STRATIFICATION AND ADOPTION OF AGRICULTURAL
INNOVATIONS AMONG COSTA RICAN FARMERS

Dissertation for the Degree of Ph. D.
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ABSTRACT

STRATIFICATION AND ADOPTION OF AGRICULTURAL
INNOVATIONS AMONG COSTA RICAN FARMERS

By

Parizad Tahbazzadeh

The general objective of this study is to inves-
tigate the relationship between social stratification and
the modernization process, by studying the relationship
between the socio-economic hierarchy of a peasant society
and the adoption of agricultural innovations. Specific
questions to be answered by the study are as follows:

What is the relationship between the individual's
position in the stratification system and his acceptance
of new ideas?

What is the structure of this relationship? Is it
linear, as is often assumed in the literature, or can a
hypothesis which suggests a curvilinear relationship be
supported?

Is this relationship direct, or is it mediated by
particular intervening variables? Is it possible to iden-
tify some of these intermediary factors?

How is social stratification related to the inter-
vening variables?

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What is the relationship between the intervening variables and innovative behavior?

Is it possible to determine the relative contribution of each of the intervening variables in explaining the hypothesized relationship between social stratification and innovative behavior?

First it is hypothesized that, contrary to what has often been assumed, the relationship between stratification variables and innovative behavior is not linear, but curvilinear, and of a monotonic increasing type. Furthermore, it is assumed that a relationship of this particular structure can be explained through a set of intervening variables and their relationship with innovative behavior.

Three sets of variables are identified as intervening between social stratification and innovative behavior, namely, "economic inputs," "communication channels," and finally, "modernity orientations." The objective was to determine if these variables can be incorporated within the framework of a single model based on social stratification theory.

The relationship of these variables with innovative behavior is assumed to be curvilinear with two stages, "take-off" and "optimum point." The rationale for hypothesizing such stages is that the indivisible nature of many innovations makes impossible the implementation of modern

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technology without at least a minimum amount of resources. In addition to this, after a certain point is reached, the law of diminishing returns applies to the input-output relationships and results in a plateau effect on the hypothesized curve. Thus, the particular structure of the relationship hypothesized between the intervening variables and innovative behavior is assumed to explain the curvilinearity of the relationship between stratification and adoption behavior.

The relationship between social stratification and the intervening variables, however, is assumed to be positive and linear. Furthermore, economic variables are hypothesized to have the most explanatory power as far as the relationship between stratification and adoption behavior is concerned, followed by the communication and psychological variables, respectively.

The two major assumptions involved in the study are: First, the organization of production is <u>not</u> collective. Secondly, we are considering a hierarchical society with a differential allocation of resources.

The unit of analysis is the individual, and the stratified society is defined as the rural sector of the population.

The data utilized were collected by F. B. Waisanen of Michigan State University during the summer of 1973.

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The sample consists of 698 farmers from 14 communities in the province of San José, Costa Rica.

A composite additive scale is constructed for each one of the five variables. The individual's position in the stratification system (his socio-economic status) is measured by the family's income, as well as the number of square blocks of corn, coffee, sugar, and beans planted. Each item is in turn divided by the number of family members. The economic input variable includes three components, namely, the amount of loan received, labor employed, and the economic initiative taken by the respondent. The communication variable is measured along three dimensions: mass media exposure, inter-personal contacts, and finally, physical mobility. For psychological orientations, a modernity scale developed by Smith and Inkeles (1966, pp. 372-73) is utilized which taps the following themes: political activism; educational aspirations; readiness for new experience; belief in distributive justice; achievement orientation; faith in science and technology; fatalism; cosmopolitanism; empathy; religiosity; organizational membership; and general information. The index for adoption behavior includes the following nine agricultural innovations: soil conservation, seed selection, fertilizers, insecticides, fungicides, weed killer, diesel tractor, corn sheller, and plow.

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The methodology used is simple cross-tabulation of percentages, and due to the ordinal nature of the data the non-parametric statistics of Chi-square and Kendall's Tau B are used to test for significance of independence and measure the degree of association.

The results gave partial support to the hypothesized model. With regard to the hypothesis of curvilinearity no definite conclusion was reached. More accurate measures are necessary to justify the use of more sophisticated techniques such as curve fitting.

The additive control of the intervening variables proved to have an increasing attenuating effect on the relationship between socio-economic status and innovative behavior, as was assumed.

However, contrary to our expectation, there were no significant differences among the contributions of the intervening variables, although the economic input variable proved to have slightly more explanatory power.

Socio-economic status was found to have a positive relationship with all the intervening variables, as expected. Nevertheless, the correlations, especially in the case of communication and attitudinal variables, were somewhat lower than suggested by the model.

In sum, although our findings cast some doubt on the generalizability of the theoretical model to the

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situation of rural Costa Rica, the limitations of the study make necessary a cautious approach in interpreting the results. Generally, it may be concluded that the significance of social stratification for innovative behavior was verified, although much more research is necessary.

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A DISSERTATION

Submitted to
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ACKNOWLEDGMENTS

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Last, but not least, I wish to record my gratitude to my dear friends, Donna J. Hess, Tej P. Singh, Marietta M. Gamso, Joseph Yankech, and Leon Grunberg for their generosity and sincere help.

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INTRODUCTION

Background

With the emergence of a large number of independent states in the post-World War era, the subject of diffusion of innovations has been attracting the attention of developmental experts and policy administrators. It is widely believed that if modern technology and scientific practices are diffused among subsistence farmers and potential industrial entrepreneurs, the age-old problems of poverty and unemployment can be solved to a great extent. However, it is common knowledge that there exists a tremendous communication gap: on the one hand, there is a great store of scientific knowledge and practices which, if utilized properly, can usher in an era of prosperity; on the other hand, large segments of humanity are either not aware of these developments, or have not learned to utilize them for the betterment of their lives. The problem then is how to diffuse the right knowledge among the disadvantaged people in underdeveloped societies.

Social scientists have, therefore, been engaged in studying the process of diffusion of innovations and the factors which facilitate or inhibit their adoption. Researchers from different disciplines--sociology, anthropology, psychology, economics, education, and communication--

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have made significant contributions to the identification
of a number of variables and processes which are relevant
in this regard. Their emphases, however, reflect their
disciplinary preferences. Thus, economists regard the
availability of necessary inputs and market incentives as
the most significant factors determining adoption of new
technology; anthropologists emphasize cultural patterns
and values which affect the diffusion and adoption of new
ideas. Psychologists, in this respect, have stressed
various personality variables; for example, "authoritarian-
ism," "dogmatism," "efficacy," and "aspirations." One
variable which has been universally emphasized is socio-
economic status. Although the evidence is not conclusive,
researchers have generally noted that those people most
responsive to new ideas tend to come from the upper socio-
economic strata of a society. However, it is our view
that the importance of social stratification is not fully
acknowledged and explored in explaining the differential
success of change programs. This negligence deserves
criticism considering the wide ranging consequences of the
stratification system for one's life chances, his outlook,
and behavior.

The Problem

The main objective of this study, then, is to
raise a number of theoretical issues about the ramifica-
tions of social stratification for success or failure of

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modernization programs. We will endeavor to answer a number of questions such as the following:

Is there any relationship between socio-economic hierarchy and the acceptance of new ideas?

What importance, if any, does such a socio-economic differentiation have as far as the implementation of new ideas and practices are concerned?

What are the mechanisms involved in this relationship?

Specifically speaking, we would like to know:

1. Is there any relationship between an individual's socio-economic status (SES) and his innovative behavior?

2. Are SES and innovative behavior related directly, or indirectly, through some intervening variables? Some of these intervening variables can be primarily identified as economic, communication, and psychological resources. These variables, especially the latter two, have been emphasized in the literature dealing with diffusion of innovations. It was decided, therefore, to see whether such communication variables as media exposure, inter-systemic contact, and psychological variables such as risk-taking, achievement motivation, and the like are not themselves determined by one's differential position in the socio-economic strata. The purpose is then to

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integrate these variables in a model within the framework
of stratification theory.

3. What is the structure of the relationship
between SES and innovative behavior? Is the relationship
linear, as most of the literature has assumed so far, or
curvilinear, or does it not show any definite pattern, and
why? In case we assume a curvilinear relationship, what
is the rationale behind such an assumption? Could this be
due to the structure of the relationship between these
two variables and the intervening variables? In other
words, is the relationship between SES and the three inter-
vening variables linear, or curvilinear? What is the
structure of the relationship between the intervening vari-
ables and innovative behavior? And what are the possible
explanations for the assumed types of relationships?

4. What is the relative importance of each one of
the intervening variables in terms of explaining the SES-
innovative behavior relationship? Which one of the inter-
vening variables is mostly determined by SES? Which one
of them has the highest correlation with innovative
behavior?

These are the questions for which we will try to
provide answers on the basis of empirical evidence.

The scope of our analysis is limited by the fol-
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First, the study focuses on innovative behavior in agriculture, thus excluding all innovations relevant to other fields--education, industry, organizations, etc.

Secondly, the unit of analysis is the individual, his socio-economic status, and his innovative behavior. In this respect, we have excluded all social system level variables such as institutional arrangements, system openness, and the development level of the society from our analysis.

Thirdly, we have concentrated on the underdeveloped societies, where there exists a great scope for the modernization of agriculture, and where change programs for rural areas are being executed.

Finally, for all of the relationships among our variables we have implicitly assumed unidirectionality progressing from SES through the intervening variables to innovative behavior, thus the reverse effects of the variables are outside the scope of this investigation.

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CHAPTER I

THEORETICAL FRAMEWORK AND

REVIEW OF LITERATURE

The concept of socio-economic status is one of the most crucial constructs in sociological analysis. The notion of "status" should be distinguished from that of "class," which owes its popularity to the theory of "class-conflict" as propounded by Karl Marx. Marx has classified different constellations in human history into two distinct, antagonistic classes with conflicting interests, namely, those who own means of production, and those who do not and have no choice but to offer their labor. According to Weber, "class" determines one's "life chances," while "status" determines the "life style." Simply stated, "status" refers to one's position in a social hierarchy. The two individuals having the same economic position need not enjoy equal prestige or honor in a community. Perhaps a person who comes from a prestigious family, ethnic or racial group, or who was educated in a particular school may be accorded more prestige than his counterpart coming from a different background. The concept of "socio-economic status" (SES) has been widely used in the literature to refer to an individual's or a group's position on a number

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of indicators of social and economic ranking and prestige and life style. Social scientists use a wide variety of variables such as education, income, occupation, caste, or ethnic membership to determine one's SES.

