social collectivities are regarded here as open systems, which are characterized by their constant exchange

with their environment — a patterned and continuing inflow and outflow of energy, through "permeable boundaries".[38] This "commerce" is essential to the survival of the system, and not just a characteristic of it. The importation of energy allows the system to acquire more energy from the environment than it expends, thus using the difference to overcome entropy. Without this negative entropy, the natural process of positive entropy would bring about the death of the system.[39]

Open systems have several other characteristics which will be discussed here briefly:[40]

a) Information input, and negative feedback: The input to open systems is not only in the form of energy. Inputs are also informative in nature and their reception is selective, governed by a system of coding, which simplifies the "blooming, buzzing" confusion of the world. Karl W. Deutsch defines information as "a patterned relationship between events", or "a transmitted pattern that is received and evaluated against the background of a statistical ensemble of related patterns."[41] The nature of the functions performed by the system determines the nature and content of the coding mechanism.

Feedback allows the system to take into account the results of its previous actions in its subsequent behavior. Positive feedback reinforces the behavior of the system, while the negative feedback stimulates it

to take corrective action in its behavior.

b. Steady state and the dynamic homeostasis: The continuous flow of energy in, through, and out of an open system results in a steady state of exchange, which Katz and Kahn call the "character of the system."[42] The basic reaction of open systems to disturbances in this process is that of counteraction, aimed at restoring the original state. However, this counteraction is not precise, but approximate, resulting in a series of ups and downs in the temporal chart of the behavior of the system.

Another product of this dynamic homeostasis is the development over time of a more complex and more comprehensive internal equilibrium. Note that this concept differs markedly from mechanistic equilibrium theory in that it considers the possibility of the goal's focusing on a point outside the system; the system to be dynamically interrelated to its environment; the goals to be susceptible to change, and the goals being considered as a succession of series of tactical sub-goals.[43] Blau and Scott attribute change in the goals of social organizations mainly to the latter's relationship with their environment. If this relationship is hostile, goal displacement results; if it is friendly, goal succession will often develop.[44]

As a result of this process of dynamic homeostasis and the tendency to preserve their character, open systems

build up reserves. They also become more complex and expand.

c. Open systems move in the direction of differentiation and elaboration through the process of dynamic mechanization, which denotes a gradual movement from the dynamics of interaction of their components to fixed arrangements and conditions. The end result is that the system becomes more efficient, but it also loses its equipotentiality.[45] Burns and Stalker found that organizational structure and relationships differed from organization to organization according to how stable the organizational goals were. The more stable the goals, the more defined, structured and prescribed was organizational activity. And conversely, the less stable the goals, the less formal were internal relationships in the organization.[46] Their finding is clear evidence for the working of the dynamic mechanization process, since mercurial goals do not allow the system to develop its own routines and subroutines.

d. Finally, open systems have the quality of equifinality, which means that the same final state may be reached through many different routes, and from different initial points.

Social systems, besides sharing the common

characteristics of all open systems, also have special traits which distinguish them. Among these, four are very important:

a) They are held together by psychological bonds, which integrate the individuals into cohesive systems. These bonds include roles, norms, and values, which are interrelated in a more or less complex form.[47]

b) They are contrived, and thus, they can be designed for a variety of objectives. In other words, they do not have any innate goals.[48]

c) They do not follow the growth pattern or the life cycle of open physical and physiological systems.

d) They require control mechanisms to keep their components together.[49] Among the forces used to reduce human variability to a level acceptable by the requirements and the working of the system are 1) environmental pressures, such as crisis, needs, etc. of the situation; 2) shared values and expectation of members; and 3) the enforcement of rules.[50]

It is in the realm of the control and steering mechanisms of a social collectivity that the cybernetic model is very important and helpful. This model at the societal or organizational level assumes:

a) That there are one or more control centers which issue command signals to the units which do the work--the production units;

b) That a net of communication lines connect the center to these points, as well as to receptors "tuned" to environmental information--input and feedback;[51]

c) That the center has the power to back up its commands with sanctions; and

d) That there are at least analytical distinctions within the command center between the sub-units that absorb and analyze the incoming information, and those that make decisions.[52]

Thus, this model separates the processes of communications network from their conventional physical casing. That is to say, a social collectivity is regarded as being able to think, to be aware (or to be conscious), to be creative, and to be innovative as individuals are, without the same physiological prerequisites.[53]

With these points in mind, let us close this section with a few words on the goals of organizations and other social collectivities. The cybernetic model enables us to distinguish between at least two different orders of goals. First-order goals are those short-run, often repetitive goals which need relatively immediate satisfaction, and which are usually achieved by the activities of the production sub-units of the collectivity. Second-order purposes imply self-preservation of the network, and are carried out primarily by the maintenance and adaptive

sub-units of the system.[54] These goals are especially important for the innovativeness of any social system, because, often innovative actions are taken by organizations to satisfy a second-order goal, although on the surface it may appear to alter production patterns.

The management-political sub-system, or as Etzioni calls it, the "command center," functions across both of these categories, depending on the nature of the need and required responses of the system to meet such needs.

3. Governments as Adopting Units

In this section we shall briefly point out how governmental innovations fit the theoretical framework laid down in the previous section.

Governments are the political sub-systems of the society, and in that capacity they have the three functions of adjudicating internal conflicts among the society's subsystems, implementing the decisions made in that adjudication, and also mobilizing the society in its relationships with other nations--be they cooperative, competitive, or conflictual.[55] Also, as was stated earlier, all open systems are in constant exchange with their environment. This exchange requires adjustive reaction by the system to variations in the milieu.

All these factors require the state--especially in modern societies--to mobilize all its resources and

energies to cope with the challenges of everyday problems as well as those of long-range development. Adoption of novel ideas and new solutions are inevitable if the government is to preserve its legitimate control over other sub-systems. Such innovations usually require the generation, storage and combination of societal knowledge. Societies, in fact, do produce and use knowledge as collectivities. For example, the scientific laboratories owned and operated by a government are parts of the societal mechanism to generate knowledge. Libraries are examples of societal storing of information.[56]

By the same token, unless there is a societal mechanism for making such information available to the decision-making bodies, such findings remain useless and problems remain unsolved. The discussion of part C, below, will make these points more clear.

4. Sociological Level of Analysis

Social collectivities have been regarded by many scholars as the abstraction of the purposes of their designers, leaders or key members. One of the major fallacies of this viewpoint is that of equating the purposes and goals of such collectivities with those of their individual members. In previous sections mention was made of the individual variations and internal conflicts within any social entity and methods of handling such conflicts.

(See footnote No. 55, above.) The organization as a system has an output, a product or an outcome, but this is not necessarily identical with the individual purposes of the members of the group.[57] The same is true about individual characteristics, and those of the social system. It is true that the behavior of people in organizations is the behavior of people, but "it has a different set of determinants than behavior outside organizational roles."[58] By the same token, societal properties are not necessarily aggregates of individual properties, and should not be treated as such unless empirically demonstrated, even then, in the interest of rigor and in order to prevent methodological "spill-overs", it is best to keep the two separate.

Etzioni distinguishes between three kinds of sociological variables: (a) macro-properties or traits which refer to societies; (b) micro-properties, which refer to the smaller sub-units, and (c) universal properties, which may be used to describe either the society or its sub-units.[59] While many aspects of societal behavior may be explained in terms of variations in individual factors, there are those which can only be explained by variance in macro-properties, and which cannot be reduced to other variables.[60]

This is precisely what Hage and Aiken mean by a sociological imagination,[61] which emphasizes the necessity

of explaining organizational phenomena in terms of organizational properties and not in terms of the individual characteristics of members. As Durkheim said, "social facts must be explained by other social facts."[62] Unfortunately, most studies on the innovativeness of groups and organizations have lacked this sociological attitude. Thus, we still find psychologists and psychoanalysts who argue that aggressive impulses of man are the cause of war, and that if we find ways of lessening, or redirecting these impulses we can change the nature of state and eliminate wars.[63] A sociological attitude enables us to see that individuals who declare wars do so by virtue of the requirements of their roles, and any change in their personalities would have very little to do with the nature of the state or their willingness to go to war.

C. DETERMINANTS OF INNOVATIVENESS

To view social collectivities as open systems denotes that changes in such collectivities are due to dynamic disturbances from either internal or external sources. The adjustive behavior of the system is that of reaction--a corrective measure--which, in the long run, does not only restore a state of dynamic equilibrium, but also results in a relatively more complex relationship with the source of the disturbance, and the environment in general. This is partially what Blau and Scott refer

to as the dialectic process of organizational development, which implies the observation that as a problem is being resolved new problems arise and a degree of learning takes place, both of which, in turn, affect the organizational ability to meet new challenges.[64]

Smelser offers a more elaborate account of the sequential steps in social system change. According to him, there are seven steps: (1) expression of dissatisfaction with some aspect of the system's functioning, accompanied by the "prospect of facilities to overcome the source of dissatisfaction"; (2) immediate responses, which are undirected or misdirected symptoms of disturbance; (3) gradual bringing into line of the immediate responses by social control; (4) emergence of new modes of action in response to the dissatisfaction; (5) specification of the new actions; (6) trial of new actions; and (7) consolidation and routinization of the new pattern.[65] The end result of this process is usually the emergence of a more differentiated social system.

The sequential steps suggested by Smelser are fundamentally those that are involved in the process of learning. The essential elements of that process are the stimulus and the response. Learning is "a relatively enduring change in the response to stimulus."[66] Continued reinforcement of desirable response to stimulus results in a more or less permanent change in the system's pattern

of responses. In terms of Smelser's steps of change, the first step--i.e. the expression of dissatisfaction--is stimulus; the second through the fifth steps are responses, which through feedback and reinforcement are narrowed down to a few and concrete patterns; and the sixth and the seventh are consolidations of the new pattern of behavior.

In cybernetic terms, this process of learning involves four elements: (a) drive, (b) cue, (c) response, and (d) reward.[67] In the following paragraphs we shall elaborate on these concepts, especially in terms of the findings and thoughts of other writers and scholars. Then we shall examine the various modes of failure of social collectivities to respond to changing situations. Later, on the basis of the conclusions of this first part, the major hypotheses of this paper shall be put forward. A review of the literature on the determinants of organizational innovativeness shall follow to clarify these hypotheses.

1. Cybernetic Model of Learning

a) Drive: This is what other writers have referred to as some type of disequilibrium or disturbance in the system, the sources of which may be internal or external.

Internal disturbances may be of several types, the most prominent ones of which are the following.

Various types of small variations and conflicts which exist in all systems, and which, due to their aggregate effects, produce intolerably large disturbances. Among these are the so-called normal conflicts among different individuals and groups in a social collectivity over who should be performing different tasks in the organization,[68] small scale changes in the working of sub-systems, especially in the autonomous areas, variations in the manner of performance of the tasks, tensions due to inequalities within the collectivity,[69] changes in the profile of membership through turnover,[70] and different rates of growth among sub-systems.[71]

Disturbances which are endemic to all organizations, and which Blau and Scott have called the "dilemmas" of formal organizations are the second type of internal disturbances. Among these are the dilemmas of coordination versus communication, discipline versus professional expertise, and planning versus innovation.[72]

The external sources of disturbances are also numerous and are illustrated by the following categories.

Changes in the environment which alter the nature of the "environmental challenge":[73] Among these are any changes from a friendly relationship to a hostile one, or vice-versa, between the collectivity and its social, or physical environment. Also included in this category are

environmental variations which occur due to the actions of the organization, which may become possible sources of further needs for new adjustive actions.

Changes in the content of information from outside the system, either due to the first category of environmental alteration or due to the opening of new and previously unknown channels from new sources: A good example of this is the exposure of developing countries to the ways of the West and the disturbances which that causes in traditional societies facing acculturation.

Among new inputs from the environment, two are very important: modified production input, and modified maintenance input.[74] The first denotes changes in material as well as in information received by the system--e.g. new alloys, new technology, etc. New technology includes changes in values and motives transmitted to the members and the implications of such changes for the system as a whole--e.g. the slow democratization of American industries due to changes in societal norms.

b) Cue: This is the information signal which makes the system aware of the existence of a disturbance. There must already exist in the system a pattern against which such signals are interpreted. There are two types of cues: those which tell the system about its problems and those which carry information relevant to the solution of the

system some degree of internal rearrangement and adjustment is necessary. These internal rearrangements are integral parts of every learning process. Without such changes in the configurations of the elements within a system, the organizational responses would not alter at all. The major elements of this process--between reception of the cues and the emissions of responses--are the following: reception of the cues, interpretation of the cues, dissociation of some of this information from the rest, recall from the system's memory of other systematically determined relevant items, recombination of some of these old and new items into new patterns, abstraction, and transmission of these patterns to action sub-systems where a new configuration of production units results and produces a new set of resources.[80] This new arrangement of the internal elements of the system--be it in one or all of its sub-systems--is the very essence of organizational learning. It solidifies after a series of give and take with the sources of disturbance through the process of feedback and reward.

d) Reward: The feedback mechanism, which adjusts the responses of the system, eventually functions as a mechanism of reward of the system, leading to sustained adoption of a pattern of behavior which is innovative.

problems faced by the system. Both of these should be properly interpreted in order to enable the system to respond, and to respond directedly.

While the first type of cues usually originate from within the system, the second type of cues have many diversified sources among which some of the more interesting ones are: professional organizations to which the members of an organization also belong,[75] other organizations,[76] and centers of knowledge generation and learning.[77] The "other directedness" which McClelland found to be correlated with economic growth[78] can be interpreted as a change in the receiving and coding system--tuning it to other external sources of cues for one's behavior, thus enabling that system to receive and to interpret new and different types of information.

c) Response: Once the information about a drive is received and understood, the system responds. The nature of its response may range from completely irrelevant to exactly satisfying. Usually the initial responses are not satisfying. It is only through the feedback mechanism that the system adjusts itself, and eventually responds directedly, both qualitatively and quantitatively--i.e., giving the right kind of response with the correct intensity.[79]

Let us remember that to change the output of a

system some degree of internal rearrangement and adjustment is necessary. These internal rearrangements are integral parts of every learning process. Without such changes in the configurations of the elements within a system, the organizational responses would not alter at all. The major elements of this process--between reception of the cues and the emissions of responses--are the following: reception of the cues, interpretation of the cues, dissociation of some of this information from the rest, recall from the system's memory of other systematically determined relevant items, recombination of some of these old and new items into new patterns, abstraction, and transmission of these patterns to action sub-systems where a new configuration of production units results and produces a new set of resources.[80] This new arrangement of the internal elements of the system--be it in one or all of its sub-systems--is the very essence of organizational learning. It solidifies after a series of give and take with the sources of disturbance through the process of feedback and reward.

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2. Basic Modes of Failure to Respond

The above analysis is based on the argument that innovation is indeed a form of learning and that, as such, modes of failure to learn are very similar to modes of failure to respond to a changing environment. From that analysis, also, one can derive two basic categories of reasons for unresponsive systemic behavior: those due to the failure of the system's communications network and those due to failure to rearrange production elements.[81] Let us examine these more carefully.

a) Communications network failures: These are usually due to the following causes:

Lack of, or defect in receptors of a system make it unable to receive certain cues (for example, about its internal problems) or to retransmit such information to the centers of decision-making.

Deficiencies in the channels of communication from the receptors to the decision centers is another sub-category of network failure causes.[82] Isolation of the governmental leaders from the "grass roots" and the masses always carries the risk of distortion or stoppage of the incoming information from this segment of the population.

Problems of decoding and interpretation of the incoming information signals are numerous and complicated. It was pointed out that the incoming information, unless

decoded against a pre-existing pattern within the command center, or other points in the system, will remain meaningless and insignificant.

This pattern, however, is developed through the values, norms and past decisions of the social collectivity. Values and norms function as labels for the incoming signals, and also function as filters through which the systemically determined important data are processed.[83] When this filter becomes too rigid, it does not allow even correctly interpreted information to go through. This happens, for instance, when a system "wills" to continue on a certain course of action, and practically blocks all incoming signals which may weaken the original decision.[84] The rigidity thus created is usually much more noticeable when the decisions are fixed on certain goals and the system is programmed to achieve those regardless of all information which would otherwise persuade the system to change its goals.[85]

Another danger in this stage of labelling the incoming information is the system's propensity to overvalue certain elements in the signals, over and above the other relevant contents, thus resulting in complete loss of the system's perspective. An example is the adoption of slack innovations, due to the reception of cues which are so overloaded with other values--such as prestige--that the relevance of their other contents to the system is

overshadowed, and subsequently, disregarded. Innovations are thus adopted because it is prestigious to have adopted those novelties regardless of their pertinence to the needs of the adopting system.[86]

Of the ten inhibitors of flow of knowledge into an organization enumerated by Havelock et.al., seven are elaborations on this point of internal "programming" of the system and the effects they have on the reception, interpretation and thus, acceptance of new information. These seven are: the need for stability, coding barriers, fear of malevolence of outsiders, personal threat, local pride, social relations and the steady state of the system, and status differences among organizations.[87] All of these are factors which affect the coding, filtering, decoding and interpreting of incoming signals.

The above sub-categories are also applicable to the distortion or misunderstandings of decisions made in the command centers due to its limitations and in their transmission to the production sub-units. That is to say, the production unit may not have the receptors, or its receptors may be out of tune for certain types of decisions, or the channels carrying the information may distort the contents, or the arriving signals may either be misunderstood or be completely blocked out in the filtering and decoding processes within that sub-system.

b) Inability to rearrange the production sub-system is the second category of causes of unresponsiveness. Changes in the output of any system may require creation of new production units, or other changes in such structure. Regardless of how radical these changes may be, variance in systemic response requires some degree of change in the production sub-structure. In bringing about such variations human and material resources are significant factors. The learning capacity of any system is indeed the "range of its effective internal rearrangements."[88] It is a function of the amount of its uncommitted resources and also the configuration of such resources or the ease with which they may be reassigned. This is a qualitative element in the learning capacity of a system.[89]

Cottrell believes that the amount of energy available to a society limits what man can do and influences what he will do.[90] Eisenstadt concluded that before any change can occur in certain societies, there must be some "free-floating" resources available within the system.[91] Economic conditions and the size of organizations presented by Havelock et al., as factors of openness to change are further examples of how significant the resources of a system are considered to be for its innovativeness.[92]

There are several factors which are good clues to the ability of a system to rearrange its internal

configurations. Hage and Aiken showed that the degree of formalization and centralization of decisions in organizations were negatively correlated with the rate of organizational change.[93] Both of these traits make the system rigid, inflexible and unable to reassign its resources with ease.

Burns and Stalker's typology of organizations into "mechanistic" and "organic" types, and their findings, provide additional evidence for the same contention. Almost all of the characteristics differentiating between the two types are those which describe the rigidity of task assignment within the system, and thus determine the degree of rearrangeability of resources. The mechanistic type is one in which division of labor is strict; specializations are distinct; technical duties are precisely defined; and work is governed by specific instructions.[94] The organic type, on the other hand, is characterized by a looser division of labor; overlapping specialization patterns; and a greater degree of ambiguity in duties and work instructions. As expected, Burns and Stalker found the organic type organizations to be more hospitable to innovation than the mechanistic ones.

3. Determinants of Innovativeness

The analysis of the basic modes of organizational failure to respond to changing situations leads us to two

basic categories of determinants of a system's propensity to innovate:

a) The system's ability to receive and perceive cues regarding drives and solutions to those drives constitute the first category. Such perception is usually over and above, and sometimes regardless of, the objective existence of such needs and/or solutions.

b) The amount of its resources and their assignability to new configurations constitute the second category.

We shall call the first category a system's motivation to innovate, and the second, its resources.

In this section we shall first state the major hypotheses of this study, and then through an examination of the literature, we shall attempt to explain these hypotheses.

