A THEORY OF INNOVATION DIFFUSION AND ITS APPLICATION
TO INDIAN EDUCATION AND COMMUNITY DEVELOPMENT

DISSERTATION

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By

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*** ********

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PUBLICATIONS


"Innovation Research and Theory." Columbus: School of Education, Ohio State University, 1965. (Mimeographed)
FIELDS OF STUDY

Major Field: Communications and Educational Media

Studies in Communication Theory. Professors Edgar Dale, Robert W. Wagner at Ohio State University, and Professor Harvey Black at Indiana University

Studies in Foundations of Education and Communication, Professors James B. Christoph, Erika E. Bourguignon at Ohio State University and Professors Philip G. Smith, Melvin DeFleur, Malcolm L. Fleming, Lee H. Stoner at Indiana University

Studies in Programmed Instruction and Instructional Technology. Professor Edgar Dale at Ohio State University, and Professor Henry A. Barn at Indiana University

Studies in Design and Production of Educational Media. Professors Harvey Frye, Bruce Muckley, Seymore Friedberg, Beryl E. Blain at Indiana University

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Studies in Research Design and Methodology. Professors Egon G. Cuba, David L. Clark at Ohio State University and Professor Lawson E. Hughes at Indiana University

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CHAPTER I

PROBLEM, OBJECTIVES, AND PROCEDURES

Introduction

The phenomenon of cultural evolution of man can be viewed in terms of his increasing capacity to control the environment. This process, until we started down the inclined plane of today's world, has been slow but, nonetheless, fascinating. It has been a product of dream and reality, of search and accident; a play between Utopias and theoretical models.

Human control of the physical environment has a longer history than man's interest in his own private universe or social organization. Social sciences are comparatively new. Experimental psychology dates from the establishment of Wilhelm Wundt's Psychological Laboratory at Leipzig in 1879, less than a century ago. In sociology the major influences of contemporary interest have all appeared in this century, and the more significant of these since the postwar years. The study of communications as a discipline does not go farther back than two or three decades.

The social sciences, sometimes also called behavioral sciences, though young in years are not wanting in maturity. They have come of age. The new sciences of human behavior, naturally, have drawn upon the intellectual and methodological resources of the physical and biological sciences in theorizing, experimenting, and generating knowledge.
This has enabled social and behavioral scientists to produce, in a bare half century, an impressive fund of ideas and concepts, some of which have been rigorously tested in the field.

The temper of our times has provided the behavioral and social scientists a truly splendid opportunity. They have been asked to help promote group harmony, improve living standards of nations, increase productivity of economic systems, build integrated communities, accelerate social education programs, and guide evolution of groups and institutions through self-knowledge, self-help and growth. These opportunities have occurred both in advanced and under-developed countries. During the past two decades many newly independent countries have been added to the community of nations. These new nations represent people looking for richer and better lives comparable to the best that other nations have made possible for their citizens. Most of these nations, therefore, are working for planned social change as part of their national policies. At the same time the advanced nations of the world, under stress of ideological imperatives or in pursuit of excellence, are working hard to maximize the outputs of their social, educational, economic and technological systems.

These needs have naturally made heavy demands on the intellectual communities of the world, and the social science departments in the universities are in the very thick of the battle. Though the opportunity for experimentation in the behavioral sciences is new and the major breakthrough is yet to come, the study of the phenomenon of change is not new to universities and research institutions. For instance, the social anthropologist's interest in enculturation goes far back in years though it has consisted almost wholly in the
dynamics of cultural change in primitive groups. More recently, and more directly, the problems of innovation diffusion have claimed the attention of writers and researchers in the area of anthropology, rural sociology, political science and public opinion processes, agricultural extension, advertising and marketing, medical sociology, communications, group dynamics, and education.

Understandably, considerable research is available. For instance, the tradition of innovation research in rural sociology has provided useful insights in the characteristics of acceptable ideas and new tools, has explained the role of change agents, and has given us the concept of adoption by stages. Public opinion research rediscovered the primary group; advertising and marketing has contributed some action strategies for change. Research in communications has improved our competence in the transmission of meaningful messages and preparation of effective communication materials.

This research, however, has many different parameters. Its hypotheses and findings have various theoretical orientations. Until recently, there had been no dialogue between the various disciplines and no real confrontation between experts in various fields. This deficiency has now been recognized and efforts are being made to bridge the gap and provide opportunity for a cross fertilization of ideas.

The interest today in an integrated approach to the problems of guided evolution or planned change is high and it was in this mood of stocktaking and consolidation at American universities that the problem investigated here suggested itself.
The Problem

In the introductory section it was stated that a sizeable fund of knowledge of specifies in the field of innovations was available but an integrated approach was yet to be developed. In the report of the "Symposium on Identifying Techniques and Principles for Gaining Acceptance of Research Results of Use of Newer Media in Education," held at Lincoln, Nebraska, during November 24-27, 1963, W. C. Naierhenry wrote:

...There are not as yet well developed theories of innovation in any field and certainly not in education. Further, since various theories are just now being postulated, there are no clear, neat models from which to work.... However, there is a wide range of variables which are known to have significance for innovators either singly or in combination with each other.  

The problem of the field of innovation then clearly was to develop a general theory of innovation diffusion. By a general theory was envisaged a theoretical formulation which would be applicable to guided change in all areas from rural sociology to education, public opinion, advertising and marketing, and industrial automation. It would be possible to deduce from such a general theory, the already known and tested conceptualizations on innovation diffusion in various subject matter fields, as special cases of this general theory.

The problem may be restated in the context of the social and economic goals of India that have found expression in India's Five-Year Plans and its educational and community development

1. Media and Educational Innovation (Preliminary Report; Lincoln, Nebraska: The University of Nebraska, 1964), p 326.
India is committed to democracy, universal elementary education, and eradication of adult illiteracy. It wishes to work for the economic uplift of the people through improved agricultural practices and increased industrialisation. It is also committed to the social and cultural enrichment of its four hundred and eighty million people through community development programs. This makes India potentially one of the world's greatest consumers of innovations and innovation diffusion strategies. For example, India's community development program early in 1962 served 820,000 square miles of area and a population of 232,000,000 divided into 3,590 blocks of 100 villages each. It provided one Gram Sevak (Village Level Worker) for every ten villages working full time as a change agent in addition to teams of experts in adult education, agriculture, animal husbandry, rural engineering, health and sanitation, poultry farming, and other special developmental areas in its 320 or more districts. This clearly is a massive educational and developmental enterprise.

Unfortunately, the Village Level Worker engaged in community development work is not very well equipped. He lacks both new skills, and methods of diffusing them. The Government of India, Committee

2. The term community development "has come into international usage to connote the processes by which the efforts of the people themselves are united with those of the governmental authorities to improve the economic, social, and cultural conditions of communities, to integrate these communities into the life of the nation, and to enable them to contribute fully to national progress." (Unesco)

on Plan Projects had this to say in 1957: "...We are not satisfied that with the type of training he [Village Level Worker] has been receiving, he has been able to make any special mark in this all important field [of Agricultural Extension]." The situation has not appreciably changed since this report was submitted.

Where do we go for insights, tactics, and strategies? Our search may lead us to anthropology, a discipline that has been interested in the phenomenon of change. We find, however, that anthropologists are interested mainly in natural change which is not comparable to guided change. Also the fields of rural sociology, public opinion, advertising and marketing though directly interested in innovation and innovation diffusion are unlikely to be of much help because of the very different motivational structures of their innovators, change agents, and adopters.

The practitioner in the field of innovations does not find much research in his own area. There are as yet no useful research findings, no evaluated methodologies. In India this research area is particularly barren. The Secretary of the Research Programs Committee of the Indian Planning Commission made this under-statement: "The research personnel in India for socio-economic studies is somewhat limited." This is so because the Indian universities do not have a lively


5. In a communication to the South Asia Studies Newsletter, No. 4, June-July, 1955, published at the Institute of East Asiatic Studies, University of California, Berkley.
tradition of social science research. And there are no institutions outside of universities specially set up to undertake social science research excepting perhaps in economics. Again, whenever some research has been undertaken, "Indian social scientists have designed much of their research upon the concepts developed in the United Kingdom or the United States, concepts not necessarily comprehending some of the dominant variables in Indian economics or social or political or personal life."  

It could be said, without inviting disagreement, that the field of innovations is not even viewed in India as a comprehensive system of innovators, packagers, diffusion agents, influentials, and adopters. Interest has been narrowed down to 'communication' neglecting other parts of the system. Even in the area of communications, research has been wanting. A Ford Foundation Study Team report published in 1963 confirms the above statement: "There is now very little communication research in India. The situation is unfortunate because such research is a chief source of knowledge of the audiences of information programmes and of what makes various programmes effective."  

The problem then was to design a framework, a general theory that would help both the researcher and the practitioner. Surely, a theory needs to be field-tested and validated before it can be used to deliver rules and principles for community action. In the present situation, however, theory-testing and field-use had to go

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together. The need for a working set of ideas and procedures was both immediate and imperative and what such a working set of ideas and procedures would replace had little theoretical sophistication or efficiency.

The problem stated here could admit of a solution only if we could find a comprehensive theory of possible application in school systems, agriculture extension, family planning, national integration, economic planning for cottage and small-scale industries, or in building decentralized democratic institutions. It had to apply equally to all regions and communities of India to be able to accommodate India's "unity in diversity."

Clearly, the field of innovations could have been studied from different points of view and at different stages of the innovation process. However, it was possible to assign priorities among the available alternatives in the context of our needs.

The logistics of change in our culture is such that decision-making is shared between different groups and at different levels of the system within a legal and permissive social consensus. The value decisions regarding innovations are made by elected politicians or other leadership groups. Thus the philosophic considerations of guided change have already been taken care of by these leadership groups. The nation through its elected representatives has decided that we want social change. We want to plan for it, we want to design for modernity as commonly understood, at the same time avoiding anomie and rootlessness or social disintegration of communities. It is agreed too, that the methods of changing must be democratic, involving community decisions, and voluntary action.
Again, the innovation — a new thing, a new tool, a new skill, or a new attitude — is already available from the creative resources of the country or another advanced nation. The content of innovation is thus also decided in advance by inventors, innovators, and economic and social planners. Finally, evaluation methods and criteria of successful programs draw upon a tradition in education and psychology which has given us the taxonomies of objectives and the know-how of testing achievement or attitude change.

However, the crucial and not-well-known aspect of innovations was the process of innovation diffusion. We lack a technology of diffusion. Granted the availability of an innovation and a decision to diffuse it, how do we actually carry out the process of diffusion?

We have much to learn from the study of inventiveness and creativity, of innovating systems, of the problems of development and packaging, and of what makes systems and organizations self-innovating. Even the value questions are yet unanswered. But the immediate problem was how to diffuse what we have rightly or wrongly decided to incorporate. How could we secure the acceptance of ideas that we had decided in our best wisdom to be essential for social and economic advancement?

In this study our interest therefore was basically at the level of diffusion. Considerations regarding the nature of innovation, innovators, and adopters necessarily entered the area of our concerns.

The Objectives

Some of the objectives of the study were theoretical; some
others were developmental. These were stated as follows:

1. To construct a comprehensive theoretical model of diffusion based on known variables of change. This would serve both theoretical and developmental purposes.

2. To generate a series of testable hypotheses for innovation diffusion research and to suggest a set of work principles and operations on the basis of this theoretical model that may be considered invariant — until further research adapted it or improved on it.

3. To translate and analogize this theoretical model to Indian education and community development for purposes of relating research and knowledge of innovation diffusion to Indian conditions.

The significance of the theoretical objectives of this investigation was obvious. The investigation would contribute new insights in this emerging area of knowledge. The theoretical model would serve as a research framework assisting researchers in planning research studies to test this model or ideas of their own.

The achievement of developmental objectives of the study would also serve useful needs. Indian researchers in universities and specialized institutions of community development, communications, and extension would find helpful a study that will delineate the field of innovations as a comprehensive system, recount its antecedents, and relate it to its foundational disciplines. It would provide educational administrators and trainers of community development personnel with system analyses of Indian education and community development done with theoretical sophistication and relating strategies to economic, social, political, and motivational variables
peculiar to India.

The study would also provide a communication tool for use in training programs by suggesting a verbal or graphic paradigm — a filing system — for organizing facts, skills, and ideas and evaluations. It would help operationalize "innovation diffusion" in terms of a more or less invariant set of operations and would thereby contribute considerably to the effectiveness of all training and developmental programs.

**Procedures**

The present study was conceived of as a theoretical and developmental investigation. Procedural problems, in this case, reduced themselves to a statement of tasks with a suggested order of accomplishing them.

**Task I**

A list of subject matter areas likely to contribute insights to understanding of innovation diffusion was to be made first. This was not a simple task. The study of changes in communities and human institutions is not limited to a few disciplines. The social sciences certainly are an obvious field to which to turn. They explain social structures, growth and decline of human societies, movements of populations, human needs and motivations. In their strictly behavioral aspect they illuminate learning and persuasive situations.

Some recent researchers of learning by lower forms of life seem to suggest that soon the biological sciences may be able to make
direct contributions to our knowledge of human learning. The physical sciences have an excellent record of contributions of theoretical models to the new emerging areas of social sciences and may prove a productive area for study by a researcher in innovation diffusion. Should we, therefore, include in our list of subject matter areas to be reviewed, the biological and the physical sciences as well? Such a list would certainly have been impossible to handle. Neither was the problem of limitation solved by limiting the review to social sciences.

The social sciences themselves are being studied today in diverse areas of very high specialization. The 'Specialties List for Use with National Register of Scientific and Technical Personnel' of the United States Government circulated in 1964 listed eleven sub-fields and more than seventy-five specialities within these sub-fields in the area of psychology alone.

It was indeed difficult to develop any useful operational criteria for making up a list by eliminating sub-fields or specialities from a total population of them. It was considered feasible, therefore, to request important researchers working in the area of innovations for advice instead of making a wholly arbitrary list. They were requested to suggest ten subject matter areas that were likely to be promising in regard to delivering useful variables for a theory of innovation diffusion. The following were invited to suggest subject matter areas: W. W. Charters, Jr., Washington University, St. Louis, Missouri; Robert Chin, Boston University, Boston, Mass.; Art Gallaher, Institute of Innovation, University of Kentucky, Lexington, Ky.; Norman Kurland, New York State Department

In the meanwhile the writer began working with the following list until replies from our correspondents were received: advertising, agricultural extension, communications, economics, education, group dynamics, psychology, political processes, social anthropology, and sociology.

**Task 2**

A review of literature in the subject matter areas suggested by expert researchers was made. The purpose of this review was to look for important variables determined by other researchers working in the different fields of innovation diffusion and to look for well-established principles and theoretical concepts. To synthesize facts and information culled from literature around a few important foci we organized the review in terms of a few aspects of the field of innovations.

Meaningful organization of research findings and conceptualizations also offered problems. No worthwhile taxonomy in the area of innovation is available for use. Even a descriptive taxonomy,
which is a desperate need of this field is unavailable. In an area where the nature of innovation itself is not well defined and where innovation is used synonymously with improvement, creative problem solving, adaptiveness for efficiency, invention, and innovation-inventing stance, useful categorizations will require considerable cobweb cleaning, and hard work spread over many years.

A tentative first taxonomy was suggested for organizing the review of research and theory into some meaningful scheme. A taxonomy based on operations or processes would have been useful but as indicated earlier, it was impossible to suggest such a taxonomy with the present inadequacy of our knowledge of innovation processes. The present taxonomy is, therefore, necessarily a descriptive taxonomy. It is descriptive in terms of the content of questions that might be raised in this area. It is found useful by us to focus these questions around five themes, detailed below.

Philosophic considerations

The first set of questions may be subsumed under the category of Philosophic Considerations. Innovation diffusion, or planned change has also a value component. Questions as these can be raised: Shall we plan any change for others? Would we let others plan change for us? Where do we get our mandate as Innovators? These questions have indeed been raised often with respect to industrialization and Westernization of developing countries in Asia, the Middle and the Far East. Within their own national boundaries innovators have been challenged about their work for reasons of alleged violation of the basic nature of man and his right to self-
determination; for compromising democratic processes for purposes of efficiency; or for limiting and negating man's dignity. Complaints of too much government, too much organization, hidden persuaders, robot makers are too often heard.

Content of innovations

A second set of questions may be asked with respect to the content of innovations. What is an innovation? How does it differ from an invention? How do we define it with respect to improvement or day-to-day problem solving? Is innovation always a tool or a thing? Is it possible to consider opinions, attitudes, and ideas as innovations? When does an innovation cease to be an innovation, to become a non-innovation? What is a generative innovation that may start a complete re-structuring of a whole community? What is a static innovation that does not go farther than itself? Can an innovation be socially integrative or disruptive for adopter systems? Do we, as innovators, know all the alternatives?

Nature of inventors, innovators, and adopters

Again, questions may be asked about the people involved in the process of invention, innovation and innovation diffusion. What is the nature of inventors, innovators, and adopters? What kind of people are they? In what kind of social systems, or organisations do they work? How is an inventor related to an innovator? What are the motivational structures of inventors and innovators? How do innovators differ when acting in their own behalf of acting in behalf of political or social institutions? What are the drives
and motivations of adopters?

Process and tactics of diffusion

One further area of inquiry in the general field of innovations would be the process and tactics of diffusion. A few of the questions involved at this stage may be about the perceptual apparatuses of individuals; structures of groups, and institutions; relation of information and attitudes; structuring information or persuasive messages; building motivations and improved communication channels; locating leadership patterns; increasing interaction through generalized mechanisms of influence, inducement, identification, and deterrence.

Criteria of evaluation

Last of all, we would be concerned with questions of evaluation. We must ask ourselves whether or not we succeeded in doing what we started out to do? And more importantly, whether we should have done what we did for a community or group.

Our taxonomy, therefore, consisted of five topics: (1) philosophic considerations, (2) content of innovations, (3) nature of inventors, innovators, and adopters, (4) process and tactics of diffusion, and (5) criteria of evaluation.

Epistemology, the science of knowing, has increased considerably our sophistication and understanding of the nature of knowledge and how it can be generated and tested. Without going into any elaborate classifications, we devised a convenient way of evaluating the findings in the area of innovations against a continuum of refinement of available knowledge. There are, for instance, areas
of human knowledge that we only have an awareness of but know nothing about. Probably we have not been able to ask even the right questions in those areas. There are others in which we seem to know many specifics and disconnected bits of information but do not know enough about their relationships. There are still other fields in which we have descriptive models and paradigms and finally there are areas in which we have come up with validated theories that are both explanatory and predictive.

We have, therefore, placed the five areas of inquiry in the field of innovation against the evaluation dimension of the state of our knowledge in the area. This evaluation scale runs through (1) awareness, (2) knowledge of specifics, (3) availability of models and paradigms, and (4) validated theories.

The two-dimensional chart on the next page describes the topology of the field of innovations used by this investigator.

Even within the subject matter areas suggested by researchers in the innovation field (Task 1) the available literature was certainly going to be considerable. It was difficult to review it in totality. Again, it was not possible for one researcher to be completely at home in all these disciplines. We, therefore, used selective references suggested by experts in publications like Media and Educational Innovation and other seminar reports and articles. Advice of the faculty at Ohio State University was also sought to develop key bibliographies in all suggested areas.

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<td>Awareness</td>
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<td>Content of Innovations</td>
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It was also realized that when we have the bibliographies available reviewing would not simply be a matter of reading. Ability to get at the crucial points and to pick up the key concepts certainly would require considerable sophistication in the respective fields. The present investigator looked at himself as an intermediary for bringing together the available knowledge and suggesting a theory. He began with his own areas of competence — communication, education, and learning theory and used them as a basis for attacking other fields. Reviews were often shown to subject matter specialists to make sure that key concepts in different areas had not been missed.

Task 3

The emphasis was then focused on the methods of innovation diffusion. This was done because our objectives were to work for a theory of innovation diffusion and we were going to concern ourselves with this and not with any other sub-area of the field of innovations. The variables related to this sub-area were evaluated and a kind of inventory of variables was made. The limitations of available models in different subject matter areas were briefly discussed, using mainly the criteria of generalizability and application to other fields.

That brought us to the main task of suggesting a general theory. Varied approaches have been used in theory construction. Professor Elizabeth Steiner Maccia in her work at the Center for Construction of Theory in Education, Bureau of Educational Research and Service, Ohio State University, has demonstrated through various papers the
use of retroduction, a theory model approach, to theory construction. A validated theory from some other field is taken as a model and logically applied by a researcher to his own field of investigation by translating terms and concepts and analogizing equations and relationships. The other approach to theory construction is the heuristic approach described by Bruner as follows:

A heuristic procedure, as we have noted, is in essence a nonrigorous method of achieving solutions of problems. While heuristic procedure often leads to solutions, it offers no guarantee of doing so. An algorithm, on the other hand, is a procedure for solving a problem which, if followed accurately, guarantees that in a finite number of steps you will find a solution to problem if the problem has a solution. Heuristic procedures are often available when no algorithmic procedures are known; this is one of their advantages.... Moreover, even when algorithm is available, heuristic procedures are often much faster.⁹

We used an eclectic method in theory construction going from the heuristic to the algorithmic (retroductive) and back to heuristic depending upon situational and specific problems and difficulties.

Task 4

The fourth task was to generate a series of hypotheses from the general theory developed as part of this investigation. This was done. Some of the suggested hypotheses were tested as partial validation of the proposed theory. A detailed report on the validation and theoretical assessment of the proposed conceptualization is presented in chapter IV.

Task 5

An analysis of the Indian educational system was made. This required a systems analysis approach considering the Indian educational system as a communication system.

Task 6

A similar systems analysis of the Indian community development was made by treating community development also as a communication system.

Task 7

These analyses were then used to suggest strategies of change in overhauling Indian education and in maximizing returns of community development in terms of the suggested theory.
CHAPTER II

INNOVATION RESEARCH AND THEORY—A REVIEW

The first task set for himself by the investigator was to prepare a list of subject matter areas and research traditions most likely to contribute insights to an understanding of the process of innovation diffusion. As we pointed out earlier in the chapter on procedures a list such as this could have been quite arbitrary and some promising areas could have been excluded because of the researcher's own bias or his particular orientation. Therefore, ten nationally known innovation theoreticians and researchers were requested through personal communications to suggest potentially useful areas, indicate important references or bibliographies, and, if possible, suggest key concepts or approaches to the problem of constructing a general theory model on innovation diffusion. It was thus possible to remove any subjective arbitrariness from the list with which the investigator ultimately worked.

We started with a list that included the research traditions in the following areas: advertising, agricultural extension, communication, economics, education, group dynamics, psychology, political and historical processes, social anthropology, and sociology. On the basis of professional comments received from
innovation researchers, this first working list was improved in many ways. A few additional research orientations were added, for instance, creativity, curriculum construction, drug diffusion, educational administration, organization theory, and role theory. Some approaches were noted as more useful than others. Miles suggested social-psychological and sociological approaches. Rogers shared with this investigator his present interest in the personal characteristics of people who change and those who don't. Work of both eminent persons.