The close and positive relationship between SES and innovative behavior has been well documented in the diffusion literature. Indeed, a review of the literature on the diffusion of innovations reveals that there is hardly any study which has not included SES as one of the independent variables. Most of these studies have found it to be an important predictor. Rogers and Shoemaker (1971) have cited 163 studies dealing only with agricultural innovations where the early adopters are reported to have come from high status groups. A few of these studies will be cited for illustration.

Marsh and Coleman (1955) in their study of 393 Kentucky farmers tried to relate 21 variables, including SES, to the adoption of 16 new practices. Out of 21 independent variables, only 3 proved to be strongly related to adoption, namely, SES, education, and agency contact.

Copp (1958) made a comparative study of 157 cattlemen in Kansas and 177 dairymen in Wisconsin. Among the several independent variables such as SES, personality orientations, and social position (age, education, and social participation), he found economic status and personality variables as highly related to adoption behavior.

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Choudhary et al. (1966) included SES in a relatively large number of independent variables related to adoption behavior. The SES was operationalized on the basis of farm size, income, literacy, and tenancy status. The findings indicated that the first three components of SES explained most of the variation in innovative behavior.

Savale's (1966) study of 243 farmers in India included two sets of variables, namely, sources of information and economic factors. The economic status of the farmers proved to be the most important factor in explaining their innovative behavior.

The above are a few examples of the studies which treated SES as one of the many independent variables. The major deficiency of these studies is their lack of the underlying theoretical reasoning. Little attention has been paid to the question of why SES is related to adoption behavior. What are its dimensions which are the most crucial? Moreover, most of these studies have heavily relied on simple correlational analysis, which can often be misleading.

There are also a number of studies in which SES has been treated as the only independent variable. The number of these studies is very small, and with few exceptions, there is little theoretical basis for these studies. Several examples can be given in this respect.

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Freeman (1961) selected various measures of economic status, such as land tenure, type of house, farm animals, agricultural equipment, and personal possessions, and related them to six agricultural practices. His hypothesis that "Families of higher economic status tend to adopt new agricultural practices more than families of lower economic status" was confirmed by his findings. However, one wonders if Freeman was measuring the contribution of economic facilities rather than the relationship between SES and innovative behavior.

Singh et al. (1965) hypothesized that adoption was a function of socio-economic characteristics. Farm size, economic status, and social participation were found to be positively related to adoption behavior in their study.

Barnabas (1960) studied the relationship between SES and adoption behavior with reference to "multiple factor theory of social action" developed by William Reeder (1959). In his study, he included the following sets of variables: "opportunity," "ability," "support," "force," and "institutionalized behavior." All these factors, according to Barnabas, deal with different aspects of the stratification system. For example, under the concept of "opportunity" are included the opportunities to observe, to learn, and to act, and all these are highly determined by the prevalent system of stratification. Thus, individual

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characteristics such as age, education, occupation, income, and farm size are regarded as "opportunity" and "ability" factors, enabling individuals to engage in innovative behavior. One also perceives interdependence among these factors: If there is "opportunity," but no "ability," innovations would not take place. The findings indicated that individuals belonging to upper castes adopted most of the agricultural innovations. Since all status measures, such as education, income, occupation, and size of land holdings, were highly correlated with caste status, it was concluded that the higher the SES, the more innovative the individual.

Despite the fact that Barnabas has conducted his study within a theoretical framework, he hardly contributes to enlightenment on the subject. There are several problems with his reasoning and analysis: Although he acknowledges the interdependence of the variables, he fails to specify its nature. His theorizing assumes that some factors facilitate change, while others restrict it. Nevertheless, he does not assign any weight to these different variables. It is reasonable to ask, which factors included in his conceptual framework combine to generate the most change?

Probably one of the most significant contributions to the subject has been made by Frank Cancian (1967) who has propounded the thesis of curvilinearity of relationship

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between status and adoption behavior. A more detailed presentation of his study will be given later. Suffice it to mention here that Cancian argues that individuals belonging to high socio-economic ranking are likely to be the early adopters because they would like to maintain their high status, and also because they can make the necessary investments. And yet, at the same time, they would be reluctant to take the initial risk because they have more to lose than the lower status individuals in case innovations fail. The interaction of these two types of "facilitating" and "inhibiting" effects results in the curvilinear effects of status on adoption behavior. Cancian has used cross-cultural data to validate his theory. His theory is also open to criticism, and since it is more relevant to the second part of this study, it will be elaborated later.

The main objective of the above review was to suggest that diffusion researchers have stressed the positive and close relationship between SES and innovative behavior. However, the purpose of theory is not merely to predict the facts, but also to explain them. As can be seen from the above cited studies, the literature on this subject is mainly confined to citing the factors assumed to have predictive value for adoption behavior. In most studies, several indicators of SES have been related to adoption behavior, without weighing their relative importance, or

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showing the interrelationship between the indicators themselves. Moreover, it has not been explained why these indicators are hypothesized to be positively related to adoption behavior. These are some of the issues which arise out of the theoretical deficiency of studies dealing with status and adoption of innovations.

In the following sections we will present our suggested model and examine its details in the light of the past researches.

The Intervening Variables Between SES and Innovative Behavior

The question can be asked at this stage why SES is related to adoption behavior. The relationship can be explained with reference to three sets of intervening variables:

1. Economic inputs,

2. Communication channels, and

3. Psychological orientations.

SES	Access to	1. Economic Inputs	Innovative Behavior
	Access to	2. Communication Channels	
	Access to	3. Psychological Orientations	
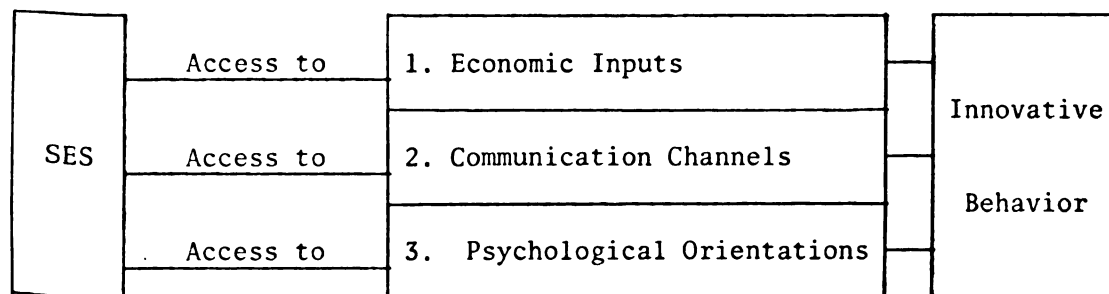
In the following pages, each intervening variable will be discussed in some detail.

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1. The first dimension is obvious. By the very definition of socio-economic status, it follows that the upper strata would possess, relatively speaking, greater access to economic resources, and, therefore, would be in a better position to invest the required economic inputs in implementing new practices. There is no doubt that most of the new agricultural technologies, no matter how simple, require some initial investment either in the form of capital or labor. In a subsistence economy, the use of chemical fertilizers, improved variety of seeds, or modern tools and implements involve significant investments in terms of the farmer's total income or savings. For example, in the case of Iran, after the Land Reform, the poor farmers generally failed to make use of modern innovations due to the lack of sufficient capital. Thus, the farmers coming from higher social strata have the direct advantage of possessing economic resources. Moreover, they find it easier to raise the necessary credit from banks, cooperatives, or private parties.

The experience of the Green Revolution shows that the modern agricultural innovations have been mainly adopted by rich farmers. Economists have attributed it to the availability of economic inputs by large farmers only. Indeed, most of the economists who do not bother about the role of cultural values and psychological variables have consistently taken the position that if necessary economic

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resources are made available to subsistence farmers, they are likely to respond positively to new practices (Schultz, 1964; Wharton, 1968). Whether their reasoning is simplistic or not is beside the point. What is important to note here is their implicit assumption that the modernization of subsistence economies is largely a function of the availability of economic inputs. The point is too obvious to be elaborated further. Moreover, the emphasis of this study is on sociological aspects of adoption behavior. While the relationship between SES and innovative behavior may be largely attributed to the economic input variable, the two other variables--access to communication channels and a set of psychological orientations conducive to change-- deserve to be discussed in some detail.

2. The role of modern communication channels in the diffusion of new ideas and technology is known widely. Obviously, the farmers can adopt innovations only when they are aware of them; they know about their advantages and how to implement them. In this respect, communication channels seem to have three functions:

(1) The dissemination of knowledge and skills,

(2) The generation of psychological needs for innovations, and

(3) The promotion of psychological orientations conducive to innovative behavior.

However, it must be pointed out that the assumption made here is that the messages sent through communication

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channels are _modern_. They include information about modern technology and encourage new outlooks.

Let us briefly mention how communication channels affect these functions.

Communication--mass media or inter-personal-- contributes to the diffusion of modern ideas and technology. In underdeveloped societies, radios, movies, and printed media are used to a great extent for this purpose. Also, under the extension programs, change agents contact farmers at an inter-personal level. The role of these channels in disseminating information is widely recognized, and has been acknowledged in a large number of studies (Katz and Menzel, 1954; Rogers and Shoemaker, 1971; Waisanen, 1969).

Communication channels are also utilized for gen- erating psychological needs for innovations. Indeed, one of the consequences of _knowledge_ about innovations is the generation of a perceived _need_ for them. Although the sequence is not that simplistic and automatic, we can speculate, for example, that once a farmer becomes aware that there is a variety of seed which would triple the grain production, he would probably feel some kind of need for it.

Finally, exposure to new ideas results in some change in old values and beliefs. A number of well-known social scientists such as Lerner (1958), Pye (1963), Smith and Inkeles (1966), Inkeles (1969, 1973), Waisanen (1969),

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Waisanen and Kumata (1972), Rogers and Svenning (1969), Schramm (1964), and Powdermaker (1962) have shown that exposure to modern mass media generates certain psychological orientations which can be categorized under the concept of "individual modernity." Whether or not there is such a syndrome as "individual modernity" is a controversy beyond the limits of this study. Also, the process by which mass media bring about changes in one's psychological construct cannot be discussed here. It is sufficient to say that the review of the literature suggests a significant relationship between media exposure and psychological orientations such as aspirations, efficacy, planning orientations, perceived autonomy, inter-personal trust, and secular orientation.