The major hypotheses of this study are the following:

HYPOTHESIS I: The length of time a government waits before it adopts an innovative policy is inversely related to its motivation to innovate.

HYPOTHESIS II: The length of time a government waits before it adopts an innovative policy is inversely related to the amount of resources it possesses relevant to adoption of that policy.

a) Motivation to innovate denotes recognition or perception of a need--a drive--and a degree of awareness of some remedy or of some means of satisfying that need. Schon argues that

> "only the strongest incentives can lead an organization to effective deliberate change. Something like a state of crisis must arise. The organization must come to feel that its survival, or at any rate, its survival as it has been, is threatened." 95

Once this happens, change follows. As he notes, crises do not have to be real. The perception of crisis is the controlling factor. Frequently, succession of leadership brings about such a feeling in a formal organization, motivating it to innovate. That is probably why it is usually in leadership succession periods that innovations are easiest to introduce.[96] Tully et al. found that knowledge of the causes of a problem played an important role in the decision to adopt remedial measures among farmers.[97]

Mansfield in his study of 294 industrial organizations found that the profitability of an innovation was positively correlated with the rate of its adoption.[98] "Fear of profit loss", Newman found, was a motivating factor in business organizations to seek and to adopt new ideas.[99] Mohr in his study of 93 public health agencies found that the public health officers' motivation to innovate was positively correlated with their innovative

behavior.[100] His measure of motivation to innovate is fundamentally an index of the degree to which a public health officer perceives progressive programs to be desirable to undertake by his department.

The above examples from other studies,[101] both on the level of individuals and organizations, should suffice to point to the importance of motivation in innovation, and the importance of a need perception in motivation. Perception of need is a function of the existence and the degree of fidelity of the system's internal network of communication. In fact one of the most effective means of bringing about organizational change is to provide the system with new receptors and channels to make novel types of information available to it. This is what Mann and his associates have accomplished by their technique of gathering internally generated information on the human side of the organization (morale) and feeding it back to the organization.[102] What is intriguing about this approach is the fact that the researcher-consultant does not interpret the findings beyond the minimum requirements of understandability. Nor does he suggest any corrective action. The organizational groups to whom the information is submitted (which Mann calls the "organizational family," made up of a supervisor and those employees who directly report to him) determine what the

new data means and what should be done. This method is especially effective when the organizational families have the discretion to interpret and to solve their own problems.[103]

Thus, information about the needs of the system is a very significant factor in change. It is also significant that when systemic barriers or filters are weakened or removed, the system becomes so over-responsive that it tends to drift or to lose its character. To be excessively responsive becomes especially dangerous when the system enjoys the power it requires to enforce its whimsical wishes. This is precisely what happens in "mass societies."[104]

b) Resources: There is a large body of literature on the relevance of an adopting unit's resources to its propensity to innovate. Gillin,[105] Lewis,[106] and Lionberger and Hassinger[107] have pointed out the inadequacy of resources as a major reason for the lack of innovativeness among communities they studied. Mohr found that the amount of resources available to a public health department was positively correlated with its degree of innovativeness.[108]

Sometimes the researchers have posed their question in terms of the risks involved in the adoption of a specific item. This concept of risks is partially a

function of the resources available to a system, partially a function of its motivation to innovate--i.e. the degree that the system "hurts"--and at the same time a measure of the flexibility of the resources.[109]

There are also a few reports of research findings pointing to the flexibility and reassignability of resources as factors affecting innovativeness. Copp found that the mental flexibility of farmers and their ability to cope with problem situations were two basic variables explaining their innovativeness.[110] Meltzer found that freedom was one of the most important factors in the productivity of scientists in organizations.[111] Centralization of decisions about organizational resources and the degree of formalization of the organizational relationships were found to be negatively correlated with an organization's rate of program change.[112] Both of these concepts imply a degree of rigidity and hence lack of reassignability of organizational resources. Guest and also Hage and Aiken found the number of levels of hierarchy to be negatively related to the speed of adoption of innovations by organizations.[113]

The amount of vested interests and the political powers involved in a specific pattern of organizational functioning is another index of the reassignability of resources, and the importance of this factor in innovation. Many studies of social change have pointed out a negative

relationship between the strength of vested interests in a certain way of doing things, and the ease with which it can be changed.[114]

There is a category of organizational traits which have been shown to be related to organizational innovativeness, but have complicated relationships with the basic variables of motivation and resources. These include growth rate, complexity of operations, degree of specialization, professionalism and rate of personnel turnover.

Markham found that up to a certain point, the curve of innovativeness of business organizations rises with size; after that point, it flattens, and then decreases.[115] Kaplan found that "communication between courts and people decreases as the scale of the society increases".[116] In other words, as the jurisdiction of the court is enlarged its communication with the people decreases. This, he argues, is due to the fact that with increasing size comes greater differentiation, which makes communication more difficult until the time when specialized communication systems develop.[117] Thus, while size is positively related to innovativeness--because of the likelihood of availability of more resources in larger systems--growth is either negatively related, or not related at all, to innovativeness [118] because new and necessary systems of communication (as well as other support systems) have not yet developed.

Degree of complexity of the organizational structure of its functioning should be expected to be negatively correlated with its rate of adoption because it involves establishment of many interrelated sub-routines and specialization of positions which run counter to flexibility. Yet it has been found to be positively correlated with organizational innovation.[119] The explanation is somewhat involved. As Jerald Hage argues, addition of new programs by an agency requires addition of new jobs and introduction of new professions. Professionals appointed to these positions usually have the tendency to expand the scope of their work even further. At the same time, their professional activities outside the system provide them with channels through which they receive information about new ideas and techniques. Furthermore, the greater the number of the professionals in an organization, the greater the struggle among them to prove the need for the expansion of their own specific field.[120] Thus, complexity may be regarded as a measure of the ensemble of the resources, and an indication of the sophistication of the communications network within an organization. In this respect, it resembles adult learning.[121] This type of learning, (as against infant learning), is faster, but more limited in the possible combinations of the elements which are used in the new patterns. This is similar to the differences between building with

pre-fabricated parts and building with bricks. That is why, while professionals do bring changes in organizations, the changes they introduce are usually not very profound.

However, rapid turnover in the membership of organizations seems to be a corrective factor. The rate of turnover was found to be positively related to the organization's innovativeness.[122] Such turnover functions as a change in the "pre-fabricated panels" with which the organization can build new structures, never being completely free to try all possible combinations in every facet of its re-structurings. Limitations of this nature are probably very functional because when the turnovers are too frequent, no new pattern will stand a chance to solidify due to lack of sustaining efforts to pursue and to support it. Lack of tenured authority, Tesdell found, was one of the paralyzing factors in economic development in Iraq and Jordan.[123]

FOOTNOTES

1. Derek J. Price, "The Exponential Curve of Science," The Sociology of Science, ed. Bernard Barber, and Walter Hirsch (Glencoe: Free Press, 1962), p. 518.

2. Ibid., p. 519. Price found that the number of composers, poets, and politicians doubled about once in a generation, while the population of scientists doubled at least thrice in a generation, multiplying, therefore, by a factor of eight. pp. 518-519.
For further discusion of this subject also see the following: Bernard Barber, "Sociology of Science; a Trend Report and Bibliography," Current Sociology, V (1956), 91-153; Hans Neisser, On the Sociology of Knowledge (New York: J.H. Heineman, 1965).

3. Wilbert E. Moore, Social Change (Englewood Cliffs: Prentice-Hall, 1963), pp. 71-72.

4. Karl W. Deutsch, "Social Mobilization and Political Development," American Political Science Review, LV (September, 1961), 493-514.

5. Amitai Etzioni, "Toward a Keynesian Theory of Social Process," Readings on Modern Organizations, ed. A. Etzioni (Englewood Cliffs: Prentice-Hall, 1969), pp. 190-191. Italics in the original.

6. Hans L. Zetterberg, Social Theory and Social Practice (New York: The Bedminister Press, 1962), p. 22.

7. Ibid.

8. Cited by Everett M. Rogers, Diffusion of Innovation (New York: Free Press, 1962), p. 54. He cites numerous examples of lack of communication even among the researchers of the more or less similar fields of diffusion research. The most interesting one of these examples is his account of how he, a rural sociologist, came ac an educational journal devoted to reviewing research across studies on the diffusion of new educational ideas in 1955. That, he suggests, was the first time that the two research traditions of education and rural sociology converged, after at least seventeen years of independent development in each field. (See p. 21.)

9. Hubert H. Humphery, Congressional Record, 87th Cong., 2d Sess., 1962, CVIII, Part 3, 3717.

10. This author recognizes the possible criticism that unless there are channels through which the findings of innovation studies are communicated to the decision centers, and unless these centers are indeed innovative, these studies, including the present one, will remain futile.

11. Alxis DeTocqueville wrote of the French Revolution:

> "The Revolution effected on a sudden and by a violent and convulsive effort, without any transition, without forethought, without mercy, that which would have happened little by little if left to itself. This was its work."

On the State of Society in France (London: John Murray, 1956), pp. 35-36.

12. For further discussion of active intervention into the social processes see, among others; Deutsch, Op. cit., especially pp. 505-506; Etzioni, Op.cit., pp. 192-193; and Amiati Etzioni, The Active Society (Glencoe: Free Press, 1968).

13. S.N. Eisenstadt, Modernization: Protest and Change (Englewood Cliffs: Prentice-Hall, 1966), p. 1. For further discussion of modernization see the following, from among a large collection of works: G.A. Almond, and J.S. Coleman (eds.), The Politics of the Developing Areas (Princeton: Princeton University Press, 1960); R. Emerson, From Empires to Nations (Cambridge: Harvard University Press, 1960) ; Harold D. Lasswell, The World Revolution of our Time (Stanford: Stanford University Press, 1951) ; Daniel Lerner, "Communication Systems and Social Systems: A Statistical Exploration in History and Politics," Behavioral Science, II (October, 1957), 266-275 ; Daniel Lerner, The Passing of Traditional Society (Glencoe: Free Press, 1958) ; D.A. Rustow, Politics and Westernization in the Near East (Princeton: Center for International Studies, Princeton University, 1959) , and Deutsch, Op. cit.

14. Eisenstadt, Op. cit., pp. 2-5.

15. Deutsch, Op. cit., p. 494. Deutsch also elaborates on Edward Shils' suggestion that social mobilization involves two stages: 1) the stage of uprooting, or the breaking away, and 2) the stage of induction, or recommitment to new modes. This separation, although analytical, may prove to be a very valuable conceptual tool for practical policy decisions regarding active mobilization of a society.

16. Eisenstadt, Op. cit. pp. 2-5. Industrialization, wrote Moore, indicates "extensive use of inannimate sources of power for economic production, and all that that entails by way of organization, transportation, communication, and so on." Op. cit., pp. 91-92

17. For further elaboration on these points see: Moore, Op. cit., pp. 93-97.

18. For further elaboration on the concept of innovation, and the definitions offered by other writers see: Lawrence B. Mohr, "Determinants of Innovation in Organizations," American Political Science Review, LXIII (March, 1969), pp. 111-126, especially p. 112. Mohr defines innovation as "the successful introduction into an applied situation of means or ends that are new to that situation." p. 112.

19. Deutsch, Op. cit., pp. 497-502. Also see: Simon Marcson, "Social Change and Social Structure in Transitional Societies," International Journal of Comparative Sociology I (September, 1960), pp. 248-253. For the role of the elite in the modernizing societies, see: David Apter, The Politics of Modernization (Chicago: The University of Chicago Press, 1965), especially pp. 164-166.

20. Deutsch, Op. cit., p. 502.

21. Rogers, Op. cit., pp. 22-52.

22. Elihu Katz, Martin L. Levin, and Herbert Hamilton, "Traditions of Research on the Diffusion of Innovation," American Sociological Review XXVIII (April, 1963), p. 240. Italics in the original.

23. Among others see: Katz et al., Op. cit., pp. 237-252 ; W.G. Bennis, K.D. Benne, and R. Chin (eds.), The Planning of Change: Readings in Applied Behavioral Sciences (New York: Holt, Rinehart and Winston, 1961) ; Rogers, Op. cit.; A.G. Barnett, Innovations (New York: McGraw-Hill, 1953) ; Ronald G. Havelock et al., Planning for Innovation through Dissemination and Utilization of Knowledge (Ann Arbor: Institute for Social Research, University of Michigan, 1969).

24. For an excellant and concise criticism of various definitions of innovation see: Mohr, Op. cit., pp. 112 ff., especially his citation of other definitions.

25. Mohr argues that the determinants of innovation and innovativeness are shown to be different from those of invention and of creativity. Op. cit., p. 112.

26. For example, consider Walker's definition of innovation: "A program or policy which is new to the states adopting it, no matter how old the program may be or how many other states may have adopted it...." Jack L. Walker, "The Diffusion of Innovation Among the American States," American Political Science Review, LXIII (September, 1969), p. 881. Or Mohr's definition cited above, or the very vague definition of innovativeness by Hage and Aiken, who approach the concept in terms of program change in social organization. Jerald Hage, and Michael Aiken, "Program Change and Organizational Properties: A Comparative Analysis," American Journal of Sociology, LXXII (March, 1967), pp. 503-504.

27. Mohr, Op. cit., p. 112.

28. Elihu Katz, "Notes on the Unit of Adoption in Diffusion Research," Sociological Inquiry, XXXII (1962), pp. 3-9. Katz uses his division of units of adoption as a very important vehicle in his discussion of the types of innovation; and the relationship between an innovation and the required or prescribed unit of adoption for it. Then he poses several interesting questions, some of which are the subjects of this study and will be taken up later.

29. As Katz has pointed out, (Ibid.) what may be an individual decision of adoption in one culture may well become a subject for group adoption in another, depending on the circumstances, norms, values and perceptions of the adopting units.

30. Etzioni, The Active Society, p. 98.

31. Bernard Bass defines a group as "a collection of individuals whose existence as a collection is rewarding to the individual." Leadership, Psychology and Organizational Behavior (New York: Harper and Brothers, 1960), p. 39. In essence, this definition has the same elements as Etzioni's, except that it spells out the nature of the normative bonds within the group in the most general terms. For further discussion of this topic see: E.W. Bakke, Bonds of Organization, An Appraisal of Corporate Human Relations (New York: Harper and Brothers, 1950), Chapter 1. He defines an organization as "a small society, that is, a group of individuals welded together into a functioning team by certain devices, or bonds of

organization." He enumerates five such bonds: functional specification, status system, communication system, reward and penalty system and organizational character.

32. See, for example, Bass, Op. cit., Chapter 5. Blau and Scott minimally define formal organizations as groups in which "collective effort is explicitly organized for specific ends." Peter M. Blau and Richard W. Scott, Formal Organizations: A Comparative Approach (San Francisco; Chandler Publishing Co., 1962), p. 223. This definition is more limited than the one elaborated here because it fails to include the informal structure and functions within administrative organizations. On this point, among many others, see Bakke, Op. cit., who points out the role of informal organizations, not only as a structural element, but also as a dynamic one. Individuals' behaviors, he argues, were found to be affected by both formal and informal structures, each of which was almost inseparable from the other. He concludes that due to this inseparability, management can usually only initiate change through formal structure, but the informal aspects of the organization take their own course from there on. If the adoption is indeed made, it is, in the last analysis, due to the informal structure of the organization. (p. 200) The classical Weberian enumeration of the characteristics of formal organizations are all, both indications of, and reinforcements for the formal relationships in bureaucracies. Consider these characteristics: division of labor, hierarchy, general rules and regulations governing relationships, impersonal detachment from the work, objective criteria for personnel policies, and full-time, life career of the members. Max Weber, The Theory of Social and Economic Organization, trans. A.M. Henerson and T. Parsons (New York: Free Press, 1947).

33. See: Etzioni, A Comparative Analysis of Complex Organizations (Glencoe: Free Press, 1961), and also, Etzioni, The Active Society, p. 96.

34. Blau and Scott, Op. cit., p. 224. They distinguish between four types: mutual benefit associations, business organizations, service organizations, and commonweal organizations. This typology, although useful for their own use, has limited value for overall theoretical considerations.

35. Daniel Katz and Robert L. Kahn, The Social Psychology of Organizations (New York: John Wiley, 1966), pp. 110-148. Also note their typology based on second-order functions.

36. Ibid., p. 17. Italics in the original.

37. Ibid., p. 69.

38. Ibid., p. 19.

39. Entropy is a universal law of nature. It denotes that all forms of organization move toward disorganization and random arrangement or death. See: Katz and Kahn, Op. cit., pp. 21-22.

40. Ibid., pp. 19-26.

41. Karl W. Deutsch, Nerves of Government (New York: Free Press, 1963), p. 84.

42. Character is the "more or less stable inner program of a system." Ibid., p. 111.

43. Ibid., pp. 185 ff.

44. Blau and Scott, Op. cit., p. 231.

45. Bertalanffy, quoted by Katz and Kahn, Op. cit., p. 25. This process has traditionally been referred to as institutionalization--which, of course, has a broader connotation at times. See Eisenstadt, Op. cit., and also S.N. Eisenstadt, The Political System of Empires (New York: The Free Press, 1963).

46. Tom Burns and G.M. Stalker, The Management of Innovation (London: Tavistack Publications, 1961), pp. 79 ff.

47. Katz and Kahn, Op. cit., pp. 37-39.

48. Ibid., pp. 33 ff.

49. Loc. cit.

50. Ibid., pp. 35-37.

51. An example of such receptors is the organizational sub-units specifically charged with "paying attention" to specific targets, as the country desks do in the U.S. Department of State. Etzioni, The Active Society, p. 225.

52. Etzioni, Readings on Modern Organizations, p. 192.

53. For a discussion of consciousness, will, and autonomy in cybernetic terms see: Deutsch, Nationalism and Social Communication (Cambridge: MIT Press, 1966), pp. 165-186 ; also Etzioni, The Active Society, pp. 115-116.

54. Deutsch has enumerated also third and fourth order purposes which do not seem to be especially useful, at least not for the present study. See Nerves of Government, pp. 92-93.

55. Katz and Kahn, Op. cit., pp. 136ff. It was pointed out before that human variations within a social collectivity must be reduced to acceptable levels, so that the system can survive. The first two of the above functions are aimed at this end and are achieved by the use of a wide range of methods, from appeasement to compromise to punishment. However, none of these methods, or combinations thereof, is sufficient to eliminate conflicts of interests, values or outlooks on the part of members--individuals or groups. These, as well as what Blau and Scott call "dilemmas" of organizations (Op. cit., pp. 242-250), are parts of the nature of social collectivities, and have been regarded by many scholars as the raison d'etre of the political sub-systems. On these points, see: Eisenstadt, Essays on Comparative Institutions (New York: John Wiley and Sons, 1965), pp. 40-44. He gives a good summary of the internal forces in institutions which lead to change. Besides lack of homogeneity in membership, changes over time in members' goals and values, and the forces of environment, he also points out the possibility of creation of anti-systems during the process of institutionalization.

On the roles of political sub-systems, see: David Easton, "The Analysis of Political Systems," Comparative Politics, eds. R.C. Macredes and B.E. Brown (Homewood: Dorsey Press, 1968), pp. 81-94.

56. Etzioni, The Active Society, pp. 135-136.

57. Katz and Kahn, Op. cit., p. 15. Analytical similarities between individual and group or organizational properties have caused many confusions. Analogies made between the individual traits associated with, say, openness to change--such as cosmopoliteness--and the organizational counterpart of such traits have misled many scholars to believe that such individual traits of members can explain organizational innovation. In other words, an organization made up of cosmopolitan individuals is not necessarily an innovative organization. This point is well illustrated by Hage and Aiken who found personal motives and positive attitude of members toward change

to be very slightly, and negatively correlated with the rate of organizational change. Op. cit., p. 514.