1. Comments and suggestions were received from Dr. W. W. Charters, Jr., Professor of Education, Washington University, St. Louis, Missouri; Professor Art Gallahe, Jr., Institute of Innovation, University of Kentucky, Lexington, Kentucky; Dr. Norman D. Kurland, Director, Center on Innovation in Education, The University of the State of New York, Albany, New York; Dr. Herbert F. Loinberger, Professor of Rural Sociology, University of Missouri, Columbia, Missouri; Dr. Matthew B. Miles, Professor of Psychology and Education, Teachers College, Columbia University, New York; Dr. Everett M. Rogers, Associate Professor of Communications, Michigan State University, East Lansing, Michigan; Dr. J. Richard Sasham, Director, Curriculum and Instruction Branch, U.S. Office of Education, Washington, D.C. The author is grateful to these men for their helpful suggestions and materials and deeply appreciative of their permitting this encroachment on their time.

and institutions brought to the notice of this investigator was included for study and examination.

Though the interest of the present investigator was specifically related to the event of diffusion, the review of research and theory was not confined to this particular aspect. To be able to take in view the various interactions, for instance, between philosophic considerations of change, characteristics of adopters and change agents, available resources, communication patterns within groups and communities, the review was designed to be comprehensive, including all the various aspects of the field of innovation.

The taxonomy of the field of innovations suggested in chapter I was used. As a first and descriptive taxonomy of the field the categorization worked well and proved useful. Problems of interactions between categories were handled by categorizing research reports or theory models first on the basis of their emphasis and dominant interest, and second by using them in more than one section of the taxonomic division.

A mere listing of references bearing on innovation diffusion processes from the different research traditions and subject matter areas mentioned earlier would cover many pages. The critical review presented below is, therefore, not as comprehensive as we would have wished but has been shortened to fit the scope and requirement of this dissertation.

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3. The work of the Inquiry Training Project, 805 Pennsylvania Avenue, Urbana, Ill., and Center on Research on Utilization of Scientific Knowledge at the University of Michigan, Ann Arbor, Michigan was recommended in this regard.
Review of Literature

The following material has been organized in three sections: (1) review of literature, (2) an inventory of change variables resulting from this review, and (3) a brief discussion on the adequacy of available models of change.

In the section on review of literature we will present a brief review of innovation research and theory organized around five subsections: 4 philosophical considerations, nature and content of innovation, nature of innovators as individuals and organizations, the process and tactics of diffusion, and measurement and evaluation. Each subsection will present a few basic generalizations resulting from the review of literature related to that topic, will refer to a few crucial references, and underscore important variables and parameters of change.

An inventory of useful variables of change and of clusters and configurations of such variables will be presented in the next section.

Brief comments will be made in the last section on the adequacy or otherwise of the available models of change before presenting our own theory in Chapter III.

4. For a more comprehensive review of literature see E.S. Shola, "Innovation Research and Theory," (Columbus, Ohio: School of Education, The Ohio State University, 1965) prepared as a pre-conference document for the "Conference on Strategies for Educational Change," held in Washington, D.C., during November 8-10, 1965, under the joint sponsorship of the School of Education, Ohio State University and the U.S. Office of Education under Title III, Contract No. OE-5-10-307. This larger review includes an additional subsection, namely, "A Methodological Perspective" which suggests problems and approaches to the study and investigation of innovation and social change.
First, then, a brief literature review.

**Philosophic considerations**

A review of related literature on this topic would provide the important insight that "rational" models of change are often different from sociological models of change⁵ and many a battle in social change is lost because change agents follow purely rational models without taking into view the sociological realities or the philosophic objections from adopters to proposed change.

It would also be clear from a review of such literature that philosophic objections to change are stronger and more frequent in some sectors of our life than in others. Education, for instance, is most shy of planned change and very often teachers and educators confuse planning of any educational change with thought reform. On the other hand, in the areas of political science and public opinion processes where leading researchers and writers have done considerable work in reinterpreting the old classical democratic theory⁶ in terms of the present-day metropolitan world, planned change through selected or elected decision-makers does not present many philosophic problems. Educators perhaps need to do the same. The old concept of town democracy and local autonomy in American education must be reinterpreted to legitimize the cooperative and democratic relationships between decision-making publics, attentive publics, and

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mass publics in education as in political life.\textsuperscript{7}

**The content of innovation**

The content of innovation is an ill-defined concept. There are many unresolved questions in this area.

First of all, is innovation a tangible thing or is it a process? If it is a thing, is it an innovation in an absolute sense or is it an innovation only for persons, communities, or cultures for whom it is new. Another question often asked is: Can we categorize innovations so as to ascertain whether they will be more or less capable of diffusion?

Answers are not easy to come by. An innovation has been defined as a new thing, an invention, a fundamental and radical new idea.\textsuperscript{8} It has also been defined as an idea or practice which departs from those generally prevailing in a community.\textsuperscript{9} Again, it has been looked upon as a creative process,\textsuperscript{10} a personal goal-seeking activity,\textsuperscript{11} or

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\textsuperscript{10} Barnett, op. cit.

\textsuperscript{11} Eugene A. Wilkenning and Donald E. Johnson, *Goals in Farm Decision-Making as Related to Practice Adoption* (Bulletin 225; Madison: Wisconsin Agricultural Experimental Station, February, 1961).
adaptability — the capacity to take on new practices and discard old ones.\(^{12}\) The system analysis tradition considers innovation as a process.\(^{13}\)

There seems to be a general agreement among researchers that an innovation need not be an invention in the sense of an addition to human knowledge but that it can be new in terms of individual or group perceptions of ideas, skills, or tools being diffused in a society.

Lionberger has summarized the characteristics of innovations that have a bearing on rate of acceptance as being complexity, utility, initial cost, continuing cost, rate of cost recovery, compatibility, communicability, relative advantage, mechanical attraction, saving of time, saving of discomfort, and divisibility. Varying degrees of support have been found for most of these factors with the cost perhaps being in greatest dispute and complexity, compatibility and relative advantage being best supported as important factors.\(^{14}\)

Innovators and adopters as individuals and organizations

Two clearly discernable and influential research traditions


are seen in this area of research related to innovators and adopters as individuals and organizations. One of these traditions emphasizes the individual in the innovation-adooption process. The other tradition emphasizes the organization within which individuals work, as the proper context of change.

Most of the work on innovation adopters and innovators as individuals has been done in the research tradition of rural sociology. Rogers\textsuperscript{15} who uses the word innovator synonymously with the earliest adopter, suggests five adopter categories as ideal types: innovators, early adopters, early majority, late adopters, and laggards. Rogers\textsuperscript{16} also summarizes the general characteristics of innovators as follows:

1. Innovators generally are young.
2. Innovators have relatively high social status, in terms of amount of education, prestige rating, and income.
3. Impersonal and cosmopolite sources of information are important to innovators.
4. Innovators are cosmopolite.
5. Innovators exert opinion leadership.
6. Innovators are likely to be viewed as deviants by their peers and by themselves.

In our study of the motivations to change, the concept of the economic man very often seems to be attractive and we are tempted to consider economic motives as the most effective and general for adopters to adopt new innovations. Bemner and Straus\textsuperscript{17} found,


\textsuperscript{16} Everett M. Rogers, "What are Innovators Like," \textit{Theory Into Practice}, II (December, 1963), pp 252-56.

\textsuperscript{17} Lowell Bemner and Murray A. Straus, "Congruence vs. Profitability of Hybrid Sorghum," \textit{Rural Sociology}, XXIV (December, 1959), pp 381-83.
however, that even in technologically advanced, profit-motivated societies congruity (relatedness to existing cultural patterns) was a more basic element in the diffusion process than economic incentives.

Shifting our attention to organizations as innovators and adopters we find the greatest contribution to organization theory coming from the industrial and business management field. 18

One basic approach of organizational theorists toward change lies in making the organization "healthy." Healthy organizations are postulated to take care of innovations as an adaptive response. The following are required of organizations to show organizational health: goal appropriateness, communications adequacy and power equalization, resource utilization, cohesiveness and morale, innovativeness, autonomy, adaptation, and problem-solving adequacy. 19

Process and tactics of diffusion

This sub-area in the general field of innovation research and theory is probably the most researched. The fund of knowledge available is immense and there is considerable sophistication in


terms of theoretical structures used and suggested.

The literature in this area can be further organized around three themes: (1) communication structures, (2) influence flow, and (3) adoption models and strategies of change.

Communication structures

Studies of communication models and analysis of communication networks have helped change agents to plan better dissemination of information, through use of available communication patterns and networks in communities, through activation of dead networks, and through creating new ones. Smith in a short review suggests some twenty communication models with different theoretical and subject matter orientations. The Shannon and Weaver model is theoretically the most important of available models because of the fact that it has already been developed into a full fledged and highly heuristic information theory.

The single most important idea in communication is what is often called the "re-discovery" of the primary group. Though this concept had never been lost sight of in the rural sociology the communication researchers in their early enthusiasm for mass media, hurried to advance concepts of mass audiences, mass influence, and mass manipulation. Literature that has since grown around what is called the


"Two-Step Flow of Information" hypothesis has indicated beyond doubt, that between the media and the audiences there are the gatekeepers, and opinion leaders. It is the function of these opinion leaders to bring small groups into touch with relevant parts of environment through whatever media are appropriate.²²

Another exciting idea is presented by McLechan²³ who analyses seven typical communication structures: the cocktail party, the rural community, the military organization, a team for useful scientific research, the network on teaching, telephonic networks, and information retrieval systems. He points out the diffusion potential of these different communication structures and their mode of "monitoring" information — monitoring being defined by him as a system of controls over the types of information sent from the various centers.

Influence flow

The existence of widely spread and elaborate communication networks, and perception by adopters or adopter systems of information flowing over these communication networks do not necessarily lead to adoption of innovations. Various generalized interaction mechanisms must be brought into existence to influence adopters to accept new concepts, attitudes, or tools. The study of influence, therefore, is the basic underlying concern of persuasive communication, attitude change, public opinion processes, etc.


Talcott Parsons\(^{24}\) discusses influence as a generalized mechanism (a currency system) for affecting the attitudes and opinions of others through intentional (though not necessarily rational) action. Influence in process terms is seen as guiding the direction of human interactions toward agreed ends.

Parsons analyses four major generalized mechanisms: persuasion, inducement, power, and activation of commitments and loyalties to a person or group. Considerable literature has built around all these mechanisms of influencing people.

In the area of persuasion there are two influential traditions: the learning theory research\(^{25}\) and homeostatic theory models.\(^{26}\) Research in both these traditions is too huge to be mentioned in any detail. Festinger's theory of cognitive dissonance\(^{27}\) may be mentioned as an example of homeostatic theory models; and Miller's\(^{28}\) Drive-Cue-Response-Reward paradigm may be mentioned as a refinement of interpretations of the classical conditioning theory.

\(^{24}\) Talcott Parsons, "On the Concept of Influence," Public Opinion Quarterly, XIV (Spring, 1963), pp 37-62.


\(^{27}\) Leon Festinger, A Theory of Cognitive Dissonance (Evanston, Ill.: Row, Peterson, 1957).

Money as motivation has not been studied much in the area of education or community development which are looked upon as purely ideational enterprises. Most research dealing with money as motivation has been carried out in the field of industrial productivity and has been brought together by Whyte.\textsuperscript{29} He found that whereas money was not unimportant the response to economic symbols was a learned response like any other that could not be separated from an individual's total personal and social development.

Power as an instrument of change is against the democratic sentiment and has, therefore, not even been studied very seriously. Cartwright\textsuperscript{30} drew attention to power as a variable in social psychology and suggested an outline of a formal system of concepts to put the construct power in a more general theory of human behavior. Etzioni\textsuperscript{31} has followed it up in suggesting that power in itself is neither legitimate or illegitimate, nor necessarily disruptive. He considers the use of power — coercive, remunerative, or normative being applied in all organizations for achieving compliance relationships in service of organisational goals.

Influencing for social change through activation of commitments


is again an area much better researched than the use of money or power for social change. Most of it has been investigated under the rubric of the theory of the reference group.\textsuperscript{32, 33} Colembiewski\textsuperscript{34} recently called attention to the body of research in small group analysis and took the first step toward shaping a theory of the small group in an organisational context.

Adoption models

Influence and change variables discussed above have indeed been put together into mutually explanatory relationships for suggesting paradigms and models of change. We will, however, mention and evaluate some of them later toward the end of this chapter.

Measurement and evaluation

In the area of social change and innovation—adoption processes we seem to have no lively tradition of research or action involving measurement and evaluation or prediction.

There have been many reminders, however, for the need of such evaluations. Clark\textsuperscript{35} while discussing the "Research-Development-


Dissemination-Demonstration-Implementation model of engineering of change points out that the various stages of this model will require different criteria of evaluation and that evaluation will take place in quite a different way at each stage. Bhola\textsuperscript{36} has classified the kinds of evaluations possible in this area as: substantive evaluation, project evaluation, process evaluation, and systemic evaluation. Evaluation studies related to change and innovation are still awaited.

An Inventory of Useful Variables of Social Change

A synthesis of the literature reviewed in the preceding section would deliver a fairly good list of variables involved in the process of innovation diffusion. Advantage can be taken here of two such listings already attempted: one by Miles\textsuperscript{37} who accomplished this task in his concluding comments on various research reports and papers included in his \textit{Innovation in Education}; the other listing is presented by Meierhenry\textsuperscript{38} in his concluding summary of the papers presented at the Nebraska seminar on educational innovation involving the educational media.

A review of chapters such as those written by Miles and Meierhenry

\begin{itemize}
  \item \textsuperscript{36} Bhola, \textit{op. cit.}
\end{itemize}
will give one the impression that whereas we do seem to know many variables of change, these variables are often contextual, they do not fall into any analytical pattern, and they tend to be descriptive.

Miles refers to the fact that the authors contributing to his volume have offered 250 odd generalizations of various shapes, sizes, and degrees of potency but they cannot be included in any elegant organization. Meierhenry expresses a similar disappointment.

Using Miles' categories we find first of all that the organizational context is an important variable in innovation diffusion. Social systems, or sub-systems operating within them, do have certain ideological beliefs, they provide or deny incentives, they have or do not have change agent roles, and they are more or less stable as organizations.

A second set of variables relates to the characteristics of innovation itself. Cost is one factor. If costs can be phased, that is, if the innovation is divisible the innovation has a better chance. Technological innovations, for example, are supposedly easier than those requiring changes in human roles. The existence or otherwise of associated materials and of implementation support is another factor. The congruence of the innovation with the system in which it is to be diffused is again a determining factor.

A third set of variables relates to persons and groups. What kind of a person is the innovator? How much power does he hold within the organization? The nature of the innovative groups similarly determine probabilities of change. Does the community have suitable innovation norms? What kind of incentives does the group offer
to its members?

The prior state of relevant systems is another general theme. What is the nature of adopter systems? Are they stable systems interested in maintenance roles? What is the surrounding context? Is there, or is there not an internal pressure for change? Does any communication exist and does the message requesting change have any credibility in the adopter system?

Meierhenry makes a similar list and ends by noting that the problem of organizing change variables into meaningful scheme is gnawing and perplexing.

Available Models of Change

Many models of innovation diffusion and adoption have been proposed — some of them in the social science context, others in the contexts of rural sociology or anthropology and some by researchers with educational orientation. A few of these formulations are in fact pre-models suggesting only sets of variables entering innovation diffusion; others are more inclusive. Again, they are either process models, or stages-of-adoption models or sequential models on the time dimension.

One of the many models of change is Kurt Lewin's\textsuperscript{39} three-phase process: (1) unfreeze, (2) move, and (3) refreeze. This is based on the assumption that people change either to improve their present condition or to avoid a worse condition. The unfreezing, then,

involves creating dissatisfaction with the present. Movement to
a new condition is achieved by inducement or reward; and refreezing
involves establishment of equilibrium set after the new level of
behavior has been reached.

Lewin’s model focuses on the individual and his value re-
orientation. Its primary interest is in acculturation and the
psychological and perceptual correlates of this process. Therein
lie the limits of its application.

Rogers\footnote{40} working in the rural sociology tradition suggests a
useful model based on stages of adoption. It posits five stages
in the adoption process: awareness, interest, evaluation, trial
and adoption. This model has proved highly heuristic suggesting,
for instance, the study of innovators (defined as early adopters)
and communication behavior of adopters at various stages of adoption.
However, this model again emphasizes the individual functioning as a
private person and is strongly related to one research tradition.

Farnsworth\footnote{41} suggested an application model in educational
change going through the following sequence: recognize and articulate
the need; propose a solution; create interest in the suggested
solution; demonstrate usefulness; invite group and public interest;
obtain official approval and community financing; and remove any
legal restrictions. As an application model for use in American

\footnote{40} Rogers, Diffusion of Innovations, op. cit.

\footnote{41} Philo T. Farnsworth, Adaptation Processes in Public School
Systems (New York: Bureau of Publications, Teachers College, Columbia
University Press, 1940).
education it makes lot of sense but it lacks theoretical sophistication and generalizability.

The Guba-Clark schema of Research Into Action is again a useful tool since it draws attention to the different processes that must take place before an invention can become an innovation. It is, however, not an event theory about the dynamics of change. It does not tell us of the ways of increasing the probability or speed of change over those different stages.

An interesting model of change that looks at rejection rather than acceptance of innovation is that of Eichholz. Eichholz identifies different forms of rejection as ignorance, suspended judgment, situational, personal, and experimental; and analyses the possible causes of such rejection. The state of the subject and his anticipated responses related to each form of rejection are indicated.

Eichholz provides a complementary perspective to the adoption concept included in Rogers' model. The diagnostic value of Eichholz' categories of rejection behavior should be of considerable value at the level of the individual adopter. However, a theory going beyond diagnosis into prescriptions of achieving innovation diffusion


43. Gerhard C. Eichholz, "Why Do Teachers Reject Change?" Theory Into Practice, II (December, 1963), pp 264-68. Also see G. Eichholz, "Development of a Rejection Classification for Never Educational Media" (Unpublished Doctoral Dissertation; The Ohio State University, 1961).
and social change is still needed by those investigating or practicing change.

Thus there remains the need for an event theory of innovation diffusion that is inter-situational, inter-disciplinary, and inter-cultural, a model that is process oriented and which can be used to generate both research hypotheses and change strategies.

To this task we address ourselves in the next chapter.
CHAPTER III

A CONFIGURATIONAL THEORY OF INNOVATION DIFFUSION

The theory presented here is designed to explain the process of innovation diffusion and predict success or failure of innovation diffusion plans and projects.\textsuperscript{1} It focuses on the diffusion event and its practical concerns lie in increasing the probability of occurrence of such events.

Questions will certainly arise with respect to the worthwhileness of diffusion events as well as to the men and means employed to secure the occurrence of those events. These are important value questions but we do not seek to answer them. This theory takes a value position for granted. We are committed to planned change designed on the basis of research and informed opinion, organized for maximum effectiveness, and handled by people trained to do the job.

We are indeed aware of a strong and aggressive tradition against planned change, in democratic countries, in some sectors of our social and economic life, and especially, in the area of Education. It is a tradition haunted by the ghosts of laissez-faire, rugged individualism, and classical liberalism; and sentimentalized by the

\textsuperscript{1} The author wishes to acknowledge his debt of gratitude to Professor Egon G. Guba of the School of Education, Ohio State University who gave so generously of his time and counsel in the refinement and formalization of the theory presented here. The faults, of course, are the author's own and have persisted in spite of Professor Guba's abundant guidance.
Brave New World and the 1984. Any organized intelligent planning for social change is dubbed as manipulation, thought-reform, an ugly battle for the minds of unsuspecting men. In the educational sector of our social lives, those afraid of planned change are particularly eloquent. The teachers have a self-concept which is completely unrealistic. If not a rite, education is still considered an art, a personal style, a matter between the teacher and his student.

The position taken here is this: educational change based on the new educational technology could be had and education as art and personal style could still be saved if we worked for the "art of the science of instruction." The art and the science of instruction are certainly not incompatible. We could accept the science of instruction from the researcher and innovator and apply our art and creativity in the use of materials and techniques to our special circumstance.

"Planned change in all the different sectors of our social and economic life must be accepted because it seeks to maximize the social returns of our systems, and it does not, necessarily, damage the individual and his right to self-fulfillment within a better, more productive social system. On the contrary, it very often improves the chances of such fulfillment." We believe, then, that innovators and change agents should be enabled to work for innovation diffusion as long as they are competent, are using their social skills for the common good, have been assigned to their roles by the people themselves through known democratic procedures and
can be removed from those roles, again, through established processes; and as long as individuals or groups have the freedom not to consume the innovation or change offered and made available.

The review of literature presented in the preceding chapter had attempted to cover all the different aspects of the innovation- adoption process from valuation to evaluation and measurement. This theory, as was indicated earlier, focuses on diffusion. Within this specialization, however, it is meant to be a comprehensive theory. It should be possible, for instance, to use this general theory to deduce conceptual models for innovation diffusion in different subject matter areas as special cases of this general theory. In its present stage of presentation it is not a quantitative theory but it is sufficiently formalized to render relational statements or hypotheses that can be empirically tested.

We have reviewed elsewhere the different positions on the nature of innovation, innovator, adopter and other roles in the diffusion process. The position taken by this theory is that an innovation is always something definable that is 'new' to an adopter individual, group or system; that from the web of interacting relationships involved in social change, we can always identify one or a whole series of diffusion events, involving an innovator (or an agent acting on his behalf), an innovation (that is being diffused), and an adopter (or again some one acting on adopter's behalf).

Theory construction, in many ways, is a hazardous task. Since we will isolate diffusion events from the diffusion process — the whole web of such events — it might sometimes seem as if innovation
diffusion is a linear unidirectional process starting at one end and terminating at the other. This certainly is not so. It goes back and forth, and round in circles; breaks up to form galaxies of a thousand diffusion events, big and small, of long and short durations. It is an interaction of many different roles at the same time.

Neither man nor his social group is primary; they exist in interaction. Innovation diffusion, that is, is a process concept. Innovators and adopters necessarily interact on each other. Innovators when successful may change adopters — sometimes only perceptibly, sometimes considerably. But adopters may influence and change the innovators that came to influence and change them. Adopters may make innovators change their strategies, phase out innovations, change the packaging of an innovation, or give it up altogether!

The Theory

The general theory of innovation diffusion suggested here and hereafter called the Configurational Theory of Innovation Diffusion can be stated as a function symbolized as follows:

\[ D = f(CLER) \]

In descriptive terms Diffusion (D) of an innovation is a function of the Configurational relationship (C) between the Initiator (i) from a class of such initiators and the Target (j) from a class of such targets; the extent and nature of Linkage (L) between and within configurations; the Environment (E) in which the configurations are located; and the Resources (R) of both the initiator and target configurations.
The definition of terms

The various terms used in the above explanatory statement are defined as follows for the purposes of the theory propounded here.