The importance of the above discussion for the purpose of this study is due to the fact that access to communication channels is not equally available to all members of a community. One's position in the socio-economic hierarchy is also signficant to it. Those occupying higher positions are more likely to have access to these channels than those at the lower levels of the hierarchy (Frey, 1966; Rogers and Svenning, 1969).

There is yet another factor to be taken into account with regard to the privileged position of higher SES individuals in this respect. The use of printed media largely depends upon literacy and education. Obviously

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enough, an illiterate person cannot make any use of printed media. In fact, the advantages of literacy go beyond the mere use of printed media. Rogers (1966) has explained it in the following words:

> [Literacy] is more than just a facilitator of mass media exposure. Perhaps, functional literacy leads to different mental abilities such as a general capacity to deal with abstract symbols, to an interest in cosmopolite events outside of the peasant's village, and to some sort of motivation to modernize, all of which are evidently partially independent of mass media per se. (See also: Lerner, 1958; Deutschman, 1963; Rogers, 1966.)

The so-called "centripetal effect" of mass media also works to the advantage of upper class members. By "centripetal effect" it is meant that exposure to one form of media contributes to exposure to other forms of media. Newspaper reading, for example, increases one's interest in radio or television news and vice versa. This phenomenon has been observed cross-culturally by several researchers (Lerner, 1964, and Frey, 1966, in Turkey; Carter and Sepulveda, 1969, in Chile; Rogers and Svenning, 1969, in Colombia).

Communication, besides mass media, includes interpersonal contacts as well. Past experience shows that change agents' contact with their potential clients is selective, favoring those from upper socio-economic strata (Wilkening, 1952; Marsh and Coleman, 1955; Lionberger, 1955; Rogers and Havens, 1961). Several reasons can be suggested in this respect. First, change agents who

generally face the task of approaching a relatively large
number of farmers find it more rewarding to concentrate
on those farmers who can afford the required investments
(Van den Ban, 1964). Second, there exists the well-known
phenomenon of what social scientsists have called
"homophily," implying that interacting individuals often
share certain attributes such as beliefs, values, educa-
tion, and social status. Change agents, who have a higher
social status because of their education, knowledge, and
possibly income, are likely to communicate with higher
status farmers. Little enthusiasm may be shown in reaching
the lower strata. Moreover, it also pays to the change
agents' self-interest to develop friendship with farmers
of power and prestige who have greater access to political
authority, and who can help with their promotion in the
agency.

The nature of inter-personal networks also facili-
tates the diffusion of new ideas among higher socio-
economic ranks. It is a well-known fact that in social
networks, individuals occupying similar status positions
have greater opportunity to come into contact with one
another and exchange information and ideas. And since
those belonging to higher SES are assumed to have greater
access to mass communication channels, and consequently
more exposure to modern ideas, they are likely to share it
within their groups. The knowledge of modern technology,

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thus, is less likely to diffuse through the social net-
works of lower strata. Lionberger and Coughenour (1957)
have shown that farm information is more likely to be
transmitted among the clique members than among the farmers
who are not the members of an identifiable group. Wilken-
ing (1962, p. 55) in this regard makes the following
observation:

> Social cleavages based upon race, language and
> other distinctions act as a barrier to infor-
> mation contact, and communication about farm
> matters. Since informal contact occurs largely
> among social equals, distinction of class,
> nationality, etc. tend to inhibit informal com-
> munication of new ideas.

Another advantage of higher SES farmers with respect
to exposure to new ideas is their relative physical mobility
(Dye, 1963; Rogers and Svenning, 1969). Not only does
physical mobility require means of transportation which is
more easily available to well-to-do farmers, but also indi-
viduals of higher SES are more likely to have some political,
social, and economic linkages with urban centers. The con-
clusion can be drawn that the better access of higher SES
individuals to communications channels provides a clue
about the positive relationship between SES and innovative
behavior.

3. Finally, the positive relationship between SES
and innovative behavior can be attributed to the varying
social-psychological orientations of different status
groups. On the basis of some empirical and theoretical

evidence, one can hypothesize that the psychological orientations of upper SES groups are likely to be more conducive to the adoption of innovations.

The critical role of values, attitudes, and self-perceptions in entrepreneurial roles and rational economic behavior has often been emphasized by sociological and psychological researchers. Max Weber has argued that the development of capitalism in Western Europe and North America resulted from the secularization of Protestant ethic. He compared the religious beliefs and values of Chinese and Indian civilizations with those of Protestant nations to support his argument. Weber's thesis has influenced contemporary thinking to a great extent. McClelland (1961) has also taken the position that a psychological quality, namely, achievement motivation, is the most significant element in promoting economic development. Hagen (1962) believes that innovative personalities are the results of change in child rearing practices. Economist Gunnar Myrdal (1968) in his "Asian Drama" has emphasized the role of a set of value orientations which pose barriers to the development of Asian nations. Sociologists like Lipset (1967), Levy (1966), and Smelser (1966) have used the Parsonian scheme of "pattern variables" (achievement vs. ascription, specificity vs. diffuseness, universalism vs. particularism, etc.) to explain the norms and values of developed and underdeveloped

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societies. Social scientists have identified a number of
psychological orientations which are supposed to be related
to innovative behavior. Variables such as efficacy, ambi-
tion, empathy, deferred gratification, planning orientation,
cosmopolitanism, and change-proneness have been universally
emphasized in the literature. It has been argued that the
lack of these orientations hinder the adoption of new
ideas and practices.

Apparently, a farmer who lacks efficacy is likely
to demonstrate little enthusiasm and initiative. Why
should he work when his material conditions are the func-
tion of supernatural powers? Again, in the absence of an
all-consuming ambition, there would be little motivation
for him to engage in innovative behavior. Often, the
adoption of new practices requires deferred gratification
and a planning orientation. A person who is willing to
make sacrifices in anticipation of future rewards, and pre-
fers to plan his affairs in advance, will be more inclined
to experiment with new technology and practices. As most
of the innovations involve an element of risk, a risk-
oriented farmer is expected to be a better adopter. Rogers
and Shoemaker (1971) have developed some generalizations
in this regard. They have suggested that adoption behavior
is related to (1) empathy, (2) low dogmatism, (3) ration-
ality, (4) low fatalism, (5) achievement orientation,
(6) change-proneness, (7) planning orientation, (8) risk

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orientation, (9) level of aspirations, and (10) positive attitudes toward science and technology. However, they have also pointed to a number of studies which do not support the above argument. Indeed, recently there has been a great deal of controversy over the existential and predictive value of attitudinal orientations: Whether, as some social psychologists assume, there is inter-relationship between these attitudes themselves, constituting a syndrome, or whether one's psychological orientations can at all predict his overt behavior (Armer and Schnaiberg, 1971; Horowitz, 1972; Kumar, 1973).

The relevant question for this study, however, is how far these attitudinal variables, assumed to be related to innovative behavior, can be regarded as functions of SES. Both evidence and common sense seem to support the thesis of a positive relationship between SES and a set of psychological characteristics. The socio-economic status affects one's psychological orientations in two ways:

In the first place, the objective conditions set limits to one's perceptions, aspirations, and values. As Hyman (1970, p. 197) has observed:

> This pattern of reduced personal aspirations and reduced appeal or valence of given occupations among the lower classes seems to derive from the perception of reality that the lower classes have. The goals of all individuals are governed to some extent by the appraisal of reality. Since a variety of data indicate that the poor are more aware of their lack of opportunity, presumably they would set their goals in the light of such beliefs.

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Chinoy (1952, p. 454) has similarly noticed that:

> The aspirations of the automobile workers . . .
> represent a constant balancing of hope and desire
> against the objective circumstances in which they
> find themselves . . . by and large they confine
> their aims to those limited alternatives which
> seem possible for men with their skills and
> resources.

In a similar fashion, a peasant deprived of economic pros-perity and political power is more likely to be lacking efficacy and will tend to develop fatalistic attitudes toward work and life. In underdeveloped societies, the peasantry has been subject to ruthless exploitation by the political elite and large landlords. Thus, it should not come as a surprise if they are found to score the lowest in scales of inter-personal trust. The conditions which lead to severe distrust among the peasantry is described in a more illuminating manner by an Indian villager:

> You cannot know unless you are a villager, how
> everyone threatens us and takes from us. When
> . . . a sophisticated town man goes anywhere, he
> demands service and gets it. We stand dumb and
> show our fear, and they trample on us. . . .
> There is no one outside our own group whom we
> dare trust. Everyone who comes to us or to whom
> we go, thinks of what he can get from us--be it
> money, or gain or personal glory (Wiser and Wiser,
> 1963, pp. 127-29).

Apart from the fact that one's self-perception and his attitudes toward life are very much determined by the realities surrounding him, there is yet another reason to believe that members of different socio-economic strata would develop different mentalities and outlooks as a result of socialization in different environments. Our

attitudes are not only shaped by our appraisal of the reality, but also due to our differential socialization in the family and the social networks. An individual belonging to a certain socio-economic strata is exposed to different ideas and perspectives than his counterpart in higher or lower ranks.

One of the exponents of the theory that one's status determines his beliefs, values, and self-perception is Alex Inkeles (1960). His researches, although confined to the psychological constructs of "industrial" or "modern" man, show that one's position in the social and institutional hierarchy largely conditions his psychological being. Inkeles (1960) has shown not only that marked differences in the psychological orientations of different status groups exist, but also that these differences are to be noted cross-culturally. The upper SES people have been found to be more optimistic, efficacious, ambitious, cosmopolite, planning oriented, and achievement motivated. A wide number of empirical investigations seem to substantiate this thesis.

A more powerful--although indirect--support to the above thesis has been provided by the findings of some of the modernity theorists. Kahl (1968) has noted that his scale of "modernism" has been highly associated with SES, the strength of correlations being .56 and .48 in the case of Brazil and Mexico, respectively.

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Armer and Schnaiberg (1971), who replicated the modernity scales of Smith and Inkeles (1966), Kahl (1968), Armer (1971), and Schnaiberg (1968), in a suburb of Chicago, have also noted that the modernity orientations, most of which were identified in the above discussion, were correlated with the measures of socio-economic status.