58. Katz and Kahn, Op. cit., p. 391.

59. Etzioni, The Active Society, pp. 47-48. Also see: Paul Lazarsfeld and Herbert Menzel, "On the Relation between Individual and Collective Properties," Complex Organizations: A Sociological Reader, ed. Etzioni (New York: Holt, Rinehart and Winston, 1964), pp. 422-440. They distinguish between three types of properties: analytical, which are those "obtained by performing some mathematical operations upon some property of each single member", (p. 427) such as the average rent paid in a precinct, structural properties, based on data about the relationship between members, obtained by "performing some operation on data about the relations of each member to some or all of the others", (p. 428) like sociometric data, and global properties which are not based on information about the properties of individual members, for example, cultural norms.

60. For an elaboration on his "non-reductionist position" in sociological analysis, see Etzioni, The Active Society, p. 51.

61. Hage and Aiken, Op. cit., pp. 505-507, and 518-519.

62. Quoted by Hage and Aiken, Ibid., p. 519. Also see Robert K. Merton, Social Theory and Social Practice (New York: Free Press, 1949), pp. 93-94, for an enumeration of the characteristics of rigorous sociological theory. Among these he mentions the sociological nature of such theories.

63. Katz and Kahn, Op. cit., p. 391. For a contrary viewpoint see: Fred I. Greenstein, Personality and Politics (Chicago: Markham Publishing Co., 1969).

64. Blau and Scott, Op. cit., pp. 250-251.

65. Neil J. Smelser, Social Change in the Industrial Revolution (Chicago: The University of Chicago Press, 1959), p. 402.

66. Rogers, Op. cit., p. 7. Also see his citations on the same page.

67. Deutsch, Nerves of Government, pp. 91-92.

68. Blau and Scott, Op. cit., p. 240. Aso see the notes on the same page. Blau, in another work, wrote: "the widely held belief that members of bureaucratic organizations necessarily resist change rests on the assumption that bureaucratic structures are characterized by a perfect state of equilibrium, which makes any alteration a disturbance." The Dynamics of Bureaucracy (Chicago: The University of Chicago Press, 1963), p. 241. This assumption is very misleading, and dangerous for action oriented research in organizational theory.

69. Moore, Op. cit., pp. 70 ff. Also see Katz and Kahn, Op. cit., pp. 446-448.

70. Blau and Scott, Op. cit., pp. 251-253. Also see Smelser, Op. cit.

71. Katz and Kahn, Op. cit., pp. 446-448.

72. Blau and Scott, Op. cit., p. 222, and 242-250.

73. Moore, Op. cit., pp. 70-88.

74. Katz and Kahn, Op. cit., pp. 446-448. Also see the following for a general discussion of organizational disturbances and drives: Edgar H. Schein and Warren G. Bennis, Personal and Organizational Change through Group Methods (New York: John Wiley and Sons, 1965) ; Ronald Lippit, J. Watson, and B. Westley, The Dynamics of Planned Change (New York: Hartcourt, Brace and Co., 1958) and Mathew B. Miles, "Educational Innovation: The Nature of the Problem," Innovation in Education, ed. M.B. Miles (New York: Columbia Teachers College, 1964), pp. 1-46.

75. Hage and Aiken, Op. cit., pp. 503-519.

76. Walker, Op. cit., pp. 880-899.

77. Etzioni, The Active Society.

78. David C. McClelland, The Achieving Society (New York: D. Van Nostrand Co., 1961), pp. 192-196.

79. The reader is reminded that open systems do not usually react in exact quality or quantity. Aproximation is understood when proper quality or quantity of response is being discussed.

80. Deutsch calls this sequence, up to transmission of new patterns to production units, thought process. Nerves of Government, pp. 85-86.

81. The reader is reminded that production sub-units do not necessarily produce material output. The output of the maintenance sub-systems are education and socialization of the recruits, which are by no means measurable in physical terms.

82. Also see Etzioni, The Active Society, pp. 517-518.

83. Baker studying seventy-two employees of a scientific laboratory, found that their perception of organizational objectives and needs tended to stimulate ideas perceived to be relevant to those needs and objectives and influenced the communication of such ideas to their supervisors. Norman R. Baker, "The Influence of Several Organizational Factors on the Idea Generation and Submission Behavior of Industrial Researchers and Technicians," (unpublished Ph.D. dissertation, Northwestern University, 1965). Pound studying a research and development laboratory, found a positive relationship between perceived idea relevance and disposition decision (acceptance, rejection, or no action) regarding these ideas. W.H. Pound, "Communication, Evaluation and the Flow of Ideas in an Industrial Research and Development Laboratory," (unpublished Ph.D. dissertation, Northwestern University, 1966). These two studies are examples of how a certain set of ideas and values act as a filter through which ideas are sifted, and only those perceived relevant are acted upon.

84. "Will may be called the set of internally labelled decisions and anticipated results, proposed by application of data from the system's past and by the blocking of incompatible impulses or data from the system's present or future." Deutsch, Nerves of Government, p. 105.

85. Also see Etzioni, The Active Society, pp. 517-518.

86. See Walker, Op. cit. Another example is what economists refer to as conspicuous consumption, by individuals as well as nations. Note, for example, the number of "national airlines" among developing countries which are economically disastrous ventures. This is probably a value judgment, however; relevance of an innovation is judged on objective criteria of direct solutions to problems at hand, and nothing else.

87. Havelock et al., Op. cit., pp. 6-7 to 6-10. The remaining three factors are: economic conditions of

the organization, training, and size, which we shall discuss in later pages.

88. Deutsch, Nerves of Government, p. 96.

89. Ibid.

90. Fred Cottrell, Energy and Society (New York: McGraw-Hill, 1955), p. 2.

91. Eisenstadt, The Political Systems of Empires, p. 27, and also pp. 33 ff.

92. Havelock et al., Op. cit., pp. 6-9 to 6-10.

93. Hage and Aiken, Op. cit., pp. 516-517.

94. Burns and Stalker, Op. cit.

95. Donald A. Schon, Technology and Change (New York: Delacorte Press, 1967), p. 127.

96. A. Etzioni, Modern Organizations (Englewood Cliffs: Prentice-Hall, 1964), p. 56.

97. Joan Tully et al., "Factors in Decision-making in Farming Problems," Human Relations, XVII (1964), pp. 295-320.

98. Edwin Mansfield, "Intrafirm Rates of Diffusion of Innovation," Review of Economics and Statistics, XLV (1963), pp. 348-359.

99. Joseph W. Newman, "Working with Behavioral Scientists," Harvard Business Review, XXXVIII (July-August, 1958), pp. 64-74.

100. Mohr, Op. cit., pp. 114 ff.

101. Consult also: John Gillin, "Parallel Cultures and the Inhibitors to Acculturation in a Guatemalan Community," Social Forces, XXIV (October, 1945), pp. 1-14 ; Loren Tesdell, "Planning for Technical Assistance: Iraq and Jordan," Middle East Journal, XV (Autumn, 1961), pp. 389-402 ; Inayatullah, "Communication and Innovation in a Pakistani Village," (unpublished paper, Hawaii East-West Center, International Development Institute, 1964) ; Barney G. Glaser, "Differential Association and the Institutional Motivation of Scientists," Administrative Science Quarterly, X (1965), pp. 82-97 ; Irving Kaplan, "Courts as Catalysts of Change: A Chaga Case,"

Southwestern Journal of Anthropology, XXI (Spring, 1965), pp. 79-96 ; Baker, Op. cit. ; and Pound, Op. cit.

102. See: Floyd C. Mann, "Studying and Creating Change: a Means to Understanding Social Organizations," Research in Industrial Human Relations, Industrial Relations Research Association, No. 17, 1957, pp. 146-167 ; and F.C. Mann and H.J. Baumgartle, Absences and Employee Attitude in an Electric Power Company (Ann Arbor: Institute for Social Research, 1952).

103. Katz and Kahn, Op. cit., p. 420.

104. William Kornhauser, The Politics of Mass Society (Glencoe: Free Press, 1959), p. 228. Mass society is defined by Kornhauser as an abstract type in which "both elite (control centers) and the non-elite are directly accessible to one another by virtue of the weakness of groups capable of mediating between them." (p. 228) The result is mass politics which denotes large numbers of people engaging in political activity "outside of the procedures and rules" instituted by the society for such actions. (p. 227) These procedures are in fact filters which do not only label incoming demands, they arrange them in terms of priority and feasibility via more or less long-range policy decisions. To remove these criteria which distinguish the needs of a people from their caprices, is to deprive the control-action centers from one of their basic tools of decision-making. The system thus, starts to drift.

By the same token, there is also the danger of some part of the leadership strata--one of whose functions is the reception and interpretation of raw data on the the state of affairs in the society--to use the masses for its own narrow ends, by feeding them seemingly correct observations on their needs, and on the remedies for such needs, accompanied with large doses of half-truths. Thus, the aggregation and definition of problems by the elite is being abused by a demagogue very effectively, by virtue of his direct access to the masses, circumventing the checks and balances of the ordinary communications system of a pluralistic society.

105. John Gillin, Op. cit.

106. Oscar Lewis, "Medicine and Politics in a Mexican Village," Health, Culture and Community, ed. Benjamin D. Paul (New York: Russell Sage Foundation, 1955), pp. 403-433.

107. Herbert F. Lionberger and Edward Hassinger,

Roads to Knowledge (Columbia: Missouri Agricultural Experiment Station, Bulletin 633, 1954).

108. Mohr, Op. cit., pp. 119 ff. Also see: Charles R. Hoffer and D.L. Gibson, The Community Situation as it Affects Agricultural Extension Work (East Lansing: Michigan Agricultural Experiment Station, Special Bulletin 312, 1941) ; Leo Meltzer, "Scientific Productivity in Organizational Settings," Journal of Social Issues, XII (1956), pp. 32-40 ; Ethel M. Albert, "Socio-political Organization and Receptivity to Change: Some Differences between Ruanda and Burandi," Southwest Journal of Anthropology, XVI (Spring, 1960), pp. 46-74 ; Mary H. Lystad, "Institutional Planning for Social Change," Sociology and Social Research, XLIV (January-February, 1960), pp. 165-171 ; and Kaplan, Op. cit.

109. U.S. Department of Commerce, President's Conference on Technical-Distribution Research for the Benefit of Small Business, Washington, D.C. September 23-25, 1957, Office of Technical Services, (Washington, D.C., 1957); W. Paul Strassman, "The Risks of Innovation in 20th Century Manufacturing Methods," Technology and Culture, V (Spring, 1964), pp. 215-223 ; and Edwin Mansfield, "The Speed of Response of Firms to New Technology," Quarterly Journal of Economics, LXXVII (May, 1963), pp. 290-311.

110. James H. Copp, "Toward Generalizations in Farm Practice Research," Rural Sociology, XXIII (June, 1958), pp. 110-111.

111. Meltzer, Op. cit.

112. Hage and Aiken, Op. cit., pp. 511-512.

113. Robert Guest, Organizational Change: The Effects of Successful Leadership (Homewood: The Dorsey Press, 1962), Chapter 7 ; and Hage and Aiken, Op. cit., p. 517. Also see: Edwin Mansfield, "Technical Change and the Rate of Imitation," Econometrics, XXIX (October, 1961), pp. 741-766. Mansfield points out that those innovations which did not require the replacement of durable equipment were more readily adopted than those which did.

114. See, for example, Lewis, Op. cit. ; Marcson, Op. cit. ; Lystad, Op. cit. ; K.A. Bosworth, "The Politics of Management Improvement in States," American Political Science Review, XLVII (1953), pp. 84-99 ; and J.A. Perkins, "Reflections on State Reorganizations," American Political

Science Review, XLV (1951), pp. 507-516.

115. J.W. Markham, "Market Structure, Business Conduct, and Innovation," American Economic Review: Papers and Proceedings, LV (May, 1965), p. 329.

116. Kaplan, Op. cit., p. 93.

117. Ibid., p. 94.

118. Mansfield, "The Speed of Response of Firms to New Techniques," p. 310.

119. Hage and Aiken, Op. cit., p. 509.

120. Jerald Hage, "An Axiomatic Theory of Organizations," Administrative Science Quarterly, X (December, 1965), pp. 289-321. Also see: Emil Durkheim, The Division of Labor in Society (New York: McMillan Co., 1963), pp. 267-270.

121. Deutsch, Nerves of Government, pp. 166-167 and 170-171.

122. See: Walker, Op. cit., pp. 885-887. Also see: Theodore Lowi, "Toward Functionalism in Political Science: The Case of Innovation in Party Systems," American Political Science Review, LVll (1963), pp. 570-583 ; Daniel E. Griffiths, "Administrative Theory and Change in Organizations," in Miles (ed.), Op. cit. ; Richard O. Carlson, Adoption of Educational Innovations (Eugene: University of Oregon Press, 1965) ; and Alfred J. Marrow, David G. Bowers, and Stanly E. Seashore, Management by Participation: Creating Climate for Personal and Organizational Development (New York: Harper and Row, 1967).

123. Tesdell, Op. cit. Also see Katz et al. Op. cit., p. 242, especially note 26.

CHAPTER II

METHODOLOGY

In this chapter we shall describe and explain the basic elements in the methodology followed in the verification of the hypotheses which were set forth in the first chapter. To do so, we will deal with units of adoption, indices of innovativeness, indices of resources, indices of motivation, and the relationship between the latter two indices, in that order.

A. UNITS OF ADOPTION

The adopting units in this study are nation-states. We chose, at first, twenty-six countries as units of adoption on the basis of the following criteria:

1) They were all developing nations, as generally defined in terms of economic, social and political institutional standards of development. Although they were at different levels of development, none of them was considered to be a fully developed country in comparison with the Western European, or North American nation-states.

2) They all shared the same objective problems for which the innovations used in this study are

possible and recognized solutions. These problems were five areas of public health concern: malaria, mother and child care, smallpox, tuberculosis, and venereal diseases. We shall discuss these in the next part of this chapter.

On the basis of the above criteria these countries were chosen: Argentina, Brazil, Cameroun, Chad, Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, Egypt (UAR), El Salvador, Ethiopia, Guatemala, Honduras, Iraq, Lebanon, Madagascar, Mexico, Nicaragua, Pakistan, Panama, Paraguay, Peru, Senegal, Tunisia, and Uruguay. It can be seen that these countries are not confined to any continent or region.

B. INDICES OF INNOVATIVENESS

The innovativeness of the above countries was measured in terms of how fast they adopted, as national policy, the recommendations of the World Health Organization on the above-mentioned five areas of public health. These recommendations were expressed in the form of World Health Assembly Resolutions, in which the member-states were urged to take "preventive, curative, legislative, social and other measures necessary"[1] to deal with the field of health. Table 2.1 shows the date and the number of each of these resolutions.

TABLE 2.1

WORLD HEALTH ASSEMBLY RESOLUTIONS
USED IN THIS STUDY

Subject	Date	No.
Malaria	July, 1948	WHA 1.9
Mother and Child Care	July, 1948	WHA 1.42
Smallpox	May, 1954	WHA 7.5
Tuberculosis	July, 1948	WHA 1.19
Venereal Diseases	July, 1948	WHA 1.21

Source: World Health Organization, Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board (Nineth edition, 1948-1967) (Geneva, 1967).

In all of these resolutions action to correct a service or to control a disease was urged. Thus, the date against which the speed of a government's adoption was measured was the date of the resolution. Several points must be stated here to clarify the nature and meaning of the indices of innovativeness thus developed and used in this study.

1) The degree of effectiveness of a program was not measured; its adoption, either in the form of a law or an executive decree, was used as the criteria.[2]

2) Where there had already been existing legislation and regulations, modifications of these

rules were used as measures of adoption. However, due to the very complexity of the subject, no basic model of legislation was followed.[3]

3) In the case of malaria, it was found that in many countries legislation for the control of this disease already existed, and that new legislation was usually in the form of laws proclaiming a national policy to eradicate it. Thus, two measures were developed: one for the adoption of malaria control legislation, and one for the adoption of malaria eradication policy. Many countries were scored on both.

4) In the case of tuberculosis, only laws pertaining to pulmonary tuberculosis were used to avoid confusion, and to ensure comparability.

5) Mass B.C.G. campaigns carried out in Syria, Israel, Egypt and Lebanon by joint agreement among the national health ministries of these countries, the Danish Red Cross, UNICEF, WHO, Swedish Red Cross, and the Norwegian Relief for Europe during the 1948-1951 period, and the other comparable experiments undertaken in Iraq, Turkey, Egypt, Jordan, and Iran in the 1951-53 period were not considered as measures of adoption due to the very temporary, low and experimental levels of these undertakings.[4]

6) In many cases, legislation pertaining to several of these areas promulgated in one body of

law was used as the measure of adoption of all these policies.[5]

7) In the case of venereal diseases, legislation referring to two diseases was used as the basic criterion of adoption. These two were syphilis and gonorrhea. It was found that most of the legislation on venereal diseases was also included in legislation on other infectious diseases.[6]

8) All of these areas of public health are shared concerns of all the countries studied here. Data on the mortality and morbidity rates related to each aspect, although not complete, do not show any large variations among these units of adoption.[7] The data mostly refer to the 1948-54 period, which enable us to compare these countries during the period immediately following the passage of the above-mentioned resolutions by the World Health Assembly.

Six indices of innovativeness were developed based on rank ordering of adoption of public health policies in the fields of malaria control, malaria eradication, mother and child care, smallpox, tuberculosis, and venereal diseases. Due to unavailability of data, not every country chosen for this study could receive a rank on every one of these indices. A composite rank order was developed for each country by averaging its

score on the separate policy areas. Nine countries were dropped from the computation of this composite index because of lack of data. The remaining seventeen were those which had rankings on at least three of the six. Thus a composite index of innovativeness (I) was developed for the following countries: Argentina, Brazil, Cameroun, Chad, Costa Rica, Dominican Republic, Egypt (UAR), Ethiopia, Guatemala, Honduras, Iraq, Lebanon, Mexico, Paraguay, Peru, Senegal, and Uruguay. Table 2.2 reports the ranking of countries on this composite index of innovativeness.[8]

TABLE 2.2

RANK ORDER OF COUNTRIES UNDER STUDY ON THE COMPOSITE INDEX OF INNOVATIVENESS

Country	Rank
Argentina	4
Brazil	12
Cameroun	16
Chad	15
Costa Rica	5
Dominican Republic	6
Egypt	11
Ethiopia	9
Guatemala	7.5*
Honduras	7.5*
Iraq	17
Lebanon	3
Mexico	1.5*
Paraguay	1.5*
Peru	13
Senegal	14
Uruguay	10

* Tied ranks are computed by giving the arithmetic mean of the rank scores that would have been received by countries had there been no ties.

C. INDICES OF RESOURCES

Two sets of indices were developed in this section: indices of size, and indices of resources. The distinction between the two is essential and significant. Size of a country is measured in terms of area, total population, and gross national product. Resources are measured in terms of population density and gross national product per capita.[9]

Two composite indices were also developed: a composite index of size (S) and a composite index of resources (R), both of which were composite rank orderings of the countries under study on each of the subindices within the composite index. Table 2.3 reports the rankings on these two composite indices.

Other possible measures--such as governmental expenditures on public health as a percentage of national income, or governmental expenditure as percentage of gross national product, etc.--were not used for two basic reasons: first, no logical connection between similar measures and innovativeness had been demonstrated in previous studies.[10] Second, data was not available on all these variables, and what little was available was either unreliable, or not comparable from country to country. This is an example of the validity of

TABLE 2.3

RANK ORDERS ON COMPOSITE INDICES OF SIZE (S) AND OF RESOURCES (R)

Country	Rank on S	Rank on R
Argentina . . .	2.5	8
Brazil . . .	1	10
Cameroun . . .	17	15
Chad . . .	9	17
Costa Rica . . .	10	2
Dominican Republic	13	3
Egypt . . .	4	9
Ethiopia . . .	6	13
Guatemala . . .	11	6
Honduras . . .	14.5	7
Iraq . . .	7.5	12
Lebanon . . .	16	1
Mexico . . .	2.5	5
Paraguay . . .	14.5	16
Peru . . .	5	14
Senegal . . .	12	11
Uruguay . . .	7.5	4

Source: Bruce M. Russett, et al., World Handbook of Political and Social Indicators (New York: Yale University Press, 1964), pp. 18-20, 139-141, 142-144, 152-154, and 155-157.