Innovation. — Innovation is a concept (about military organization, curriculum construction, marketing practices, agricultural methods), an attitude (about communal or racial harmony, women voting rights), a tool with accompanying skills (16mm film projector, an insecticide spray machine), or two or more of these together, introduced to an individual, group, institution, or culture that had not functionally incorporated it before.

An innovation is an innovation with respect to a particular individual, group, institution, or culture, but is not necessarily a new invention or addition to general human knowledge.

Configuration. — Configurations are social units within which individuals play a variety of formal and informal social roles. These roles may be played as individuals, in groups, in institutions, or in cultures. Thus four configurations are recognized:

1. Individual (I)
2. Group (G)
3. Institution (IS)
4. Culture (C)

Initiator (or innovator). — When a configuration is playing the role of an initiator with respect to an innovation so that it may be accepted into another configuration for reasons such as personal profit, social idealism, or official duty, that configuration is termed an Initiator or an Innovator.
An innovator role is here distinguished from an inventor role. The two roles may, however, be combined in one person or group or an institution.

**Target (or adopter).** — The configuration with which an initiator is working for the acceptance of an innovation is a Target configuration or an Adopter system.

**Configurational relationship.** — An initiator configuration acting on another target configuration together make a configurational relationship, symbolized by $C_{ij}$.

Whereas a configuration $(x)$ may be an initiator configuration and a configuration $(y)$ may be a target configuration for an innovation $P$; for another innovation $Q$ the relationship may be reversed, configuration $(y)$ becoming an initiator configuration and configuration $(x)$ becoming a target configuration. Both configurational relationships $C_{xy}$ and $C_{yx}$ may exist contemporaneously.

**Linkage.** — Linkage is communication. Two configurations are in linkage when they are in communication with each other. Linkage may be interconfigurational ($L_P$) or intraconfigurational ($L_y$), that is, it may be between or within configurations.

**Diffusion.** — Diffusion is the process involving information consumption, social interaction, and behavioral change through which an innovation is incorporated into a configuration, tending toward a sociopsychologically stable and integrated relationship with the cognitive-affective-motor structure of that configuration.

An innovation may be considered to have been totally diffused when the innovation is voluntarily sought as a need or value by a
configuration and when the configuration itself can provide or has access to the skills and resources needed for adoption by a new member of the configuration, not previously related to the innovation.

Environment. — Environment is defined as the system of physical, social, and intellectual forces and conditions in which configuration(s) are located. Environments may be near and remote, and may be determined by both perceptual and persistent factors.

Resources. — Resources are material, conceptual, and psychological abilities, and capacities of innovators to cause diffusion and of target systems to absorb the innovation.

We will now discuss the different variables in the functional equation — diffusion, environment, configurational relationships, linkage, and resources, in that order — in greater detail.

**Diffusion**

We have already defined diffusion in the preceding section. Diffusion may be seen analytically as going through the stages aiming at —

1. Disseminating information.
2. Maximizing interaction.
3. Facilitating behavioral change and action.
4. Providing support and service for integration.

The first three of the stages mentioned here are roughly comparable to Cuba and Clark’s² dissemination, demonstration, and implementation.

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</tbody>
</table>
stages in their 'Theory Into Action' model on the preceding page.

As indicated earlier the theory presented here is an innovation diffusion theory, and in terms of Table 2 begins after the research and development stages. However, what might at first sight appear to be a neglect of these two important stages of the theory-into-action model is really not a neglect. It may be noticed that the function of promoting, accelerating, or institutionalizing research and development for creating innovations for societies is itself a problem of innovation diffusion. In this case the innovation is a package of awareness, skills, opportunities, and new structures needed by our college communities and intellectual resources to produce a subsequent generation of innovations.

Going back to the table on page 49, this theory suggests another stage in innovation diffusion after the stage of implementation, namely, service and support. This extension may read as follows:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Service and Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td>To consolidate adoption</td>
</tr>
<tr>
<td></td>
<td>1) Continuity</td>
</tr>
<tr>
<td></td>
<td>2) Valuation</td>
</tr>
<tr>
<td></td>
<td>3) Support</td>
</tr>
<tr>
<td>Relation to</td>
<td>Integrates innovation</td>
</tr>
<tr>
<td>Change</td>
<td></td>
</tr>
</tbody>
</table>
Total diffusion may be said to have occurred only after the service and support stage when "incorporation" of innovation has become rewarding and a maintenance sub-system is created in the adopter system.

Total diffusion is thus not a numerical concept requiring every single element in a configuration to integrate the innovation.

An innovation may be said to have been functionally diffused after the implementation stage.

The following bar graph presents the comparisons schematically:

---

Dissemination

+ Demonstration

+ Implementation
  (Functional Diffusion)

+ Support
  (Total Diffusion)

---

Fig. 1. — A schematic comparison of different stages of diffusion.

Environment

Conceptualization of environment has been bothering researchers for a long time. More recently there has been a second wave of interest in the concept of environment. The introduction of Environment (E) as a variable in experimentation and analysis has made a major difference in the ability of researchers to predict and explain human and social characteristics.
We have defined environment as comprising physical, social, and intellectual conditions and forces that impinge continuously on a configuration. In the case of an individual it will include "a range of environments from the most immediate social interactions to the more remote cultural and institutional forces."³

For a group, institution, or a culture there will be environments both within and around them.

Researchers have noted a lack of interest in the measurement of environment. There are indeed many tests of individual traits and personality characteristics but hardly any attempts have been made to measure social environments.⁴

There are difficulties involved even in the definition of environment that must precede any attempt at measurement.

Environment may be viewed along two dimensions: objective-subjective, and instantaneous-persistent. The following table suggests four aspects of environment:

<table>
<thead>
<tr>
<th></th>
<th>Subjective</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instantaneous</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Persistent</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>


We are not interested in the instantaneous environments whether subjective or objective. This disinterest, if for no other reason, is justified on the ground that we have no known way of handling this concept.

Persistent-subjective environments will be actualized by individuals, which may mean that there will be as many environments as there are individuals. We will cope with this problem in terms of individual perceptions.

It is the persistent-objective environment which will, wholly or in part, supply the ecology of an innovation. The net component of forces in such an environment operating on an innovation may make it:

1. a supportive environment,
2. a neutral environment, or
3. an inhibiting environment.

The state of the art of measurement of environments being what it is, it is not easy to define the three types of environments — supportive, neutral, or inhibiting — operationally. Only suggestive statements can be made about them.

**Supportive environment.** — Supportive environments encourage initiators (innovators) to support innovations and targets (adopters) to accept them. The Sputnik, for instance, provided in the United States an environment highly supportive of innovation diffusion.

**Neutral environment.** — Neutral environments do not directly contribute to innovation diffusion one way or the other but may do so through interaction with other factors.
Inhibiting environment. — Inhibiting environments do not sanction innovations and make target systems unresponsive to initiators' efforts. Pressey's teaching machine, for example, in the inhibiting environment of the depression years in the United States was not accepted by educators or others as a teaching or testing aid.

Weak and powerful environment

Supportive and inhibiting environments may in themselves range from weak to powerful.

| Powerful | Weak | Weak | Powerful |

Supportive — Neutral — Inhibiting

Fig. 2. — Supportive-inhibiting continuum of environment for change.

An environment, whether supportive or inhibiting, is powerful when the configuration finds it difficult to interact with it and is completely at its mercy. An environment, whether supportive or inhibiting, is weak when the configuration may alter it or may interact with it, selectively.

Dissimilar environments for two configurations in one configurational relationship

Both the initiator and target systems may not be open to the same environment. The following combinations are possible. We may not be able to state definite probabilities for each combination or to put them on an interval scale but three more or less distinct groups can be perceived.
TABLE 5
PROBABILITIES OF DIFFUSION FOR COMBINATIONS OF DIFFERENTIAL ENVIRONMENTS FOR INITIATOR AND TARGET CONFIGURATIONS

<table>
<thead>
<tr>
<th>Initiator</th>
<th>Target</th>
<th>Likelihood of Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supportive</td>
<td>Supportive</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>Supportive</td>
<td>Diffusion very likely</td>
</tr>
<tr>
<td>Supportive</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Inhibiting</td>
<td>Supportive</td>
<td>Diffusion difficult</td>
</tr>
<tr>
<td>Supportive</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Inhibiting</td>
<td>Neutral</td>
<td>Diffusion most unlikely</td>
</tr>
<tr>
<td>Neutral</td>
<td>Inhibiting</td>
<td></td>
</tr>
<tr>
<td>Inhibiting</td>
<td>Inhibiting</td>
<td></td>
</tr>
</tbody>
</table>

Supportive environments may not be always desirable; and sometimes they may be undesirable beyond a certain optimal point. In some cases a highly supportive environment may indicate communal or national stress or other social malfunctioning. The system may want innovation for prestige, or for ceremonial rather than functional reasons. Also a stress situation may not give any time for the innovation to get routinized and pay dividends, but may throw it out too soon in favor of another.
Location of configurations with respect to each other

In some cases the Target may lie within the Initiator configuration and the I may act as T's environment. Other things being equal diffusion would be more likely in such situations.

In other cases, the Initiator may lie within the Target configuration and the T may act as I's environment, in which case, other things being equal, diffusion would be comparatively difficult to handle.

![Diagram showing the relationship between T and I configurations.]

Fig. 3. — Location of T configuration in the environment of I, and of I configuration in the environment of T

Configurational Relationships

We have already defined configurations and configurational relationships. The concept of configurational relationships is the most important component of the theory being presented here. It is
a concept that provides a comprehensive inventory of innovation diffusion relationships: a typology of innovation diffusion situations which will encompass classroom teaching, pressure groups in politics, agricultural extension, community education, charismatic leaders, acculturation, and others besides. It will thus give to the theory the generality that we intended it to have.

The concept of configurational relationships will help us to view innovation diffusion in its dynamic aspects. It will suggest that a molar innovation diffusion relationship must break up and act at "molecular" and "atomic" levels for diffusion to come through. An obvious analogy is found in chemical reaction between two mutually active chemical compounds, which must break up to act at the molecular level. We will discuss this in greater detail in our section on linkage.

The following matrix attempts to tabulate different innovation diffusion relationships likely to occur in human societies:

**TABLE 6**

**A TYPOLOGY OF CONFIGURATIONAL (INNOVATOR-ADOPTER) RELATIONSHIPS**

<table>
<thead>
<tr>
<th>INITIATORS</th>
<th>INDIVIDUALS (I)</th>
<th>GROUPS (G)</th>
<th>INSTITUTIONS (IS)</th>
<th>CULTURES (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I) I-I</td>
<td>I-G</td>
<td>I-IS</td>
<td>I-C</td>
<td></td>
</tr>
<tr>
<td>(G) G-I</td>
<td>G-G</td>
<td>G-IS</td>
<td>G-C</td>
<td></td>
</tr>
<tr>
<td>(IS) IS-I</td>
<td>IS-G</td>
<td>IS-IS</td>
<td>IS-C</td>
<td></td>
</tr>
<tr>
<td>(G) C-I</td>
<td>C-G</td>
<td>C-IS</td>
<td>C-C</td>
<td></td>
</tr>
</tbody>
</table>
These sixteen configurational relationships can be divided into three broad categories, molecular, molar-molecular, and molar. The molecular relationships, it is hypothesized, are most amenable to control and molar the least, with molar-molecular relationships occupying an intermediate position. This is brought out in the following discussion.

An "I" configuration is just one person. This person’s behavior both as an initiator and as a target has only one choice in each case. There must be one clear-cut decision. An "I" configuration is thus a homogeneous configuration, and therefore, as a unit easiest to cope with.

A Group of twenty members may be theoretically so completely heterogeneous that its members may make twenty different decisions. As initiators they may dissipate their innovation diffusion energies and as targets they may make a variety of adoption-rejection responses. Even though a group of twenty is not likely to make twenty different responses and exist as a group, it may still make a group decision not shared by a small number of group members who may form themselves into one or more deviant sub-groups and manage to avoid total group pressures. In fact the latter is likely to be true often unless the group is in a crisis or under stress and individual considerations are resigned to group ends. A "G" configuration then under normal conditions may be considered to be heterogeneous. As initiator it may make different diffusion plans, and as target it may make different adoption-rejection responses making diffusion comparatively difficult to cope with.
An IS configuration though often composed of many members has a bureaucratized structure with fixed and well-defined decision-making and compliance roles. Once an institutional decision is made the IS configuration provides few alternatives, if any, to members who are expected to fall in line. Those who do not accept an innovation must tolerate it. Those who cannot even tolerate the innovation must quit, or sometimes stay and sabotage.

However, institutions cannot be considered homogeneous because of the latent heterogeneity that must always exist in institutions because they contain a number of small groups within them.

An IS configuration can be considered homogeneous only for the purposes of formal acceptance of innovations but not necessarily for functional acceptance of innovations. The nature of the problems of diffusion will thus depend upon the kind of diffusion we have in view — formal or functional.

Cultures are the most heterogeneous of configurations. They are composed of so many institutions, groups, and individuals that clear decision-making for cultures as units is almost impossible. Therefore, both as initiators and targets they are most difficult to cope with in configurational relationships for the purposes of innovation diffusion.

On the basis of the foregoing we can now put the sixteen configurational relationships into three suggested categories as follows:

---

5. The concept of toleration will be developed further in our section of "Resources."
Molecular relationships

I-I

Molar-molecular relationships

I-C
I-IS
I-C
G-I
IS-I
C-I

Molar relationships

G-G
G-IS
G-C
IS-G
IS-IS
IS-C
C-C
C-IS
C-C

It may be possible to assign rough indexes of heterogeneity to configurations entering a particular configurational relationship in terms of the total number of differential decisions they are likely to make. The following matrix then shows patterns of probabilities with maximum probability of diffusion in the case of I-I relationship and successive decrease of probabilities of innovation diffusion horizontally, vertically and diagonally.

TARGETS

Index of heterogeneity

\[
\begin{array}{cccccc}
1 & 5 & 10 & 25 & \infty \\
1 & & & & \\
5 & & & & \\
10 & & & & \\
25 & & & & \\
\infty & & & & \\
\end{array}
\]

INITIATORS

Index of heterogeneity

Fig. 4. -- A matrix showing rough indexes of difficulty in coping with change in diffusion situations
Second-order configurational relationships

Within the sixteen configurational relationships discussed earlier there will be further variations since these four configurations—I, G, IS, and C, are themselves variables and may be more or less susceptible to change.

In the following discussion we will look for suitable classifications of individuals, groups, institutions, or cultures which make them more or less open to play initiator and target roles in a diffusion situation.

Sociopsychological typologies of these configurations with respect to their compatibility with innovation diffusion and change processes are obviously needed to explain, to control, and to predict diffusion with increased refinement. It is not within the scope of the present theory to develop such categories, and we will have to look for them in available literature, however inadequate may be the results of such a search. Unfortunately, these typologies are not easy to find in sociological and psychological literature and those that are available are not operational and easy to use.

Individual as variables

For a categorization of individuals (I) with respect to susceptibility to change, we will have to go to personality psychology or sociology to find individual types that could be classed as more or less compatible with the innovation diffusion process.

One such classification is suggested by David Riesman6 who classifies individuals as tradition-directed, inner-directed, and

---

other-directed. This classification is chosen here because it was advanced by Riesman in the context of social influence and may, therefore, be directly relevant to our needs.

The three personality types are seen as subject to different emotional sanctions and controls. The tradition-directed person reacts to his culture as a unit which is mediated to him through a small number of people that he comes in contact with every day of his life. He is expected to behave in an approved way and the operative sanction in his case is the fear of being ashamed.

The inner-directed person acts in tune with his psychic gyroscope incorporated early in life under the influence of his parents and other authority figures and is capable of great stability because of the internalization of a number of principles and guides that he feels guilty about violating.

The other-directed person is attentive to a larger social environment but unlike the tradition-directed individual he is cosmopolitan, susceptible to quick changes to fall in line, and capable of superficial intimacy with every new and unfamiliar person and idea.

Groups as variables

The group concept is indeed a complex one. Groups have been defined in terms of their foundations, types and levels, interaction patterns, and values. Since we are interested in whether one kind of group is more amenable to innovation diffusion than another, we will find a categorization based on leader-member interactions within groups more useful than any other.
In terms of leadership styles four types of groups have been suggested: (1) laissez-faire, (2) authoritarian (or aggregate), (3) democratic (or organic), and group-centered groups.  

In the laissez-faire groups there is complete permissiveness. The leadership style requires no planning, initiating, or influencing of group members. Everybody is on his own. Such groups are likely to be very heterogeneous, might involve differential decisions and thus make the innovation-adoption event highly unpredictable.

In authoritarian (or aggregate) groups the leader controls all members. He plans in advance the content, method and outcome of learning or innovation-adoption processes. Such groups would probably make clear-cut and quick decisions to accept innovations without necessarily being committed to the innovation and to incorporating or internalizing it.

In democratic or organic groups the leader and members act cooperatively through a process of selection, initiation, discussion, and community action. Decision-making in such groups may be frustrating and take a longer time but once a decision is arrived at it may mean innovation acceptance with commitment and positive affective behavior.

In the group-centered group the leader will only establish and maintain a psychological climate of acceptance and understanding, leaving everything else to the members. Here again the decision-making will be frustrating but once a decision has been made it will involve group commitment and group action.

---

This further discrimination of G configuration as laissez-faire, authoritarian, democratic, and group-centered within a Gij involving a G will enable a social scientist interested in change to make a more sophisticated analysis of the change situation and make better qualitative judgments of the probability of innovation diffusion.

Institutions as variables

Further classification of institutions, our IS configuration, based on some structural features that make them more or less susceptible to decision-making for change should similarly help a more refined analysis of an innovation diffusion situation within institutions or organizations.

Institutions and organizations have been found to be differential in terms of operating characteristics like motivational structures, character of communication, character of interaction-influence process, decision-making, goal-setting, control processes, and performance.

Etzioni's classification of organizations correlating the structure of power in organizations on the one hand, and the motivations of members of institutions on the other, is most relevant to innovation diffusion and change within institutions and organizations.

Etzioni suggests three types of organizations: coercive, remunerative, and normative. Coercive organizations could achieve formal (if not functional) change even with considerable dissensus.

---

Remunerative organizations need consensus, at least with regard to instrumental activities for operational changes, whereas normative organizations require high consensus of both ends and means for any innovation or change to occur.

Cultures as variables

Similarly, it is possible to classify cultures in respect to their probability of taking or resisting change. Daniel Lerner\textsuperscript{9} classifies them as (1) Traditional, (2) Transitional, and (3) Modernist. He notes that Modernist cultures have the greatest amount of empathy, which he considers the most useful characteristic contributing to change. The Traditional cultures have the least empathy and the Transitional cultures are intermediate in this attribute.

It is possible to see one single attribute in the democratic group, in the normative participative organization, and in the empathetic modern culture: the ability to handle abstractions, or the competence at rational symbolic transformations. Though this concept needs to be developed considerably, it seems to be promising in explaining susceptibility of configurations to innovation diffusion, and we will talk more of this in our section on "Resources."

The preceding discussion of sub-classifications within configurations will enable us to sharpen our focus on the nature of configurational relationships while planning, initiating and predicting innovation diffusion and change. Taking the example of our I-C configurational relationship out of the sixteen such relationships suggested earlier

\textsuperscript{9} Daniel Lerner, \textit{The Passing of the Traditional Society} (Glencoe, Ill.: The Free Press, 1958).
we could have the following second-order configurational relationships.

**TABLE 7**
SECOND-ORDER CONFIGURATIONAL (INNOVATOR–ADOPTER) RELATIONSHIPS UNDER I–C CONFIGURATIONAL RELATIONSHIP

<table>
<thead>
<tr>
<th>Culture (Target)</th>
<th>Traditional</th>
<th>Transitional</th>
<th>Modernist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tradition-Directed</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Individual (Initiator)</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Other-Directed</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

It should be possible to work into this matrix common sense, qualitative probabilities for different second-order configurational relationships. The remaining fifteen first-order configurational relationships can be similarly treated for second-order relationships and qualitative probabilities.

**Articulation of initiator and target configurations**

An initiator and a target configuration may need articulation to be able to enter into a configurational relationship at all. A university extension division, for instance, may need articulation by the state education department to enter into an innovation relationship with the local school system, with the state department
playing an adapter role.

Such adapter roles will probably be necessary in many other situations. In some cases it will be necessary to create a new adapter configuration overlapping both Initiator and Target configurations. In other instances, the adapter will provide a bridge between Initiator and Target through a legal requirement or social sanction or similar facilitating arrangement.

**Innovation and enculturation**

Configurational relationships may be consciously pursued as stated policy, secret design, propaganda effort, pressure goal, or for profit motive. These consciously pursued relationships may be called innovating relationships.

Alternatively, these relationships may exist by sheer fact of contiguity or nearness of two configurations in a field. Any communication between these contiguous configurations would lead to 'unintended innovating relationships.' The products of such relationships will be called enculturation situations and will not be discussed as innovating relationships under the theory presented here.

**Mutual expectations of initiator and target roles**

Very often a configurational relationship, as defined here, comes into being because of the initiator's initiative, and the target system is not even asked to play that role or even to know that he is the target. Such a relationship is one-sided. Other things being equal, innovation diffusion in such cases will be more
Fig. 5 (a). — Case of an overlapping adapter configuration

Fig. 5 (b). — Case of a bridge adapter configuration
difficult as compared with the situation where relationship is built on a mutual expectation of roles. In the latter situation diffusion would be more likely, provided that other contributory conditions of innovation diffusion are available.

A more productive configurational relationship, therefore, exists when both the initiator and target systems are conscious of their roles and have mutual expectations of these roles under some kind of social or institutional consensus.

*Equal and unequal configurational relationships*

At least one further dimension of $C_{ij}$ can be analyzed. This is the equal-unequal dimension of a configurational relationship.

The equal and unequal concept may be defined in terms of resources at the command of two configurations involved in a $C_{ij}$. The amount of resources and the duration of time they are available will determine one index of innovation potential of initiators and the resistance potential of adopters, should they decide to resist adoption. It is not often that adopters actively organize resistance against innovations, and most often we will be dealing with social inertia while talking of resistance potential of adopters.

The relationship when unequal may be positive or negative from the point of view of diffusion probabilities. When the initiator configuration has greater potential than the target, the relationship is obviously unequal but positive, for the innovator resulting in increased probabilities of innovation diffusion. When the target has greater potential than the initiator, other things being equal,
the diffusion probabilities are low because of possible target resistance or sheer inertia.