In view of the above discussion, it is reasonable to think that the values, beliefs, and attitudes of upper socio-economic status groups may be conducive to the adoption of modern agricultural innovations. Thus, the conclusion can be reached that there are at least three sets of variables that explain the positive relationship between SES and adoption behavior: economic inputs, communication channels, and psychological orientations.

The Structure of SES-Adoption Relationship

The above discussion leads us to the next logical question: What is the structure of the relationship between SES and innovative behavior? Is it linear, curvilinear, or does it not show any definite pattern?

There has been some interesting theorizing on this subject. While the majority of diffusion experts have assumed that the relationship between the two is linear, several authors have questioned this assumption (Homans, 1961; Cancian, 1967; Wilkening et al., 1969; Morrison et al., 1972). Beside the above cited studies, Waisanen's

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theory of "take-off effects" is also important in this regard (Waisanen, 1971; Waisanen and Kumata, 1972). There is some reason to believe that his thesis may also apply to the relationship between SES and innovative behavior.

As was mentioned earlier, one of the significant contributions about the nature of the relationship between SES and adoption behavior has been made by Frank Cancian, who believes that the assumption of a positive, linear relationship in this respect is too simplistic. Wealth and status need not always be functional to the adoption of innovations: they can be even dysfunctional for certain status groups who might have to lose as a result of the "risks" involved in the early adoption process.

Cancian's reasoning has been very much influenced by Homans (1961) who elaborated the thesis of "middle class conservatism" in explaining the relationship between status and conformity. Homans has explained his theorizing on the basis of three status groups: Low, Middle, and High. The new nonconformist behavior, which usually involves some risks, has different consequences for each of the above groups:

> The lower status man, already at the bottom, has
> no more status to lose; and the upper status man,
> just because he has a lot of status to lose, can
> afford to risk some of it; but the middle status
> man can less easily stand the loss of his little
> all (Homans, 1961, p. 352).

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Thus, Homans hypothesizes a U-shape curve: the low or high being innovative, with the middle class following a conservative course.

Cancian has adopted a similar reasoning, although his theory is much more complicated. He has assumed--in an arbitrary fashion--four socio-economic ranks: High, High Middle, Low Middle, and Low. There are two assumptions which are basic to his theory:

1. All members of the society would rather be high than low on socio-economic ranking;

2. All innovations involve some degree of risk (an assumption open to criticism).

Cancian argues that the element of risk involved suggests that the higher status groups have more to lose than the lower status groups. Thus, the higher the socio-economic status, the greater the risk involved. Therefore, it is reasonable to assume that the element of risk would discourage individuals of upper socio-economic groups to adopt innovations. He calls this the "inhibiting effect" of status.

Cancian, however, realizes that the relationship is not so simple, and that the "inhibiting effect" can be demonstrated empirically only when the following conditions are met:

1. All risks are perfectly divisible.

2. Knowledge is equally spread over all ranks.

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3. The risk necessary to maintain present rank is equal in proportion to total resources for all ranks.

4. No individual can suffer total loss of resources from loss on a single risk.

5. No individual has so many more resources than the next lower relevant individual, or category of individuals, that he is completely protected from loss of rank.

These conditions are not fully met in the real life situations. Empirical studies show that unlike Cancian's original hypothesis which posited a negative relationship between rank and innovative behavior, rank is positively associated with innovative behavior. Cancian has, therefore, suggested that the best place to look for the negative effect of rank on innovative behavior would be the two middle ranks, i.e., the Low Middle and the High Middle. Here, he insists, empirical evidence would show that the Low Middle rank is more innovative than the High Middle rank.

Cancian has provided empirical support to his theory by using data from seven studies, conducted in Japan, Mexico, and the U.S.A. Out of these, at least five seem to provide support for his theory.

It is not out of place to mention that Cancian's theory is applicable with regard to those situations where some element of risk is involved. In the case of those situations where the amount of risk is negligible, or

nonexistent, as in the later stages of innovations, the relationship need not be curvilinear.

Cancian's presentation of his thesis is at times unnecessarily complicated. Anderson (1974) has simplified the argument by reducing it to an equation. The equation contains three parameters, namely, (1) "estimated loss," (2) "estimated gain" resulting from adoption of an innovation, and finally, (3) "propensity to accept innovations," because of access to different sources of information, knowledge, and different "modernity" orientations. If $Pr(G_{Si})$ represents the perceptional estimate among members of stratum i that a particular innovation will be to their gain, $1 - Pr(G_{Si})$ is then their perceptual estimate that it is likely to turn out to be a failure. K_{Si} indicates the over-all propensity of stratum i to innovate, and $Acc(S_i)I$ stands for the <u>probability</u> that the stratum i accepts the innovation I, then:

$$Acc(S_i)I = K_{Si}(SES_i) + a_{Si}Pr(G_{Si}) + b_{Si}[1-Pr(G_{Si})].$$

The parameters which represent the weight assigned by each stratum to the gain and loss involved in each innovation, a_{Si} and b_{Si}, can theoretically be regarded as independent of each other.

The linearity or curvilinearity of the relationship between SES and acceptance of innovations will then depend on the values of these parameters. However, even if we

assume simply that the K-parameter is equal for all the strata, i.e., assuming a linear relationship between SES and propensity to innovate, for estimating a and b parameters for the various strata, a large number of repeated observations will be needed in order to find out how each of the members respond to any particular innovation.

Several criticisms, both conceptual and methodological, can be raised against Cancian's theory (Wilkening et al., 1969; Morrison et al., 1972; Morrison, 1972).

First, Cancian has apparently over-stressed the role of risk-taking in adoption behavior: not all innovations involve a high degree of risk. Moreover, there can be situations and times where not to be innovative can be as risky as to innovate. In a community where great emphasis is laid on the adoption of new practices, those who fail to do so are likely to lose their status. In addition, we should make a distinction between actual "risk" and "perceived risk," and not the real "risk" as measured by objective indicators.

Secondly, and importantly, Cancian assumes that status is always achieved and innovations may bring instability in the social structure. The question can be raised, what about status positions where innovations may not result in change in status hierarchies? Examples can be given of caste and ethnic stratification. In this connection, it would be appropriate to mention the findings

of a study conducted by Morrison et al. (1972) which seems
to contradict the notion of the "middle-class conservatism"
advocated by Cancian. In this study, which used caste as
a measure of rank, it was found that the High Middle rank
and not the High rank, was the most innovative. Several
explanations can be given to this finding. First, since
the caste is an ascribed status, high castes do not need
to innovate for maintaining their status: it is acquired
by birth and not by achievement. Besides, it can also be
argued that as a result of a secularization process,
caste structure is changing from ascribed to achieved.
Those at the top are in a very shaky situation and, there-
fore, the inhibiting effects are working more against them
than any other rank. Later, Morrison et al. (1974) failed
to support Cancian's notion of negative relationship
between rank and risk-taking among the Middle ranks, by
using either caste or other indicators of "achieved"
socio-economic rank. The authors argue that Cancian's
findings are the artifact of his quartiling method applied
to populations with highly unequal distribution of
resources.

There are other methodological problems involved
in the Cancian study. The samples he has used to test his
thesis are far from satisfactory. His data come mostly
from developed nations. Again, the sample size is very
small, and as Morrison (1972) has indicated, if less than

half a dozen cases are manipulated in the sample, little
empirical support would be left for the theory. Finally,
dependent and independent variables in Cancian's own study
in Mexico are not operationally independent from each
other, thus resulting in tautology. Rank is operationalized
in terms of the amount of corn seeded; and adoption of
innovations on the basis of the first time when corn was
sold to state receive centers. Obviously, the more corn
that is seeded, the higher is the probability of selling
the surplus. Everett Rogers, during a discussion with the
author, suggested that in order to solve this problem a
measure of "perceived risk" may be used rather than "risk-
taking."

Wilkening et al. (1969) replicated Cancian's study
in the U.S., and collected data from 495 farm families in
Wisconsin. Instead of using one indicator of status, they
used at least three separate indicators, i.e., gross farm
income, level of living, and social participation. Their
data indicate that although the assumption of linearity is
questionable, it is not a third or fourth order curve as
suggested by Cancian, but a simple exponential one. Thus,
contrary to Cancian's theorizing, the High Middle rank is
not more conservative than the Low Middle rank. The
authors attributed this to the simple fact that there were
more resourcess--"the facilitating effects," in Cancian's

words--available for the High Middle rank to neutralize
the negative effects of involved risks.

As was suggested earlier, we would like to briefly
mention here the "take-off" effect hypothesis formulated
by Briones and Waisanen (1969) and later developed and
tested by Waisanen (1971), and Waisanen and Kumata (1972).
Probably, the discussion of their hypotheses seems unwar-
ranted at this stage, but its relevance will become obvious
when a few hypotheses are put forward.

The positive contribution of formal education and
literacy to attitudinal and behavioral modernity has been
widely recognized. Education is more than learning how to
read and write or acquiring specialized knowledge or mas-
tering specific skills. The student learns modern orien-
tations and modes of behavior not merely through the
curriculum, but also as a result of his participation in
the formal organization of the school (Inkeles, 1969;
Waisanen, 1971).

The question arises whether the formal education
and modernity orientations are related in a positive,
linear fashion. As will be seen from the following dis-
cussion, the answer seems to be No.

Tumin and Feldman (1956), who conducted their study
on the relationship between education and achievement,
noted the phenomenon of educational threshold:

It would appear that while education up to four years of school may matter, and though its effects may be cumulative, once the fourth year is passed, a new vista of life possibilities seems to be opened.

Briones and Waisanen (1969) found support for the above thesis in their Chilean data. When they plotted data on the educational achievement of 268 heads of households in Santiago against their educational aspirations for their children, the results indicated a curvilinear relationship. There were only modest increases in aspirations following each of the first four years of formal education. Only after the fifth year, a "take-off" slope was noted. Since the Chilean data was confined to a relatively small sample, Waisanen (1971) again tested the hypotheses with data from Costa Rica and Finland. The findings confirmed the earlier theorizing.

Waisanen and Kumata (1972) also conducted a five-nation study on education, functional literacy, and participation in development. The results for all five nations supported the hypothesized take-off stage, irrespective of the age, sex, place of residence, and the income of respondents.