Karl Deutsch's contention that "at this stage in the compilation of evidence the choice of indicators and definitions must be considerably influenced by the availability of statistical data."[11]

However, a set of indices of resources particularly relevant to health services was developed. This composite index of health resources (HR) is made of three sub-indices of rank orders on the ratio of

graduate nurses per 10,000 population, ratio of physicians per 10,000 population, and the ratio of hospital beds per 1,000 population. It was reasoned that these measures were not only readily available indicators of health resources of a country, but they were also widely used by health professionals as meaningful indices of the stage of development of a country's health services. Table 2.4 presents the ranking on this index.

TABLE 2.4

RANK ORDER ON THE COMPOSITE INDEX OF HEALTH RESOURCES(HR)

Country	Rank on HR
Argentina	1
Brazil	6
Cameroun	10
Chad	14
Costa Rica	3
Dominican Republic	5
Egypt	13
Ethiopia	-*
Guatemala	7.5
Honduras	12
Iraq	11
Lebanon	-*
Mexico	9
Paraguay	7.5
Peru	4
Senegal	-*
Uruguay	2

* Data not available.

Source: World Health Organization, Third Report on the World Health Situation--1961-1964 (Official Records of WHO, No. 155) (Geneva, 1967), pp. 71, 74, 295, 311, and 312 ; and Pan American Health Organization, Health Conditions in the Americas: 1961-1964 (Scientific publication No. 138) (Washington, D.C., 1967), pp. 112, 121, and 125.

To measure the degree of flexibility of the resources indices were used which were regarded to be indicators of a system's general style and disposition toward change. These indices, which are mostly covered under the topic of political indices are explained more fully in Chapter III, section E.

D. INDICES OF MOTIVATION

Motivation to innovate is probably the most difficult concept to operationalize. As was stated in Chapter I, motivation to innovate denotes perception of a drive by a system and a degree of awareness of some means to satisfy that drive. Two basic devices are used simultaneously for operationalization of this concept.

First, objective determination of the existence of need in a country and the existence in human knowledge and practice of a remedy for that need. In the first part of this chapter we indicated that these countries all have drives related to the five areas of public health under study. We also pointed out that the drives in all of these countries were objectively similar in strength. In other words, the objective needs were more or less equal. Need, then, is roughly a constant in this study. We indicated that the innovations used in this study are in fact remedies for these drives. Thus,

we can turn to the second aspect of motivation.

The second device is the measurement and comparison of the channels of communication which make the central decision-making system of each country aware of the drive and aware of the solutions—that is, internal channels of upward communication, and channels which make a system aware of the outside world and the achievements of other peoples.

Thus, a research hypothesis in regard to motivation to innovate should be stated as follows: <u>When the existence of a need and of a remedy for that need are objectively established, a country's degree of innovativeness is positively correlated with the extent of its communications network</u>. Therefore, this is the hypothesis that we shall try to verify as a means of verifying our original hypothesis on the correlation between innovativeness and motivation to innovate. Keeping in mind the theoretical considerations stated in Chapter I, and earlier in the present chapter, verification of the above research hypothesis is more than a clue to the validity of the general, theoretical hypothesis stated in Chapter I. It supports or rejects the main theoretical framework (i.e., the cybernetic model) within which these generalizations were drawn.

A composite index of communications media (CM)

was developed, made of rank order indices of: number of radio sets per 1,000 population, number of television sets per 1,000 population, and the daily newspaper circulation per 1,000 population. Another set of indicators was used to measure communication with the outside world. This index, which was called a measure of cosmopoliteness, is made of the rank orders on the number of radio sets per 1,000 population, and the rate of cinema attendance per capita per year.[12]

Also relevant to communication media were measures of urbanization, and of industrialization. Both of these indices are related to communication, because they facilitate it, either through bringing of people together in large cities, thus making them closer to the centers of governmental decision-making, or through the growth in resources and technology that help a country develop better means of communication.

Urbanization (U) was measured by the rank ordering of the units of adoption in terms of the percentage of the population living in cities of 20,000 or more inhabitants. Industrialization (In) is a composite index of rank orders on the level of employment in industry as a percentage of working age population, and reverse rank order of the percentage of labor force employed in agriculture. Table 2.5 reports rank orders on communications media, urbanization and industrialization.

TABLE 2.5

RANK ORDERS ON COMMUNICATIONS MEDIA (CM), URBANIZATION (U), AND INDUSTRIALIZATION (In)

Country	Rank on CM	Rank on U	Rank on In
Argentina	1.5	1	1
Brazil	6	3	9
Cameroun	17	14	-*
Chad	16	16	13
Costa Rica	5	7	5
Dominican Republic	11	12	8
Egypt	10	2	10
Ethiopia	15	15	-*
Guatemala	8.5	11	11
Honduras	8.5	10	12
Iraq	13	5	14
Lebanon	7	6	3
Mexico	3	4	7
Paraguay	12	8	4
Peru	4	9	6
Senegal	14	13	-*
Uruguay	1.5	-*	2

Source: Russett, et al., Op. cit., on CM: pp. 108-110, 118-122, and 126-127 ; on U: pp. 51-53 ; and on In.: pp. 178-179, and 185-186.

* Data not available.

FOOTNOTES

1. From Resolution No. 7.5 of the World Health Assembly, May, 1954. World Health Organization, Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board (Geneva, ninth edition, 1948-1967, December, 1967), p. 37.

2. Walker used a similar definition of adoption of an innovation in his study of innovativeness among the American states. Op. cit., p. 882.

3. See: "Malaria, a Survey of Existing Legislation," International Digest of Health Legislation, World Health Organization, Vol. 7, No.4, pp. 537-565. "The diversity of local factors, such as the stage of development of the health services of the country, and the ecology of the malaria vectors, make it impossible to draft...a model law." p. 539.

4. For details on these two campaigns see: World Health Organization, Mass Vaccination Campaign, 1948-51, (Tuberculosis Section, The International Tuberculosis Campaign, Copenhagen, 1954) ; and World Health Organization, Bulletin, Vol. 12 (1955), No. 1 and 2, pp. 30 ff.

5. See for example, "Tuberculosis: A Survey of Recent Legislation," International Digest of Health Legislation, Vol. 3 (1951-52), pp. 419-434, especially p. 420.

6. This is a relatively new trend, which indicates the separation of social and moral implications of venereal diseases from their medical aspects. On these points see: W.G. Smillie, Preventive Medicine and Public Health (New York: McMillan, 1952), p. 276 ; and International Digest of Health Legislation, Vol. 7 (1956), pp. 157-198.

7. See: J.B. McDougall, "Tuberculosis Mortality; 1937-1949," Epidemiological and Vital Statistics Report, World Health Organization, (Geneva), Vol. 3 (1950), pp. 240-250 ; "A Study of Smallpox Endemicity in the World during 1936-1950," in Ibid. Vol. 6 (1953), pp. 227-243 ; Pan American Health Organization, Health Conditions in the Americas: 1961-64, pp. 61, 62-72, and 77 ; Russett, et al., Op. cit., pp. 36-37, and 200-201 ;

Epidemiological and Vital Statistics Report, Vol. 3 (1950), pp. 21, 102-107, 117-120, 251, 264-270; Vol. 4 (1951), pp. 16-20, 176-179, 180-181, 304-305, 349, 421-429 ; Vol. 5 (1952), pp. 167-171, 257-262, 304, 596-604; Vol. 6 (1953) pp. 43-51, 119-127, 249-256 ; Vol. 7 (1954), pp. 1-5, 167-175, 231-240, 335-339, 379, 412-413 ; Vol. 8 (1955), pp. 57, 61, 67-70, 311-312, and 422-430.

8. See the following sources for the material used in this table: (arranged by country)

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9. Other authors have used similar indices of size and resources in their studies. For example, see the following:Seymour M. Lipset, "Some Social Requisites of Democracy," American Political Science Review, LIII (1959), pp. 69-105 ; Mohr, Op. cit.; Walker, Op. cit.; Donald J. McCrone and Charles F. Cnudde, "Toward a Communication Theory of Democratic Political Development: A Causal Model," American Political Science Review, LXI (1967), pp. 72-79, especially p. 73 ; Carlson, Op. cit., pp. 63 ff ; Ira Sharkansky, "Governmental Expenditure and Public Services in the American States," American Political Science Review, LXI (1967), pp. 1066-1077 ; McClelland, Op. cit., pp. 82 ff. ; and Hage and Aiken, Op. cit., especially pp. 514-516.

10. See, for instance, Mohr, Op. cit., and Carlson, Op. cit., p. 63 on the lack of strong and meaningful relationship between the expenditure per unit and rate of adoption in public health departments and in school systems.

11. Deutsch, "Social Mobilization and Political Development," especially p. 495.

12. For a review of other authors' measures of communications media see: Hage and Aiken, Op. cit.; Lerner, The Passing of Traditional Society ; Lipset, Op. cit.; and McCrone and Cnudde, Op. cit.

CHAPTER III

PRESENTATION OF DATA AND ANALYSIS

A. SIZE AND INNOVATION

Scholars have found varying degrees of association between the size of an adopting unit and its innovativeness. A few examples: Copp found that the size of a farm operation was a factor in its adoption of new techniques.[1] Robert Guest and also Edwin Mansfield concluded from their independent studies that the size of an industrial organization was associated with its innovativeness.[2] Many other students of innovation have reported similar findings, including Eisenstadt, Hage and Aiken, Mytinger, and Walker.[3]

In this study, and within the theoretical framework established in Chapter I, however, size and innovativeness of a country are not expected to be correlated. Unless resources and/or motivation to innovate are involved in the measurement of size, there is no logical connection between size and innovativeness. As Mohr has observed, "neither community size, farm size, size of health department, nor size of firm

should be accepted hastily as an accurate predictor of innovation."[4] His study in this respect is a very good example of a rigorous examination of concepts and findings within a sound theoretical framework, because, although size of community was shown to be correlated with the innovativeness of the public health department under study, lack of logical necessity for such correlation led him to examine his data further for other clues. He concluded that "community size was important for innovation in this study because it connoted a summary of factors that included motivation, obstacles, and resources in a highly conducive combination."[5]

Since most of the concepts used in the social sciences are not yet precisely defined and unanimously accepted by all scholars in the field, usage of the same term does not necessarily mean usage of the same concept. Even when concepts are the same, operational definitions of them may (and do) vary from researcher to researcher. Hopefully, as time passes, these concepts will be refined, and somewhat standardized. Most previous studies have measured the size of a farm in terms of the dollar value of its revenue. Organizations have been measured in terms of either the number of people employed in them or the dollar value of their revenues or expenditures.[6] All of these operational definitions have a degree of implicit

alliance with resources.

As stated in Chapter II, there are three measures of size used in this study, and a composite index of size (S). Table 3.1 summarizes the correlations between size and innovativeness.

TABLE 3.1

RANK CORRELATIONS OF MEASURES OF SIZE AND INNOVATIVENESS

Areas of Innovation	Area	Pop.	GNP	S
Malaria Control	-0.167	-0.259	-0.188	
Malaria Eradication	-0.346	-0.419	-0.292	
Mother and Child Care	0.234	0.350	0.429	
Smallpox	0.029	0.029	0.165	
Tuberculosis	-0.190	-0.022	-0.161	
Venereal Diseases	-0.021	-0.280	-0.461	
Composite I	-0.241	-0.267	-0.167	-0.009*

* N= 17

With the three exceptions of malaria eradication versus population; mother and child care versus gross national product; and venereal diseses versus gross national product, the correlations are very weak. Of those three exceptions, two are negative and none at a stronger level of significance than 0.15. That is, there would be about fifteen percent chance of attaining a correlation this strong by simple random ranking rather than ranking by size. The correlation of the composite indices

of size and innovativeness is very close to zero.

Size, therefore, as operationally defined here, has essentially no association with innovativeness. As is shown in Table 3.2, it is also essentially independent of motivation and resources.

TABLE 3.2

RANK CORRELATIONS BETWEEN VARIOUS COMPOSITE INDICES AND SIZE

Composite Indices	Correlations with size
Resources (R)	-0.107
Health Resources (HR)	0.002
Communications Media (CM)	0.146
Education (E)	0.097
Urbanization (U)	0.193
Industrialization (In)	0.094

Thus, these results substantiate the conclusion of Mohr that size is not theoretically relevant to innovativeness, and that it will not be related to innovativeness when it does not connote systemic variations in motivation and/or resources. These results also point out that the measures of size used in this study, unlike those used by other researchers, are relatively free of "contamination" by factors that are theoretically relevant to innovation.

B. RESOURCES AND INNOVATIVENESS

It was postulated in the previous chapters that there is a direct and strong correlation between the amount of resources a country possesses and its innovativeness. The composite index of resources (R) is made of two sub-indices of population density and gross national product per capita. Table 3.3 reports the correlations found between these sub-indices, the composite index, and various areas of innovation.

TABLE 3.3

RANK CORRELATIONS BETWEEN RESOURCES AND INNOVATIVENESS

Areas of Innovation	Pop.Den.	GNP/cap	R
Malaria Control	0.085	0.477[a]	
Malaria Eradication	0.046	0.284	
Mother and Child Care	0.134	0.524	
Smallpox	0.192	0.292	
Tuberculosis	0.453[a]	0.081	
Venereal Diseases	0.176	-0.482	
Composite I	0.336	0.372	0.444[b*]

[a] Significant at 0.05 level.
[b] Significant at 0.08 level.
* N= 17

This table shows that both the overall results--the correlation between composite indices of resources

and innovativeness--and most individual results are in the direction of the hypothesized prediction and are fairly strong.

Note that in this table a negative and fairly strong correlation is reported between venereal diseases and gross national product per capita. This is a reflection of the fact that, as a World Health Organization report stated it, "important advances in the modern treatment of venereal diseases do not appear to have influenced legislation on venereal diseases at present, although it might have been expected that these advances would have influenced provisions relating to defaulters and compulsory hospitalization."[7] Thus, while many newer nations who would otherwise be expected to innovate last, passed legislations on the venereal diseases along with other legislation on infectious diseases, many older and otherwise more innovative ones did not change their existing laws on the venereal diseases, leading to this disparity between their innovativeness in this field as against other fields of public health. The same explanation applies to similar discrepancies in the following tables. When venereal diseases are omitted from the computations of composite innovativeness (I), the R-I correlation becomes 0.601, significant at the 0.05 level. The same type of computation with the omission of venereal diseases

were made on other indices, but unless the results are significantly different they are not reported.

These data support the hypothesis of a relationship between resources and innovativeness.

As stipulated in the second major hypothesis in Chapter I, a stronger correlation should exist between innovativeness and the amount of resources directly related to the specific innovations--in this case public health resources. Table 3.4 reports the findings on this point.

TABLE 3.4

RANK CORRELATIONS BETWEEN HEALTH RESOURCES AND INNOVATIVENESS

Areas of Innovation	Ratio of Doc.	Ratio of Nurs	Ratio of H.Bed	HR
Malaria Control	0.507[a]	0.268	0.121	
Malaria Eradication	0.439[a]	-0.035	-0.381	
Mother and Child Care	0.881[a]	0.411	0.435	
Smallpox	0.798	0.509	0.481	
Tuberculosis	0.095	-0.017	0.091	
Venereal Diseases	-0.381	-0.127	-0.457	
Composite I	0.655[a]	0.205	0.264	0.494[b*]

[a]Significant at 0.05 level.
[b]Significant at 0.07 level.
* N= 15

The overall correlation between composite indices of innovativeness (I) and health resources (HR) is significant at the 0.07 level,,which is indicative of an association between the possession of health resources and innovativeness in the field of health policies.

Note that, of the three sub-indices of health resources, the ratio of physicians per 10,000 population is the only one with a strong correlation with individual areas of innovation and with overall innovativeness. This may be interpreted as an indicator of the more influential role of the physicians in a country--at least relative to the role and influence of the nurses--insofar as public health policies are concerned. In this respect, both physicians and nurses are more than mere indicators of health resources of a country. They are also strong and influential groups who inspire people to demand and hope for better health conditions, and who also provide them with the information to feed such inspirations and to back up those demands.

In their role of source of inspiration and interest articulation, our data indicate that doctors and nurses have different degrees of influence. There seem to be two factors involved in these differences. The first is the obvious fact that most physicians are men, and in all of the countries under study men are more influential

than women. The second possible factor may be related to the relative amount of formal education and the relative prestige of physicians as against the education and prestige of the nurses as a group.

In their role of providers of information, the level of education and the degree of the physicians' professionalism are important factors to explain their influence. Thus, it can be argued that the physician-population ratio in a country is an indicator of the level of professionalization of health services in that country. Since professionalism has been found to be related to innovativeness in other research reports, let us examine this point further.

Professionalism and Innovativeness

Professionalism of the members of an organization--defined in terms of professional affiliations of the members, the level of their dependence on their professional colleagues for esteem, and the degree of their awareness of the judgment of their peers--has been found to be a facilitator of innovation in organizations by many scholars. The process through which this result is achieved, argue Havelock et al., includes among its primary facets the esteem of professional colleagues for the innovator, and the

pressure of striving to "keep up" with the profession, which, together, provide very special means of communicating the latest information and most up-to-date findings.[8]

Kimbrough suggests that professionalism introduces external channels of communication and, most importantly, external criteria of excellence, which would lead to innovativeness and dynamism in school systems.[9]

Walker also found professionalism to be relevant to innovativeness. Arguing that with the development of professional organizations and the increased level of professionalism among American state officials, the spread of innovations among the states should speed up, he found that the average elapsed time of diffusion was substantially reduced in the three different time periods of 1870-1899, 1900-1929, and 1930-1966.[10] The reasons he offers for this relationship between professionalism and innovativeness are substantially the same as those stated above--channels of communication developed and maintained by professional organizations among their members, broadening of the basic viewpoints of officials to make them more cosmopolitan, and introduction of a wider set of criteria for excellence of performance.[11]

There are other research reports which point to the same concepts and findings, but indirectly. Research done by Mohr, and by Hage and Aiken stand out

as examples. Among the variables studied by Mohr was health officers' activism-ideology, and also the extent of public health training of key employees in the health department. Both of these measures, especially the latter, are relevant to--if not direct measures of--the extent of professionalism within the department. He found significant correlations between progressive programming and both of the above indices.[12]

Hage and Aiken also used two additional measures which can be seen as indicators of professionalism in the organization, although they were actually employed as indicators of organizational complexity. They were the length of training required for each occupation and the degree of professional activity associated with each occupation. They found that the latter had a very high correlation with the rate of program change, while the former variable had a relatively low correlation.[13]

Richard Carlson found the professionalism of school administrators to be highly correlated with their innovativeness.[14] Kornhauser also argues that, although excessive professionalism of the scientists working in industrial organizations may hamper their effectiveness, mixing professional-organizational orientation is ideal for development and communication of research findings.[15]

In sum, the degree of professionalism of the

personnel directly involved in the area of innovation is positively associated with the innovativeness of an organization. The data provided in Table 3.4 may be taken as supporting this contention on the lewel of national governments, at least in the field of public health.