Linkage

Linkage \((L)\), the next factor in our functional equation, is viewed in two parts: \(L_b\) (the Linkage between configurations) and \(L_w\) (the Linkage within configurations). Linkage or communication network is seen as both personal and impersonal, with information and attitudes passing over physical facilities or by word-of-mouth among men and women in interaction through reading, writing, talking, listening, picturing, observing.

**Linkage between configurations** \((L_b)\)

Cultures operate through their institutions and groups; institutions and groups make decisions and initiate actions through individuals of which they are composed. Groups, institutions, and cultures, though they have been found to have modal personalities of their own, do not act outside of individuals. They do not communicate but provide structures of communication roles; they do not act but provide the limits of action or inaction. **Individuals**, then, are the basic loci of change — change when planned, change when manifested. Innovating relationships should, therefore, be looked upon as relationships between individuals acting on their own behalf or on behalf of their groups, institutions, or cultures. Unless molar innovation relationships are broken down into molar-molecular and molecular configurational relationships diffusion is
impossible to achieve.

Diffusion may, therefore, have to be handled by innovators through **chains of relationships**. Two kinds of chains may be possible to indicate: (1) operational, and (2) volitional.

**Operational chains** are linkages that hold individuals in groups and organizations enabling them to handle information flow needed for their maintenance. A university president and his faculty, for instance, are linked through operational chains. Operational chains will be symbolized here by (•).

**Volitional chains** are linkages that are created by and between individuals through their own choosing and through exercise of will, to introduce non-routine information to a group or institution. The American Medical Association's political lobby, for instance, would be linked to the Republicans in the United States Senate through volitional chains. Volitional chains will be symbolized here by (=).

A group acting on another group, for most effective diffusion, must go through chains of relationships of which the following may be two examples:

\[ G-I-I-G \] or

\[ G-I-I-IS-I-I-G \]

The I's occurring in these chains may be either **change agents** or **maximal points** of a configuration which we will discuss later.

All the innovation diffusion relationships do not have to be seen as linear or as **single linkages**. There is the possibility
of linkage networks, or the two of these in combination. A linkage network is exemplified by the following:

\[
\begin{align*}
I - IS &= \ldots \\
I - IS &= \ldots \\
I - IS &= \ldots \\
I - IS &= \ldots \\
I - IS &= \ldots \\
I - IS &= \ldots
\end{align*}
\]

Fig. 6. — A linkage network showing an individual (I) acting on a whole culture (C)

The above network would fit a situation where the United States President links himself operationally with his cabinet; the cabinet members link themselves operationally with their departments, which, in turn, seek volitional linkage with press, broadcasting agencies, influential individuals, and groups to involve the whole American culture in some particular issue or problem.

Single linkages and linkage networks present two different communication concepts. The single linkage could be seen as the primary group situation involving the two-step flow of information, influence, and support through small groups. The concept of linkage networks, however, parallels mass communication situations when information and influence are suspended in the environment, as it were, and are available in a probabilistic sense to those who selectively interact with them. Single linkages, again, are like closed-circuit information distribution systems, while the linkage
networks are comparable to broadcasting.

Maximal points

We have already referred to the concept of chains for linking initiators and targets. For best results these chains need to be connected at maximal points, of both initiators and targets. In case of institutions, for example, the maximal point may be the head of an institution when an innovator is working for toleration or physical incorporation. For achieving acceptance or functional diffusion a new maximal point may have to be located, shifting from the authority network of an institution to the influence network within it. Maximal points are thus not fixed but must shift with the shifting intents of the innovating system. Again, they are different for different configurations and vary from time to time at different stages of the diffusion process. For example, in an informal group the maximal point will be the leader. Different areas of social life in communities, as we know, have different leaders. Therefore, leaders will have to be rediscovered for every new innovation. Different stages of diffusion of the same one innovation may in fact require different types of leadership roles.

A change agent may be looked at as a maximal point of an initiator configuration. The change agent, again, need not be a fixed role and may shift in relation to the maximal points in a target configuration. For example, statuses of the change agent in the $C_i$ and of the leader in the $C_j$ may have to be matched for better communication to take place. In traditional societies this matching may be specially necessary.
Important characteristics of a change agent are his commitment to what he is trying to diffuse, his knowledge of it, and his acceptance by the target system.

Linkage within configurations ($L_w$)

The linkage within configurations may be viewed as an electrical circuit. Configurations may be fully wired or partially wired. In an institution, communication roles and obligations are defined for each member of the institution. Such a system may be called a fully wired system. This system has a multi-way potential. Should the need arise, and if bureaucratic sanctions permit, each member of a fully wired system may talk to every other member through the proper channel.

A Group is not necessarily fully wired. There are, generally, no defined and fixed proper channels and monitoring points, as in the case of institutions and organizations. There is, in fact, considerable clogging and short-circuiting and the leader is effective in passing information and exerting influence to the extent that communication channels exist and are linked.

Under circumstances of intense goal-seeking behavior by groups or in the midst of a crisis groups may become fully wired, that is, may become bureaucratized.

Cultures, taken as units, are seldom fully wired. If they are, they will become completely autocratic, where both public and private life is institutionalized. In democracies they are full of an
infinite number of dead and live, fully and partially wired sub-circuits.

The most effectively wired sub-circuit in a culture is generally the leadership group, the decision-making elite. The second most efficiently linked are the attentive public which are always seeking to get linked with the decision-making group to influence their decisions. Under special circumstances of national stress most or all the sub-circuits in a culture may get linked into one total communication network, bringing the mass public into the network as well. ¹⁰

The fully or partially wired system may be one-way, two-way, or a multi-way wiring system making it possible to have information, questions, or statements flow one way or the other, or not at all. This 'monitoring' question is determined by social, political and ideological nature of a configuration.

A communication network would have a specific channel capacity. A configuration may, therefore, refuse to handle information about an innovation because all its channels are already full of some other information and it can take no more.

Circuit systems have also different calibrations. A network would handle the information that it has been designed to handle. An engineering firm, for example, will have a wiring system that will handle engineering information put on it. This system will

also handle other symbolic information that an engineering community
can normally handle and would be able to cope with common sense
information as well. It may not, however, be able to transmit
information on classical music or psychological anthropology because
this network has not been calibrated for such information flow.
Again, while an Indian village may do a very good transmission job
of rumour or information on Hindu mythology it may not cope with
information on germ theory or abstract art or may lose it all
in high semantic noise.

Circuit-breakers within configurations

Circuit systems within configurations may have people playing
the roles of circuit breakers. Such persons may intentionally act
as circuit-breakers for saving face, for personal profit, or for
avoiding damage to an individual or system with which they identify.
An opinion leader when acting as a circuit-breaker may withhold
information and may not let it be disseminated to the group of
people that he influences as a leader.

Resources

The amount of available resources, as well as the duration of
time for which they are available, will affect the probability of
innovation diffusion. Both innovators and adopters need the necessary
resources for completing the innovation transaction though some
resources are needed more by the initiators than by targets. These

11 Noise is a widely used concept in Information Theory
and it has been considered unnecessary to develop it here.
resources may be classified as follows:

1. Material resources
2. Resources of conceptual skills
3. Resources of personnel
4. Resources of influence

Material resources

The initiators and targets may lack the material resources for completing the innovation- adoption transaction. The initiators, for instance, may be operating on low budgets — a very frequent handicap — and may not be able to spend the money needed for the diffusion effort. The target systems may mentally go through the whole process of decision-making to accept the innovation but may not have the money to buy a new type of agricultural tool or the needed fertilizer. The art of innovation may then also consist in providing such resources.

Conceptual resources

The resources of conceptual skills, again, are needed both by initiators and the target systems. The conceptual resources of the initiators would probably consist largely in their ability to plan dissemination campaigns, to produce communication messages, and to explain and demonstrate the innovation. The conceptual resources of the target systems may consist in their abilities to handle symbolic transformations, and in the fund of 'empathy' both of which may be related to the educational status of a community.

It may be possible to quantify conceptual resources of adopter communities in terms of Symbolic Transformation Indexes (STI)
for predicting innovation diffusion and for making practical decisions about using specific information media — face-to-face communication, mass media, printed material — in particular communities at the dissemination stage of innovation diffusion. STI may be seen as a multiple index based on total number of man-school years available in a community, newspaper circulation, number of radio receivers, movie attendance and the length of time the communication and media facilities have been available to a community.

**Personal resources**

The resources of personal again are needed both by initiators and target systems though their requirements are considerably different. The initiators need, for instance, a sufficient number of change agents who, once a molar innovation relationship has been established, can work to break it up into smaller molecular relationships and cope with the manifold innovation situations so produced. The target systems, most of all, need leadership and a sufficient number of "collaborators," those early adopters who can work for the initiator and his change agent.

**Influence resources**

Influence is seen here as any generalized mechanism to channelize social interactions toward pre-determined ends.\(^{12}\) The initiator systems would use influence of their own and that of leaders and "collaborators" in the community. Parsons has analysed four types of influence as follows:

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### TABLE 8
PARSONS' PARADIGM OF INFLUENCE

<table>
<thead>
<tr>
<th>SANCTION</th>
<th>Intentional</th>
<th>CHANNEL</th>
<th>Situational</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>Persuasion</td>
<td>Inducement</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Influence</td>
<td>Money</td>
<td></td>
</tr>
<tr>
<td><strong>Negative:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>Activation of Commitments</td>
<td>Deterrence</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Generalization of Commitments</td>
<td>Power</td>
<td></td>
</tr>
</tbody>
</table>

Parsons thus conceptualizes influentials as using **positive** sanctions or **negative** sanctions. Again, the channels through which influence is applied are seen as **intentional** wherein the innovator acts on the individual or as **situational** wherein the innovator acts to change the situation surrounding the adopter. Four mode-medium combinations are thereby generated: (1) persuasion-influence, (2) inducement-money, (3) activation-generalization of commitments, and (4) deterrence-power.

All the four types of influence — persuasion, inducement, activation of commitments, and deterrence — may have to be used by initiators to diffuse innovation. Influence, again, may not be viewed as a fixed quantity but as capital that can be increased or decreased, earned and spent.
Husbanding of resources

Resources require good husbanding. They have to be used according to the best business principles.

Two innovators or two initiator systems acting on the same target system but pulling in different directions will obviously diffuse minimally, if at all. The waste of resources both financial and psychological will be considerable.

Investment and return

The availability of resources within an adopter system does not mean that they will be used for the adoption effort. Resources will tend to be conserved and will be utilized if the investment will bring sufficient material, social, or psychological rewards.

The nature and extent of investment and the type and amount of return will determine the probability of diffusion of an innovation. Every innovation then will have a salience ratio that will determine adoption. This salience ratio may be defined as the ratio between investment and return, given by

\[ \frac{\text{Return}}{\text{Investment}} = \frac{R}{I} \]

The greater the value of the salience ratio, the greater the probability of adoption. As can be easily seen the R/I's for material and personnel resources are more easily quantified than those for conceptual and psychological resources.

Incidence of costs and returns

There is another difficulty in determining the salience ratios
for innovations because in some cases the incidence of cost of innovation adoption may not be visible or the profits and benefits accruing from adoption may be indirect, postponed, and hence invisible. An example of visible costs would be the adoption of a new type of spraying machine; that of a visible return, the increased number of bushels of wheat per acre. An example of invisible costs would be indirect taxation; and that of invisible rewards, the opportunity of living in a better, safer, enriching community through a comprehensive and permanent adult education program.

This concept is of special interest to innovators in those areas where the bookkeeping is not in terms of dollars and cents but in terms of social and psychological returns.

The concept of visible and invisible costs and returns leads us to the concept of toleration of innovations, frequently referred to in earlier part of this theoretical presentation. Tolerance covers an innovation situation in which a member of a group or a sub-environment in an institution does not accept or adopt an innovation functionally but does not reject it either. He does not see the cost of this "useless" innovation accruing to him, monetarily or psychologically. And he does not feel too strongly about it to protest and possibly pay the price of non-conformity.

The following matrix envisages some toleration situations:
**TABLE 9**

**COST-RETURN CONTEXT OF INNOVATION ADOPTION**

<table>
<thead>
<tr>
<th>Returns</th>
<th>Costs</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visible</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Visible</td>
<td></td>
<td>Ambiguous</td>
<td>Acceptance</td>
</tr>
<tr>
<td>Low</td>
<td>Rejection</td>
<td>Ambiguous</td>
<td>Tolerance</td>
</tr>
<tr>
<td>Invisible</td>
<td>Rejection</td>
<td>Rejection</td>
<td>Tolerance</td>
</tr>
</tbody>
</table>

Visible costs and invisible returns would mean rejection of adoption. Invisible costs and invisible returns may involve toleration. Tolerance would be more probable when the costs are invisible and returns are visible, though low. Invisible costs and high visible returns would be a case of acceptance. When both costs and returns are visible, the adoption may be rejected, accepted or may face uncertain future, depending upon the Return/Investment ratio as can be seen from the above table.

Innovators working in the context of groups and institutions should find the concept of toleration, again, a very useful conceptual tool. After a formal acceptance through group decision or an administrative order the innovator will have to work with individual users for helping them change from toleration to acceptance — from
physical incorporation to functional incorporation. This may require training in the utilization of the new innovation, help in coping with any additional work that might be necessary, and setting up of rewarding situations for attitude change.

In summary, the theoretical formulation presented here has emphasized the diffusion event, and has considered four factors as important for making the diffusion event more probable: (1) the nature of the configurational relationship between the innovator and the adopter, (2) the linkage between and within the innovator and the adopter configurations, (3) the nature of the environment(s) in which the innovator and the adopter are located, and (4) the availability of material, personnel, and psychological resources to both the innovator and the adopter.

An important feature of the preceding theoretical formulation consists in the suggested typology of innovator-adopter relationships. Diffusion events have been seen neither as absolutely unique nor as completely alike. Sixteen different types of configurational relationships have been suggested under which all possible diffusion events and situations may be classified. The theory thus may provide a tool for equating the parameters of one diffusion event with another, and for evaluating what experiences may be transferable between situations.

The formulation has provided a synthesis of the psychological (Ideographic) and sociological (Nomothetic) approaches to social change. This theory has accepted the position that innovations
are adopted by individuals, and, therefore, the individual is the locus of adoption. It has accepted, at the same time, the reality of groups and organizations to which individuals may contribute for reasons of personal commitment or social contract. It is thus recognized that individuals submit to group decisions to a more or lesser degree, depending upon the nature of the group or organizational structure. This submission to the group or organization consists in accepting leader-follower relationships within groups, or the recognition of decision-making rights of upper levels of bureaucratic hierarchies within organizations. It is indicated that molar configurational relationships, that is, relationships involving G, IS, and C configurations are mediated through molecular configurational relationships between individuals; but in most cases the innovator does not have to work directly with all individuals in a group or within an organization. The innovator may utilize the already existing compliance relationships within groups and organizations by working at a molar level and later, may work with individuals at a molecular level, if necessary, and if worthwhile.

In the next chapter we will show the heuristic possibilities of the theoretical formulation presented here and weigh its theoretical adequacy.
CHAPTER IV

VALIDATION AND ASSESSMENT OF THE THEORY

Three different methodological approaches were used, with more or less success, to test the validity and usefulness of the Configurational Theory of Innovation Diffusion presented in the preceding chapter. Three approaches used were: (1) hypothesis-testing with the use of empirical data related to diffusion of innovations, (2) use of concepts, constructs, and statements from the logical structure of the suggested theory in explaining a real-life innovation diffusion event, and (3) testing the adequacy of the proposed theory according to established criteria for theorizing in social science fields.

Generating and Testing Hypotheses

The final test of the validity of any theory lies in its ability to explain and predict real events. Systematic validation involves using the theory to generate empirically testable hypotheses, designing crucial experiments to test these hypotheses, and interpreting empirical data to see whether they do or do not disconfirm the theory. It was not within the scope of the present investigation to set up laboratory or field experiments to collect data for testing hypotheses generated from this theory. We were, therefore, content with generating a few hypotheses to demonstrate the heuristic
value of the theory; and with analyzing selective research reports and case study material to find support, or lack of it, for the theoretical formulation.

The following hypotheses were generated from the proposed theory. These, of course, are not all the hypotheses that could be generated from this theory. These are only a few of the possible ones but should demonstrate the fact that the proposed theory can be used to deliver testable hypotheses. While making this list we looked for hypotheses that were provocative and unusual.

1. Coping with innovation is an unstable state. It must result either in the disuse of the innovation in question or in an innovation's becoming a non-innovation through routinization within the adopter system.

   Antecedents. — This hypothesis can be deduced from the stage of "service and support" proposed as an extension to Cuba-Clark schema (see tables 2 and 3, pp 49-50). Implementation must be followed by rejection or by complete integration within the adopter system.

2. Innovation adoption within molar configurational relationships must be mediated through molar-molecular and molecular relationships; and within molar-molecular through molecular relationships.

   Antecedents. — This hypothesis can be deduced from our discussion of "linkage between configurations" and definition of "operational" and "volitional" chains (see pp 70-71).

   It may be seen that this hypothesis is, in fact, a more general statement of the "two-step flow of information" hypothesis.

3. Groups showing intense goal-seeking behavior while promoting
or resisting innovation will tend to institutionalize (or bureaucratis) themselves to a greater or lesser degree.

**Antecedents.** — This hypothesis is embedded in our discussion on fully and partially wired systems under the section on "linkage within configurations" (see pp 74-75). Intense goal-seeking behavior should articulate the need for optimal intracomunication, and partially wired systems should tend to become fully wired.

4. In institutions where decision-making roles have been clearly defined and formally distributed, diffusion will go through two stages: (1) formal acceptance of an innovation by authorities with toleration from actual and individual users of innovation and (2) functional diffusion wherein the individual adopters would accept the innovation.

**Antecedents.** — The hypothesis is generated from our discussion of the concept of toleration explicated under the section on "incidence of cost and returns" of innovations and in our paradigm of cost-return context of innovation adoption (see table 9, p 82).

5. An adopter community with higher "symbolic transformation index" (STI) will demonstrate greater ability to understand communications and greater willingness to act on messages than an adopter community with low STI, the STI being a multiple index based on the total number of man-school years available in the community, newspaper circulation, number of radio receivers, attendance at movies and the duration of time the communication and media facilities have been available to the community.
Antecedents. — The hypothesis is embedded in our discussion of individuals, groups, organisations, and cultures as variables; and is directly deducible from the discussion of symbolic transformations index (STI) as a conceptual resource of adopters (see p 65 and pp 77-78).

6. In strongly inhibiting environments radical innovation will be rejected and will have prospects of diffusion only to the extent of its divisibility.

Antecedents. — The hypothesis is deducible from our discussion on resources. Since radical diffusion will demand great psychological expense it will give very low Return/Investment ratio, making the diffusion event highly improbable (see pp 80-82).

7. A larger configuration will innovate among sub-configurations located inside itself more easily than those located outside.

Antecedents. — The hypothesis is directly deducible from our discussion of "location of configurations with respect to each other" in the section on environments of change (see p 56).

8. An innovation with low or invisible costs to the adopter but likely to bring high and visible returns will tend to be accepted. An innovation with high and visible costs and invisible returns will tend to be rejected.

Antecedents. — The hypothesis is directly deducible from our paradigm of cost-return context of innovation adoption (see table 9, p 82).

9. Innovation adoption by individuals, groups, institutions or cultures is a kind of learning which is transferable to subsequent
innovation adoption situations. It would, therefore, be possible to classify communities as traditional, transitional or modernist in terms of the number of innovations adopted over time.

**Antecedents.** — This hypothesis is embedded in our discussion of individuals, groups, institutions, and cultures as variables and of psychological resources of adopters (see p 77). The experience of absorbing an innovation is a psychological resource and at least part of this resource would be transferable.

The foregoing should, in a preliminary way, demonstrate the heuristic value of the theory. We will now take a few case studies of innovation adoption and some published data from diffusion research to test parts of the theoretical formulation presented in the preceding chapter.

**Testing parts of the theory from published data**

Nine cases of innovation diffusion reported in Miles¹ were

selected for analysis. These cases reportedly come from many disciplines and professions: anthropology, education, engineering, English, political science, psychology, social psychology, and sociology. They were, therefore, expected to supply inter-disciplinary orientation. To introduce an inter-cultural flavor an AID research report, and some other research reported in the proceedings of an inter-American research symposium were added to the material to be analysed.

Some methodological comments are in order before presenting the results of the attempted validation.

The method of "borrowed empiricism" -- testing a new theoretical formulation with data borrowed from already published research -- though logically promising, presents difficulties when actually applied. In the first place, a good theory should go farther than theories and facts already available. It should suggest some new aspects of the problem, illuminate new patterns in the process, provide new insights for suggesting hypotheses never suggested before, and raise questions not raised earlier. It would not be easy to find empirical data adaptable to answering questions never raised before. More likely, available data would relate to "trivial" hypotheses and to sufficiently confirmed parts of a theory without


providing any support for the crucial and high information hypotheses.

A second difficulty arises from the fact that available data are thoroughly embedded in the particular theoretical orientation of the original researcher and are hard to retrieve for use in the context of the new theory. Also these data have undergone different mathematical operations to produce indexes that are of no use to the new researcher. And raw untreated data are often hard to come by in published research.

The specific material selected for analysis imposed an additional limitation. It turned out to be insufficient in scope and could test no more than a couple of hypotheses and statements of the theory. Also the style of research reporting tended to be descriptive without emphasis on the process which is the major interest of the proposed theory. As a result, the analysis presented below is short and sketchy.

The following statement from the AID research report may be quoted, at least, in partial support of hypothesis 5, above:

"The more intelligent a person, the more responsive he would be to the message. Since it was not possible to determine intelligence directly, indirect measures were used, such as level of education, literacy, extent of reading, and receptiveness to information." 4

The concept of Symbolic Transformations Index, as we will see in the following, can be used to reconcile two differential patterns in the use of information sources at different stages of innovation.

adoption. Rogers, for example, found that use of information sources at the various stages of adoption in Colombia differed from that seen in communities in the United States. In the United States the mass media information sources have been found to be the most important at the awareness stage, and personal information sources the most important at the evaluation stage in the adoption process. But in Colombia "no mention of any mass source was made by any of the 158 respondents at any stage in the adoption process."

Similar patterns of use of information sources in different communities and cultures should in fact not be expected. Adopters as individuals and groups will use whatever communication source and medium is both available and accessible to them, and whatever medium is functionally suited to their purposes. The Symbolic Transformations Index of a community may in fact be so low that mass media even when available may not be accessible or functionally suitable. In such cases, these media would not be utilized at any stage of adoption of an innovation.

Hypothesis 8 finds sufficient support in the following quotation:

The lack of cost and promise of future reward may explain the popularity of vaccination — the people were getting little, but at no cost. Low cost with low but immediate returns, may have accounted for the intermediate position of marmalade. Moderate cost with high return may have been the operative relationship with regard to stoves. High cost with low immediate returns and only ill-perceived promise of future reward, may account for latrines being the least frequently chosen practice.