It is not out of place to mention here that a curvilinear relationship of monotonic increasing type between education and attitudinal modernity is also be to found in the six-nation study of Inkeles and Smith (1974, p. 135, Figure 9-1). Interestingly enough, the authors

have declined to make any point in this respect, although they have taken notice of the remarkably similar slope for the line presenting the relation of education to attitudinal modernity.

The preceding discussions of Cancian's thesis and Waisanen's findings cast some doubt upon the assumption of linear relationship between SES and innovative behavior. Therefore, a possible curvilinear relationship between these two variables are speculated in this study. The suggested hypothesis is based on two points:

First, there is some possibility of a "take-off" stage as shown by the findings of Feldman, Waisanen, Briones, and others. [This hypothesis gets some support from the findings of Wilkening et al. (1969) who have suggested that the relationship between status and innovative behavior becomes exponential after a certain stage.]

Secondly, we can speculate that a stage can be reached when high status need not make much difference for adoption behavior. This hypothesis will be explained further in the following pages. As will be seen, a case for it can be made on the basis of the "law of diminishing returns" in economic analysis.

The rationale for the above reasoning can be presented in terms of the three intervening variables that seem to account for the hypothesized relationship between SES and innovative behavior.

First comes the availability of economic resources. It was suggested earlier that higher status individuals are able to innovate partly because they have access to economic inputs. However, it can be assumed that the relationship between economic investment and adoption behavior would not be linear for two reasons:

1. Often the application of modern technology and practices requires <u>at least a minimum level</u> of investment, without which innovations cannot be introduced. Adoption of innovations represents an entirely new production function, and adjustment to new forms of production cannot be made in the fashion of small increments in the allocation of resources. For example, we cannot purchase half a tractor. Nor can we dig half a well. One needs a certain quantity of chemical fertilizers; if that amount is not available, the whole investment is likely to be wasted. In other words, there is a "take-off" point in the input-output relationship. The "take-off" point may differ from innovation to innovation depending upon the divisibility of the specific input. The more divisible the input, the earlier will occur the "take-off" point. However, this point is beyond the scope of our focus. What must be emphasized here is the hypothesis that in order to adopt an innovation, a farmer needs a certain minimum quantity of economic inputs. Thus, the farmers in the lowest echelons of SES would not have much chance to engage

in innovative behavior, and the adoption of innovations would perhaps begin with the Lower Middle class farmers who can afford the minimally required investment.

2. It is assumed that the "law of diminishing returns" would be operative with regard to the adoption of innovations. The law predicts that if the quantity of a production factor is constant, the application to that factor of successive increments of the other factors will show progressively decreasing increments of production. Thus, if a farmer has one tractor which is sufficient for his field, the availability of an additional tractor would not necessarily mean a better output. If a farmer needs, say, 100 kilos of chemical fertilizers, additional amounts of fertilizers would not only be useless, but can even decrease the output. The implication of this law is obvious. Once a farmer has sufficient resources in terms of capital or labor, the availability of more resources would not necessarily contribute to more adoptions. Thus, once an optimum point is reached, higher status does not contribute to adoption.

The above reasoning also applies in the case of access of communication channels which, in our view, partly explains the relationship between SES and innovative behavior. In the first place, the "take-off" point which Waisanen and Kumata (1972) have noted about formal education appears to be applicable to the case of the effects

of communication. Some minimum level of exposure is neces-
sary to persuade a potential adopter. Probably, one
demonstration may not be enough: two or three would serve
the purpose. The farmer may become aware of the new idea
or practice in one encounter, but it requires much more to
be acquainted with complete skill, and form a positive
attitude toward the innovation. The first visit of the
change agent is not very useful: in order to persuade
the farmer, the change agent should establish some rapport
and then demonstrate the usefulness of the innovation.
The implication is that those who are at the lowest end of
the SES ladder, and consequently have a very limited amount
of communication with change agents and little access
to mass media, may not be in a position to accept the new
practices.

By the logic of the "law of diminishing returns"
it would also be expected that beyond a certain optimal
limit, additional exposure to modern communication channels
would not make a marked difference in adoption behavior.
Indeed, the study of Inkeles and Smith (1974) of individual
modernity in six countries implies that the effects of mass
media exposure on modernity cease to increase with the
same rate after a certain state. The authors, themselves,
however, did not take any notice of the fact, which is
especially obvious in the case of India and East Pakistan
(now Bangladesh) (Inkeles and Smith, 1974, p. 147,

Figure 10-1).* Thus, it can be assumed that after a few business visits, the change agent contact becomes more a social intercourse rather than a business relationship. Frequent demonstrations about the advantages of an innovation, or a set of innovations, can contribute to drudgery, and the audience hardly learns a new thing. Thus, an optimal point can be discerned, when additional exposure to modern communication channels of the highest SES individuals do not result in their greater innovative behavior. There are two additional reasons for this assertion. First, in agriculture, unlike industry, the pace of innovation is slow. Second, the policies of the government in underdeveloped societies are generally more designed to facilitate the adoption of fairly simple practices which do not require a great deal of effort to teach.

And, finally, we come to the subject of the curvilinear effects of modernity orientations on adoption behavior. There is neither any theoretical reason nor empirical evidence to posit such a relationship. Only further research can shed light on this subject. At this point, it can only be said that whatever the relationship between psychological modernity and adoption behavior, they are not likely to change significantly the structure of the relationship between SES and innovative behavior as

*I owe this point to Dr. Anderson who mentioned it for the first time.

hypothesized earlier. This suggestion is based on one essential premise: as compared to economic and communication variables, modernity orientations appear to be less predictive of adoption behavior. This premise has been supported by a number of studies which have found psychological orientations to be among the weakest predictors of innovative behavior (Rogers et al., 1970; Kumar, 1972; White, 1967).

In summary, we would say that the structure of the relationship between SES and innovative behavior is likely to be curvilinear as a result of the differential effects of economic and communication variables on adoption behavior.

To conclude, the theoretical framework of the study will be sketched briefly. First, it is suggested that the positive relationship between SES and adoption behavior can be explained with reference to three sets of intervening variables, i.e., economic inputs, communication channels, and modernity orientations. Individuals occupying different positions in status hierarchies do not have equal access to the above mentioned resources. As a result, those who are at the upper end of the SES ladder innovate more, and vice versa.

Second, it has been argued that the relationship between SES and innovative behavior is not linear, but

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curvilinear. However, this curvilinearity is not of the type hypothesized by Frank Cancian (1967). Instead, if our underlying reasoning is correct, the curve is expected to be of a monotonic increasing type having both take-off and optimum points.

CHAPTER II

PROCEDURES AND METHODOLOGY

Hypotheses

As delineated in the theoretical framework, the central problem of this study bears on the indirect relationship that socio-economic status has to the adoption of agricultural innovations. It is assumed that socio-economic status is related to innovative behavior through a set of intermediary factors, namely, economic inputs, access to modern communication channels, and finally, attitudinal modernity. It is also assumed that the relationship between the major independent variable and the dependent variable is curvilinear, rather than the oft-assumed linear relationship.

On the basis of this framework, the following hypotheses were generated, which will be presented first in a general form; then more specific hypotheses will be formulated on the basis of these general statements.

General Hypotheses

     I: There is a positive relationship between one's socio-economic status and his innovative behavior.

    II: The relationship between SES and adoption behavior is not of a linear type, but rather is curvilinear.

III: The relationship between SES and innovative behavior is explainable through a number of intervening variables, namely, economic inputs, communication channels, and psychological orientations.

IV: The curvilinearity of the relationship between SES and innovative behavior is due to the curvilinear relationship existing between two of the intervening variables and the dependent variable.

Specific Hypotheses

(1) There is a curvilinear relationship between economic input and innovative behavior.

(2) There is a curvilinear relationship between communication channels and innovative behavior.

With respect to the relationship between psychological modernity and innovative behavior, there was neither theoretical nor empirical basis from which we could derive our hypothesis of curvilinearity.

The assumption of curvilinearity, also, does not apply to the relationship between the independent variable, SES, and the three intervening variables:

(3) The higher the SES, the more available are economic inputs.

(4) The higher the SES, the better the access to communication channels.

(5) The higher the SES, the more "modern" the psychological orientations.

The relationship between SES and innovative behavior is expected to be reduced if the variables intervening between them are controlled.

(6) An individual with better access to eco-
nomic resources is more likely to adopt
innovations, irrespective of his socio-
economic status.

(7) An individual having more exposure to
modern communication channels is expected
to be more innovative, regardless of his
socio-economic status.

(8) An individual with "modern" psychological
orientations will be more innovative, no
matter to what SES group he belongs.

Finally, the relative contribution of each inter-

vening variable should be specified.

(9) Economic input variable has more explana-
tory power with respect to the relationship
between SES and innovative behavior.

(10) Access to communication channels has more
significance as an intervening variable
than attitudinal modernity.

Operational Definitions

SES: SES is the characteristic of an individual

that reflects his position in a system of social stratifi-

cation. The concept of SES has been operationalized in

many different ways. It generally covers economic, social,

and educational dimensions. The most conventional indica-

tors used to measure SES have been income, education, and

occupation. In the case of our sample, since there was no

occupational differentiation as such--all of the respondents

being farmers--occupation could not be used as an indicator;

education was found to be very poorly correlated with the

other SES measures. This could be due to the fact that the

literacy rate in Costa Rica is quite high (about 80%) and,

therefore, it is more equally distributed across different socio-economic strata. The best alternative, therefore, was to concentrate on the economic dimension of SES. One way to measure it would be to use simply family income. However, it was felt that to use income alone would not be an accurate measure of one's economic standing. Four additional indicators were used, namely, the number of square blocks of corn, beans, coffee, and sugar planted. These are among the most common crops planted in Costa Rica. Since income thus acquired has to support a differing number of family members, in order to obtain a more accurate measure, all of the indicators were divided by the family size.

Innovative behavior: Innovativeness is defined as the degree to which an individual is relatively earlier in adopting new ideas than the other members of his system (Rogers and Shoemaker, 1971, p. 27). Innovative behavior in this study is measured by asking the respondents whether they are presently using either one of the following nine agricultural innovations:

1. Soil conservation
2. Seed selection
3. Fertilizers
4. Insecticides
5. Fungicides
6. Weed killer
7. Diesel tractor
8. Corn sheller
9. Plow

A positve answer to each item is scored 2 and a negative answer is scored 1.