C. MOTIVATION AND INNOVATIVENESS

We believe, as modern psychologists do, that although the actions of an individual or a system may be motivated, the nature of motivation cannot be inferred from the action alone. For example, an individual may eat due to many motives other than hunger.[16] This distinction in human behavior is a very important contribution made by Freud and his students to the advancement of psychology.[17] The same distinction must be made in organizational behavior. While in many cases organizational actions may be consequences of certain logically related and obvious motivations, this relationship cannot and must not be assumed to exist in all cases. A case in point is the so-called slack innovation--where an organization adopts new procedures and/or practices, not because it needs these innovations per-se, but because it needs the prestige that accompanies such innovations, among other factors.[18] Therefore, motivation

should be studied in a different manner than logical inferences from a system's behavior.

The cybernetic model of organizations offer a set of probabilities for comparative study and measurement of motivation in all systems, especially in very large entities such as manufacturing, administrative, or political organizations, as well as nation-states. The method proposed in this study in the previous two chapters is that of comparison of channels of communication through which drives are perceived and acted upon within a system. The reasoning was set forth that, of two systems with an equal degree of objective need, that which has a better (more extensive and more efficient) system of communication, both internally and with the environment, is more likely to innovate. Thus, one of the major research hypotheses of this study is that there is a positive correlation between the extent of communications media and innovativeness in a country.

In making this hypothesis it is assumed that the objective need for the innovation (the systemic drive) does exist in each of the countries, and that this objective need is more or less equal for all the units of adoption studied. As stated in Chapter II, in the selection of the countries for this study, care was taken to meet these two criteria.

To measure the extent of communications media three indices were used: daily newspaper circulation per 100,000 population (NPC), number of radio sets per 1,000 population (Ra), and number of television sets per 1,000 population (TV). The data on the correlations between the communications media (CM) and innovativeness are reported in Table 3.5

TABLE 3.5

RANK CORRELATIONS BETWEEN COMMUNICATIONS MEDIA AND INNOVATIVENESS

Areas of Innovation	NPC	Ra	TV	CM
Malaria Control	0.591[a]	0.551[a]	0.307	
Malaria Eradication	0.285	0.528[a]	0.055	
Mother and Child Care	0.484	0.184	0.715[a]	
Smallpox	0.334	0.300	0.655[a]	
Tuberculosis	0.131	0.059	-0.314	
Venereal Diseases	-0.065	0.006	-0.400	
Composite I	0.617[a]	0.445[a]	0.285	0.495[a]*

[a]Significant at the 0.05 level.
*N= 17

As the table shows, while there are fluctuations in the relative importance of each of the media of communication in relation to each of the areas of innovation, the overall correlation is strong and siginficant at the 0.05 level of confidence. Thus, the

hypothesis is supported that where there is a minimum degree of objective need, there is a strong association between the extent of media of mass communication and innovativeness.

The point may be raised that this is indeed another manifestation of the association between resources and innovativeness. To test this contention, we must study the relationship among the three: communications media (CM), resources (R), and innovativeness (I). Figure 3.1 portrays the developmental relationship among these three--resources to communications media to innovativeness.

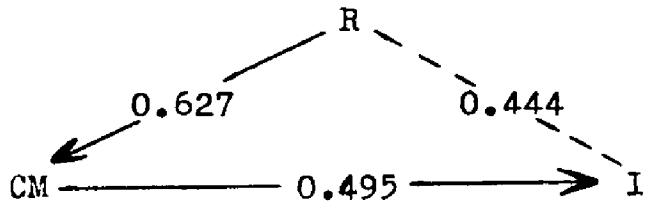

FIGURE 3.1

If we can confirm such a developmental relationship, the above contention would be verified. In a developmental association as postulated in the triangle in Figure 3.1, if we control the middle variable (CM), the correlation between the other two (R-I) should be reduced to zero or near zero.[19] Should this happen, we must agree that the relationship between resources and innovativeness is <u>totally</u> due to this intervention of communications

To measure the extent of communications media three indices were used: daily newspaper circulation per 100,000 population (NPC), number of radio sets per 1,000 population (Ra), and number of television sets per 1,000 population (TV). The data on the correlations between the communications media (CM) and innovativeness are reported in Table 3.5

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Composite I	0.617[a]	0.445[a]	0.285	0.495[a]*

[a]Significant at the 0.05 level.
*N= 17

As the table shows, while there are fluctuations in the relative importance of each of the media of communication in relation to each of the areas of innovation, the overall correlation is strong and siginficant at the 0.05 level of confidence. Thus, the

media. The results are the following:

High CM R ----- 0.608 ------- I

Low CM R ----- 0.467 --------I

This data shows that resources act on innovativeness directly. By controlling resources we can test the spurious model of causal relationship between communications media and innovativeness. If the CM-I correlation disappears we can assert that the high correlation between communications media and innovativeness is false, and due to a third variable—namely resources.

High R CM ------- 0.209 ------- I

Low R CM ------- 0.400 ------- I

These results point to a degree of spuriousness, as well as independent causal effects between communications media and innovativeness. In other words, while must agree that richer countries are more likely to innovate, and have a better and more extensive communications network at the same time, communications media still have an independent effect on innovativeness. Thus, communications media indicate the existence of factors other than resources, which are relevant to innovativeness. Theoretically, the most important among such other factors is motivation to innovate.

The data presented above give us clues to another

important question in innovation research--namely, the nature of the relationship between resources, motivation and innovativeness. It has been stated by Mohr that this relationship is multiplicative, i.e., the scores on independent variables should be multiplied to predict scores on innovativeness.[20] He feels that, although in his data a multiplicative model explains this phenomenon only slightly better than an additive model, the former, being "theoretically more cogent," must be preferred.[21]

The data presented here do not provide conclusive evidence for the multiplicative mathematical model, due to a relatively limited range of scores on each of the variables and lack of very precise operationalization of underlying concepts,[22] which generally make additive models as descriptive as multiplicative ones. But there is at least one clue which suggests the existence of a multiplicative causal relationship between communications media, resources and innovativeness. A closer examination of the variations in the R-I correlations when CM is controlled suggests that when there is high motivation (to the extent that CM is a reflection of motivation) resources and innovativeness have stronger correlation than when motivation is low. In other words, it matters little how large the amount of resources are, when motivation is low, the likelihood of innovation is also low. The progression of this argument leads to

the conclusion that when motivation is zero, innovativeness also decreases to zero, regardless of the amount of resources, and vice versa.

However, when resources are high, the CM-I correlation is not higher than when resources are low. This latter discrepancy makes it impossible to claim support for the multiplicative theoretical model offered by Mohr.[23] The nature of our data does not allow more elaborate statistical manipulation to verify further the mathematical model under discussion. Suffice it to say that besides theoretical considerations and research findings of other scholars, we can view our results as at least not discouraging a preference for a multiplicative model of association between motivation and resources on the one hand, and innovativeness on the other.

D. URBANIZATION, EDUCATION AND INDUSTRIALIZATION

Daniel Lerner believes that, in "the secular evolution" of societies, there are three phases: urbanization comes first, then comes the expansion of education or the rise of the literacy rate, and the third phase is that of the growth of media of communication. It is as a result of this process that "institutions of participation," such as voting and election, develop.[24]

On the same subject, McCrone and Cnudde also contend that democratic political developments occur in urbanized or urbanizing societies, and that urbanization leads to this development because it increases educational and literacy rates in the society, and the latter cause development and enlargement of mass communication.[25] In other words, the process leading to democratization of societies--defined in terms of popular participation in social affairs--starts with urbanization and proceeds through a rise in education and literacy and the development of mass communication. When mass communication permeates a society, democratization follows.

It was also argued in Chapter I that democracies are usually more innovative because, as Etzioni points out, they are the most flexible systems of government. This flexibility, he contends, is basically due to the fact that in democracies the upward communication, which is the channel through which needs are transmitted to the decision centers, is combined with power in an institutional form.[26]

Thus, one can argue that if, in fact, the above writers are correct, there must be: 1) positive association between education, communications media and urbanization on the one hand, and innovativeness on the

other, and 2) the nature of causal association among urbanization, education, communications media and innovativeness should be primarily sequential, and in that order.

To verify these two points, urbanization and education are correlated with innovativeness. Urbanization (U) is measured in terms of the percentage of population living in cities with 20,000 or more inhabitants. Education (E) is a composite measure made of three indices: literacy (L), i.e., percentage of population literate among those aged 15 and above, pupils enrolled in elementary and secondary schools (PE) as percentage of population aged 5-19, and rate of student enrollment (SE) per 100,000 population. Table 3.6 presents a summary of findings.

The results show significant and strong correlations between education and innovativeness (at the 0.03 level of confidence) and relatively weak association (at the 0.18 level) between urbanization and innovativeness. Communications media have already been shown to have strong correlations with the latter.

TABLE 3.6

RANK CORRELATIONS BETWEEN EDUCATION, URBANIZATION AND INNOVATIVENESS

Areas of Innovation	L	PE	SE	E	U
Malaria Control	0.454[a]	0.489[a]	0.256		0.347[b]
Malaria Eradication	0.363[b]	0.390[b]	0.066		0.329
Mother and Child Care	0.620[a]	0.750[a]	0.467[a]		0.334
Smallpox	0.547[a]	0.460[a]	0.413[a]		0.113
Tuberculosis	-0.077	0.083	-0.119		0.095
Venereal Diseases	-0.286	0.006	0.044		-0.076
Composite I	0.489[a]	0.578[a]	0.345[b]	0.581[a] N=17	0.347[b] N=17

[a] Significant at 0.05 level.

[b] Significant at 0.20 level

Now let us consider the second point regarding the sequential causal relationship among the four. In Figure 3.2 the hypothesized sequence of causation is demonstrated by arrows, with the figures showing the correlations.

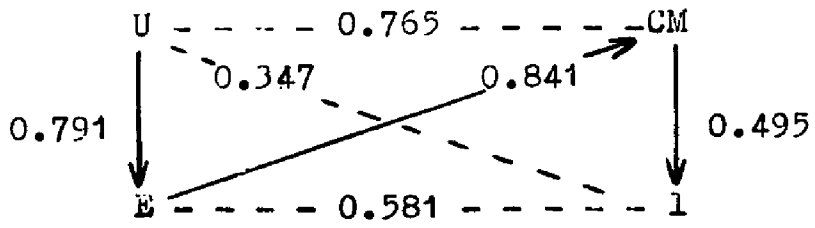

FIGURE 3.2

In order to test this causal model, we can regard the rectangle as being composed of two triangles: U, E, CM, and E, CM, I. Using the method of partial control we can test the validity of the postulated causal relationships in each of the triangles. First, we control E, and measure the U-CM correlations. If the causal model is correct, they should be reduced to zero or near zero.

High E U--------- 0.577---------CM

Low E U--------- 0.803---------CM

These data reject the model in which education is an intervening factor in the relationship between urbanization and the extent of communications media. The strong correlation between these latter two apparently proceeds through intervening factors other than education. Examples of countries wherein the level of education is lagging behind the concomitant advancement and expansion of urbanization and communications media are numerous. Almost all developing countries share this trait with varying degrees. It is not difficult to reason why this has happened. With the introduction of batteries and transistor radios, there is no need for many of the technological and other educational prerequisites of using modern means of communication, not even that of having a network of electrical power. Therefore, communications networks in an urbanizing

country expand with a minimum of effort, expenditure or sacrifice regardless of the level of popular education.

Before suggesting any alternative model of causation let us look at the second triangle--E, CM, I. According to the hypothesis, the value of E-I correlation should be reduced to zero, or near zero, if we control CM. The results are different from the expectations.

High CM E -------- 0.430 ------- I

Low CM E -------- 0.446 ------- I

Thus, we find that the first hypothesis, which postulated the existence of association among the four variables of U, E, CM, and I is confirmed, while the second hypothesis on the nature of causal sequence among these four is rejected.

Now, we can test an alternative model of causality among these four. Let us first look at the relationship among U, CM, and I. If the causal relationship among them is a sequential one, as shown in Figure 3.3, we expect the value of U-I correlation to drop to zero, or near zero, when we control CM.

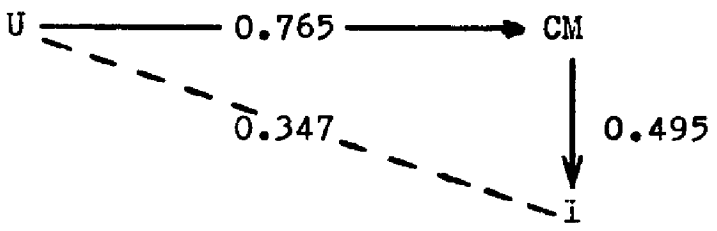

FIGURE 3.3

The results do not fit the expected pattern.

High CM U -------- 0.372 ------- I

Low Cm U -------- 0.249 ------- I

In view of the above, let us postulate a causal model in which urbanization and communications media both contribute, fairly independently, to innovativeness. To support this we would want to rule out urbanization as a source of spuriousness in the relationship between CM and I. The data indicate that the relationship is not spurious.

High U CM ------- 0.600 ------- I

Low U CM ------- 0.564 ------- I

Thus, the model of relationship among U, CM, and I would seem to be one of contributing conditions, as shown in Figure 3.4 (the horizontal arrow is included in the Figure to indicate the interaction between U and CM that is suggested as possible by the data just reviewed).

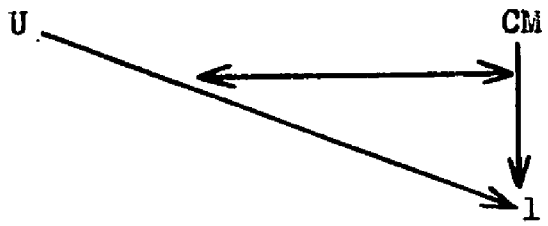

FIGURE 3.4

In other words, increased urbanization increases the innovativeness of a nation-state; so also does expansion of the communications network. Urbanization and communications media in combination amplify a country's propensity to innovate.

Now, let us look at the U, E, I relationship. Let us postulate a sequential causal model without the communications media being involved, as shown in Figure 3.5.

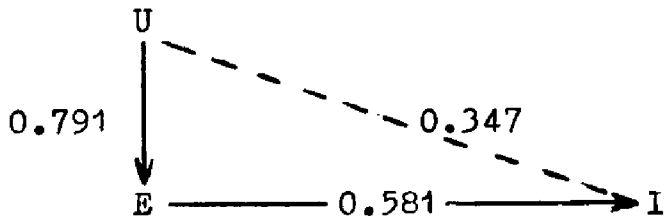

FIGURE 3.5

If this model is valid, the value of U-I correlation should become zero, or near zero, when we control E.

High E U ------- 0.134 ------- I

Low E U ------- 0.122 ------- I

The results do tend to confirm the postulated model.

To summarize, our data suggest that:

1) There is a causal relationship between urbanization and innovativeness, in which educational level acts as an intervening variable.

2) There is also a relationship between communications media and innovativeness that is independent of urbanization. These two relationships are depicted in Figure 3.6.

FIGURE 3.6

3) There may be a slight interactive association between these two sets of causation, in that the higher the extent of communications media in a country, the higher the causal association between urbanization and innovativeness.

4) We have been unable at this point to determine a specific additive one-way causal model for the high association among urbanization, education and communications media. It seems likely that these three are largely mutually reinforcing; that is, they are causally related in a complex set of two-way or reciprocal associations.

The data presented above are similar to the data reported by Daniel Lerner. He found a correlation of 0.80 between literacy and urbanization (our result is r=0.579) and of 0.82 between communications media and literacy (ours is r=0.792).[27] Several reasons might be offered to explain why our own conclusions are not the same as his. For example, he uses data on a large number of countries (73), in a more scaled form. Here the data presented are rank-ordered and are based on no more than 26 countries. Moreover, he wrote about democratization, which is related to, but not the same as innovativeness. The primary consideration, however, is that Lerner took into account both developed Western and developing non-Western countries. The data here refer only to developing countries, and therefore, the conclusions drawn are bound to be different. This is due to a historical process through which Western countries have developed, but which the developing countries have not undergone.

To demonstrate this point, let us examine the most striking difference between Lerner's conclusions and our own, namely, the lack of evidence in this study to support a sequential relationship among urbanization, education and communications media such that U → E → CM. (Compare Figures 3.2 and 3.6).

The composite index of communications media, as used here, is composed of three indicators: rates of newspaper circulation, radio sets and television sets. Only the first of these three requires literacy. The other two are a-literate. What Lerner found about the very important role of the rise of literacy as a prerequisite of enlargement of communications media was true in the Western countries which went through this "historical phase" at the time when radio and television had not been invented.[28] Then, the major (if not the only) communications medium was the newspaper, which required literacy. If we use literacy (L) instead of education, and newspaper circulation (NPC) instead of the composite index of communications media, we should be able to find a sequential causal association among urbanization, literacy and newspaper circulation. See Figure 3.7.[29]

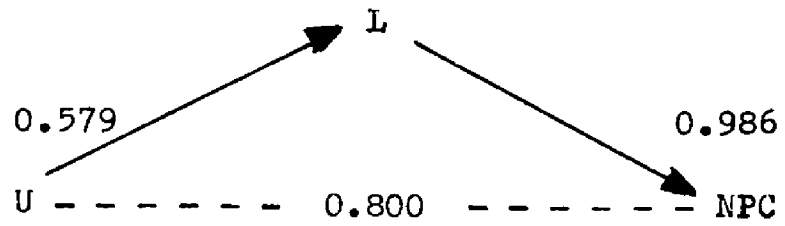

FIGURE 3.7

To test this causal model, when we control L, the U-NPC correlation should drop to zero or near zero. The

results do not support the model.

High L U ------- 0.853 ------- NPC

Low L U ------- 0.530 ------- NPC

These data compel us to reject the model of sequential causation among urbanization, literacy and newspaper circulation in favor of one in which the former two (U and L) are each independently associated with the latter (NPC), as shown in Figure 3.8.

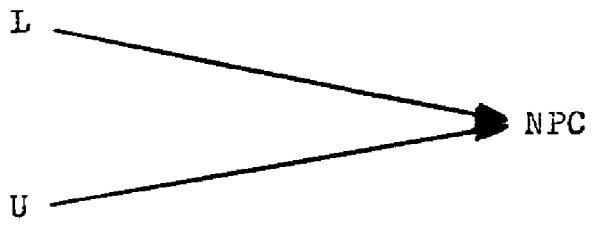

FIGURE 3.8

However, we are apparently confronted with cases in which urbanization and newspaper circulation are both low, even though literacy is high, and cases in which urbanization and newspaper circulation are both high even though literacy is low.

The explanation for the first phenomenon (low U, and NPC, with high L) must be sought in the fact that in many countries literacy rises due to factors other than urbanization. This is especially true about those smaller countries where the rural population have not migrated to the cities, but modern roads and other

facilities have enabled such populations to receive schooling and to become literate. As an effect of national programs such as VISTA, in the United States, and the Literacy Corps, in Iran, it will become more common in the future to observe relatively high levels of literacy combined with not as high a level of urbanization. Without the easily accessible urban market, newspaper circulation does not grow even though the level of popular literacy is relatively high. For example, the Dominican Republic is ranked fifth on literacy, but twelfth on urbanization and ninth on newspaper circulation. If in such countries, the government also controls the press the relative circulation of newspapers would be further reduced.

As to the situation in which, inspite of a low literacy rate, urbanization and newspaper circulation are both high, it appears that the rise of newspaper circulation in many developing nations is due to factors other than urbanization and literacy, independently, as we have found, or in sequence, as Lerner argues. In these countries populations have moved into urban areas in the past two or three decades due to many factors, including the rural population's awareness of the "better" life in the cities, a limited degree of industrialization, opening of roads, etc. From personal experience, this

writer knows that in the political turmoils that have characterized many developing nations in the past few decades, ownership and publishing of any newspaper is a highly valued and strong weapon in the game of politics. Hence, newspapers are often published in large quantities without necessarily being read. The political function of newspapers in such countries is fulfilled when they are published, regardless of their readership. Thus, although in many cases urbanization may increase newspaper circulation through literacy, this is not always the pattern. A good example of such exceptions is Peru, which is relatively low on literacy, while being high on both newspaper circulation and on urbanization.