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A quotation from Watson's case study\(^7\) that "The ferment was exciting but wearing. Innovations hardly had a chance to make contribution before they were altered. Stability was hard to achieve," supports our theoretical position on the types of environments and our statement that supportive environments beyond a certain degree may be unnecessary and even harmful for innovation (see pp 53-54).

Johnson's\(^8\) discussion of the "new cycle of change" after the introduction of innovative educational tools in school systems seems to support the concept of \textit{toleration} advanced in our theory (see pp 82-83). Johnson's case study does not, however, articulate the concept too well.

The School Problems Commission in Illinois\(^9\) is a case of an \textit{adapter system} discussed in our theory under the sub-heading "Articulation of Initiator and Target Configurations" (see pp 66-68).

In the preceding, we have attempted to demonstrate the heuristic value of the theory by generating a series of hypotheses and identifying their antecedents to the logical structure of the theory. We have also analyzed a few case studies of innovation diffusion to test some of the hypotheses deduced from the theory. It was not within the scope of the present investigation to attempt a comprehensive validation of the theory by testing all the possible hypotheses deducible from it. The attempt, therefore, has been, merely illustrative.

\(^7\) Watson, \textit{op. cit.}, p 104.

\(^8\) Johnson, \textit{op. cit.}, p 171.

A Statement on the American Civil Rights Movement Using the Terms, Concepts, and Constructs of the Configurational Theory of Innovation Diffusion

In this section we have employed a different strategy to examine the usefulness of the proposed theory. This strategy consists in the use of the concepts, constructs, and statements from the logical structure of the proposed theory to state and explain a real-life diffusion event. This is not, strictly speaking, a validation procedure but should bring out the heuristic value of the theory.

The American Civil Rights Movement has been selected as an example of "innovation diffusion" in contemporary America both for its historical importance and its complex nature. Considerable information on the Civil Rights Movement will most certainly be available to readers of this report, and we can, therefore, easily omit factual descriptions to emphasize interpretive materials.

The period selected for analysis has been arbitrarily fixed as beginning with January 20, 1965, the date of the inauguration of President Johnson, and ending with the Los Angeles race riots during the second week of August, 1965. What follows is not an inclusive statement on the Civil Rights Movement during the period chosen. It refers only to the process of spread of the movement. Only the milestones in this national movement could be taken in view within the limited scope of this section, and we have necessarily, been not too mindful of details. To recollect the events of the eight months of the Civil Rights Movement conformed here we used "The News of the Week in Review," in the Sunday editions of The New York Times.
for an inventory of events; and actual statements by leaders of
civil rights and resistance groups have sometimes been quoted from
The New Republic.

The Configurational Theory of Innovation Diffusion presented
earlier focuses on four factors — the nature of the configurational
relationship, that is, the pattern of the existing innovator-adopter
relationship; the state of linkage; the nature of the environments
to which the innovator and the adopter are open; and the resources
of the adopter, and the innovator. It is understandable, therefore,
that in our analysis of the Civil Rights Movement as a diffusion
event we should talk in terms of these factors identifying adopter
and innovator roles, the state of linkage, environmental support,
and the availability and use of material, psychological and power
resources.

A basic concept of the proposed theory is the nature of the
configurational relationship between initiators and adopters and we
will, therefore, begin by identifying these roles.

The initiator role in the case of the Civil Rights Movement
is being played by the many Civil Rights groups, such as NAACP
(National Association for the Advancement of Colored People),
CORE (Congress on Racial Equality), MFDP (Mississippi Freedom Demo-
cratic Party), SNCC (Students' Non-Violent Coordinating Committee),
LCCR (Leadership Conference on Civil Rights), etc. According to our
typology of innovator-adopter relationships (see table 5, p 57)
these are G configurations but because of intense goal-seeking
behavior they are all bureaucratised to a considerable degree.

The multiplicity of initiators should help to the extent that it would multiply resources and potentials of initiators and provide opportunities for local and regional identification where initiator groups are local and regional. But this multiplicity of initiator configurations could be harmful to the Negro cause if the aims of different initiator groups were highly divergent and not supplementary to each other. The Black Muslim movement is a case in point of an inverse factor in the multiplication of initiator systems.

The adopters in this case are the black and white Americans all over the nation. The configurational relationship is, therefore, basically a G–G type (a Group acting on a Culture) which by its very nature should take years if not decades for functional diffusion of innovation.

The nature of innovation itself is important here insofar as it gives an idea of the amount of resources needed for accomplishing functional diffusion. Since the innovation being diffused is a new pattern of social relationships and a new distribution of political and economic power in an entire culture, what we are dealing with is not an innovation but a complex hierarchy of innovations. Functional diffusion of all these innovations cannot be conceived of in terms of quick schedules.

There is, however, a new actor in the innovator–adopter relationship analysed above. It is a resistance group of potential adopters, so articulate that it provides a neutralizing force to
the actions of the innovator configuration.

In such a situation the neutralization influence of the resistance group must first be removed or reduced before the actual diffusion of innovations can take place and these innovations can be incorporated into the adopter system and sub-systems. The American Civil Rights Movement, at present, may be said to be at this first stage.

The Environment factor of our functional equation for maximum diffusion, in the present case, may be evaluated as extremely favorable to the Civil Rights Movement. The last two decades or more have seen a universal movement toward civil and human rights, anti-colonialism, and political self-determination. The United States itself has contributed substantially to this world movement and as a world power is completely open to this environment. Unless there was a drastic shift in US policy toward isolationism this supportive world environment will be available to the Negro.

In a culture as saturated with communications media and facilities as is the United States, the time tables for innovation diffusion can be considerably shortened. Linkage systems in fact are already available and most often it is the question of putting the proper information on these lines of communication.

The national mass media also provide the Civil Rights Movement the legitimization (a psychological resource) it needs. The United States being a democratic society, social consensus does not permit selective monitoring of information by the resistance groups even on the communication channels owned by them. A case in point is that
of station WLBT in Jackson, Mississippi, which defaulted in carrying
information related to the Negro Civil Rights Movement and came near
to losing its broadcasting license from the FCC.

The army of change agents employed by the Civil Rights groups
provide the bridge between the national movement and the mass media
on the one hand and the Negro and white adopters on the other.

A study of the nature and use of resources by initiators and
resisters makes fascinating analysis. The resistance groups active
in maintenance of segregation have the resources of political and
social power and that is the resource they most often use. The Negro,
on the other hand, has only the moral resource available to him and
naturally that is the resource that Negro innovators most often use.
The Negro is also able to "borrow" the power resources of the federal
government and the economic resources released by the civil rights
legislation.

The resistance groups are greatly handicapped in terms of resources.
The Negro is, in fact, challenging the social and political power of
the white population and whenever this power is used the Negro by
the sheer fact of being a victim of power builds a huge fund of moral
resource for use in his diffusion campaign. For example, State Attorney
William Ferguson in Kansas employs political power to interpret the
Civil Rights Legislation of 1964 so that a Negro cannot even learn
the barbering trade except in prison.\footnote{10} The Negro movement capitalizes
upon this misuse of power by resistance groups. Sheriff Jim Clark

\footnote{10. The New Republic, January 23, 1965, p 7.}
uses power to break up a march in Selma, Alabama, and the crop of moral resources reaped by the Negro is tremendous.

On the other hand, the Negro is non-violent. He plays the victim. He gives the battle a religious flavor. He meets in the churches. He quotes the Bible and uses the spiritual "thee" and "thou." He sings and kneels and asks for permission to pray. He makes human sacrifices for his "moral" bank account. He asks the white clergy to join with him and confuses the resisters with this stunning force.

This moral resource is not locally available in the South where the major battle is being fought. That is why the white man in the South says: "This is a local problem. Leave us alone and let us solve it." But the Negro wants to import his resources for the battle. He invites Martin Luther King who is a mobile bank of moral resources greatly enhanced by his Nobel Peace Prize. To a Negro, a battle in an unknown Southern county is not just a local issue. He makes verbal comparisons between that "local issue" and the Congo and the Vietnam War. John Lewis, Chairman of the SNCC said to a crowd, "I don't see how President Johnson can send troops to Vietnam — I don't see how he can send troops to the Congo... and can't send troops to Selma, Alabama."11

The moral resource is always a delicate account. The resistance groups seek to destroy it by associating the Civil Rights Movement with communists and subversives, and the civil rights workers with morally depraved delinquents. The recent race riots in Los Angeles

for which the Negro has been held responsible seem to have depleted the moral resources of the Civil Rights Movement to some degree. Some further repetitions of this pattern may be harmful to the Negro movement because that involves expense of moral and psychological resources.

The Negro cannot spend much on the Civil Rights Movement but he can make the resistance groups pay the price. Martin Luther King during April of 1965 asked for a consumer, industrial, and labor union boycott of Alabama products, withdrawal of reserve funds from Alabama banks, and other economic reprisals, knowing that economic sanctions can reduce the will of the Southern white to resist change. An inducement for change is offered through the Civil Rights Act of 1964 which offers a large portion of more than a billion dollars of Federal funds to schools in the deep South if they desegregate.

The Civil Rights Movement on the whole has selected a useful strategy. This is the innovation of "form" before the innovation of "meaning" (see p 32). Through legislation they have created a new rule of the game to which all Americans must respond as long as they contribute to the general American consensus of the Rule of Law. The New Civil Rights Law and the New Education Act of 1965 supply the form, a framework of toleration, within which the Negro must then start anew and work slowly and by inches to bring about the revolution of "meanings" of social equality. As the President said in his

Howard University Commencement Address, June, 1965, "...Legislative guarantees of freedom provide only the structure in which the Negro social problem can be resolved."

To the innovation researcher it seems to suggest the principle that whenever possible innovation might first be legislated. Once racial equality, a new calculating machine, or the New Mathematics curriculum has been introduced through executive action or legislation, and toleration of form has been achieved, work may begin on the revolution of meanings. It may be more difficult, or not possible at all, the other way round.

This rather brief interpretation of the Civil Rights Movement in terms of the Configurational Theory of Innovation Diffusion enables us to remark both on the usefulness of the concepts of our theory and the methodology of examining the heuristic value of such theoretical presentations before they can be field tested. A more extensive exercise with more varied material may not only test the heuristic value of the concepts and constructs of a theory but in some cases may help extend the original theory to include processes and events not previously visualized.

We will now turn to the third methodological approach to test the validity and usefulness of the proposed theory.

Assessment of Theoretical Adequacy

An assessment of the theoretical adequacy of the Configurational Theory of Innovation Diffusion according to suitable criteria for judging such adequacy was undertaken as a third and final step to
examine objectively the potential usefulness of the proposed theory.

The criteria used for assessment were those developed by Harry Broudy\textsuperscript{13} for assessing the theoretical adequacy of a conceptual framework of planned educational change. These criteria have the merit of having been developed ostensibly for use with theories and conceptualisations dealing with innovation and social change. But on the other hand they have appeared in a "working paper" which would probably be subjected to further revision to remove some present ambiguities, and to make some of the criteria more operational.

The list of criteria\textsuperscript{14} suggested by Broudy is produced below:

\textbf{Summary of criteria}

1.0 How precise is the terminology?

1.1 Does a given concept or term used in the study conform to an accepted use of the term by the experts in the field?

1.2 If a different meaning from the accepted one is intended, has the difference been clearly indicated?

1.3 If a difference in meaning is intended, have reasons for the innovation been stated?

1.4 Is the "concept" being used in a psychological or a logical sense?

1.5 Have the usual logical criteria for definitions of terms been observed?


\textsuperscript{14} Ibid.
2.0 Is the given term or terms a name for a set of observational data (e.g., attitudes = answers on an attitude inventory), or is it a construct for which meanings have been stipulated (e.g., id = repression)?

2.1 If they are names of observational data, have the connotation and extension of the terms been made explicit?

2.2 If the terms are constructs, have operational definitions been given that will enable them to be translated into experimental or observational procedures?

2.3 Is the set of constructs sufficient to explain the phenomena?

2.4 Are all the constructs in the set necessary? Can some be deduced from other members of the set?

2.5 Are the concepts and constructs taken from one system of ideas (psychology) or from more than one?

2.6 If the concepts are mixed, what are the logical relations between them?

3.0 Does the theory meet logical and methodological tests?

3.1 Is there support for the theory apart from the data it was designed to explain?

3.11 Is the reasoning in it circular?

3.12 Does it beg the question?

3.13 Does it name the explicanda or does it explain them?

3.2 Have rival theories been sought out and matched for adequacy?

3.3 Have the consequences of the theory been deduced?

3.31 Are they testable?

3.32 Have they been tested?

3.33 Have the really hard cases been explained?

3.4 Has the testing been confined to finding confirmatory cases, or has there been a genuine attempt at testing that might refute the theory?

3.5 Have the generalizations in the study been over-generalized?
3.6 Does the theory lend itself to being visualized by a model more concrete than the theory itself?

3.7 Does the model seem to fit the phenomena to which the theory refers without gross discrepancies?

3.8 Is the "theory" any more than a model borrowed from some other field?

3.9 Have the similarities and differences between the model and the phenomena been carefully scrutinized?

3.91 Are the similarities numerous and important?

3.92 Are the differences irrelevant?

4.0 To what extent have the limitations of social inquiry as a science been made explicit in this inquiry?

4.1 Is the hypothesis or theory much more complicated than the rivals in the field? Is it so complicated that even trained workers in the field cannot understand it?

4.2 Does this theory assert that everything is related to everything else, so that nothing can be separated or distinguished?

4.3 Does the theory or inquiry assume that knowledge in this type of inquiry is impossible?

4.4 Have steps been taken to identify the idiosyncratic factors in the inquiry and the cultural factors?

4.5 Have provisions been made for estimating the effects of idiosyncratic factors?

4.6 If the explanation is a functional one, have the boundaries of the system in which the variables function been clearly indicated?

4.7 Have the value assumptions of the inquiry been made explicit?

Assessment by judges

Three judges were asked to assess the theory against the preceding

15. The author is grateful to Professors David L. Clark (Judge 1), Egon G. Cusa (Judge 2), and Roy A. Larmee (Judge 3) for agreeing to assess the theoretical adequacy of the proposed theory on the basis of criteria developed by Harry Broudy.
list of criteria. The results of this assessment are given below item by item. The analysis is qualitative; statistical treatment of responses was considered unnecessary.

1.0 How precise is the terminology?

J(1) Satisfactory
J(2) Satisfactory
J(3) Satisfactory

Remarks — The theory is thus adequate on this count.

1.1 Does a given concept or term used in the study conform to an accepted use of the term by the experts in the field?

J(1) Satisfactory (in most cases)
J(2) Satisfactory
J(3) Not satisfactory

Remarks — The comments of Judge 3 seem to be based on the definition of only one term, that is, 'Innovator' which is defined in this theory differently from its common usage in rural sociology. The definition of the term has, however, been included in the theory and reasons for a different definition indicated.

1.2 If a different meaning from the accepted one is intended, has the difference been clearly indicated?

J(1) Less Satisfactory
J(2) Irrelevant
J(3) Satisfactory

Remarks — The theory is thus quite adequate on this count.

1.3 If a difference in meaning is intended, have reasons for innovation been stated?

J(1) Unsatisfactory
J(2) Irrelevant
J(3) Yes

Remarks — This material in the theory needs to be articulated.
1.4 Is the "concept" being used in a psychological or a logical sense?

J(1) Don't understand this question
J(2) Logical
J(3) Logical

Remarks — This criterion does not affect the usefulness of the theory one way or the other but only seeks to contribute to the understanding of the nature of the conceptualization.

1.5 Have the usual logical criteria for definitions of terms been observed?

J(1) Satisfactory
J(2) I'm not sure what Broudy means
J(3) Yes

Remarks — The theory can be considered satisfactory on this count.

2.0 Is the given term or terms a name for a set of observational data (e.g., attitudes = answers on an attitude inventory), or is it a construct for which meanings have been stipulated (e.g., id = repression)?

J(1) Construct
J(2) Construct
J(3) Construct

Remarks — This criterion again does not affect the usefulness of the theory one way or the other.

2.1 If they are names of observational data, have the connotation and extension of the terms been made explicit?

J(1) They are not observational data
J(2) Irrelevant
J(3) They are not observational data

Remarks — Since the theory is not observational data, the criterion is not relevant.

2.2 If the terms are constructs, have operational definitions been given that will enable them to be translated into experimental or observational procedures?

J(1) Reasonably Satisfactory
J(2) No
J(3) Yes
Remarks — "No" from Judge 2 and a qualified "Satisfactory" from Judge 3 indicate need for further work on operationalization of some of the constructs.

2.3 Is the set of constructs sufficient to explain the phenomena?

J(1) Undoubtedly not, but they are a reasonable starting point
J(2) ?
J(3) No

Remarks — The theory would be subjected to further formalization.

2.4 Are all the constructs in the set necessary? Can some be deduced from other members of the set?

J(1) (For the first question) No, but generally satisfactory.
(For the second question) Satisfactory
J(2) Plus. Don't think they can be deduced, but not sure all are necessary. Think assumptions unstated
J(3) Satisfactory

Remarks — It seems that further formalization is necessary when some explanatory material may be shifted to another section or taken out of the logical structure of the theory altogether.

2.5 Are the concepts and constructs taken from one system of ideas (Psychology) or from more than one?

J(1) More than one
J(2) More than one
J(3) More than one

Remarks — This, in fact, is a strong point of the theory for it combines psychological and sociological approaches.

2.6 If the concepts are mixed, what are the logical relations between them?

J(1) They are not too well interrelated by the author
J(2) ?
J(3) Generally satisfactory interrelationships

Remarks — Interrelationships are suggested through categorization of configurational relationships as molar, molar-molecular, and molecular; and through hypothesizing that lower-order relationships exist within the molar, higher-order relationships.

3.0 Does the theory meet logical and methodological tests?
J(1) This is too gross a question to deal with
J(2) Untried as yet
J(3) Generally, yes

Remarks — This is probably not a very operational criterion.

3.1 Is there support for the theory apart from the data it was
designed to explain?

J(1) Yes
J(2) Yes
J(3) Yes

Remarks — The theory may be considered satisfactory on this
count.

3.11 Is the reasoning in it circular?

J(1) Satisfactory
J(2) Satisfactory
J(3) Satisfactory

Remarks — The theory may be considered satisfactory on this
count.

3.12 Does it beg the question?

J(1) Satisfactory
J(2) Satisfactory
J(3) ?

Remarks — The theory may be considered satisfactory on this
count.

3.13 Does it name the explicanda or does it explain them?

J(1) Unsatisfactory. This is probably the weakest link in
the theory as now stated. It is chiefly explicanda
J(2) Tends to name
J(3) Tends to name

Remarks — This objection to theoretical adequacy is difficult
to meet in the present form of the theory which will have to
be moved more toward "explaining" should it be possible, at all.

3.2 Have rival theories been sought out and matched for adequacy?

J(1) Unsatisfactory
J(2) No
J(3) Yes, to some degree
Remarks — Rival innovation models have been sought and discussed in the chapter on review of innovation research and theory. This discussion does not form part of the theory proper.

3.3 Have the consequences of the theory been deduced?

J(1) To a limited extent
J(2) No
J(3) Yes, to some degree

Remarks — The consequences need to be articulated better than they are in the present form.

3.31 Are they testable?

J(1) To a limited extent
J(2) Probably
J(3) Yes

Remarks — Testable hypotheses have actually been generated from the theory and included in an earlier section of the present chapter.

3.32 Have they been tested?

J(1) No
J(2) No
J(3) No

Remarks — Testing of the theory was not part of the task set for himself by this investigator. Reference is again made to earlier sections of the present chapter.

3.33 Have the really hard cases been explained?

J(1) No
J(2) No
J(3) No

Remarks — This was not part of the task set for himself by the investigator. Reference is again made to earlier sections of the present chapter.

3.4 Has the testing been confined to finding confirmatory cases, or has there been a genuine attempt at testing that might refute the theory?
J(1) Not applicable yet
J(2) Presume this will be done
J(3) ?

Remarks — This will be done, later.

3.5 Have the generalizations in the study been over-generalized?

J(1) Satisfactory
J(2) Irrelevant
J(3) Satisfactory

Remarks — The theory may be considered to be satisfactory on this count.

3.6 Does the theory lend itself to being visualised by a model more concrete than the theory itself?

J(1) Yes, but this has not really been attempted
J(2) Yes
J(3) Yes

Remarks — The theory may be considered to be satisfactory on this count.

3.7 Does the model seem to fit the phenomena to which the theory refers without gross discrepancies?

J(1) Not applicable
J(2) Plus
J(3) Yes

Remarks — The theory can be considered to be satisfactory on this count.

3.8 Is the "theory" any more than a model borrowed from some other field?

J(1) Yes
J(2) Yes
J(3) Yes

Remarks — The theory may be considered to be satisfactory on this count.

3.9 Have the similarities and differences between the model and the phenomena been carefully scrutinized?

J(1) Not applicable
J(2) Presume this will be done
J(3) No
Remarks — This will be done when the theory is field tested and the phenomenon of change is empirically studied.

3.91 Are the similarities numerous and important?

J(1) Not applicable
J(2) ?
J(3) ?

Remarks — No comments.

3.92 Are the differences irrelevant?

J(1) Not applicable
J(2) ?
J(3) No

Remarks — No comments.

4.0 To what extent have the limitations of social inquiry as a science been made explicit in this inquiry?

J(1) Little
J(2) Not satisfactory
J(3) Satisfactory

Remarks — This aspect will have to be articulated in further formalisation of the theory.

4.1 Is the hypothesis or theory much more complicated than the rivals in the field? Is it so complicated that even trained workers in the field cannot understand it?

J(1) Satisfactory
J(2) But (Although writing could, of course, be improved and clarified)
J(3) "Yes" to question 1. "No" to question 2

Remarks — Verbal changes can be made in the course of further formalisation of the theory.

4.2 Does this theory assert that everything is related to everything else, so that nothing can be separated or distinguished?

J(1) Satisfactory
J(2) Satisfactory
J(3) Satisfactory

Remarks — The theory can be considered to be satisfactory on this count.
4.3 Does the theory or inquiry assume that knowledge in this type of inquiry is impossible?

J(1) Satisfactory
J(2) Plus
J(3) Satisfactory

Remarks — The theory can be considered to be satisfactory on this count.

4.4 Have steps been taken to identify the idiosyncratic factors in the inquiry and the cultural factors?

J(1) Satisfactory
J(2) Plus
J(3) Yes, to some degree

Remarks — The theory can be considered to be satisfactory on this count.

4.5 Have provisions been made for estimating the effect of idiosyncratic factors?

J(1) To some extent
J(2) No
J(3) Yes

Remarks — This feature of the theory needs further articulation.

4.6 If the explanation is a functional one, have the boundaries of the system in which variables function been clearly indicated?

J(1) Reasonably well
J(2) ?
J(3) No

Remarks — This feature may need further articulation.