<u>Communication channels</u>: Communication channels are defined as the means by which messages get from sources to receivers (Rogers and Shoemaker, 1971, p. 24). Our definition of access to communication channels is rather broad. It includes not only exposure to mass communication channels such as printed media, but also contact with change agents and urban centers. A composite index is developed for this variable on the basis of the following indicators:

    a. The frequency of newspaper reading in a week.

    b. The frequency of reading magazines in a week.

    c. The number of movies seen in the past 12 months.

    d. The frequency of watching TV in the last 12 months.

    e. The number of trips to urban centers in the past year (physical mobility).

    f. The frequency of contact with extension service agents in the last 12 months.

    g. The frequency of contact with agents for commercial fertilizer manufacturers in the last 12 months.

    h. The frequency of contact with bank agents in the last 12 months.

<u>Psychological orientations</u>: Broadly speaking, psychological orientations refer to one's general outlook towards life; to be more specific, it may be defined as one's values and attitudes towards work, the future, time, social environment, and, finally, other people belonging to one's social network.

The close association between one's position in a socio-economic ranking system and his personality system was elaborated earlier, as was the relationship between mental orientations and overt behavior--in this case, innovative behavior. The literature is abundant with the study of personality systems relevant to "traditional" or "modern" societies. Lerner (1958), Inkeles (1960, 1966), Smith and Inkeles (1966), Inkeles and Smith (1974), Doob (1967), Kahl (1968), Waisanen (1969), and Rogers (1969) are only a number of the studies to be mentioned. However, Inkeles has contributed significantly to the refinement of the theory and the elaboration of scaling methods. He has attempted to measure what is known as the "modernity syndrome." The concept signifies not only the relationship of one's values, beliefs, and attitudes to his position in the society and to the type of social system he is living in, but it also purports the significance of these personality characteristics as preconditions for modernization and development. Inkeles (1966) has mentioned nine characteristics for a "modern man":

1. Readiness for new experience and openness to innovation and change.

2. Disposition to form and hold opinions over a large number of problems and issues.

3. Awareness of time, and tendency to be oriented toward the future and present rather than the past.

4. Orientation toward and involvement in planning and organizing.

5. The belief that one can learn to dominate his environment in order to advance his own purposes and goals, rather than being dominated entirely by that environment.

6. Having confidence that the world is calculable, that other people and institutions around can be relied upon to fulfill or meet their obligations and responsibilities.

7. Faith in science and technology.

8. An increased awareness of the dignity of others.

9. Having the belief that rewards should be according to contributions.

The operationalization of attitudinal modernity in this study is based on a modernity scale called OM-12, developed by Inkeles and Smith (1974, pp. 348-350). OM-12 is a shortened form derived from the larger OM (overall modernity) scales developed by the same authors to study cross-culturally the process of individual modernity. The details of the theoretical framework, the procedures followed in constructing the scales, as well as the findings of the study, are reported in great detail in Inkeles and Smith (1974). The items included in OM-12 are as follows:

a. Have you ever (thought over much) gotten so highly concerned (involved) regarding some public issue, such as taxes, that you really wanted to do something about it?
   3 = frequently
   2 = few times, don't know
   1 = never
b. If schooling is freely available (if there were no kinds of obstacles) how much schooling (reading and writing) do you think children (the son) of people like yourself should have?
   Exact number

c. Two twelve-year-old boys took time out from
their work in the corn (rice) fields. They were
trying to figure out a way to grow the same
amount of corn (rice) with fewer hours of work.
The father of one boy said: "That is a good
thing to think about. Tell me your thoughts
about how we should change our ways of growing
corn (rice)." The father of the other boy said:
"The way to grow corn (rice) is the way we have
always done it. Talk about change will waste
time but not help."
   Which father said the wiser words:
      2 = it is good to think about it
      1 = always the same, don't know

d. What should most qualify a man to hold high
office?
   a. Coming from right (distinguished or high)
      family background
   b. Devotion to the old and (revered) time-
      honored ways
   c. Being the most popular among the people
   d. High education and special knowledge
      2 = education
      1 = others, don't know

e. Which is the most important for the future of
Costa Rica?
   a. The hard work of the people
   b. Good planning on the part of the govern-
      ment
   c. God's help
   d. Good luck
      2 = hard work, planning
      1 = God's help, luck, don't know

f. Learned men (scholars, scientists) in the uni-
versities are studying such things as what
determines whether a baby is a boy or girl and
how it is that a seed turns into a plant. Do
you think that these investigations (studies)
are:
   a. all very good (beneficial)
   b. all somewhat good (beneficial)
   c. all somewhat harmful
   d. all very harmful
      4 = very beneficial
      3 = somewhat beneficial
      2 = somewhat harmful
      1 = very harmful

g. Some people say that it is necessary for a man
and his wife to limit the number of children to
be born so they can take better care of those

they do have (already have). Others say that it is wrong for a man and wife purposely (voluntarily) to limit the number of children to be born. Which of these opinions do you agree with more?

> 2 = limiting necessary
> 1 = limiting is wrong, don't know

h. Which one of these (following) kinds of news interests you most?
   a. World events (happenings in other countries)
   b. The nation
   c. Your home town (or village)
   d. Sports
   e. Religious (or tribal, cultural) events (ceremonies) or festivals

> 3 = world events
> 2 = the nation
> 1 = others, don't know

i. If you were to meet a person in another country a long way off (thousands of kilometers away), could you understand his way of thinking?

> 2 = yes
> 1 = no, don't know

j. Do you think a man can be truly good without having any religion at all?

> 2 = yes
> 1 = no, don't know

k. Do you belong to any organization (associations, clubs), such as, for example, social clubs, unions, church organizations, political groups, or other groups? If "yes," what are the names of all the organizations you belong to?

> Exact number _____

l. Would you tell me what are the biggest problems you see facing Costa Rica?

> Exact number _____

m. Where is (in what country) the city of Washington?

> 2 = correct
> 1 = incorrect, don't know

n. How often do you (usually) get news and information from newspapers:

> 4 = every day
> 3 = few times a week
> 2 = (occasionally) rarely
> 1 = never, don't know

The Data

The data that will be utilized are part of a larger project concerned with communications and development

directed by Fred B. Waisanen. The research site is Costa Rica. In June and July, 1973, the data were collected by interviews with 698 heads of households in 14 rural communities surrounding the market center of San Isidro de El General. The interview schedule was pre-coded, and schedules were brought to Michigan State University for card preparation and analysis.

Sampling problems are not at issue. Although the formal boundaries of the 14 communities are not well established, interviewing began at community centers and extended spirally to cover all heads of households until specific community interview totals were met. These totals were based upon earlier (1964) surveys of the 14 communities.

Index Construction

The components of the five variables were selected from a pool of 119 items included in the original interview schedule. It must be pointed out that certain limitations were encountered at this stage, since the available data were collected for a different purpose. For example, in the case of the economic input variable, our choice was limited to a great extent.

The next step was to recode the selected items with regard to the "illegal" codes and the missing data. The transformation was also necessary so that the extreme

values of "no information," "don't know," and "not appli-
cable" would not spuriously affect the correlation
coefficients. As a result, all the above categories were
transformed to the median category. In some cases, how-
ever, "not applicable" was recoded as "No." The decision
was applied to those items where "not applicable" did
actually mean "No." None of the transformations posed
any problem, due to the small frequencies associated with
them.

The validity of each item was determined by
running inter-item correlations. Each item was correlated
with the other individual items as well as with the sum
of all the items in the index excluding the item under
consideration. There is no formal rule to set the minimum
value of correlation coefficients for individual items.
Our minimum r value differed from index to index. Gen-
erally, the items with r values of .3 or less were rejected.
In the case of Inkeles' modernity scale all items were
selected regardless of their r values, considering the
extensive use of the scale by previous researchers. There
were, however, not more than two "illegal" items which
would have otherwise been rejected.

After item selection, a composite additive scale
was constructed for each variable. To give each item an
equal weight, the scores were normalized. The use of
summated ratings to measure each variable was felt to be

justified, since not only were the inter-item correlations high enough, but also the total scale distribution matched fairly well with the distribution of individual items in that scale.

Analysis of Data

The first step to be taken in the analysis of the data is to decide about the linearity or curvilinearity of the relationships under consideration, since the techniques to be used for further analysis will largely depend on the structure of the relationships involved. For this purpose, the mean score values of each variable for the variable assumed to be associated with it are computed. If both the original scores of, say, variable A and the mean scores of variable B computed for variable A are found to increase (or decrease) together, the relationship between the two variables is assumed to be linear; otherwise, some curvilinearity can be suspected, provided the deviations are not too small to be attributed to chance.

The rest of the data is mostly presented in two-by-two contingency tables. The advantage of this type of simple tabulation is that it provides one with a fairly comprehensible presentation of the data. However, more refined tabulations are presented in the Appendix.

Since most of the measures used in this study are ordinal, the use of statistics such as Chi-square and Kendall's Tau B are justified to test for significance of independence and measure the degree of association.

CHAPTER III

FINDINGS AND DISCUSSION

The suggested theoretical model postulates a curvilinear relationship between socio-economic status and innovative behavior. The relationship is assumed to be mediated by three sets of economic, communication, and psychological variables, which are themselves related to innovative behavior in a curvilinear fashion. However, the relationship between SES and all the intermediary variables is hypothesized to be positive linear. Finally, economic variables are expected to make the highest contribution in explaining the SES-innovative behavior relationship followed by communication and attitudinal variables, respectively.

Our model was neither totally confirmed nor rejected by the actual findings. The results were ambiguous with respect to one of the major assumptions of the study, the assumed curvilinear relationship between SES and innovative behavior. Nevertheless, the significance of SES as a major factor in adoption of agricultural innovations was confirmed. Although with some modifications, the role of other variables as intervening between SES and adoption behavior was also supported by the data.

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As mentioned before, one of the major hypotheses of our study was that the relationship between SES and innovative behavior is curvilinear. In order to test this hypothesis, the mean scores of innovative behavior as computed for each SES category are presented in Table 1.