Furthermore, it seems that radio and television have changed the stages of development--even if only slightly. What seems to have happened is that the rise of the a-literate mass communications media may have "short circuited" the developmental process--going around the basic necessity of literacy for mass communications.[30] This is not to suggest that literacy has become obsolete and unnecessary, or that newspapers do not serve any of their traditional functions at all. Hirabayesh and Al-Khatib made a study of communication systems in five Egyptian villages. They found that: 1) it was not true, as it might have been several years

ago, that the fellah (peasant) population of Egypt knew nothing of the state, nation and/or international affairs, 2) in the process of political awareness of the peasants mass media (radio and newspapers), superimposed on the the traditional word of mouth channels of communication, had played very significant roles, and 3) literacy seemed to have been undeniably the factor in political sophistication of a few, as against the mere political awareness of the illiterate multitude.[31]

Our findings, therefore, suggest that in developing countries nowadays, urbanization leads to a rise in education and innovativeness in that sequence, but that this sequence is independent of variations in communications media, which is, by itself, a factor in innovativeness.

Cosmopoliteness and Innovativeness

Cosmopoliteness, as used in research reports on innovation, refers to a degree of "other-directedness," as used by McClelland,[32] or to having a reference group or information source other than those immediately surrounding the person. Carlson found that cosmopoliteness of the superintendent of a school system was weakly correlated with that school system's innovativeness.[33] Walker found that this other-directedness of the policy-

makers in the American states had gone so far as to lead to copying legislation from one another even to the point of including serious typographical errors from the original.[34]

There is no need to review other findings on this point.[35] Suffice it to say, while research reports are not unanimous on this point, theoretically we might expect cosmopoliteness to be relevant to and associated with innovativeness.

Radios are very good channels of communication with the world outside the immediate polity. In this capacity, they play a very important role as a source of information to the people on what other people have, and thus they raise the people's aspirations by giving them knowledge of the existence of remedies for their ills which they never possessed before. As the reader remembers, this is a very important aspect of motivation as it was elaborated in Chapter I--i.e., to know about the existence of remedies to satisfy a drive.

Inasmuch as radios perform this role, one may use them as indirect measures of the "cosmopoliteness" of a population. Using this and rate of cinema attendance per capita per year (CA) as sub-indices of cosmopoliteness, we find the following correlations with innovativeness as reported in Table 3.7.

TABLE 3.7

RANK CORRELATIONS BETWEEN COSMOPOLITENESS AND INNOVATIVENESS

Areas of Innovativeness	CA	Ra
Malaria Control	0.518	0.551
Malaria Eradication	0.405	0.528
Mother and Child Care	0.393	0.184
Smallpox	0.358	0.300
Tuberculosis	-0.041	0.059
Venereal Diseases	0.143	0.006
Composite I	0.615[a]	0.445[b]

[a] N= 12

[b] N= 17

Cosmopoliteness, we find, is highly correlated with innovativeness. Cinema attendance, especially in countries where cinema has not yet developed as an art form, measures the amount of exposure of the population to foreign influences, providing models of what life is like in other countries. Viewed in this light, radio and cinema are relatively good measures, on national level, of what, at the individual level is referred to as "cosmopoliteness."

It is not common in social science to regard the cinema as a measure of mass communication, in the same sense as other communications media. The fact of the matter seems to be, however, that it does function as

a channel of mass communication and, as our data show, it is very strongly associated with innovativeness. As a matter of fact, the correlation between innovativeness and the other communications media is lower than that between innovativeness and cinema attendance ($r=0.495$ versus $r=0.615$). Movies in the developing countries serve powerfully as windows through which people take a glance at what, they like to believe, is life in other countries, especially in the West. Even the elite are not immune to this effect. Daniel Lerner recalls a young Iranian bureaucrat who once told him "the movies are like teachers to us who tell us what to do and what not to do."[36]

Industrialization and Innovativeness

Many scholars have found (or at least have argued) that industrialization is one of the early phases of the process of democratization of societies.[37] If this contention is true, we should also find industrialization to be associated with innovativeness--by virtue of the same reasoning stated earlier to relate urbanization to innovativeness. Our data will substantiate that contention.

But first, let us note that the association between industrialization and urbanization found in this study

is relatively weaker than one would expect offhand (r=0.485). However, since our definition of urbanization considers only the actual percentage of population living in cities, we cannot distinguish between the true urbanite population and what Lerner calls the "internal rural refugees" who have flooded the cities in the recent three decades, especially in the developing countries.[38] Thus, our measure of urbanization tends to have a less powerful association with industrialization than would be expected. In other words, where large numbers of people have moved into the cities, the percentage of people working in industrial firms (which is one of the modal occupations of the "true" urbanite) often has not risen proportionally.

Therefore, while in the developed Western countries it is legitimate to use urbanization as an index and "subsume" industrialization under that index as Lerner does,[39] in the study of developing countries we must use industrialization and urbanization as separate indices.

Table 3.8 presents a summary of correlations among the different areas of innovation adoption and two indices of industrialization--namely, percentage of population of working age (15-64) employed in industry, and percentage of the working force engaged in agriculture. Bearing in mind that the latter is a reverse measure of

industrialization, we expect a negative correlation with this index. The composite index of industrialization (In) is composed of rank orders on the first and reverse ranking on the second.

TABLE 3.8

RANK CORRELATIONS BETWEEN INDUSTRIALIZATION AND INNOVATIVENESS

Areas of Innovation	% Labor in industry	% Labor in Agri.	In.
Malaria Control	0.219	-0.395[b]	
Malaria Eradication	0.019	0.080	
Mother and Child Care	- c	-0.595[a]	
Smallpox	0.399	-0.482[a]	
Tuberculosis	-0.370	0.058	
Venereal Diseases	-0.392	0.257	
Composite I	0.517[a]	-0.378[b]	0.615[a]*

[a] Significant at the 0.05 level.

[b] Significant at the 0.15 level.

[c] Incomplete data.

* N= 15

The data show a strong correlation between industrialization and innovativeness. Lerner would have us believe that industrialization effects innovativeness through causing a rise in educational levels and communications media growth.

We have already shown a causal sequence existing

from urbanization to education to innovativeness, with no intervening role for communications media. In respect to industrialization, we find basically the same causal pattern. When education is controlled, the industrialization-innovativeness correlation is reduced to near zero, but the number of cases is not large enough to carry this stipulation beyond the point of reasonable speculation. Communications media still remains as a separate variable relating independently to innovativeness.

E. POLITICAL INDICES

In Chapters I and II we discussed the relationship between resources and innovation and postulated that, not only the amount of resources, but also their reassignability was an indicator of a social system's innovativeness. In earlier parts of this chapter we were able to show that the amount of resources a country possessed was related to its innovativeness. In this part we shall try to verify the hypothesized association between innovativeness and the flexibility of its resources.

Eisenstadt has shown that as societies "develop," a large amount and great variety of societal resources, both human and material, are freed from traditional uses and commitments and thus become reassignable, flexible.

He demonstrated this phenomenon among various empires, which, in the process of transformation--from an ascriptive and rigid, to an achievement-oriented and more flexible and mobile system of social status, from a particularistic to a universalistic value system, and from an agrarian economy to a more differentiated and specialized system of economic institutions, experienced the generation of such "free-floating" resources.[40]

The nature and direction of change in traditional societies toward modernization are very similar to those studied by Eisenstadt. As was mentioned in Chapter I, traditional societies undergoing the process of modernization are essentially moving from relatively ascriptive, particularistic, agrarian systems to more achievement-oriented, universalistic, and differentiated ones.[41]

We pointed out in Chapter II that one of the criteria in choosing our units of adoption was that these countries be in the process of economic, social and political development--from traditional to modern. Thus, following Eisenstadt's demonstration, their resources may be presumed to be freer and more reassignable the further they have moved along the continuum from traditional to modern. In this respect, since we have excluded the modern totalitarian, bureaucratic dictatorships from our population, we can use indices of institutional

and political pluralism, universalism, and equalitarianism to measure the relative flexibility and reassignability of resources among the nation-states studied here.

Besides these arguments, some of the political indices used in this section should be expected to relate to innovativeness simply by virtue of their indicating the responsiveness of the political system to popular needs and demands. When such is the case, the relationship will be elaborated upon in these terms as well.

In the following pages we shall examine various political characteristics of our units of adoption in relation to their innovativeness. In so doing, we shall be using mostly Banks and Textor's taxonomy and their assignment of values to each trait.

However, before examining the specific political traits and characteristics related to pluralism, universalism and equalitarianism in our units of adoption, let us examine our contention in the most general terms. That is to say, according to the present hypothesis we should surely find a positive association between general political and bureaucratic modernization and innovativeness.

To verify this contention, we use the typology advanced by Black and followed by Banks and Textor.

This typology is constructed in terms of periodization of political development into three phases: advanced, mid-transitional, and early-transitional.[42] Using cross tabulation, we find that political modernity is indeed positively associated with innovativeness. Table 3.9 reports the findings in this respect.

TABLE 3.9

POLITICAL MODERNIZATION VERSUS INNOVATIVENESS

Inn.	Advanced	Mid-Transitional	Early-Transitional
High	Argentina Costa Rica Guatemala Lebanon Mexico 5/9	Dominican Republic Honduras Paraguay 3/5	0/3
Low	Brazil Iraq UAR Uruguay	Ethiopia Peru	Cameroun Chad Senegal

Source: Banks and Textor, A Cross-Polity Survey (Cambridge, MIT Press, 1963), Finished Characteristics, Nos.85 and 86.

Note that while the proportion of high to low innovativeness is close among the countries with advanced and mid-transitional political systems, none of the early

traditional countries belongs to the higher innovative group.

As to the modernity of the bureaucracy, Banks and Textor's typology of modern, semi-modern, post-colonial and traditional bureaucracies can be used to advantage, because it embodies most of the contemporary thought on the subject. Table 3.10 shows the tabulation of this index versus innovativeness.

TABLE 3.10

CHARACTER OF BUREAUCRACY VERSUS INNOVATIVENESS

Inno.	Modern or Semi-modern	Post-colonial or Traditional
High	Argentina Costa Rica Dominican Republic Guatemala Honduras Lebanon Mexico Paraguay 8/12	0/4
Low	Brazil Peru UAR Uruguay	Cameroun Chad Ethiopia Senegal

Source: Banks and Textor, Op. cit., F.C. 108.

Difference of Proportions = 0.67

Unascertainable: Iraq

The table shows that all countries with high levels of innovativeness have either modern or semi-modern bureaucracies.

We see, therefore, that innovativeness in the field of public health tends to go along with general political and bureaucratic innovativeness. Now, let us examine the specific political indices, related to the degree of pluralism, equalitarianism, and universalism of a polity in relation to its innovativeness.

First, we consider the nature of leadership and the pattern of relationship among the various groups and individuals comprising the elite strata in a society. In this respect, Walker's research finding is worth mentioning. He found, among the American states, a positive correlation between inter-party competition and the speed of turn-over of the administration on the one hand and innovativeness of the state government on the other.[43] Both of these indices are related to and thus are indirect measures of institutional mobility within a system, a system's general openness to different sources of information, and its tendency to respond to variations in systemic needs.

In this study we use the degree of freedom given to opposition groups in a country as a measure of political competition. The degree of freedom given to

the opposition groups in a country not only denotes the degree of pluralism of a system and tolerance among the elite group of various viewpoints, it also indicates the willingness of a system's decision centers to receive and to act upon negative feedback. A system which allows such feedback cannot survive its effects unless it is ready and able to make adjustments in the configuration of its resource allocation. When such adjustments cannot be made, either the channels of such feedback are blocked, or the system collapses under the pressure of unfulfilled demands. Therefore, if a system grants such freedom to its opposition groups within the elite strata, and survives it, it must be enjoying the required flexibility and reassignability of resources. Table 3.11 reports the results of our analysis in this regard.

The table shows that there is a small positive correlation between freedom of opposition and innovativeness. This provides at least a slight measure of support for Walker's finding on the relationship between political competition and innovativeness.

TABLE 3.11

FREEDOM OF OPPOSITION GROUPS VERSUS INNOVATIVENESS

Inno.	Fully Tolerated	Partially or not at all tolerated
High	Argentina Costa Rica Dominican Republic Honduras Lebanon 5/7	Guatemala Mexico Paraguay 3/9
Low	Brazil Uruguay	Cameroun Chad Ethiopia Iraq Senegal UAR

Source: Banks and Textor, Op. ci., F.C. 107

Difference of Proportions = 0.38

Unascertainable: Peru

As stated before, Walker also found positive correlation between the speed of turnover of the administration and the innovativeness of the state governments in the United States. Our findings seem to contradict that conclusion.

For a measure of speed of turnover we use the index of executive stability developed by Russett et al., by dividing the number of years independent by the number

of chief executives, within the 1945-61 period.[44] Since this index is the reverse of Walker's measure, we expect to find a negative correlation between executive stability and innovativeness. Table 3.12 reports our finding in this regard--which is a strong positive association.

TABLE 3.12

EXECUTIVE STABILITY VERSUS INNOVATIVENESS

Inno.	High Stability	Low Stability
High	Argentina Costa Rica Dominican Republic Honduras Mexico Paraguay 6/7	Guatemala Lebanon 2/7
Low	Ethiopia	Brazil Iraq Peru UAR Uruguay

Source: Russett, et al., Op. cit., pp. 101 ff.

Difference of Proportions = 0.57

Data not available for: Cameroun, Chad, Senegal.

This unexpected and strong positive association between innovativeness and executive stability can be

explained by a closer look at what the latter concept means in the developed and in the developing countries.

In the generally stable systems of the American State governments, speed of change of administration denotes the degree of exchange of personnel between such organizations and their social environment, within a stable constitutional framework. Such exchange of personnel brings new ideas and new outlooks into the system, thus contributing to its innovativeness.

In the developing countries, on the other hand, executive turnover is usually accompanied by violent overthrow of the systemic framework of leadership succession. In any situation, some minimum of security and governmental stability is required to allow new ideas to "sink in"--to go through the system's communications network, to be received and acted upon by the decision centers. It stands to reason that executive stability, since it reflects general stability, will be positively correlated with innovativeness in developing countries.

Thus, it appears that the overall pattern of relationship between executive stability and innovativeness is curvilinear. Innovation is nearly impossible under conditions of great threat, insecurity and turmoil, and it becomes increasingly likely as stability increases. There is a point of diminishing returns, however, after

which additional degrees of stability often lead to less innovation because nearly complete security in office tends to produce unresponsiveness. Executive stability, hence, must be regarded as a multi-dimensional concept. As a predictor of innovativeness, its effect depends heavily on whether or not the larger social system under study is, itself, in a period of transition.

Now let us turn to the style of leadership. We have developed three indices: executive status, personalismo, and charismatic leadership. Executive status is measured in terms of a "dominant" versus a "strong" executive. A "dominant" executive is one who, in general, is capable of "imposing his will throughout the government establishment," while a "strong" executive is one who is strong only within the executive branch.[45] This definition points to the degree of differentiation and equalitarianism in a political system. We expect to find a negative association between executive dominance and innovativeness. Table 3.13 shows no significant correlation between executive status and innovativeness. An explanation for this and some other unexpected results will be offered later in this chapter.

Personalismo and charismatic leadership are also expected to be negatively associated with innovativeness

TABLE 3.13

EXECUTIVE STATUS VERSUS
INNOVATIVENESS

Inno.	Dominant	Strong
High	Honduras Mexico Paraguay 3/6	Costa Rica Dominican Republic Lebanon 3/5
Low	Ethiopia Senegal UAR	Brazil Cameroun

Source: Banks and Textor, Op. cit., F.C. 179.

Difference of Proportions = 0.10

Irrelevant: Uruguay

Unascertainable: Argentina, Guatemala, Iraq and Peru.

Unascertained: Chad.

because they both denote a degree of traditionality. Tables 3.14 and 3.15 present the association of innovation with "personalismo" and "charisma" in leadership styles, respectively. Personalismo is defined as "the tendency of the politically active sector of the population to follow or oppose a leader for personal, individual, and family reasons, rather than because of the influence of a political idea, program or party."[46] Charisma, on the other hand, is a belief on the part of the population

TABLE 3.14

PERSONALISMO VERSUS INNOVATIVENESS

Inno.	Pronounced or Moderate	Negligible
High	Argentina Costa Rica Guatemala Honduras Lebanon 5/11	Mexico Paraguay 2/3
Low	Brazil Cameroun Chad Peru UAR Uruguay	Senegal

Source: Banks and Textor, Op. cit., F.C. 158.

Difference of Proportions = -0.21

Irrelevant: Ethiopia

Unascertainable: Dominican Republic, Iraq.

that their leader possesses qualities which go "beyond the qualities that most humans usually possess."[47]

Table 3.14 shows that personalismo is very slightly and negatively associated with innovativeness. On the other hand, as Table 3.15 shows, charisma as an ingredient of leadership is strongly and negatively correlated with innovativeness. There are no instances here of countries

TABLE 3.15

LEADERSHIP CHARISMA VERSUS INNOVATIVENESS

Inno.	Pronounced or Moderate	Negligible
High	0/5	Argentina Costa Rica Dominican Republic Guatemala Honduras Lebanon Mexico Paraguay 8/11
Low	Cameroun Chad Ethiopia Senegal UAR	Brazil Peru Uruguay

Source: Banks and Textor, Op. cit., F.C. 164.

Difference of Proportions = -0.72

Unascertainable: Iraq

with both high level of innovativeness and a pronounced or moderate degree of charismatic leadership.

Thus, we find that only two of the three characteristics of leadership style which were studied here are predictably associated with innovativeness. Of these, charisma was the most outstanding, probably because it is one of the most important traits demarcating

traditional societies. However, we cannot help but be puzzled by the lack of stronger evidence for negative association between innovativeness on the one hand, and executive dominance and personalismo on the other.

Now let us look at the role of the national legislature in a country, for the nature and extent of this role is an index of the degree of pluralism and equalitarianism in a polity.

The status of the legislature does seem to be related to innovativeness. Table 3.16 shows that countries with fully or partially effective legislatures--that is, countries in which the legislature is allowed to perform the "normal" functions of legislation at least partially[48]--tend to be innovative, while four out of five countries with ineffective legislatures are low on innovativeness.

The representative character of the regime is also relevant to innovativeness. If a movement toward equalitarianism-universalism by a system indeed frees its resources, we should find the governments with polyarchic or limited polyarchic representative systems to be more innovative than the pseudo- or non-polyarchic ones. Table 3.17 reports the findings on this point.

TABLE 3.16

STATUS OF LEGISLATURE VERSUS INNOVATIVENESS

Inno.	Fully or Partially Effective	Largely or wholly Ineffective
High	Argentina Costa Rica Honduras Lebanon Mexico 5/8	Paraguay 1/5
Low	Brazil Cameroun Uruguay	Chad Ethiopia Senegal UAR

Source: Banks and Textor, Op. cit., F.C. 175.

Difference of Proportions = 0.42

Unascertainable: Dominican Republic, Guatemala, Iraq, Peru.

Polyarchy, defined in terms of the extent of universal franchise, is indeed positively correlated with innovativeness. A very closely related characteristic is that of the nature of political leadership on the elitism-nonelitism dimension. This measure refers to the degree to which the leadership is recruited from particular and select racial, social or ideological groups. We expect the nonelitist leadership to be more associated with innovativeness, because nonelitism

TABLE 3.17

CHARACTER OF THE REPRESENTATIVE SYSTEM VERSUS INNOVATIVENESS

Inno.	Polyarchic or limited Polyarchic	Pseudo-polyarchic or non-polyarchic
High	Argentina Costa Rica Dominican Republic Honduras Lebanon Mexico 6/9	Paraguay 1/5
Low	Brazil Cameroun Uruguay	Chad Ethiopia Senegal

Source: Banks and Textor, Op. cit., F.C. 102.