4.7 Have the value assumptions of the inquiry been made explicit?

J(1) Satisfactory
J(2) Plus
J(3) Yes

Remarks — The theory can be considered to be satisfactory on this count.

In addition to the remarks included after each set of responses by the judges, on the different criterion statements on the theoretical
adequacy of the theory, the following generalization can be made: that the theory is basically useful and heuristic though further articulation of some implied and unstated assumptions is needed; and that further verbal and formal tightening is necessary.

Perfection was neither claimed nor is supportable, but the three judges certainly have assessed this conceptualisation as more than a first step toward a general theory of innovation diffusion. Any elaborate test of the validity of the Configurational Theory of Innovation Diffusion through empirical methods must, however, await the use of the theory by researchers for conceptualizing and designing diffusion research and experimentation over the years.16

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16. This hope seems real. One of the most eminent innovation diffusion researchers in the United States, Professor Herbert F. Lionberger, University of Missouri commented as follows in a letter written to the author on September 7, 1965: "I for one will be referring to your paper in conceptualizing diffusion research studies in the future."
CHAPTER V

SYSTEM ANALYSES OF INDIAN EDUCATION AND OF COMMUNITY
DEVELOPMENT WITH SUGGESTED STRATEGIES
FOR INNOVATION DIFFUSION

The Configurational Theory of Innovation Diffusion and a
preliminary validation thereof were presented in Chapters III
and IV. We will now shift our attention to the developmental
objectives of this study and translate and analogize our theory to
Indian education and community development in order to suggest change
strategies.

As we have indicated earlier the most important concept of the
theory presented here is the typology of configurational (innovator-
adopter) relationships. The transformation of theory into practice
thus must, first, involve identification of the adopter and innovator
roles and the definition of their interrelationships; and second,
the evaluation of communication facilities, environmental support,
and availability of resources. The translating and analogising of
the theory to problems of change in Indian education and community
development must, therefore, require a system analysis of both
the educational system and the community development system.
Section I of this chapter will include a system analysis of Indian
education followed by suggestions in regard to substantive and
organizational strategies for educational change. Section II will
consist of a system analysis of Indian community development and suggest, separately, appropriate change strategies.

Section I

A system is defined in Webster's New Collegiate Dictionary as "a complete exhibition of essential principles or facts, arranged in a rational dependence or connection." These essential principles and facts may be social, economic, political, philosophic, or educational. It follows then that there may be different types of systems — social systems, economic systems, political systems, educational systems, etc.

System analysis for designing better systems has developed into a highly sophisticated, computerized technology. "Essentially, systems analysis is the comparison of alternative means of carrying out some function, when those means are rather complicated and comprise a number of interrelated elements."¹ System analyses are done in terms of inputs and outputs and wherever possible both inputs and outputs are quantified for comparison of the economics of the present and alternative systems. The emphasis on the efficiency of outputs in system analysis explains why it is sometimes called economic analysis.

It is not possible, however, to quantify the inputs and outputs of every system. The educational systems, wherein we talk of social returns, are especially resistant to quantification though some

attempts have certainly been made. Even when quantification is not possible, system analysis can be profitably used to understand and explain institutional and organizational behavior as well as the interaction patterns of individuals working within these organizations. Such analyses make the process aspects of systems more obvious, help study variables in clusters, and assist in the making of choices between functional patterns on scientific rather than intuitive basis. It should be noted, however, that system analysis does not solve all problems. Questions of cost analysis, of statistical analysis, and of design and installation of alternative systems will still remain and will have to be tackled separately.

Ideally a good system analysis should take in view all the essential facts and principles in the sociopsychological, political, or economic life of the system but this is neither possible nor necessary. It is not possible because we are not conceptually or methodologically ready to undertake analysis of variables in interaction in multi-dimensional systems. Also it is unnecessary, because a key concept in systems research is that the original statement of a problem does not delimit an investigation from contributory and explanatory elements and dimensions. It is possible, therefore, to use in system analysis the thin-end-of-the-wedge approach by considering a fact or a set of principles as primary and relating to this primary fact or set of principles all the other facts and principles pertaining to the system. The "contributory and explanatory elements and dimensions" that we have talked about often cannot
be handled by a single researcher or a group of researchers within one specialization. Generally, therefore, we find teams of researchers -- physicists, statisticians, economists, psychologists, mathematicians, and engineers, educators -- working together on system analyses and system installations.

In our system analyses of Indian education and community development we will consider the facts of communication as primary. There are good reasons why a communications approach should be specially heuristic. First, it is one of the biases of the systems scientist or systems analyst to look at organizations and systems as control structures and to search for solutions in terms of information processing. The selection of communication as the primary principle is thus in the tradition of systems research. Second, education (or community development, for that matter) as an enterprise is basically an information distribution system and a communication approach should lend itself directly to system analysis of Indian education without unnecessary transferring or transforming. Third, in Indian education particularly, where the medium of instruction at the university level is still a foreign tongue, the nature of communication, in a very real sense, is the primary fact. It needs to be understood, however, that system analysis itself involves model building, and the selection of a particular approach is essentially a point of

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view which may be considered to have the status of a theory. The
criterion of evaluation in such cases must lie in the heuristic
possibilities of the approach employed.

Communication will be interpreted here both in its philosophic
and democratic dimension of "sharing of feelings and ideas in a
mood of mutuality" and in terms of an effective network of men,
media, and message systems.

Systems have components that may be called sub-systems. A
sub-system by its very nature will have all the properties of a
system and may be system analysed. We can thus have second-order
system analyses. Theoretically, it is possible to have nth order
system analyses. The analyses envisioned here are first-order system
analyses of Indian education and community development. Second-
or third-order system analyses might have been useful but are
beyond the objectives and resources of the present researcher. Also
these analyses are subject to the obvious limitation of being handled
by a single researcher without the benefit of a team of specialists
generally associated with system analyses.

Understandably, there is considerable arbitrariness about setting
the boundaries of systems to be analyzed.\(^4\) Natural systems do not
exist. In fact, a system may have to be first defined and then
analyzed. The Indian educational system is seen as comprising the

\(^4\) Edgar Dale, *Audio-Visual Methods in Teaching* (New York:

\(^5\) C. West Churchman, "On the Design of Educational Systems,"
Union Ministry of Education and its allied and attached offices; the union ministry dealing with technical education and scientific research; state departments of education with their allied and subordinate organizations; district educational departments in corporations and municipalities; universities and technical, professional, and research institutions; degree colleges, secondary, elementary and vocational schools; and the communities they serve.

Naturally, social systems are not homogeneous in an absolute sense. Systems are, in fact, ambivalent. They do opposite things at the same time and show different behaviors at various points of social discharge. However, a particular system will have a predominant complexion, and there will be persistent relationships between its components which will be considered pertinent to a system analysis.

System analysis and system design go together: an existing system may be adapted, changed, or completely dismantled and a more efficient system may be installed in its place. The design of a new system must be based on certain quantitative and qualitative criteria. It is on the basis of these criteria again that the existing system must be evaluated and the costs and returns or the inputs and outputs of a new system must be determined. Before proceeding with a communication analysis of the Indian system of education we must, therefore, state the communication attributes of an educational system in a democracy.

Let us first state the value position regarding communications. The classic in this area even today is John Dewey's *Democracy and*
Education. Dewey presents a position that relates community, education, communication, and democracy in a self-sustaining, self-correcting, self-improving relationship. Education and society must be in communication. Society has to be regenerated through education that must transfer the experience of one generation to the next:

Society exists through a process of transmission quite as much as biological life. This transmission occurs by means of communication of habits of doing, thinking, and feeling from the older to the younger. Without this communication of ideals, hopes, expectations, standards, opinions, from those members of society who are passing out of the group life to those who are coming into it, social life could not survive. If the members who compose a society lived on continuously, they might educate the newborn members, but it would be a task directed by personal interest rather than social need. Now it is a work of necessity.

To transfer what one generation thinks worth transferring to the next generation, the educational enterprise has to be in open and continuous communication with the spirit of the generation. This is what will give us community-centered education related to the educational needs of the community as it now lives and as it desires to live through the coming generations. This will give us community-concerned education and ensure that education does not become an artificial, isolated sub-culture but is concerned with the real and genuine problems of the community and the issues of the day. This would also give us community-enriched education, an


7. Ibid., p 3.
education that is not only the giver but also the receiver of enriched experiences, real problems, and dynamic solutions: "Society not only continues to exist by transmission, by communication, but it may fairly be said to exist in transmission, in communication. There is more than a verbal tie between the words common, community, and communication."  

Communication between society and education is a necessary but not a sufficient condition for democratic institutions. The nature and quality of communication determines the moral and social health of democracy. Communication has to be "a sharing of feelings and ideas in a mood of mutuality." It means an absence in societies of any elite class with special communication privileges and no communication obligations. In a teacher-taught context this means a democratic relationship between the teacher and the learner. Within the total educational enterprise composed of researchers, teachers, scholars, and students, democratic and educative communication means a multiplicity of points of origination of communication messages constructed in freedom and morality. To put it differently, it implies academic freedom, many schools of thought, free interplay of ideas, teaching not only needed facts and principles but also models of excellence in personality, dedication and scholarship.

Again, a good democratic communication network for education has to be as large as the community itself. It has to be spread all over the nation. Ideally, it should be connected with the international

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8. Ibid., p 4
communication networks to be able to give to and take from the intellectual and creative resources of other nations. It has to have a multiplicity of independent origination points. It is thus an open, broadcast network that any one can tune in. It is not a monolithic system of message making and message distribution resulting in indoctrination rather than education. In other words, there is no central monitoring in the network (see p 32). Multiple message construction, multiple monitoring, freedom to select, discount, or protest against messages, is essential to communication networks in democracies.

In educational terms the preceding would mean universal education, free and easy access to schools, faculty recruitments based on considerations of merit, and programs of continuing education for an informed community.

The requirements of an educational communication network in democracies may be summarised as follows:

1. They are as extensive as the communities they serve and are open and accessible to all members of the community.

2. They are in continuous interaction with the societies in which they exist.

3. They have no centralised monitoring, but multiple points of origination of messages.

4. There are no ceremonial rights or obligations attached to a class or group to produce or consume communication messages, and intended receivers of messages have freedom not to consume messages.
if they be so inclined.

Now that we have stated the requirements of an educational communication network in democracies we will present a communication analysis of the Indian educational system judging it from these stated criteria.

**Indian Education as a Communication Network**

The reader's knowledge of the facts of Indian education has to be presumed to a considerable extent to present an *analysis* of the system without full *description*. Some pertinent factual and descriptive material will, however, be presented to support the generalizations resulting from our analysis.

Four statements can be made about the Indian educational enterprise as a communication system:

1. It is a **highly coded** system.
2. It has a **select community** of encoders and decoders.
3. It is a **closed-circuit** network.
4. It has highly **centralized monitoring**.

The writer believes that most problems of Indian education can be analyzed by using these four propositions and that such an analysis will provide insights that have not been available to planners, critics, or students of Indian education.

**Highly coded communication: Proposition 1**

English has been the medium of instruction in Indian universities and higher secondary schools during the past one hundred years or more of the history of public instruction in India. More recently,
in the post-Independence period some universities and secondary education boards attempted to change over from English to Hindi or a regional language but the shift in many cases proved premature. Even today the medium of instruction at the university, college, and higher secondary school levels, for the most part, remains English. The responsibility for this happening lies in a historical incident, the famous Macaulay's Minute of 1835 when vernacular languages and Indian content of education were discontinued and Western education with English language and content instituted in its place.

Of course, every language is a code. In daily speech and in writing people use arbitrary symbols which give us a particular language with its words, sounds, and syntax. There is nothing unfortunate about languages being symbolic systems. In fact, the coded symbolic nature of all human language has liberated man from the tyranny of the concrete and the immediate, and made it possible for him to talk about things both near and remote and perform symbolic operations without immediate responsibility for consequences, a symbolic rehearsal. Man has thus examined the present and the possible and generated cultures.

It is also understood that for purposes of research and creation of knowledge we need definitions, and statement of laws, often times in a highly specialized metalanguage, a code within a code, in order to achieve precision, invariance, inter-researcher communication, and confirmation. A common sense language with multiple meanings, suffused with suggestibility cannot do the job in generating hypotheses
and validating theories:

To understand this shift in emphasis, it is necessary to recognize that any scientific activity depends on successful communication. The latitude in meaning which is possible in common speech and laudable in poetry is not permitted to science. The difference between "the bigger they come, the harder they fall." and "M = mc²" is enormous, encompassing not only part of the history of physics, but a good deal of language clarification as well.\(^9\)

Let us go back for a moment to the necessity of a metalanguage in sciences or the need of highly symbolic encoding for creating laws and theories and quote Margaret Mead's concern for ensuring that scientific language does not become an isolated sub-system:

The young physicist, who now talks only with other young physicists and never with a postman or a poet, would find, if he were enlisted in the task of teaching pre-physics to all children, those who will someday make good physicists, those who will be poets, and those whose greatest ambition is perhaps to be postmen. He would be forced to keep his own rare and special language closer to the natural languages of men. The walls that now separate him from his fellows, even most educated men, would crumble first in his own mind, as he faces the fact that if he could not answer the question of a bright four-year-old, he had not really discovered what he was talking about.\(^10\)

No such thing can happen in a culture where the specialist not only uses "a rare and special language" within a language, but also uses this metalanguage in the midst of a culture that does not understand that language in any form. Even the usual spoken form of the language of the educated is not understood by the

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community, the matelanguage of the specialist is two worlds apart from the common man in India. While it is important to ensure that no schism exists between the language of the common man and the researcher, the mutual enrichment of the community and the educated and scientific sub-culture becomes impossible in India with all the teaching taking place in a foreign language.

We have thus developed in Indian education what Mead elsewhere has called "special esoteric groups who can communicate only with each other." This has set up "a schismogenic process" between the general community and the educated people — a process that is "self-perpetuating and self-aggravating."

In the context of Indian culture, English has the characteristics of a dead language, which by definition, is a language that is no longer a vernacular. Obviously, it is not rooted in the earth. The man in the street adds no salt or slang; the scientist is unable to coin new words to label new concepts if he ever does suggest some. The process of discovering new concepts is also in part a process of defining and labeling concepts. And a product of the Indian educational system is seriously handicapped in performing this function. He must wait for laws, theories, and concepts to be suggested elsewhere. It is not surprising, therefore, that the Indian contribution to thought and knowledge has been limited to a few indigenous traditions.

11 Margaret Mead, "Closing the Gap Between the Scientist and the Others," Daedalus, LXXVIII (Winter, 1959), pp. 139-46.
The English language is not only a highly coded symbol system for the Indian student groups and communities but it is also a code that is highly divergent from the language code used by the common people. "No two languages are alike; each has to be approached afresh. Some are so dissimilar, English and Navajo, for example, that they force the speaker into two different images of reality."\textsuperscript{12} We are not aware of any quantitative indexes of divergence between English and Indian vernaculars but they are clearly different. There is, therefore, minimal borrowing between them and then mostly at the level of including isolated words, and names of things and places.

The highly coded language of the Indian educational system requires of the students considerable expense of time and energy in mastering the English code needed for learning content. It is difficult, again, to quantify this additional expense. No systematic attempt seems to have been made to measure these additional inputs but they should be considerable, and do, in part, explain why an average Indian college graduate is sometimes unflatteringly compared with the high school product of the U.K. or the U.S.A.

It is clear also that because of this highly coded language of the educated, filtration or diffusion of vibrant ideas, lively concepts, and issues and concerns among the communities is made impossible:

Every person who was taught in English schools was cut off from his own people in sympathy and ideology. The English-knowing person became a class by himself and refused to acknowledge kinship with, or feel sympathy for, the masses who did not know English. This unhappy result was due partly to the attempt to substitute Western culture for Eastern and partly to the use of English as a medium of instruction. The Downward Filtration Theory, therefore, did not work out satisfactorily according to the ideas of its promoters for a very long time.13

It has not been, of course, a water-tight situation for all these hundred years or more of cultural contact with the English language and with the West. There certainly have been concepts, ideas, and structures of thought that did get into the general stream of Indian life. But they are negligible in terms of what could have been possible in another culture that supported an educational system in its own vernacular.

Semantic noise in usage

Since the English language is a highly coded language system for Indian students there is generally a low proficiency in English language among the code users which results in high semantic noise. This, in turn, results in bad communication, and in low level of differentiations, concept definitions, message construction, and generation of ideas.

It certainly is a truism that no knowledge can be generated with bad grammar and indifferent spellings. Taxonomies, definitions, reduction statements, hypotheses, propositions, and laws require

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high proficiency in language. This, the usual college graduate from an Indian university does not have either in English or his own language.

It is not intended to leave the impression that no Indian scholars have high proficiency in English. There are many who do have such proficiency, there are many who are masters of literary style or of precise legal statement. There are, again, professionals in Indian universities who produce excellent research literature but they are a highly select community. On the other hand, there must be hundreds of thousands of people whose competencies never flourish!

There is another kind of noise inherent in the Indian educational system. At the elementary school level and in training programs for elementary school teachers the code used is Hindi or a regional language. But the trainers of these teachers are people who do not have proficiency in Hindi, or a regional language. Further semantic noise is thus introduced in translating and analogizing ideas from the first level to the second level of the system.

The nature of the coded message

With the highly coded symbol system comes the highly artificial nature of the message that it encodes. Most of the books used in India are written in the West and it is not surprising that some of them are out-of-date before they get into the hands of an undergraduate going to school in a provincial town in India. The time required for research published in professional journals in the West
to reach India may be years rather than months. Again, though it would not be correct to say that all material in such books is culture-bound yet there is considerable amount of it that is highly remote to the Indian student. Western concepts are "decoded" by readers often without understanding, because most of these decoders never had had the opportunity of meeting a Westerner, or visiting a Western country. Their own communities present completely different images of reality and structures of thought. There is thus a "Clear Only If Known" fallacy, that Edgar Dale talks about, perpetrated in Indian education on a truly national scale.

A highly coded symbol system presenting a body of content which to a considerable degree, is unfamiliar and remote makes the educational system an alien in the social matrix of Indian life. It becomes a middle enterprise that does not deal with the matter of fact Indian world and its concerns, but is related somehow to another place and peoples. It is a game played only in universities and schools, something that enables one to earn a living in some office. In a sense, the educated code user is a kind of a circus boy that can do some tricks with unfamiliar sounds and figures.

This being so, the real issues and concerns of communities are rarely discussed in classrooms. There are other contributory reasons for this state of affairs but we will come to them later.

In the area of subject matter content a synthesis of the East and West is seldom attempted and is, in fact, difficult to achieve. In the first place, the concepts of Indian philosophic thought and
the Hindu way of life are very divergent from Western concepts.
Second, the average professor in an Indian college or university is
unable to handle Indian thought and philosophy because he never
had any experience in these himself except in an unthinking,
unexamined way.

The result is unfortunate. In a book of philosophy of education
used in Indian teachers' colleges there is unlikely to be any ex-
tensive discussion of the Indian concept of man and his nature, or
of the Indian approach to social and moral issues. There will be
little preoccupation with Indian philosophic and educational thought.
References will be abundant to the philosophies of Plato, Rousseau,
Dewey, Whitehead and the Western concept of man based on the great
biblical tradition. The picture is repeated in sociology, history,
literary criticism, political science, history of science and every
other branch of knowledge. Dongerkery puts it this way:

The average product of the modern Indian University
resembles a young tree removed from its original
surroundings and replanted in alien soil.... The
traditions of ancient Indian or Islamic culture, as
the case may be, which are the basis of our national
life, do not reach him save through translation in a
foreign tongue.14

This is the waste of a heritage, that we are told, we should
be proud of!

The situation does not admit of quick and impatient solutions.
The clock of history cannot be put back by a century. We cannot

14. S.R. Dongerkery, Universities and Their Problems (Bombay:
Hind Kitab, Ltd., 1948), p 163.
throw English and everything Western out of our system. Nor do we want to. In fact, like the Hindu and the Islamic traditions the Western tradition is already a valuable part of the Indian culture. We must be careful not to confuse the issue. The problem is not to throw the Western tradition out of our culture but to absorb the Western culture to integrate it completely with the typically Indian tradition. Some of the great Indians did understand the problem. Brought up in the Western tradition they went to live and work with the Indian villager close to the soil. They were able to synthesize the East and West in their own persons and they were thereby able to make such striking contributions to Indian life, politics, and society that no analyst of Indian life dare underestimate. The present system analysis does, indeed, strive to underscore the need of doing, on a national scale, what was done in the persons of few men like Nehru and Gandhi.

Select community of coders and decoders: Proposition 2

It follows from the first proposition (see p 123) that in India there is only a select community that can use the code with facility. There are few who can express themselves well in the English medium. There are fewer who know the difference between good and bad writing. There are many who, though they have been through the mill, yet feel unsure of the use of the code. It is not uncommon for a high school graduate to ask somebody else to write an application for him or fill in a postal money order.
The result is a queer educational and social phenomenon in India — a community of the educated but not an educated community. Among this select community of the educated, researchers, writers, and theoreticians are even fewer.

It should be interesting to quote here Marshall McLuhan's insight on the social and psychic implications of the medium: "In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message."

The statement would be true even if "code" was substituted for the "medium." In India, for instance, a writer's ability to handle the code becomes more important than the writer's ideas. This works in many ways. Good ideas expressed in a code different from English are not legitimised and never get into the mainstream of intellectual life. On the other hand much "grammatical" English gets into print with little or no thought content at all.

Recruitment to this select community of the educated is only through the colleges and the universities. There is no other legitimate way. Poets, short story writers, and other creative producers who write in the vernaculars remain on the periphery of university life. And it is only recently that they have joined the ranks of Indian intellectuals. The self-taught man who is one of the most enriching resources of any culture, and the most significant corrective to the shortcomings of a social system or an educational

enterprise does not exist in India, because of the code.

Closed-circuit network: Proposition 3

It is not necessary to make a very big mental leap from these two propositions — (1) that Indian education is a highly coded system, and (2) that it has a select community of encoders and decoders — to suggest a third, namely: The educational enterprise in India has the properties of a closed-circuit communication network.

Since this is not a broadcast or an open system and the community cannot plug in, the community shows little interest in its schools. There is no such thing as a community "owning" its school. Parents and community leaders seldom, if ever, get into their schools. Community financing of the school programs, or community gifts to schools — of play equipment, books for the school library, household equipment for a home science course — are unheard of. It rarely happens. There are, of course, other reasons for this state of affairs: the general prevalence of poverty in communities, and perhaps also the Indian myth of "School Under The Tree" resulting in bias against making schools attractive and comfortable places for children who should be learning to live lives of resignation.