It was also hypothesized that the relationship between the intervening variables and adoption behavior is curvilinear. Tables 2, 3, and 4 display the data for economic input, communication channels, and attitudinal modernity by the mean scores of innovative behavior.

The pattern of the scores does not indicate any definite type of relationship, be it linear or curvilinear. The argument could be made for either case. At this point, therefore, the safest course is not to come to any definite conclusion at all.

The explanation for this ambiguity can partly be attributed to the population from which our sample is taken. It will be remembered that our hypothesis of curvi-linearity is based on the two concepts of "take-off" and "optimum point." The reasoning behind the use of these two concepts is that first, a minimum amount of resources is necessary in order to engage in innovative behavior. Similarly, the law of diminishing return implies that there would be an optimum point for investment in agriculture after which any increase in the amount of input will not necessarily be followed by an increase in output with the

TABLE 1.--Socio-Economic Status by Innovative Behavior Means.

Socio-Economic Status	Innovative Behavior Means	N
.0	5.472	36
.10	5.924	216
.20	6.113	155
.30	6.137	95
.40	6.222	63
.50	6.156	45
.60	6.558	26
.70	6.500	14
.80	6.611	9
.90	6.167	9
1.00	6.938	8
1.10	7.583	6
1.20	5.875	4
1.30	8.000	1
1.40	8.000	2
1.50	7.500	3
1.60	7.500	2
1.70	6.500	1
1.90	7.000	1
2.40	6.500	1
3.60	4.500	1

TABLE 2.--Economic Input by Innovative Behavior Means.

Economic Input	Innovative Behavior Means	N
1.00	5.591	220
1.10	6.000	5
1.20	5.500	2
1.30	5.625	8
1.40	6.500	4
1.50	5.901	218
1.60	6.313	8
1.70	6.333	9
1.80	6.230	37
1.90	6.955	11
2.00	6.747	79
2.10	6.500	7
2.20	7.150	10
2.30	6.731	26
2.40	7.077	13
2.50	7.042	12
2.60	7.500	1
2.70	7.000	7
2.80	7.556	9
2.90	8.000	4
3.00	7.750	8

TABLE 3.--Communication Channels by Innovative Behavior
Means.

Communication Channels	Innovative Behavior Means	N
1.50	5.340	53
1.60	5.408	38
1.70	5.967	45
1.90	5.708	48
2.00	5.805	41
2.10	6.250	2
2.20	5.524	42
2.30	6.148	27
2.40	6.210	31
2.50	5.714	7
2.60	5.526	19
2.70	5.727	22
2.80	6.375	8
2.90	6.353	34
3.00	6.176	17
3.10	6.143	7
3.20	6.139	18
3.30	6.067	15
3.40	6.952	21
3.50	7.071	7
3.60	6.375	8
3.70	6.475	20
3.80	6.167	9
3.90	6.292	12
4.00	6.250	6
4.10	6.500	12
4.20	6.068	22
4.30	6.550	10

TABLE 3.--Continued.

Communication Channels	Innovative Behavior Means	N
4.40	6.375	12
4.50	7.083	6
4.60	6.833	3
4.70	6.591	11
4.80	7.700	5
4.90	6.125	4
5.00	5.750	2
5.10	7.083	6
5.20	7.227	11
5.30	6.000	5
5.40	7.750	2
5.50	8.000	2
5.60	7.500	1
5.70	7.500	3
5.80	9.000	1
5.90	7.250	4
6.00	7.500	1
6.10	8.250	2
6.20	6.833	3
6.40	7.333	3
6.50	8.000	2
6.60	8.000	1
6.70	4.500	1
6.80	8.000	2
6.90	9.000	1
7.10	8.000	1
7.20	8.500	1
7.40	7.500	1

TABLE 4.--Modernity by Innovative Behavior Means.

Modernity	Innovative Behavior Means	N
6.10	6.000	1
6.20	5.000	2
6.40	5.500	1
6.50	5.000	5
6.60	7.000	1
6.70	5.100	5
6.80	6.250	2
6.90	5.000	1
7.00	5.100	5
7.10	5.600	5
7.20	5.611	9
7.30	5.500	8
7.40	6.100	5
7.50	5.583	6
7.60	5.125	4
7.70	5.769	13
7.80	5.618	17
7.90	5.300	10
8.00	5.806	18
8.10	5.405	21
8.20	5.500	16

TABLE 4.--Continued.

Modernity	Innovative Behavior Means	N
8.30	6.133	15
8.40	6.050	10
8.50	5.750	20
8.60	6.315	27
8.70	5.794	34
8.80	5.795	22
8.90	5.750	16
9.00	6.174	23
9.10	6.075	20
9.20	5.919	31
9.30	5.806	18
9.40	5.975	20
9.50	6.405	21
9.60	6.429	14
9.70	6.833	24
9.80	6.450	20
9.90	5.955	11
10.00	6.458	12
10.10	6.464	14
10.20	6.478	23
10.30	6.464	14
10.40	6.433	15

TABLE 4.--Continued.

Modernity	Innovative Behavior Means	N
10.50	6.727	11
10.60	6.417	6
10.70	6.444	18
10.80	6.269	13
10.90	6.375	12
11.00	5.700	5
11.10	7.143	7
11.20	6.750	10
11.30	6.143	7
11.40	7.250	2
11.50	7.625	4
11.60	5.875	4
11.70	7.357	7
11.80	6.833	3
11.90	8.000	1
12.00	8.000	1
12.10	7.500	2
12.20	7.250	4
12.40	7.000	1
12.80	8.000	1

previous rate. Thus, the implication is that among the very low and very high socio-economic groups the relation-ship between SES and adoption behavior is not as strong as it is for the middle SES group. The test of this hypothesis requires a farmer population with two segments, one extremely poor and one wealthy. Our sample, it appears, does not match such a highly differentiated structure. Speaking more specifically, were the data to vary along the SES dimension with greater sufficiency, we would probably have come up with less ambiguous findings. Indeed, Costa Rica has been cited among the very few Latin American societies with a relatively large number of middle class population. Moreover, in the area from where our sample is taken--the canton of Pérez Zeledón--class differentiation is less than compared with other regions, and the majority of the residents tend to call themselves "independent farmers." Incidentally, the above statements should not necessarily imply that Costa Rica is a homogene-ous society. In fact, the number of "independent farmers" or "small farmers" has declined steadily since the 19th century, and this has been mainly due to the expansionist activities of more prosperous and capitalist oriented plantation owners.

It must be pointed out that with respect to atti-tudinal modernity, our hypothesis of curvilinearity was highly speculative from the beginning. We could not commit

ourseyles to any definite pattern of relationship neither theoretically, nor on empirical grounds. The relationship between attitudes and behavior has been subject to a lot of controversy, and to engage in such polemics is beyond the scope of this study. We shall, nevertheless, discuss some of the issues involved when studying our intervening variables in more detail.

The data on the strength of the relationships discussed so far are presented in Tables 5, 6, 7, and 8.

The close association between one's position in the stratification system and his adoption behavior is reflected in Table 5. The comparison of the two Low SES and High SES groups reveals that while the majority of those falling in the Low SES category are among Low innovators (62.3%), with the High SES group the percentage drops to only 29.2%. The Middle SES group is divided half and half between High innovator and Low innovator categories, as was expected.

TABLE 5.--SES by Innovative Behavior.

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	157(62.3)	203(51.0)	14(29.2)	374(53.6)
High	95(37.7)	195(49.0)	54(70.8)	324(46.4)
TOTAL	252(36.1)	398(57.0)	48(6.9)	698(100.0)

d.f. = 2; X^2 = 20.27; P < .000; Kendall's Tau B = .15456.

The data presented in Table 6 give support to the idea that those who have better access to economic resources are in a better position to adopt new technology.

TABLE 6.--Economic Input by Innovative Behavior.

Innovative Behavior	Economic Input		
	Low	High	Total
Low	307(67.2)	67(27.8)	374(53.6)
High	150(32.8)	174(72.2)	324(46.4)
TOTAL	457(65.5)	241(34.5)	698(100.0)

d.f. = 1; X^2 = 96.78; P < .0000; Kendall's Tau B = .37540.

Whereas 72.2% of those scoring High on economic input are High innovators, the corresponding figure for those with low access to economic inputs is only 32.8%. It must be pointed out that the distribution of the sample across the economic input variable is fairly skewed toward the negative side. One consequence of such a skewed distribution is that some of those who actually don't have much investment to make are included in the High category of the economic input variable. As a result, the number of those in the High-economic input-Low-innovative behavior category is overestimated.

Table 7 displays the data for the communication variable by innovative behavior. The majority of those who score Low on communication are among Low innovators

TABLE 7.--Communication Channels by Innovative Behavior.

Innovative Behavior	Communication Channels		
	Low	High	Total
Low	249(70.5)	125(36.2)	374(53.6)
High	104(29.5)	220(63.8)	324(46.4)
TOTAL	353(50.6)	345(49.4)	698(100.0)

d.f. = 1; X^2 = 81.18; P < .0000; Kendall's Tau B = .34392.

(70.5%). For those who score High on communication, the corresponding figure is only 36.2%. The Tau value of .34 further indicates a fairly strong association between the two variables.

The relationship between attitudinal modernity and adoption of agricultural innovations is moderate compared with the two other variables, as is indicated in Table 8. The explanation for this finding will be given later when the relative significance of our different variables for

TABLE 8.--Modernity by Innovative Behavior.

Innovative Behavior	Modernity		
	Low	High	Total
Low	228(66.7)	146(41.0)	374(53.6)
High	114(33.3)	210(59.0)	324(46.4)
TOTAL	342(49.9)	356(51.0)	698(100.0)

d.f. = 1; X^2 = 45.13; P < .0000; Kendall's Tau B = .25716.

innovative behavior are elaborated in detail. At this point, we may conclude that the data indicate the relationships between SES and innovative behavior on one hand, and the intervening variables and innovative behavior on the other, to be strong enough to allow theorizing about their positive association. The relative position of our respondents in the stratification system of rural Costa Rica proves to be a crucial factor as far as their reaction to modern farming is concerned. Our findings are also consistent with the majority of the past studies where the communication of new skills and knowledge as well as the importance of economic factors have been emphasized to account for the differential response of the peasantry to the modernization of agriculture (Rogers and Shoemaker, 1971). Attitudinal modernity, however, does not seem to be as crucial as the other two variables. In this respect, the literature is ambivalent. Some have regarded "the subculture of the peasantry" in the underdeveloped societies to be a great deterrent to the success of change programs; others have regarded their role as negligible when compared with such structural variables as the availability of opportunities and the existence of institutional arrangements conducive to the abandonment of traditional modes of behavior. Although the discussion of this controversy is not within the limits of this study, some of the relevant issues will be discussed below.