Difference of Proportions = 0.46

Unascertainable: Guatemala, Iraq, Peru.

denotes universalism, and also because lack of restriction on the background and ideology of the members of the elites should enable them better to receive and perceive popular needs from all segments of the society. A system so disposed, in order to be able to remain effective, must have a greater degree of flexibility of resources than one not so disposed. This is due to the fact that the latter does not have to respond to as many varied demands, in virtue of the very built-in limitations

of power and wealth in a country. We expect, as have many other researchers, to find the less centralized systems to be more innovative.[49] The results are otherwise.

The data available from Banks and Textor are presented in Tables 3.19 and 3.20. Vertical distribution of power among the several levels of political structure is self-explanatory. Horizontal power distribution refers to the degree of "effective allocation of power to functionally autonomous" organs of government in each country.[50]

TABLE 3.19

VERTICAL POWER DISTRIBUTION VERSUS INNOVATIVENESS

Inno.	Effective or Limited Federalism	Formal Federalism or Formal and effective Unitarism
High	Argentina 1/3	Costa Rica Dominican Republic Guatemala Honduras Lebanon Mexico Paraguay 7/14
Low	Brazil Cameroun	Chad Ethiopia Iraq Peru Senegal UAR Uruguay

it imposes on its leadership strata, and thus on the sources and types of information it receives. However, Table 3.18 suggests no significant correlation between elitism and innovativeness.

TABLE 3.18

NATURE OF LEADERSHIP VERSUS INNOVATIVENESS

Inno.	Elitist or moderately Elitist	Nonelitist
High	Guatemala Honduras Mexico Paraguay 4/7	Argentina Costa Rica Dominican Republic 3/7
Low	Brazil Ethiopia Peru	Cameroun Chad Senegal Uruguay

Source: Banks and Textor, Op. cit., F.C. 161.

Difference of Proportions = 0.14

Ambiguous: Lebanon, UAR.

Unascertainable: Iraq.

We find the same puzzling results between innovativeness and other direct measures of equalitarianism-universalism, namely, the nature of distribution

of power and wealth in a country. We expect, as have many other researchers, to find the less centralized systems to be more innovative.[49] The results are otherwise.

The data available from Banks and Textor are presented in Tables 3.19 and 3.20. Vertical distribution of power among the several levels of political structure is self-explanatory. Horizontal power distribution refers to the degree of "effective allocation of power to functionally autonomous" organs of government in each country.[50]

TABLE 3.19

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High	Argentina 1/3	Costa Rica Dominican Republic Guatemala Honduras Lebanon Mexico Paraguay 7/14
Low	Brazil Cameroun	Chad Ethiopia Iraq Peru Senegal UAR Uruguay

Notes (for Table 3.19):
Source: Banks and Textor, Op. cit., F.C. 166.
Difference of Proportions = -0.17

TABLE 3.20

HORIZONTAL POWER DISTRIBUTION VERSUS INNOVATIVENESS

Inno.	Significant	Limited or negligible
High	Costa Rica Dominican Republic 2/4	Guatemala Honduras Lebanon Mexico Paraguay 5/10
Low	Brazil Uruguay	Cameroun Chad Ethiopia Senegal UAR

Source: Banks and Textor, Op. cit., F.C. 168.
Difference of Proportions = 0.00
Unascertainable: Argentina, Iraq, Peru.

Neither of these tables bears out the hypothesized association between the nature of distribution of power and innovativeness. Thus, the hypothesis is not supported that decentralized countries are more innovative than the centralized ones. In spite of their limitations,

these findings have some significance in that there are very few studies which have empirically addressed themselves to this important proposition.

The degree of economic equality within a society may also be considered an indicator of power distribution and, thus, a possible clue to the degree of a system's equalitarianism, and therefore, flexibility of resources. We can use the Gini Index of Inequality as a measure of this trait.[51] Bearing in mind that the higher the rank on this index, the lower the equality of distribution of agricultural land in the country, we expect to find a negative correlation between it and innovativeness. Table 3.21 reports the rank order correlations between the two.

TABLE 3.21

RANK CORRELATIONS BETWEEN THE GINI INDEX OF INEQUALITY AND INNOVATIVENESS

Areas of Innovation	Correlations
Malaria Control	-0.183
Malaria Eradication	-0.433
Mother and Child Care	0.179
Smallpox	0.284
Tuberculosis	-0.013
Venereal Diseases	-0.178
Composite I	-0.028*

* N = 12

Source: Russett, et al., Op. cit., pp. 239-240.

Although in the predicted direction, the coefficients tend to be extremely small, leading us away from accepting the hypothesized association between the equality of land distribution in a country and that country's innovativeness. Thus, as far as our population and the field of public health are concerned, there is no pattern of association between the innovativeness of a country and these fairly direct measures of the distribution of political power and economic wealth.

One plausible explanation of these unexpected results may rest on the fact that the distribution of power and wealth in a country are generally altered only at the very last stages of a country's evolutionary transition from traditional to modern. The same explanation also illuminates the weak relationship we found in the case of dominant versus strong executive status. These institutionally fundamental characteristics almost always lag behind other aspects of a social system in transition, and their change is usually associated with the final insitutionalization of a new order. Thus, many societies not yet at this advanced stage would surely still have undergone sufficient liberation of resources to support the kind of innovations considered here.

* * *

We began this section on political indices with the argument that the degree of a system's flexibility and reassignability of resources can be measured by the degree of a system's pluralism, equalitarianism, and universalism, as reflected in the relationship among the elite groups, style of leadership, the nature of power distribution, and the general disposition of the system toward change. Among the indices of the nature of leadership, we found executive stability, meaningful status of the legislature, polyarchic character of the system of representation, and the degree of freedom of opposition groups to be positively correlated with innovativeness. As to the style of leadership, we expected a negative correlation between innovativeness and charismatic leadership and we found one. Several other indices were found not to be associated with innovativeness as expected. These are the nature of distribution of power and wealth, executive status, and elitism. The explanation offered for lack of association between those traits and innovativeness was that these indices were probably the last ones to change in a changing social system.

By and large, characteristics indicating a system's change on a traditional-modern continuum were predictably correlated with innovativeness. Furthermore, the general

modernity of our units of adoption was also found to be associated with innovativeness. Bearing in mind that all these traits are indices of the degree of reassignability of a polity's resources, we have been able to find fairly compelling evidence for the hypothesis that not only the amount of resources available to a system is relevant to its innovativeness (as was shown in an earlier part of this chapter), but also the degree of reassignability of these resources within a social organization.

FOOTNOTES

1. Copp, Op. cit.

2. Guest, Op. cit., Chapter 7; Mansfield, "The speed of response of Firm to New Techniques," ; and Mansfield, Technical Change and the Rate of Imitation,".

3. Eisenstadt, The Political Systems of Empires, pp. 33-112; Hage and Aiken, Op. cit., especially pp. 514-516; Mytinger, Op. cit. ; Walker, Op. cit., p. 884. Also see: President's Conference on Technical-Distribution Research, Op. cit.; Markham, Op. cit.; and Richard Hall, et al. "Organizational Size, Complexity and Formalization," American Sociological Review, (1967), pp. 903-912.

4. Mohr, Op. cit., pp. 120-121.

5. Ibid., p. 120.

6. See: Mansfield, Op. cit.; Copp, Op. cit.; Hage and Aiken, Op. cit., and Mohr, Op. cit.

7. World Health Organization, International Digest of Health Legislation , (1956), pp. 158-159.

8. Havelock, et al., Op. cit., p. 6-15.

9. Ralph B. Kimbrough, "Community Power Structure and Curriculum Change," Strategies for Curriculum Change (Washington, D.C.; 1965), pp. 55-71.

10. Walker, Op. cit., pp. 894-895.

11. Ibid. Also see the following for a discussion of the roles and functions of professional organization and professions: Alvin W. Gouldner, "Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles," Administrative Science Quarterly, (1957), pp. 281-306; Fred E. Katz, "Occupational Contact Networks," Social Forces, (1958), pp. 52-58; Jack Ladinsky, "Occupational Determinants of Geographic Mobility among Professional Workers," American Sociological Review , (1967), pp. 253-264; Merton, Op. cit.; and Harold L. Wilensky, Intellectuals in Labor Unions (Glencoe: Free Press,1956).

12. Mohr, Op. cit., pp. 117-119.

13. Hage and Aiken, Op. cit., p. 509.

14. Carlson, Op. cit., Chapter 4.

15. William Kornhauser, "Professional Incentives in Industry," Scientists in Industry, Conflict and Accommodation (Berkeley: University of California Press, 1963), pp. 117-157.

16. McClelland, Op. cit., pp. 37 ff.

17. Ibid.

18. See Chapter I. Also see Walker, Op. cit.; and Richard M. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs: Prentice-Hall, 1963), pp. 278-279.

19. See Hubert M. Blalock, Social Statistics (New York: McGraw-Hill, 1960), p. 340.

20. Mohr, Op. cit., pp. 123-125.

21. Ibid., p. 125.

22. On this point see Hubert M. Blalock, "Theory Building and Statistical Concepts of Interaction," American Sociological Review, XXX (June, 1965), pp. 374-380.

23. See, among others: John W. Atkinson, "Motivational Determinants of Risk-Taking Behavior," Psychological Review, LXIV (1957), pp. 359-372; Mohr, Op. cit.; E.B. Palmore and P.E. Hammond, "Interacting Factors in Juvenile Delinquency," American Sociological Review, XXIX (December, 1964), pp. 848-854.

24. Lerner, The Passing of Traditional Society, p. 60.

25. McCrone and Cnudde, Op. cit., p. 78.

26. Etzioni, The Active Society, pp. 507-510.

27. Lerner, Op. cit., p. 58.

28. Ibid., p. 60.

29. Banks and Textor also found a similar relationship between literacy and newspaper circulation. A Cross-Polity Survey (Cambridge: The MIT Press, 1963), Finished Characteristics Nos. 45 versus 54 and 55 in the computer print-out section. They also found a high degree of association between literacy and urbanization. See F.C. 45 versus 29 in the same section. Also see: Walker, Op. cit. He found a strong association between literacy and innovativeness, and urbanization and innovativeness. Also see Eisenstadt, The Political Systems of Empires on the importance of the cities for the facilization of the government-people communication.

30. Lerner also recognizes that his model, based on the Western countries does not apply completely to the post-war Middle East, due to a very rapid "diffusion of cheap (or free) radio receivers" among the people. Op. cit., p. 67.

31. Kirabayesh and El-Khatib, "Communication and Political Awareness in the Villages of Egypt," Public Opinion Quarterly, XXII (Fall, 1968), pp. 357-363.

32. McClelland, Op. cit., pp. 192-196.

33. Carlson, Op.cit., pp. 51 ff. He defines cosmopoliteness in terms of advice-seeking and professional meeting attendance by superintendents and the geographical proximity of these two sources of information.

34. Walker, Op. cit., p. 881.

35. Havelock, et.al, pp. 4-28 ff. in Chapter 6.

36. Lerner, Op. cit., p. 54.

37. See for example, Lerner, Op. cit., p. 60; McCrone and Cnudde, Op. cit., p. 78, and Walker, Op. cit., p. 884. The reader should be reminded that although Lerner does not use any direct measure of industrialization, he subsumes it under the index of urbanization. See, p. 58.

38. Lerner, Op. cit., p. 67.

39. Ibid., p. 58.

40. Eisenstadt, Op. cit., pp. 27-28, and 30-112.

41. See Chapter I, especially the citations of note 13.

42. See Banks and Textor, Op. cit., pp. 78-80 for more detailed explanation of these concepts.

43. Walker, Op. cit, p. 887. Also see Lowi, Op.cit.

44. Russett, et al., Op. cit., pp. 101 ff.

45. Bank and Textor, Op. cit., p. 112.

46. G.I. Blanksten, in Harold E. Davis,(ed.), Government and Politics in Latin America (New York: Ronald Press, 1958), p. 114, quoted by Banks and Textor, Op. cit., p. 102.

47. Banks and Textor, Op. cit., p. 104.

48. Ibid., p. 110.

49. See Etzioni, Op. cit., pp. 518-519 ; Havelock, et al., Op. cit., pp. 6-24 and 6-25 to 6-36 ; Griffiths, Op. cit.; B.J. Feltz, "Conditions for Innovation," Organizational Theory: A Behavioral Approach, eds. W. Hill and D. Egans (Boston: Allyn and Bacon, 1966), pp. 501-504 ; R. Beckhart, "An Organization Improvement Program in Decentralized Organization," Journal of Applied Behavioral Science II (1966), pp. 3-25, and Schon, Op. cit.

50. Banks and Textor, Op. cit., p. 106.

51. See Russett, et al., Op. cit., pp. 237-238 for an explanation of this index and the method of computing it.

CHAPTER IV

CONCLUSIONS AND IMPLICATIONS

That change is an increasingly pervasive element in the social processes of our time needs no elaboration here. It is also redundant to say that the understanding of dynamics of social systems cannot be complete unless it includes an understanding of processes of change and innovation at the level of societal collectivities. The previous chapters have shed some light on this process. Let us review and summarize the thesis and findings of those pages.

The thesis of this research undertaking is that innovativeness among social collectivities is determined by motivation to innovate and the availability of resources necessary to bring about such innovations. Within the cybernetic framework of a structural-functional model, we defined motivation as awareness by the system of a need and of the remedy for that need. Motivation, thus viewed, becomes a function of the communication network which enables a system to receive and to perceive relevant information in regard to both of these elements.

Resources were approached not only in terms of the material and non material goods available to the system, but also in terms of the configurations of available material and other resources and the ease with which such configurations may be altered.

Using nation-states as our units of analysis, we found that:

1) The extent of a country's internal communications media and channels of communication with the outside world were positively correlated with that country's innovativeness.

2) The amount of resources in a country in general, and resources directly related to the specific innovations in particular, were positively associated with the degree of its innovativeness.

3) Of those indicators used to measure the nature of the predispositions of a country toward change and reassignability of its resources, many were predictably associated with innovativeness. Among these, the status and degree of the legislature's effectiveness as a policy-making body, representativeness of decision-making strata in a society, and modernity of the political and bureaucratic structures stood out. These indices denote the degree of flexibility, decentralization and generally innovative mood of a country. On the other

hand, while a degree of executive stability was found to be positively correlated with innovativeness, elements and traits of leadership usually believed to be associated with unresponsive, ascriptive, and rigid governments, such as dominance of the executive, personalismo and charismatic style were found to be negatively associated with innovativeness, with varying degrees of strength.

Therefore, in general terms, our findings confirmed our thesis. Now let us take a very brief glance at the most salient methodological considerations and contentions of the present study.

First, social collectivities are viewed to be more than just aggregates of individuals. They are considered to be structured collections of social positions and subsystems and, as such, they have properties and characteristics which are uniquely theirs. This is a very explicit rejection of the assumption that organizational traits are collections of the traits of the individual members in an organization. Thus, the analysis in this study is at the level of social collectivities, and whenever individuals are discussed such discussions are focused on the organizational ramifications of individual behavior.[1]

Secondly, we explicitly reject the notion that

motives of an "actor" can be logically and necessarily deduced from his actions.[2] By so doing we free our imagination to search for different and more reliable means of detecting and measuring motives on the societal level of analysis. One example of such measurement is the use of the extent of communications media as one qualified index of a nation's motivation to innovate.[3]

The choice of public health innovations enabled us to study innovativeness among developing countries without having to consider too many interfering factors which are involved in any political decision-making process, especially in countries where resources are very limited and areas of public action are very numerous. Most of these factors are eliminated from this study due to the relative uniformity of the nature of innovations we chose. In particular, since all innovations studied here belong to the same field of public action, they are relatively free of striking variations in prestige value. The prestige value of an innovation is an important factor in general. In the developing countries where the competition among various projects to be undertaken is very keen, it assumes especial importance as a factor in decision-making.[4] Improvements in public health standards cannot compete for attention and funds with national airlines, huge dams, or large

governmental buildings because the former seldom lends itself to propaganda and public relations manipulation designed to further a nation's pride and self-esteem as the latter do. By studying several innovations within the same field, we have eliminated, to a large extent, the complications of comparison of innovations from various fields.

In the following pages we shall first entertain the theoretical and methodological implications of the present research, also elaborating upon areas in which further research and refinement are needed, and then we shall discuss practitioner-oriented implications of our study.

THEORETICAL AND METHODOLOGICAL IMPLICATIONS

The first point to be mentioned is the general theoretical framework within which our conceptualizations and research operationalizations were made. The cybernetic model of social organizations, coupled with a structural-functional viewpoint, helped us not only to conceptualize our primary variables but also to derive suitable hypotheses, and operational schemes to verify those hypotheses. For instance, our approach to organizational motivation, resources and configurations of resources is based on a communications viewpoint of

organizations, with adequate understanding of structural and functional interdependencies of various sub-units within the overall social system. We shall elaborate upon these specific concepts shortly, but here we have to emphasize, and urge the reader to bear in mind the fact that, while these concepts do not belong exclusively to the cybernetic model, research and operational definitions of them used to verify our hypotheses were very much dependent on that model. It led us to approach motivation in terms of awareness of systemic problems and of solutions to those problems, and to measure it by comparing the development of communications networks. The model also enabled us to measure organizational motivation in a fashion congruent with our sociological viewpoint. Unlike previous studies of organizational motivation, we were able to operationalize this concept without having to rely upon the measurement of any characteristic of individual members.

It is our conviction that the cybernetic model merits a great deal of further exploration as a framework for the study of organizations and innovation. Almost all of the refinements in theory and methodology suggested in the subsequent paragraphs may be approached within the cybernetic, structural-functional framework.

The second theoretical point to be reviewed relates

to the employment of resources and motivation as fundamental concepts related to innovation by organizations. This approach, first suggested by Mohr[5] and further elaborated in this study, has far-reaching implications for the theory of social change as well as organizational and individual innovation. Some of these implications will be discussed in a later part of this chapter, others will be pointed out here as we continue to summarize our findings regarding these concepts.

We were able to show empirically what Mohr had suggested theoretically, that size, in itself, is unrelated to innovativeness and that the concept of "size" should, as should all concepts, be approached and operationalized very carefully so that it is not "contaminated" by other factors thus misleading the researcher to theoretically unsound conclusions. Our evidence provides support for Mohr's conclusion that size is important for innovation only insofar as it is actually a measure of motivation and resources.

Our work also indicates the importance of the concept, "reassignability of resources," and suggests that it might possibly replace similar, but less operationally suggestive concepts such as "obstacles to innovation."[6] Our data confirmed the hypothesis in

this respect that in addition to the amount of resources possessed by an organization, the flexibility of commitments and configuration of these resources determined an organization's likelihood of innovation. This concept embraces a great many factors such as vested interests, power conflicts, individual resistance to change, the congruence of the new ideas with the old system, etc. There is now a need for further work to be done to explore the theoretical potential of this concept.

There is still another area in which further work needs to be done. The nature of the relationship between motivation and resources on one hand and innovativeness on the other, requires more refinement and understanding. We have indicated our agreement with Mohr's theoretically sound contention that for this relationship a multiplicative mathematical model is probably most meaningful .[7] However, neither he nor we could find empirical evidence to provide strong support for this hypothesis. We would therefore, strongly urge that future research be designed and undertaken specifically to discriminate between the multiplicative and additive models.[8]

Lastly, it is worthwhile to remember that the process of social innovation, especially within the theoretical framework adopted in this study, is very

similar to the process of learning. They both involve relatively enduring change in the pattern of the systemic response to stimulus. Hence, it would appear to be very profitable for scholars engaged in either of the two disciplines to monitor the studies and findings of the other.