The communication network is "closed" even in terms of the content that flows over it. This should not surprise any one who finds that Indian schools have played no part at all in the community education movement. Says Dongerkery, "Our universities have not yet seriously assumed the responsibility of carrying their message
to the masses and the general public beyond their gates by means of extension or popular lectures or by pamphlets on current topics written by their teachers. The fact is that they cannot. Not only are they tongue-tied, but they have seldom studied community problems, nor given thought to the issues of concern to communities that they are supposed to be serving.

Centralised monitoring: Proposition 4

Last of all, an important characteristic of Indian education is its centralised monitoring. Monitoring is conceived of here, as the system of control over points of origination of messages and over the types of information sent from these different points.

Both in terms of administrative and academic organization the monitoring is centralised.

Though education is a state responsibility or activity in India, the Education Ministry at the center plays a great part in the educational administration of the country because of its coordination responsibilities under the Constitution.

The Education Ministry at the center is itself subject to pressures from the Planning Commission which has emerged in Indian administration as a super-Ministry. The advisory status of the Central Ministry of Education with respect to state education departments, coupled with funding distribution, gives it an important leverage in total educational planning. The state departments of

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education in their turn control education in the districts. The
government schools are, of course, under their direct control; the
municipal schools follow the curriculum laid down by the state
departments and copy exactly the pattern required of them. They
follow the same syllabi, use the same textbooks, and are inspected
by the state education inspectors.

The private educational effort is small. When it exists it is
heavily funded by the state. Private schools are also subject to
inspection by state education inspectors and have to follow state
rules and regulations to earn accreditation or recognition. All
schools, both public and private, are thus under one administrative
control.

The academic monitoring is also centralized. The University
Grants Commission has considerable control and assumes much leader-
ship in the field of university education. Within each state the
same higher, secondary, and elementary education curricula are
followed throughout a state's jurisdiction. There is generally only
one examining body in a whole state like the Delhi State Higher
Secondary Education Board for the State of Delhi, and the Panjab
University for high and higher secondary schools in the State of
Panjab.

The centralized monitoring in the Indian educational communica-
tion network has a variety of effects upon the system. For example,
it makes the educational enterprise top heavy. Again, the system
comes to be designed for the non-existent typical student.
Consequently, the system does not cover the specific needs of specific individuals and specific communities. It comes to be designed for serving the "highest common factor" of educational needs of learners. It is supposed to deal with issues that are perennial and not with critical present-day problems. The result is bookish education that is neither community-centered, nor child-centered, unresponsive to life and unrelated to critical issues of the day.

This system does genuine harm to the student caught in it. He becomes a passive recipient of material presented to him through the textbook. Since the student can relate this material neither to himself nor with a person or an event within his own experience he develops no excitement for ideas that should result from an education. He leads a bitter life full of routine and insecurity. Some students do "play the game" a little better than others but without ever finding out how they are going to use their learning in life except as a passport for a clerical job.

The system is even harder on the teacher who is reduced to the status of a robot forced to lead an unintellectual, unexamined professional life. He is made to communicate an almost secret code often without finding out what he is doing. He is not allowed to experience the feeling of teaching his own course. He cannot design, revise, extend, update, innovate. He is not supposed to look farther than the curriculum committee at the state headquarters. He cannot be responsive to the times and issues. He cannot relate teaching to the real needs of learners or incorporate in his teaching experiences
that he may consider meaningful and worth-while. He is almost out of the teacher-learner equation. The Government of India, Secondary Education Commission has put it rather mildly:

The teachers have, similarly complained that they have not enough freedom to work out their ideas and, in their case, it was stated that often it is the headmasters who stand in their way. This freedom which will embrace within its scope both staff and students, is a very exacting responsibility and all will have to be gradually trained to bear it worthily. But there is no other way of doing so than giving them the chances to work under conditions of freedom and to accept risks that may be involved in the initial stages.17

The examination system — one final examination by the university or the board at the end of two or three years — suffocates the whole educational system. It forces the students into unrewarding lives of stress and uncertainty. It makes the teachers follow the book, show good results, and lead unfulfilled professional lives. It produces an education without a point of view, an education without commitment. Since students must write a final examination for some one they have never seen, heard, or read, the tendency is to produce standardized answers. These would be answers uncontaminated by the student's own thinking or that of his teacher. These answers would include points of view of "authorities" that the examiner dare not consider wrong or be likely to disagree strongly with. And since authorities themselves take time to emerge they must be very old and often out of date.

Strategies of Educational Change

In the preceding, we have presented a system analysis of the Indian educational system discussing it as a highly coded, closed-circuit, centrally monitored communication network, maintained by a select community and functioning for a minority.

The problems of educational change in India require the dismantling of this communication system and the installation of a new communication system in its place. This obviously is difficult to do. In the first place, the human component of a social system can never be dismantled. Human beings can only be retrained or deployed. In this case particularly, the present system cannot be scrapped because the components of the new system proposed to be installed are not available, nor can they be readily engineered.

What are the essential components of the new system that needs to be installed?

The first requirement of this system is a new language code, a language understood by all people, at all levels of intelligence. We need what Margaret Mead calls, "a natural language, redundant, wide in scope, deeply rooted in many kinds of human experience and many levels of human abilities." 18

This requirement, unfortunately, is hard to meet. India has a multiplicity of languages, fourteen languages are specified in the Eighth Schedule of the Indian Constitution. If fourteen different languages are used at the university levels in the various regions

with no common and indigenous language for the whole country the intellectual life of India may be fractionated, and become parochial and compartmentalized. More harm than good may result from the disuse of the present foreign English code.

The Government of India is making considerable effort to develop Hindi into the national language of the country. It has the advantage of being spoken and understood by about forty-five per cent of the people in India and has the best chance for developing into the national language. It should be understood, however, that Hindi during the past hundred years or more was a spoken language and when used in writing was a literary medium. It is, therefore, alien to the concepts of science and technology and even to the newer concepts of social sciences, and has hardly any vocabulary and terminology for scientific expression. Clearly, Hindi as a language needs to be enriched and enrichment will come through usage. The process is being hastened through appointment of specialists' committees to draw up lists of technical terms for all the different areas of knowledge to be used by teachers, textbook writers, researchers and educators uniformly thus promoting invariance in the use of terms. The pay off has yet to come.

Though Hindi too would have for many millions of Indians the characteristics of a highly symbolic code it is bound to fare better than English since it will, in due course of time, bring most people in touch with themselves and their past and their present.
A community of the English speaking is important today in any system of education anywhere in the world. English has emerged as the international language of commerce, business, science, technology and research. The writer does not intend to convey the impression that English has no place in Indian education. In fact the contrary is the case. It must be studied diligently as an important foreign language both in schools and colleges. It would be badly needed to keep communication open with the outside world — the world of technology, science, and space. During the period of transition itself it does not need to go, it needs to take its rightful place:

It should also be recognized that even in regard to many of the diversified courses of instruction as matters stand at present, a knowledge of English will be extremely useful for understanding the subject better and for further study of the same subject. All these considerations lead to the conclusion that a study of English should be given due position in secondary schools and facilities should be made available at the Middle school stage for its study on an optional basis.19

It may seem paradoxical but the English language has to play a self-liquidating role. It has to help Hindi to become first a functional language and then a national language. It has then to withdraw itself from the rank of a lingua franca to that of a most important foreign language in the Indian educational system.

The second component of the needed system is the personnel to handle the new code, Hindi. These are also not available. This is not to say that there are no people in India who can use Hindi with the highest proficiency. There certainly are many Hindi scholars.

and more and more people are joining their ranks. There are, again, very lively traditions of poetry, short story, and drama in Hindi but scientific or technological literature in Hindi, as we pointed out before, is almost nonexistent. Serious treatment of topics of social sciences and social and political issues is also absent from the body of Hindi literature — as from most vernacular literature in whatever language.

In discussing code users the problem is not to produce only linguists but historians, sociologists, economists, engineers and literary critics who are proficient in Hindi. This may involve more difficulties than we seem to foresee. It is apparent in the case of children, though not so obvious in the case of adults, that in the excitement of learning a new language, a new technique, or a new medium the content is often neglected. The ability to use the language itself becomes a fascinating and absorbing activity. This phenomenon became obvious to the author when he was working with teacher-trainees in in-service training courses in audio-visual techniques in India. The new audio-visual enthusiasts were so much lost in the excitement of being able to handle the medium — the camera, dry process duplicator — that they forgot to bother about the structure of the lesson. The medium interfered with the message. It has to be ensured that the new Hindi user does not forget to produce ideas and concepts in his area of specialization in his excitement to use the new language.
The third important component of the new system proposed to be installed will be the multiple spread of monitoring points. In the context of Indian education this means more degree-conferring colleges, with their own examination systems, their own curricula, and their own academic councils and faculty committees.

The "engineering" of this component will make important demands on the resources of the country. The new monitoring points would need physical plants, library and laboratory facilities, and well-qualified faculties.

The general method of approach suggested here is not to dismantle the old and substitute the new system — that would be foolish and tragic, and likely impossible — but to superimpose the future system on the present system in the course of many years. To restate the point, the change should be handled within existing forms and structures, adapting and changing them as they become more plastic through absorbing new roles and functions.

We will now look at the problem of system installation or educational change in India in terms of the Configurational Theory propounded in the previous chapter and suggest strategies of educational change.

It should be noted that in Indian education the problem of innovation is not the introduction of an innovation into the existing system but the installation of a whole new system as we have so often indicated. The strategies suggested in the following are, therefore, general, designed to achieve the type of system that we envision.
The strategies suggested below will be organized according to the factors in the configurational theory: nature of the configurational relationship (C), linkage between the innovator and adopter systems and linkage within these systems (L), environment of change (E), and resources of both innovators and adopters (R).

**The nature of the configurational relationship involved in educational change in India (C)**

The configurational relationship (C) between innovators and adopters in the context of Indian education is probably good for change. Both the innovator and adopter configurations are bureaucratic institutions which, as we have indicated in our theoretical presentation, are easier to handle, at least in terms of toleration of innovations.

The two configurations also have mutual expectations of each other's roles. The history of education in India has given the country a system of public instruction which is centralised and the schools expect to follow the directives of the district, state and central government. And though the states are autonomous in the area of education they rarely are sanguine of their rights with respect to the encroachments of the center through advice on educational reform.

The configurational relationship between innovators and adopters in Indian education is, however, not too well articulated. Innovator and change agent roles have not been clearly defined and assigned. The initiators in educational change need to be multiplied. Initiator roles, for instance, also need to be built outside of the governmental
system. The central and the state governments do need educational lobbies. There needs to be educational pressure groups, a phenomenon so far unknown in Indian education. We need to build non-governmental organizations like the National Education Association and the American Educational Research Association which in the United States influence the development of educational policy. We will return to this and related questions in our section on resources.

The linkage between and linkage within configurations (L)

According to our theory, when configurations involved in a relationship are institutions, the linkage "between" them can be ideal. This is, of course, stated in probabilistic terms. There are possibilities of excellent communication but there is no guarantee that such communication will exist. Such communication indeed does not exist in Indian education between the innovators and adopters. The following statements can be made:

1. Communication within the initiators as well as the adopters is one-way — downward like water on the hillside.

2. Flow of information does not mean flow of influence and change. Very often it is information that is flowing within the configurations and between them unaccompanied by influence.

In terms of systemic structure, the Indian educational enterprise may be viewed as formed of separate layers of educational responsibility with little mobility of personnel between them, with few or no common concerns, or shared use of information storages in the
different layers. The Ministry of Education and the state education departments seldom draw people from the universities and if they do these erstwhile university people soon lose touch with their institutions and seldom if ever return to the university campuses.

Professors in degree colleges and secondary school teachers are not associated with educational planning, and the formulation of educational policy, and are rarely invited to contribute to the resolution of problems that they live with every day and therefore understand better. District educational authorities and elementary school teachers hardly figure anywhere in educational planning.

This is an unfortunate circumstance that needs to be remedied. There has to be a free flow of personnel and ideas up and down these layers. We expect that this can be achieved by what may be called a "corridor approach."
Fig. 7. -- Corridor approach to circulation of personnel and ideas among different layers of the educational system

The corridor approach presented diagrammatically above is seen as consisting of an open lane between the different layers with a continuous traffic of personnel, ideas and information between what are now minimally related sub-systems. Building this corridor would involve changes in policies on employment and rewriting of rules relating to liens and tenures. This would mean a minimal permanent
staff in the Ministry of Education at the center and in the departments of education in the states with most other staff drawn from the various strata of educational responsibility for short periods of three to five years and expected to return to their jobs in parent institutions.

The corridor can be brought into open use by undertaking research, development, packaging, and demonstration of innovations through work groups in which personnel from all these various strata come to work together for short periods. The idea is to create work- and project-based groups which exist during the life of a project and then disappear. What we are recommending then is a task force philosophy instead of bureaucratic groups with all their inflexibility and lack of specialization.

So far our remarks have been directed mainly to linkage between configurations. In what follows we will shift our attention to linkage within innovator and adopter systems in the context of educational change in India.

Both the innovators and adopters in Indian education are institutions (IS configurations) and in terms of the theory presented earlier the linkage in such configurations can be ideal. This again is a probabilistic statement. There are possibilities of excellent communication within institutions because institutions are almost always fully wired systems but there is no guarantee that excellent communication will exist. Indeed good communication within innovator and adopter configurations in India does not exist. There are some
social and overriding realities that inhibit such communication linkage within these institutional systems. For instance, in these institutions rights and obligations of communication are so distributed among different roles that the communication system begins to malfunction. The denial to some roles of the right to communicate with others placed above them and the freedom of others from obligations to accept messages from those placed below them cannot contribute to good, educative or problem-solving communication. This is very much true in the case of the Indian bureaucracy which is, or at least was meant to be, a law and order bureaucracy and which is operational not through a system of shared communication but through use of power, based on a system of order giving and compliance.

This seems to be a common problem of all bureaucracies and the only solution that suggests itself is to introduce professional people into the existing set up and keep the traffic in the corridor and within strata open. We may recall here the widely known findings of organisational research which show that industrial firms are innovating in proportion to the number of professional people on the staff. The Indian educational administration certainly needs to be professionalized.

As a short-term measure the staff handling educational administration should be put through a program of sensitivity training and some human relations programs. Work-based and project-based groups, mentioned earlier, can, within systems, draw persons from different levels of bureaucratic hierarchies and assign them equal membership in these groups.
The nature of change environment (E)

The environment of change in India at the points where the Planning Commission is near and the foreign experts and advisers are plentiful is real and exciting. The problem of extending this environment and institutionalizing it so that change in education becomes normal, and continuous does, however, exist. The measures suggested for multiplying the initiator roles and for increasing linkage between the configurations will help this extension of this supportive environment for change. The environment for change will also be partly institutionalized through the measures suggested below in our section on resources.

The resources of initiators and targets (R)

As we discussed earlier, the man-machine systems, because of their human components, cannot be completely dismantled for the installation of new ones in their places. In such systems, therefore, we must begin with what we already have and superimpose the new on the old — establishing equivalences between the old system and the new system, discarding slowly what we do not need, and incorporating the required components in suitable operational phases.

The following rather general strategies are suggested in terms of resource use for educational change in India:

1. Better management of available resources,

2. Extension and multiplication of available resources through modern educational technology,
3. Creation of new resources needed for building the newer educational system as envisioned, and

4. Institutionalization of roles and resource distribution needed for handling educational change on a continuous basis.

Better management and use of available resources is important though not always so obvious. Foreign visitors are often struck by the less than efficient use of available educational facilities in India.\(^\text{20}\) The situation needs to be remedied.

Though most resources cannot be extended or multiplied beyond certain limits, the symbolic resources of groups and institutions can be considerably extended by the use of the new educational technology. The communication revolution resulting from this technology is twofold: the sophistication of persuasion techniques has increased; and the ability of man to store, multiply, and distribute information and messages has assumed fantastic proportions.

This fact helps an educational system like India to extend its resources by mechanisms such as the following:

**Multiplication of the expert teacher.** — One way the expert teacher can be multiplied is through the use of radio and television. India already has a very sizeable radio network though its use in educational work has so far been minimal. Instructional television

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\(^{20}\) C.R. Carpenter, author and researcher, who visited India in 1963 as a member of the Mass Communication Study Team sponsored by the Ford Foundation came back with this strong impression. In an informal conversation with the author during May, 1965, he mentioned that India, unfortunately, was an example of how so little could sometimes be done educationally with so much of communication facilities already available.
is also coming in and soon should be well established. Both radio and television need to be expanded and given more important roles in Indian education so that the best teachers can visit more of the nation’s classrooms whether in New Delhi or metropolitan Calcutta or a village school of twenty children in the Tarai hills.

**Packaged instruction.** — Another mechanism for extending symbolic resources would involve use of packaged workshops; programmed material for teacher training; packaged seminars, and conferences for principals, and administrators; and instructional packages for the teaching of school subjects.

The packaging of instruction both for teachers and learners has been done with considerable success in the United States for use at different levels of instruction. The new packaging concept needs to be distinguished from the old *study kit* approach which at best was a collection of materials of different kinds arranged around a single topic and so stored in a box or container that it was easy to handle, carry and store. The *packaged* program goes much farther than the study kit. The former is, in a sense, a programmed study kit. There is emphasis on testable terminal behavioral objectives, the different instructional steps are programmed, and the materials included are geared to different steps of the presentation. Sometimes flexibility is built into the package and the package can be "unpacked." Most often, however, it is meant to be used in the same way that the programmer intended it to be used.
The personnel resources

The personnel resources of initiator configurations must also be improved. This was briefly discussed before under the heading "linkage between and within configurations" but the problem can also be looked at as a problem of resources. Here again the obvious solution seems to be to take out the Civil Service man from the specialized job of educational planning and give the policy making position to educators, university professors, and researchers.

Even when educators come to fill the jobs in educational administration at the center and state levels they should not be allowed to lose touch with their profession. As far as possible people should be drawn on short-term, work-oriented groups and then returned to the universities and colleges keeping a minimum of permanent staff in the departments.

The personnel resources of target and adopter systems

The personnel resources of the target and adopter systems themselves need to be built if educational change is to come through. A single most important measure for improving the personnel resources of the target systems is professionalization of staff. It is unfortunate that in Indian universities there are no associations or organizations of teachers or professors to create a sense of professionalism for improving professional competence or for unionizing for rights and obligations of the profession. The Indian teachers and professors need to do considerably more for themselves for improving their expertise and for policing the profession so that
the incompetent and the under-trained are not admitted or they are at least forced to train themselves while on the job.

The schools and colleges need to set up policies of compulsory workshop attendance or acquisition of college experience beyond the degree for teachers engaged in teaching in schools or colleges. A six month training or education after every five years of service, for instance, could be insisted upon if the teachers are to do the job that we expect them to do.

Inviting community participation

One way to extend initiator and target resources is to invite community participation. It would not be wrong to say that schools in India are not "owned" by the community. What the schools do is rarely the community's concern. Many parents have never visited their children's schools. There are no parent-teacher associations or established channels of communication between the school and the community. There are no operational rules for inviting or accepting community help in building better schools. Whereas the situation is not as bad in the case of private schools, a donor would not know whom to approach and what to do in case he wanted to make a financial grant to a public school in his community. And the principal would not know if he could accept it and how to do it.

Creating new resources for educational change

As indicated earlier in this section some "new" components will be needed to build the new educational system. These components
do not exist in the present system and will have to be created anew.
The rationale for the suggestions in regard to roles and resources
made below lies in the systems analysis of Indian education included
in the beginning of this chapter. Brief material on these new
components is given below:

Hindi translation bureaus
and abstract services

These should be established, primarily, through central govern-
ment effort at the center or in the central universities. Their
translation and abstracting activities should, in the first instance,
be restricted to educational and technical material published in
English but when needs arise they may be extended to German, French,
Russian and such other languages in which scientific and social
scientific literature is published in greatest quantity.

Vernacular languages translation bureaus

These should be established in and by the states providing
to the people of a particular area the scientific and social scient-
tific literature published in Hindi and English.

Research and development centers

These may be modelled after similar centers set up in the United
States and may perform similar functions. Research and Development
centers in the United States have been designed to concentrate
resources of money and personnel on a particular problem area in
education over extended periods of time. Once a fund of knowledge
and skills has been built alternative approaches for the solution of educational problems are examined both in the field and laboratory situations.

A basic feature of these research and development centers is a commitment to disseminate research findings to public schools, state governments, universities, and professional organizations so research can be translated into educational practice without loss of time.

Dissemination centers at state level

The state education departments play an important role in educational change through curriculum planning and accreditation policies and through financing of school and university education. The "professional" resources of educational departments are generally not so adequate as to take up extensive educational research and evaluation; and it may indeed be useful for state education departments to find for themselves the role of disseminators of techniques, methods, and materials developed and tested in research and development centers, universities and professional institutions. An educational innovation disseminated by the state department will also be legitimized in the process.

Demonstration centers at school district level

Dissemination of information about an innovation or the legal requirement that a new educational practice be incorporated does not tell the schools what to do about it. The schools may need to
have the innovation demonstrated to them. Model schools may, therefore, be set up in each district with the necessary facilities of materials and personnel to undertake demonstration of innovations. These model schools may also build resources for organizing short-term seminars and conferences for teachers in a particular district for exchange of ideas and skills related to educational innovations.

School and university accreditation committees

National, regional, and state accreditation committees should be set up to work out standards related to plant facilities, laboratories, libraries and instructional facilities, and faculty resources to grant accreditation to good schools and colleges recognizing them as degree conferring institutions. This will increase the points of origination of messages and introduce academic freedom and experimentation at all levels of education, improving at the same time, the academic standards in schools and colleges.

It may be noted that the new components as suggested above are all institutional in character and can be easily introduced into the existing educational system.

This, then, is a brief suggested outline for relating the concepts of the Configurational Theory of Innovation Diffusion to Indian education. The use of learners' own language as the medium of instruction at all levels; community interest and participation in education; professionalization of teaching, research, and administration of education; academic freedom with decentralization of
curriculum construction and evaluation; use of technology to extend the specialist and the expert have been suggested as some of the approaches.

In the following section we will attempt an exploratory system analysis of the community development in India and similarly suggest applications of the Configurational Theory to that enterprise.

Section II

In the beginning of section I we included a detailed discussion of the problems of system analysis and system design. It was indicated that the system analysis could be handled from the point of view of various specialities but that we would attempt a system analysis of Indian community development as a communication system.

Though some of the outputs and inputs of community development can be quantified in terms of rupees spent, personnel employed and increase of bushels of wheat per acre there are many components of community development that cannot be described in terms of tangibles. Outputs such as social returns and improved community health cannot be easily quantified. As in the case of education, here again a qualitative system analysis would be worth-while and would provide to the student of community development some useful insights. Again, as indicated in the section dealing with system analysis of education, such analyses could be performed at various levels. We are here attempting only a first-order system analysis.

In section I of this chapter we have also detailed the criteria for a communication system in a country that is committed to democracy
and is engaged in increasing participation of people in democratic institutions. Since community development is also an educational enterprise the criteria detailed in the earlier section are applicable to it in their entirety and will not be repeated here.

A Systems Analysis of Indian Community Development

The boundaries of the Indian community development system are seen as including the Planning Commission, the Community Development Ministry at the center, the development departments at the state level, the district development offices, the village level workers, research and training institutions of community development at various levels; the supporting ministries at the center and departments in the states dealing with health, agriculture, education, cottage industries, local self-government; the Information Ministry and departments dealing with mass media like the All India Radio, the Films Division, Plan Publicity Department, the Directorate of Advertising and Visual Publicity; and, of course, the 600,000 village and communities spread all over the sub-continent.

While discussing the educational system as a communication system we made four general propositions: (1) that it was a highly coded system; (2) that it had a select community of encoders and decoders; (3) that it was a closed-circuit network; and (4) that it had highly centralized monitoring. The community development system itself is a product of the conditions that gave birth to that kind of educational system: it is different only in some details because of the
special clientele to which it caters.

The following generalizations can be made about the community development system. In the first place, the two configurations — the Westernized bureaucracy (initiator), and unlettered villagers (adopter) — entering into the innovating relationship in the community development context are very dissimilar and can, in fact, be looked upon as two different sub-cultures. Again, the initiator institution is itself a two-level system.

In the upper level of the initiator system the code is English in which most of the high level personnel of Indian bureaucracy are trained. The lower level of community development personnel use a different code, a vernacular spoken by the people. The role

<table>
<thead>
<tr>
<th>Initiator system</th>
<th>Target system</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Vernacular</td>
</tr>
<tr>
<td>(Level, 1)</td>
<td>(Level, 2)</td>
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</tbody>
</table>

Fig. 8 — Language use by initiator and target configurations in Indian Community Development

expectations of personnel in the upper level of the initiator system are also different as compared with those of the community development bureaucracy in the lower level. The upper level bureaucracy
is trained in the law and order maintenance tradition. They think
of themselves as administrators and governors. The lower level of
the community development bureaucracy while it is a part and parcel
of this total well-defined hierarchical system is expected to play
a different role. This role, in India, is called developmental
bureaucracy. And this developmental bureaucracy is conceived in a
totally different tradition — the service of the people. The lower
level bureaucracy is thus in a dilemma. It does not know whether
to relate itself with the structure of which it is a part or to the
adopter system which it is supposed to serve.

Five propositions may now be stated with respect to community
development as a communication system. Each will be described in
detail below:

1. It is a bi-code system with one code in the initiator system
and a completely different code in the target system.

2. There is a partial confusion of communication roles and
styles.

3. It is a mixture of closed-circuit and broadcast systems.

4. It is centrally monitored.

5. The two major communication circuits — the initiator and the
target — have different conducting capacities.

A bi-code system: Proposition 1

As indicated earlier there are two major codes being used
in the initiator system. The high and middle positions and even
the clerical positions in the initiator system reflect the educational system of the country which as we discussed before is a highly coded system. In India higher jobs go to the people trained in colleges and universities and they are invariably trained in the English language and in the Western idiom of thought and action.

The common people of India are, however, unfamiliar with this tradition. More than eighty-five per cent of the Indian people live in some 600,000 villages speaking one of the local languages or dialects and structuring reality very differently from the Western style educated townsman.

Since the problems of community development are mostly local, no curriculum can possibly be designed in the area of community development and no textbooks are possible. There is thus a lot of noise element in the transfer of the English code into one of the vernacular codes. The only redeeming feature, if any, in this situation is the fact that the village level worker has to do and to demonstrate which helps in communication through self-correcting overt events and behaviors.

Confusion of communication roles and styles: Proposition 2

As indicated earlier the Indian bureaucracy is primarily a law and order bureaucracy. The government has attempted through short-term training programs to give it a social science orientation to make it fit for handling educational, economic and developmental tasks but success has been meagre.
The Village Level Worker in community development is under particular stress. On the one hand, he is in a power-and-compliance relationship with his headquarters but on the other hand he goes to work with people who do not form part of the power system to which he is himself subjected. The villagers are a non-captive group and he is encouraged to act democratically with them, to share his information and skills with them in a mood of mutuality, to help them grow and do things for themselves and not order them around. But he is ill-equipped to do it. The communication style to which he is habituated is that of the bureaucracy of which he is a part. This duality of roles and styles and resulting conflict is detrimental to information handling processes and the conduct of community development programs.

A mixture of closed-circuit and broadcast: Proposition 3

Community development is a closed-circuit system in its initiator circuits. The governmental bureaucracy does all the planning, handles all the programs and there is no private effort supplementary to the governmental effort. In that sense, therefore, it is a closed-circuit system. But community development programs must deal with communities and must involve extended interaction with people. At the same time there is a considerable amount of information that is put on the national and regional mass media systems. These facts and characteristics make it a broadcast system.
Central monitored system: Proposition 4

In spite of the fact that community development deals with communities which are by their very nature divergent and different from one another, the community development communication network in India tends to be centrally monitored. Very little planning takes place at the local level which means both that there is processing of unnecessary information and a lack of transmission of the information actually needed by specific communities.

Differential conducting capacities of communication circuits: Proposition 5

Communication facilities in rural India are very meagre and the consumption of information by villagers is consequently low. No mass culture has, therefore, emerged, for better or worse. The Indian villager is a very different sort of person from the initiators of innovations. He has different traditions, ideas and competencies. He has different communication styles and experiences. As a result the communication "network" that emerges in villages has a low conducting capacity and does not transmit the scientific and social scientific information that the initiator system would normally wish to conduct through the target circuit.

Strategies for Change in Community Development

As in the case of education, the community development system cannot, wholly or in part, be dismantled to make room for new components or a totally new system. Understandably the community
development system is a reflection of the educational system and improvements in the latter will surely have a salutary effect on the health of the community development system. Some additional strategies for improving the efficiency of the community development system are discussed below. They are general in nature.

The initiator configuration (C)

The initiator configuration is only a semi-skilled community. It is working on the specialized job of public welfare requiring sophisticated social work techniques in planning, programming, and evaluation. It does have people who have these competencies. But a large proportion of bureaucracy engaged on the community development work is not equipped by education, training, or temperament to undertake the task. The initiator configuration, therefore, taken as a whole is a semi-skilled community. The problem can be partially solved by increasing the ratio of professional sociologists, anthropologists, educators, communication and information personnel, and innovation diffusion experts in the community development departments at various levels of responsibility.

In a probabilistic sense, the community development initiator systems, at the center or in the states, being institutions (IS configurations), should be better able to husband their resources and carry out their purposes. This, however, is not so. Coordination between all the different public service and welfare departments—health, agriculture, information, education, community development—is not as it should be, and rigid hierarchical divisions between
"officers" and "officials" inhibit communication and coordination within departments. The solution here again may lie in project-based work groups (task forces) suggested earlier in our section on the strategies of educational change.

Multiplying the initiator configurations is another obvious strategy if something has to be achieved in the foreseeable future. This "multiplication" is possible in two ways. In terms of sources, for example, there should be many more public and private organizations working in the community development field. The potential of persons and publics, of local governments and municipalities is very considerable and should be drawn upon by the community development movement. Take the example of the Hindu church. It has contributed practically nothing to the community development enterprise. Its potential is truly immense and it can work wonders if it could be drawn into the community development movement.

This religious resource, though rich, is delicate to handle and both luck and finesse are required to make effective and socially integrative use of it. This is a church that has played no important social role in the life of the Indian people during the last many decades and is often communal rather than community-oriented. Its ministers are, more often than not, ignorant, uneducated and intellectually uninspiring individuals. Relating religion to community development then is a difficult but a highly promising strategy.

The other approach to multiplication of initiators is to increase the number of their change agents who, in the context of
Indian community development, appear as village level workers. At present one village level worker is assigned to ten villages. This has been found to be totally inadequate. More useful ratios need to be empirically determined and village level workers need to be given assignments that they can effectively manage.

The nature of target configurations (C)

While dealing with adopter configurations in Indian community development we are faced with completely unskilled communities. They are unskilled not only in terms of advanced technology but they are also unskilled in their ability to manipulate symbolic transformations (see pp 77-78). Lack of symbolic skills inhibits empathic abilities with resulting difficulties in transfer of new attitudes, points of view, or even skills. This situation makes greater demands on the skills of the initiator systems which themselves were categorized earlier as semi-skilled communities of professionals.

Solutions seem to lie basically in mass education and long-term programs of public instruction. A crash strategy is suggested in what may be called "stimulus saturation" of communities. It may be indicated that we are dealing here with communities living in physical and psychological isolation completely closed to the outside world. Adults living in such communities normally have no opportunities to interact with a person outside of their own small village groups. They meet no new people, hear no new words, get no acquaintance with diversified social roles and communication
styles. They are living in an atmosphere devoid of "communication messages" and consequently have no opportunity to vicariously extend their intellectual and emotional lives or learn social skills.

This can be remedied by saturating the environment with visual and aural stimuli. Through these stimuli the villagers will be enabled to meet more people, and see them talking, interacting, and solving problems. They can absorb this vicarious experience and bring it to bear on their own situations. **Stimulus saturation** can be achieved by extending radio and television facilities and this can speed up the socialization of the village communities for today's world.

This, we believe, is an important consideration. The change agent will find that a community saturated with evocative stimuli has developed enough empathic skills to understand what he talks about and this community can use the tools, and skills, social and technological that he makes available.

The unit of change in community development

There are two further questions relevant to any discussion of the target systems in Indian community development. The cultural diversification of India being what it is, can we talk of Indian villages as if they were all alike? In other words, are they culturally and sociologically in one general category? There would be a second question emanating from the first. What is the adoption unit for community development programs — village, family, individual,
or does it vary from one situation to another?

These questions are not easy to answer.

Lewis' assumes "that communities give us some cell-like minimal duplication of the basic cultural and structural whole especially in a peasant country like India." Marriot refuses to draw any generalizations from his study of eight villages in India and believes that "they resemble and differ from one another in ways that cannot be systematically ordered." Yet Marriot cannot help drawing rough and ready conclusions:

The comparisons begin to show some of the things that are widespread: the balance of caste separation and inter-caste dependence; the relations of land tenure to social structure; the importance of maintaining status relationships as between castes and as between individuals, and the possibilities of change in status of groups or individuals; the anxieties and quarrels that have to do with status; the influence of ancient codes or ideals — aggressive protection of honour for "warriors," ascetic withdrawal of others.

There are factors then in peasant life in India — such as, an interdependence based on caste system, agrarian basis of social structure, acute status consciousness with resulting status-based conflicts, and the influence of ancient ethical code — that show persistent patterns throughout the country, from a North Indian village to a village in Tanjore and from a fishing village in Bengal.


23. Ibid., p viii.
to a village in Gujrat. The agent of change should add to his
knowledge of general patterns of Indian life the ability to draw and
use sociograms of village communities to understand the local and
differential patterns of caste hierarchy, family-lineage-subcaste
patterns, and power and political factions.

We have assumed throughout the preceding discussion that a
village was the unit of work for a Village Level Worker. Some
researchers do not, however, consider the village as an observational
or programmatic isolate. Lewis\textsuperscript{24} has referred to widespread inter-
village connections in North Indian villages that he calls "rural
cosmopolitanism." Within this larger system of interdependence
and emotional ties he has implied more functional units like
chaugamas (four villages) and bisgamas (twenty villages). Regional
sociometric surveys should establish the patterns for programing
around more functional units.

\textbf{Mutual expectations of initiator and
target configurations}

In India, both for historical and social reasons group life
has been minimal and community action for community improvement
almost unknown. The government has been supreme and irresistible
for hundreds of years and no community planning or community action
has been encouraged. People have not, therefore, learned to do things
for themselves and therefore feel grateful for things done for them.
This introduces a serious difficulty in community development

\textsuperscript{24.} Lewis, \textit{op. cit.}
programs. The community development philosophy of Independent India demands that people do not become passive recipients of "gifts" but learn to help themselves through self-organized community action. Very often this philosophy remains a pious hope.

There is one further problem. It is possible that a community will offer "participation" in a program not because they understand their needs and are motivated to solve them but because they do not want to annoy the village level worker who is after all a government official and very often works for the district commissioner of law and order. The separation of the executive and developmental wings of government should make it possible for the community development workers to build their own image that is less threatening and offers genuine democratic alternatives.

**Linkage between configurations (L)**

The linkage between innovator and adopter configurations in the community development context has been found difficult to achieve. One reason lies in the fact brought out earlier in the discussion that the two configurations are in fact two different sub-cultures markedly divergent from each other (see fig. 8, p 160).

Another unfortunate feature of the linkage is its unidirectional nature. Feedback is absent or is intentionally distorted. The latter happens because the people working in the community development departments expect the field staff to succeed every time and to show quick results. Both these are obviously impossible demands, and a good social scientist would not make such demands. For sheer
survival in the organization, field staff reports no failures. The total organization consequently learns no lessons. Project evaluations that could be excellent sources of feedback become elaborate exercises in self-deception.

The fact that the initiator sub-culture is composed of people who have seldom been to the village puts them out of sympathy with the rural culture. They have a worldview completely different from that of the farmer and they do not inspire his confidence. The solutions here again are difficult and most of them must be long-term. Some lie in the education of the people, in extensive industrialization, and in a new system of education with due emphasis on the rural facts of Indian life.

A short-term solution may lie in bringing the local and district planning units into the country where they may live near the soil rather than in "foreign pockets" of urbanised culture. The concept of "stimulus saturation" developed earlier in this section should also prove useful. Images of industrialised life and the city-bred, talkative personality models on the radio and television may bring the two sub-cultures closer to each other.

The introduction of the village level worker between the initiator and the target systems in Indian community development is a very useful and perhaps the most ingenious strategy calculated to make the two systems talk to each other. The village level worker does, however, stand between two stools and sometimes he does fall. The village community does not identify with the
educated (even a high school graduate is educated) townsman. If he is an outsider he is also not easily integrated within the community. And if he is from the village itself he finds it difficult to break away from the traditional and rather subordinate roles. The village level worker's age is another consideration in a culture where wisdom is associated with years.

Linkage within configurations

Let us first make a few comments on linkage within the innovator systems of community development. The problems here are the problems perhaps of all bureaucratic systems: lack of coordination between different sections and divisions of the administration; the tendency of the higher level officials to administer their subordinates rather than the programs; the absence of channels of feedback and consequently of 'experiences' that higher level planners could plough back into future program planning.

We have already mentioned the inter-code communication problems and those arising from a conflict of role expectations between the upper and lower levels of administration. Some solutions to these problems have also been mentioned in the preceding discussion. A few may be recounted here. One solution, for instance, may consist in the creation of a developmental bureaucracy as separate from the law and order officialdom. Also the incumbent officials may be retrained through programs of sensitivity and human personnel training so that they can better understand their own roles and roles of others above and below their status levels.
Linkage within adopter systems

Communication channels within communities could be categorized roughly into two forms — secular and emotive.

Secular communication channels exist in communities where corporate groups are distinct from those based on family and blood exist and work. The channels of communication even when privately owned, perform public function. Everyone can use them, for good or in vain. Material that passes over them is socially oriented. On the other hand in peasant societies like India the communication channels that exist could be called emotive: they are entangled with feelings, emotions, and "gut."

The Indian village communities where the community development worker goes to work are at best emotive communication systems. Existing communication patterns in these communities are ceremonial based on age, sex, and relationships with the family. Outside the family, factors like caste, and economic status impinge upon the complex communication networks. The situation is further confounded by the existence of village factions which divide the village into water-tight exclusive groups that do not communicate with each other.

Also, as we indicated in our theoretical formulation all communication systems are not built to carry all kinds of information. Emotive communication networks like those existing in Indian village communities can handle only pattern-maintaining information and not scientific information which is likely to make them re-examine their ways of life, production, distribution, and of relating to
each other. Unfortunately, there are no quick solutions available. The conversion of a purely emotive communication network into a corporate network will have to wait for the spread of education, and emergence of a casteless society based on equal opportunity for every one for cultural, social and economic growth.

The environment of change (E)

The initiator configuration in community development is certainly open to a very supportive environment but the same is not the case with the village communities who are 'open' only to their own immediate 'prisons.' They have been living in a world where things have moved slowly, if at all. If there has been change it has occurred in the sense of an anthropologist who considers change inescapable, but not in the meaning of a social planner. Nothing seems to happen in a situation like this. Social inertia is truly colossal. Even the urban communities have no traditions of self-help and community action to support their enthusiasm for change. The nearest to supportive environments is national hysteria under stress of a national emergency like at the time of the Chinese attack in the years 1962-63 but it is difficult to use such events as sociopsychological resources for community development.

Solutions here, again, are long-term. The "stimulus saturation" approach may also be helpful here. People at least need to look at other people planning, working, doing things for themselves. Radio and television may help.
Resources for change (R)

Strategies for improving the resources of initiators may be as follows: (1) extend the financial resources of community development by inviting private participation, and by efficient spending of available resources, (2) improve personnel resources by better personnel policies, and by increasing professionalization, (3) extend resources of media and material by programming and packaging and by other techniques directed at multiplying excellence, and (4) make use of the present religious and social ethos available in many communities and make people compete for community service.

The financial resources of the community development system cannot be extended beyond a certain limit. Community development has to be content with its own share of governmental budget which is not much. However, planners could be persuaded to allocate more resources to this program than at present if social and economic returns of community development could be quantified through research and if community development could be shown to planners, administrators and the common people to be good and sound investment.

Material resources of community development may also be extended through inviting community participation. So far the pattern for private financial support to community action has taken one form: money is left by rich gentlemen and issueless dowagers to build temples, shrines, and other unproductive structures. This rich resource needs to be tied to community development. Vinobha's land grant campaign was one example of what can be done in this direction.
Efficient spending is another way of extending the financial resources but no elaborate suggestions can be made in this regard.

Improvement of personnel resources is an important consideration. The civil service must make room for the professional extension expert, university-trained communication expert, and the authority on sociology of groups and organizations. Professionalism must be continuously supported through research. More training facilities must be built. Work loads given to the village level worker must be based on empirical and operational criteria. New evaluation techniques must be invented to remove the pressure on the village level worker for 100 per cent success. The new media, radio and instructional television must be employed to extend and multiply the excellent teacher. Again packaged materials must be increasingly used to augment the competencies and training of the community development workers in the field.

An important community development resource in India may lie in the community ethos of the Sikhs, the Raniputs and other communities who could be directed into social work and community action. Some of the old religious traditions of helpfulness, resignation, and sacrifice may have to be reinterpreted in the new idiom of today's world.

Resources of adopters

The financial resources of the target systems may be extended by providing credit facilities through cooperative rural banking and by building storage and marketing facilities for farmers. Some of
these requirements admit of long-term solutions. For instance, consolidation of land holdings may be necessary before mechanised and scientific farming can be introduced, enough grain can be produced, and facilities built to store surpluses.

The personal resources of target systems can also be improved by promoting more corporate life around secular foci, articulating good leadership outside the ceremonial structure, and improving the manual and mechanical skills of the communities.

An important attribute for traditional communities to change into transitional communities, as Daniel Lerner points out is empathy, 25 ability to stand in another man’s shoes. This, to the present investigator is another way of stating the need for experiences in handling symbolic transformations (see pp 77-78). The concept of stimulus saturation so often emphasized in the previous discussion is again relevant. The only way to extend communication abilities and competencies in symbolic transformations of rural communities is to make models of social interaction available in their daily environment.

Last of all the intense religiousness of the Indian ruralite needs to be shifted into productive channels and we need to find support in religious dogma for community work.

CHAPTER VI
SUMMARY, CONCLUSIONS, AND QUESTIONS
FOR FURTHER RESEARCH

An inter-disciplinary, inter-situational, inter-cultural theory of innovation diffusion has been proposed. The Configurational Theory of Innovation Diffusion presented here focuses on the diffusion event, and takes a value position for granted.

Innovation diffusion is seen as a function of four factors:
(1) the nature of the configurational relationship between the innovator and the adopter, (2) linkage or communication between and within innovator and adopter systems, (3) the nature of the environment(s) to which the innovator and adopter systems are open, and (4) the availability of material and influence resources.

A typology of sixteen configurational (innovator-adopter) relationships has been suggested: (1) individual acting on an individual, (2) individual acting on a group, (3) individual acting on an institution or organization, (4) individual acting on a culture, (5) group acting on an individual, (6) group acting on a group, (7) group acting on an institution, (8) group acting on a culture, (9) institution acting on an individual, (10) institution acting on a group, (11) institution acting on an institution, (12) institution acting on a culture, (13) culture acting on an individual, (14) culture acting on a group, (15) culture acting on an institution, and
(16) culture acting on a culture.

The sixteen configurational relationships have been classified as molar, molar-molecular, and molecular relationships. It is hypothesized that molar relationships must be mediated through lower-order molecular relationships. A basis for integrating ideographic and nomothetic approaches to social change is thus provided.

A preliminary validation of the theory is attempted by using three different methodological approaches: (1) hypothesis-testing with the use of empirical data related to diffusion of innovations; (2) use of concepts, constructs, and statements from the logical structure of the suggested theory in explaining a real-life innovation diffusion event; and (3) testing the adequacy of the proposed theory according to established criteria for theorizing in social science fields.

Use of the proposed theory in planning strategies for innovation diffusion involved, as a first step, the definition of the existing configurational relationships between the innovator and the adopter, and analysis and evaluation of available communication facilities, environmental support and resources of material and influence. Translation of the theory into action is thus mediated through the systems analysis tradition.

To achieve the developmental objectives of this investigation, that is, for suggesting strategies of change in Indian education and community development, system analysis of Indian education and community development systems was undertaken. Communication was
used as the explanatory variable and Indian education and community development were, therefore, analyzed as "communication systems."

The Indian educational system was found to be highly coded, having a select community of encoders and decoders, and closed circuit in nature with centralized monitoring. The Indian community development as a communication system was seen as "bi-code," a mixture of closed- and open-circuit networks, centrally monitored, with two different information conducting capacities and involving a partial confusion of communication roles and styles. Change strategies on the basis of these analyses have been suggested for both education and community development.

Various questions for further research and study emerge from the present investigation. First, of course, the theory needs to be used to conceptualize diffusion research to test its various hypotheses. The suggested strategies for change in Indian education and community development should interest especially the Indian educators and community development workers who should test these strategies in the field.

Specifically, the following questions may prove both exciting and rewarding: How is planned change different from evolutionary change? Are all adoption responses basically alike, and if not, what would be a useful taxonomy of such responses? Do all innovators or change agents have similar characteristics, or are different characteristics suitable for innovators and change agents in different configurational relationships?
The change in "form" before the change of "meaning" or the concept of *toleration* of innovations in the organisational context and the use of symbolic transformations index (STI) as an index of readiness of adopter systems to accept innovations should prove fruitful areas of inquiry.
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