IMPLICATIONS FOR PRACTITIONERS

There are at least three groups of practitioners for whom this research has implications: national policy-makers, leaders of international organizations, and reform-minded social activists. It is with the implicit understanding of the overlapping nature of these three groups that we proceed to elaborate on the implications of our study for each group, in that order. In other words, the reader is urged to bear in mind that in many cases national policy-makers are also leaders in international agencies, and also perceive themselves to be social activists on both levels.

Implications for National Policy Makers

In the developing countries there are many sources from which demands for action and change have originated, and will continue to originate. National policy-makers should accept this as a fact of life in the second half

of the twentieth century. What they should aspire toward is the steering of the course of their nations in such a way that, in the long run, most demands are anticipated and met with little delay, and the fulfillment of these demands is accompanied by an intelligent sensitivity to the priorities which a nation must set up, and with a statesmanlike anticipation of the implications of each and every solution they adopt for the future of their nation, their region, and the world. Let us elaborate on these points.

We have already shown that the expansion of the media of mass communication as well as urbanization, industrialization and educational improvements in a country are elements which contribute directly, or with the intervention of other factors, to greater popular awareness of other peoples and the solutions they have found for common problems. Along with this phenomenon the intelligentsia of the developing nations are also being exposed to their counterparts in the Western countries. This exposure leads to professionalism of the educated, thus establishing a continuous flow of information about new ideas, ideals, practices and products. Professionalism in this sense is not confined to the few traditionally viewed professions such as medicine, law and the like. It encompasses the whole

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array of disciplines of human thought, knowledge and art.

The end result is the growth of popular demands for a "better" or a "good" life--one, of which the people have read in the newspapers, heard on the radio, seen on the screens of television and cinema; a life style which, the people are told by their educated elite, is not accessible to them because they never wanted it before and not because, as a proud--even if new--nation they are not worthy of it, or they do not have the funds to purchase it, or the knowledge to build it themselves. Seldom are the people told that, although some of their problems are not new but only recently perceived, many of their problems are unprecedented in their country because these issues are peculiar only to the industrial and urban societies, and even the Western countries have to cope with them.

Thus, there seems to be almost no end to the increasing demands of peoples upon their governments. The old solutions of controlling the sources of such demands does not work in the ever-expanding and anti-isolationist world of our era. This particular solution cannot work in the long run. The channels of communication with the outside world may be controlled for a while and to a degree, but cannot be shut off for long.

The game of politics, thus, becomes, in part, the generation, aggregation and articulation of popular demands by factional groups. Those who promise more win the public confidence and, by manipulating the popular demands thus generated, they attack the commitments, abilities and potentialities of their opponents. Those who, on the other hand, try to bring realism into the discussion are doomed to lose, at best, and to be branded as traitors, at worst. In the transitional stage of political development due to nonexistence of any framework within which and according to whose rules the game of politics is played, to lose public confidence or to be wrong in a proposal is often interpreted as equivalent to treason. Because there are no yardsticks against which the intentions of political actors are measured, sincerity and good intentions have become irrelevant. To be right is the same as being sincere and is often rewarded with high office, and to be wrong is to be insincere and, not infrequently, punished severely.

In this political atmosphere the best remedy for false hopes, expectations and demands due to <u>some</u> exposure to the West is probably <u>more</u> exposure to the West. Rather than controlling the flow of information into a country, a wise leader would flood his people with information. By so doing, the people would be

in a better position to judge for themselves if they still want what they thougth they wanted before knowing the price that other nations had to pay for it.

However, this is not all. While openness may introduce a degree of realism into the game of politics, the task of the statesman remains undone. No matter how extensive the exposure of a people is there are implications that such exposure, and the consequent mobilization of the society, have that must not be forgotten.

First, societal awareness of needs and of remedies have to be coupled with a degree of satisfaction of these needs to prevent unnecessary frustrations. As Deutsch has suggested, by careful examination of the seemingly small variations and changes[9] as well as other survey methods, potential problem areas can be predicted and necessary action can be taken. For instance, population increases, movements of people into cities, expansion of people's desires for higher and better education for their children, etc. can be studied, projected and predicted, so that when these changes reach the threshold of criticality--i.e., when the quantitatively small changes have accumulated to result in a qualitatively different situation--the policy-makers have already made necessary adjustments and provided for meeting such qualitatively novel situations and the demands therein.

In this regard, developing nations can learn from the experiences of the West about the consequences of ill-considered solutions for technological-social problems. For instance, while taxis and private automobiles are relatively satisfactory solutions to the problems of transporting people and goods in a city, there reaches a point when such vehicles become too numerous to be efficient. A mass transit system must have already been studied, approved, and constructed when this point is reached in order to meet the qualitatively different needs of the new situation.

This approach should also include consideration of the effects of proposed solutions for problems on the other areas of human existence. Thus, while transportation problems are being resolved, polluting effects of power plants used for such a transit system must not be overlooked. A futuristic attitude twenty years ago may have resolved many of the present environmental problems of to-day America, even before they arose. The same type of attitude to-day can prevent many issues from becoming such twenty years from now.[10]

Secondly, social mobilization has an essentially nationalistic, equalitarian, universalistic effect on the political system of a country. As was mentioned in

Chapter I, it enlarges the politically relevant strata of the population; it expands the range of human needs that governments are called upon to fulfill; it increases the role of government in the economy; it generates pressures for administrative and political restructuring of the existing systems; it calls for a broadening of the bases of origin and support of the political elite; it generates a fervor of nationalism, and it results in increased political participation by the general public.[11] These conditions, unless checked by other characteristics of a system can easily lead to the emergence of what Kornhauser calls a "mass society," in which "both elites and the non-elites are directly accessible to one another by virtue of the weakness of groups capable of mediating between them."[12] The result is mass politics which denotes large number of people engaged in political activity "outside of the procedures and rules" instituted for such activities by the society.[13] In transitional societies where, as was stated before, these very rules and procedures are being questioned, changed and developed, this danger is much more present than in modern political systems.

The fundamental danger of mass society, and mass politics is in their tendency to erode the systemic procedures through which the decision-making centers are

capable of receiving, interpreting and acting upon the needs and wishes of the people, and to distinguish between such needs and popular caprices. Unless the policy-making centers are protected against the every-day ups and downs of popular sentiments, the society starts to drift, the result of which is frustration and alienation of the masses, on the one hand, and growth of dangerous demagoguery among the leaders, on the other. The people whose every whim is acted upon become disillusioned because fulfillment of caprices is not exciting; thus they lose any sense of mission and self-esteem they may have possessed. The leaders, on the other hand, find it increasingly useless to reason with their followers, and begin to appeal to the latters' fears, hatreds and passions.

All the conditions that Kornhauser suggests to prevent the development and emergence of mass society can be summarized in one concept--pluralism. Pluralism denotes that the elite and the nonelite are separated by many intermediary groups; that there are various levels of self-government between the individual citizens and the national policy-making body; and that a degree of competition and checks and balances exist among the elite.[14] None of these characteristics are detrimental to a government's responsiveness to its citizens' needs.

As a matter of fact, we were able to show that competition and freedom of the opposition groups in a polity were positively correlated with innovativeness. Thus, pluralism augments a society's decision center's ability to respond to the needs and drives within it. It also augments its ability to receive, perceive, and act upon information regarding changes in the environment of the society. We have also shown that transitional societies have already moved toward a degree of pluralism. With the aid of the modern means of communication this process can readily be accelerated to create viable modern and pluralistic societies.

To summarize, the political elite and national policy-makers in the developing countries are urged to consider and to recognize the implications of the expansion of communications media in their countries in terms of the rise in their peoples' needs and demands. They are advised to look forward in their planning and decisions, preparing themselves for future problems before they arise and, in so doing, also to consider the costs involved and the side-effects derived from each innovation they adopt and each policy they implement.

At the same time it is argued that the flow of information should be encouraged in a society, because, in the long run, any control of such flow will prove

futile, and because it is only through knowledge that a sense of realism can be injected into the political picture, especially when national dreams are being painted in these countries as at present.

Finally, we cannot exaggerate the importance of the consequences of national policy makers' actions in the developing countries, at this stage of transition, for the future of such nations. We have already argued that the systemic movement from the traditional style to the transitional has freed certain resources in these countries, the employment of which in the long run would determine the nature of the society. Although it is very unlikely that societies so transformed will ever return to their original state of traditionality, the relatively more pluralistic, universalistic, and equalitarian nature of the transitional stage of development does not necessarily expand as societies enter the next modern stage. There have been too many modern bureaucratic totalitarian regimes in the recent history of the West to allow us to entertain such a contention seriously.

Thus, it becomes an undeniable responsibility of the national policy-makers in the developing nations to consider the systemic consequences of their decisions and actions. In other words, it is not enough to take into account the side-effects of projects and programs

in terms of material and human factors. One must also study and analyze psychological value, motivation and other systemic ramifications of each specific action, because, in the long run, these are the factors which determine the extent of a government's responsiveness to the needs of its citizens. Without such responsiveness it becomes only a matter of time before dictators dominate the system.

We have shown that pluralism, equalitarianism, and universalism are systemic traits which characterize most responsive systems. Such other characteristics as industrialization, urbanization, freedom of opposition groups, polyarchy of the representative systems, role of the legislature, literacy, communications media, etc. are either manifestations of those three characteristics or contributors to those traits as well as measures of motivation and resources. While the latter two concepts are very useful theoretical concepts, practitioners and decision-makers who are not theoretically inclined may want to use pluralism, universalism, and equalitarianism as yardsticks against which they can analyze and measure the systemic consequences of their actions. Of several alternatives in each action, that one should be chosen which enhances these qualities in the system most.

Implications for International Organizations

There are several implications in this study for international agencies whose goals cannot be achieved but through the actions and cooperation of their member-state such as the World Health Organization, International Labor Organization, UNESCO, and the like. Foremost among these implications is the fact that resources and motivation to innovate are the most important factors in adoption of international agencies' proposed programs by national governments. Both of these determinants are open to manipulation by such agencies.

International organizations, in order to be effective in the achievement of their goals in the long run, must assume a long-range attitude toward their work. Such an attitude makes it possible for them to focus their attention on the fundamentals of their tasks and the development of strong national resources relevant to their work in the member-states. In other words, the World Health Organization would be acting very wisely if it applied a large share of its resources to the training and education of the medical resources of its advanced members. This policy in the long run, will pay off handsomely for two reasons. First, whenever a health measure is introduced by the WHO, its member-states, having the necessary manpower resources to devote

to it are more likely to want to adopt it and to be able to do so. Secondly, as we pointed out in Chapter III, doctors and nurses are very effective and valuable channels of communication of information to the people. Being highly educated, they are also very influential in the developing countries, especially on matters relevant to health.

The same is true about other agencies. Developing the national resources, especially in terms of trained manpower, enables a member-state to be more receptive to proposals for action not only because there already exists the necessary resources but also because such trained professionals function as information sources for gradual introduction of such policies, as well as strong groups advocating and supporting such policy changes. In the long run, therefore, international organizations would also help the emergence of a pluralistic society wherein every interested group has a chance to be represented and heard.

In the short-run, and with the existence of the minimum of relevant resources in a country, internationally proposed projects, programs and policies stand a better chance of being adopted if the concerned international agencies devote their efforts to the generation and manipulation of national motivation to innovate. In this

type of campaign the objective should be to make a country aware of a problem, and also aware of the availability of solutions to that problem.

In the short or long run, the major sources of change, and especially of significant change, are likely to be outside a system. This contention of Katz and Kahn,[15] although not unanimously accepted by students of innovation, is at least partially true. That is to say, whether or not we agree that such sources are exclusive agents of change, they still remain very important. Let us not forget that the innovations studied here originated from an international agency, and might not have been adopted otherwise. International organizations should not lose sight of this fact, and should augment their effectiveness by developing and involving internal sources of change within their member-states. Such awareness of their own roles is fundamental to the effective functioning of international agencies.

International agencies can also be regarded as social systems in which nation-states function as subgroups. To the degree that the leaders of these agencies emphasize this point and direct their efforts toward higher cohesiveness in those systems, they can expect to benefit from certain characteristics of such systems which promote adoption of innovations by the members.

Foremost among these are the norms and value systems of the agency as a whole. Although there are no studies available on the level of international organizations, there is enough evidence from studies on small and large groups to convince us that when the norms and values of a group favor change and progressiveness, individual members, (in this case, states) innovate faster and more often.[16] Adoption of similar norms by international agencies should facilitate acceptance and adoption of their program by their members.

In summary, international agencies would do well to devote some of their efforts and resources to the development and training of resources and manpower related to their work at the nation-state level. Such a program offers them several advantages. First, when new proposals are made for new policies, national governments need not worry about lack of manpower and other resources. Secondly, such trained personnel function not only as the people who will carry out the newly adopted projects, but also as channels of communication to the national systems of the latest information in their own fields as well as being strong pressure groups whose advocating of such proposals carries powerful weight in the developing countries due to the respect which the educated command. Thirdly, in such training

programs innovativeness may be developed as a virtue, thus enabling the international organizations to establish a norm which values openness to change. Fourth, a well trained, highly informed group of concerned professionals in each country can function as receptors for their respective international agencies, informing the latter of the needs and drives which exist in each country. Through the process of aggregation of these pieces of information, international organizations, as well as national agencies, would be able to develop more meaningful and relevant programs.

Implications for Social Activists

There is a third group of individuals in the developing countries as well as in the advanced nations, whom I call social activists, who aspire to but are not yet in positions of leadership, and who desire to understand change. They feel that such understanding and a knowledge of the methods of introducing change not only provide them with the necessary tools they need when and if they achieve their aspiration of leadership, but also that such knowledge enables them to pursue their goals with the conviction that change is indeed possible.

This latter point requires elaboration. Throughout

this paper, and especially in the first chapter, the point was made that social systems are interwoven entities in which, with some variations from system to system, every sub-unit is interdependent with every other sub-unit. When this point is applied to societies, and every aspect of their norms, values, relationship with their environment, political and economic structures, one wonders if there ever is a chance to change any aspect meaningfully without having to destroy the society completely. It is with appreciation of and elaboration upon this point that many radical movements recruit their members, namely, that everything is so tightly interdependent on everything else in a social system that it can never be changed, unless it is entirely destroyed and rebuilt according to a specific blueprint. Regardless of the details of any such blueprint, appealing to such reasoning betrays a certain naivete on the part of its advocates.

Social systems are not similar to very precisely engineered and manufactured mechanical systems, with a very small range of tolerance for any sub-unit's degree of fit. Indeed, there is a vast range of variations of conformity among various sub-systems of a society. The political-management sub-units of social organizations are to ensure that these variations do not exceed acceptable limits, and not to discourage all nonconformity.

Thus, social activists should bear in mind that it is theoretically possible to achieve radical change in a society, in the long run, without the overthrow of all societal units. Such a viewpoint, regardless of the ideological systems which ride upon it, should enable the social activists in all societies to endure and to pursue, and eventually to test their capabilities, originality and vision.

Before we elaborate any further on this point and on the ramifications and mechanisms of social change we have to remember that a great many social changes, especially the kind studied in previous chapters, are organizationally adjustive behaviors and, as such, they require that the society be a system and not a conglomeration of unrelated, independent groups within a geographically defined area, as is still too often the case in varying degrees in the developing countries.[17] Where such conditions exist the first task is that of nation-building which, as far as this writer is concerned, means much more than (and need not even emphasize) inspiring a sense of nationalism. It means establishment of meaningful and effective social institutions, which demand and receive respect and loyalty from the citizens, and a citizenry which recognizes and willingly accepts such institutions and the interdependence that

the latter encourages among its sub-units. Other characteristics of a nation advanced by other scholars, such as racial, cultural and linguistic homogeniety, common heritage, etc. are facilitators of that end but should not be considered necessary prerequisites of a nation.

Regardless of the existence of a "nation" or having to build one, social activists should also devote some attention to the basic values of their society. Where a "nation" does not yet exist the leaders do have the option of determining and developing a value system which is, in Etzioni's terminology, "active". In other cases conscious effort must be devoted to the creation of such a value system. The major elements of an active value system are those of commitment to a social goal, being informed, and participating to achieve access to political power to realize their societal goals.[18] All of these elements involve either access to channels of communication and information or ability to master and to alter the configurations of resources needed to achieve social objectives.

The social activists are in the best position to devote their efforts to the generation, formulation, and formation of a value system in which those elements are consciously included. In the long run their efforts

so spent will benefit them and their societies in terms of facilization of social reforms, provided that these social activists do sincerely advocate these values, and continue to do so even after they taste the "corruptive" gusto of power.

What is said in the above pages should not make us forget that in any attempt to change, the target of change and the process through which such change is to occur must be scrutinized in advance. Closely related to this point is an awareness of our limitations and of our knowledge of social dynamics. It is, therefore, essential to consider and to provide for the study of side effects of each action. In the final analysis, it is awareness of and attentive following of these points which determine national success or failure.

FOOTNOTES

1. On this point see : Hage and Aiken, Op. cit., pp. 505-507, and also Chapter I of this study.

2. For further elaboration on this point see: McClelland, Op. cit., p. 37.

3. For the qualifications associated with the use of this index, see Chapters I and II.

4. On the issue of demonstrability of innovations and their adoption see the following: Katz, Levin, and Hamilton, Op.cit.; H. Menzel, "Innovation, Integration, and Marginality: A Survey of Physicians," American Sociological Review, XXV (1960), pp. 704-713 ; and F.C. Fliegle and J.E. Kivlin, "Attributes of Innovations as Factors in Diffusion," American Journal of Sociology, LXXII (November, 1966), pp. 235-248.

5. Mohr, Op. cit.

6. Ibid., pp. 118-119.

7. Ibid., pp. 123 ff.

8. A closely related question of theory is the nature of relationship between given increments of motivation and/or resources and increases in innovativeness. In other words, when we increase resources of a social system by, say, two units, can we expect to observe a two-unit increase in innovativeness (as an additive model would suggest), a multiple of two units (as a multiplicative model would require), or should we look for a model in which variations in motivation and/or resources cause changes in the degree of innovativeness only in "quantum"-type steps, within either of the additive or multiplicative models. Such a quantum model would speculate that innovativeness would vary only in specific quantities, and variations in motivation or resources which are less than the required amounts to increase innovativeness a complete step, would not result in any change in innovativeness. Within such a model, if and when verified, we would be able to study the take-off point concept of innovativeness, which would stipulate that an organization would not innovate unless the amounts of its resources,

and/or motivation reaches a certain magnitude.

9. Deutsch, "Social Mobilization and Political Development," pp. 502 ff.

10. One of the major problems in the developing countries is that in their enthusiasm to grow and to complete impressive projects they disregard the most fundamental problems which, although not technological, are indeed devastating. For example, building dams has always produced fertile grounds for certain type of snail which hosts an uncurable disease. However, we have too often heard that these problems will be solved as soon as they arise. A very good collection of cases is now in the press, which should prove to be very helpful in pointing out many similar problems. It is T. Farber and J. Milton (eds), Careless Technology (New York: National History Press, 1971).

11. Deutsch, Op. cit., pp. 497-502. Also see Chapter I of this paper, note 19.

12. Kornhauser, The Politics of Mass Society, p. 228.

13. Ibid., p. 227.

14. Ibid., pp. 228 ff.

15. Katz and Kahn, Op. cit., pp. 448-449.

16. For example, see: Marshall H. Becker, "Sociometric Location and Innovativeness: Reformulation and Extension of the Diffusion Model," American Sociological Review, XXXV (April, 1970), pp. 268-269.

17. On the prerequisites of adjustive developments in organizations see Blau, Op. cit., pp. 256 ff.

18. See: Etzioni (ed.), Readings on Modern Organizations, pp. 192-197 , and Etzioni, The Active Society, pp. 4-5 and 22-36.

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