With respect to the correlation between our major independent variable, SES, and the three intervening variables, we hypothesized a positive and linear relationship. Tables 9, 10, and 11 indicate that, with few reservations, the above hypotheses are supported. Among the three intervening variables, economic input has the strongest association with SES. However, communication appears to be the variable most equally distributed across different socioeconomic strata. Attitudinal modernity also does not seem

TABLE 9.--SES by Economic Input.

Economic Input	SES			
	Low	Medium	High	Total
Low	192(76.2)	243(61.1)	22(45.8)	457(65.5)
High	60(23.8)	155(38.9)	26(54.2)	241(34.5)
TOTAL	252(36.1)	398(57.0)	48(6.9)	698(100.0)

d.f. = 2; X^2 = 24.43; P < .0000; Kendall's Tau B = .18082.

TABLE 10.--SES by Communication Channels.

Communication Channels	SES			
	Low	Medium	High	Total
Low	146(57.9)	185(46.5)	22(45.8)	353(50.6)
High	106(42.1)	213(53.5)	26(54.2)	345(49.4)
TOTAL	252(36.1)	398(57.0)	48(6.9)	698(100.0)

d.f. = 2; X^2 = 8.56; P < .0138; Kendall's Tau B = .10333.

TABLE 11.--SES by Modernity.

Modernity	SES			
	Low	Medium	High	Total
Low	149(59.1)	175(44.0)	18(37.5)	342(49.0)
High	103(40.9)	223(56.0)	30(62.5)	356(51.0)
TOTAL	252(36.1)	398(57.0)	48(6.9)	698(100.0)

d.f. = 2; X^2 = 16.91; P < .0002; Kendall's Tau B = .15059.

to be as much affected by SES as was assumed. This is very well reflected in the percentage differences as we move from Low SES to High SES. The frequencies do not seem to change much across different SES groups in the cases of communication and modernity as they do when the economic input variable is involved. Thus, contrary to our expectation, we found SES to have a higher correlation with economic inputs than with the other two variables. To explain this finding, it is instructive to look at the individual items used to measure the communication channels index. We have included in our index such items as the frequency of newspaper and magazine reading as well as physical mobility (the frequency of trips made to urban centers). Mass communication is well developed in Costa Rica. The majority of the population has access to at least one or two kinds of mass media channels. In a 1965 study conducted by Waisanen and Durlak more than one-half

of the adult population reported listening to radio one
hour or more daily, and two-thirds of the population
reported reading one or more newspapers regularly. Although
it can be assumed that the corresponding figures are lower
for the rural population, the overall tendency seems to be
a more equal distribution of media consumption across dif-
ferent socio-economic strata as compared with the availa-
bility of economic resources. An intervening variable in
this respect could well be education, which has not been
included in our study. It is a well-known fact that media
exposure is highly determined by the level of one's educa-
tion. It must be pointed out that Costa Rica is among
those few Latin American countries where over 80% of the
population is literate, and although the distribution of
literacy is not equal for urban and rural sectors of the
population--the rural population having a higher ratio of
illiteracy--a relatively high literacy can still be cited
as one of the characteristics of rural Costa Rica, especially
the province of San José where our sample was taken. The
average years of education our respondents have is 4.28.
Thus, it appears that among the population we studied, mass
media is relatively available for even lower socio-economic
strata. On the other hand, the effect of media exposure
on one's beliefs and attitudes has long been an established
fact and need not be repeated any further.

This brings us to the question of whether attitudes and psychological orientations can be "learned" and modified solely through such socializing experiences as education and media exposure (sometimes called "psychic mobility"), or that they could be the direct product of one's position in the socio-economic structure.

The first school of thought, which advocates a "diffusionist" approach, is represented by scholars from diverse disciplines such as sociology, anthropology, education, and, especially, communication. The "diffusionist" approach by no means denies the importance of structural factors such as one's position in the stratification system but, nevertheless, places the main emphasis on the dissemination of beliefs and values through "psychic mobility." Among the advocates of this perspective are Lerner (1958), Rogers (1969), Waisanen (1969), and Cutright (1963).

The second approach is based on the "sociology of knowledge" tradition. Marx, Durkheim, Weber, and Mannheim can be cited among the representatives of this school.

The position taken in this study, as delineated in the theoretical framework, is that class membership affects one's attitudes both directly--because different social classes develop different conceptions of social reality depending on their life conditions--and indirectly by virtue of differential psychic mobility. However, it is our

belief that values and attitudes are more likely to be determined directly by the social structure in which one lives and by the position of the individual in this socio-economic structure. A person occupying a low position in the stratification system is more likely to feel powerless and at the mercy of external control and hence more fatalistic:

> The essence of higher class position is the expectation that one's decisions and actions can be consequential; the essence of the lower class position is the belief that one is at the mercy of forces and people beyond one's control, often, beyond one's understanding. Self-direction--acting on the basis of one's own judgment, attending to internal dynamics as well as to external consequences . . . this is possible only if the actual conditions of life allow some freedom of action, some reason to feel in control of fate. Conformity--following the dictates of authority, focusing on external consequences to exclusion of internal processes . . . being distrustful of others . . . this is the inevitable result of conditions of life that allow little freedom of action, little reason to feel in control of fate (Kohn, 1969, p. 189).

The effect of class membership on one's feelings and beliefs has been subject to a large number of studies. It has been repeatedly shown that lower-class members are more likely to express feelings of alienation and futility. Brymer (1967), who studied the relationship between social stratification and alienation, found the lower status individuals to display a significantly higher rate of alienation than the upper strata members (see also Bell, 1963; Langner and Michaels, 1963; Lefcourt and Ladwig, 1965). There has also been found a negative relationship between

socio-economic status and feelings of "external control."
What is meant by this concept is the degree to which an
individual perceives that rewards are not contingent on his
own efforts but rather are determined by some external
forces such as fate and luck.

It is hard to imagine how these feelings, so deep-
rooted in the realities of one's life, can be changed
effectively by exposure to more optimistic or "modern" ideas
without any fundamental transformation in life conditions.
This idea is supported by Kumar's study (1972) which inves-
tigated the effects of education on innovative behavior
among Indian farmers. Psychic mobility was treated as an
intervening variable between education and attitudinal
modernity. However, the relationship between psychic
mobility and psychological orientations was found to be
quite negligible. There have also been some experiments
attempting to study the relationship between change in
status and its effects on one's attitudes. Gottesfeld
and Dozier (1966) conducted a study to show that feelings
of internal-external control can be changed through
experience in leadership activities.

Perhaps it is more appropriate to distinguish
between two levels of consciousness. On one level there
are attitudes and values deep-set in one's cultural and
social environment, and on the other level there are atti-
tudes directed toward more specific objects which are more

easily subject to change. It would be rewarding to study the modernity scales from this point of view, to see whether they are not tapping two different types of psychological orientations. Inkeles' index of modernity used in this study leaves the impression that such a distinction is feasible to a certain extent. For example, items (h), (m), and (n) seem to have more to do with general information and therefore could be more easily modified via education or media consumption.

Another explanation for the relatively low correlation found between SES and attitudinal modernity could be based on the relevance of some of the modernity items we have used for the population under study. Consider, for example, item (d):

> What should most quality a man to hold high office?
> a. Coming from right (distinguished or high) family background,
> b. Devotion to the old and (revered) time-honored ways,
> c. Being the most popular among the people,
> d. High education and special knowledge.

A respondent who chooses answer (d) is considered modern and gets the highest score. With our hypothesis of a positive linear relationship between SES and modernity, we would expect a respondent with higher SES to be more likely to choose answer (d). However, it seems more reasonable to expect our High SES respondent, who considers himself to come from the "right family background," to choose answer (a).

Or item (j) poses the question: "Do you think a man can be truly good without having any religion at all?" To give a positive answer to this question would imply atheism. It would be simplistic to assume that an individual because of his higher socio-economic background should be less religious. Indeed, the Catholic Church of Costa Rica is one of the strongest and most vital in all of Latin America. Especially since recently the Church has involved itself in social welfare activities which are supported by the people. Therefore, it should come as no surprise that 79% of our respondents answered this question negatively.

Some items are highly hypothetical: "If you were to meet a person who lives in another country a long way off (thousands of kilometers away), could you understand his way of thinking?" This type of question would be very difficult to answer, and it would be unreasonable to try to explain its answer in terms of one's SES or by any other variable in a systematic way.

Finally, we should mention one variable which was not included in our model, and that is the age of our respondents. For some psychological orientations, age has proven to have more explanatory power than socio-economic status (Freeman, 1964).

At this stage of analysis, we shall test the effect of our intervening variables on SES-innovative behavior relationship.

According to Hypotheses III, (6), (7), and (8), with equal SES, individuals' innovative behavior will still be affected by their differential access to economic resources, communication channels, and modern attitudes. Therefore it is expected that by controlling these intermediary factors, the importance of SES for adoption behavior will decrease to a significant degree. Tables 12 and 13 which display the data for SES by innovative behavior, when the economic input variable is controlled, give support to Hypothesis (8). The comparison of each SES group in Table 12 with its counterpart in Table 13 reveals that all respondents, irrespective of their socioeconomic status, are consistently better innovators when they can afford the required investments. Both Chi-square

TABLE 12.--SES by Innovative Behavior, Controlling for Economic Input (Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	136(70.8)	162(66.7)	9(40.9)	307(67.2)
High	56(29.2)	81(33.3)	13(59.1)	150(32.8)
TOTAL	192(42.0)	243(53.2)	22(4.8)	457(100.0)

d.f. = 2; X^2 = 8.07; P < .0176; Kendall's Tau B = .09011.

TABLE 13.--SES by Innovative Behavior, Controlling for Economic Input (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	21(35.0)	41(26.5)	5(19.2)	67(27.8)
High	39(65.0)	114(73.5)	21(80.8)	174(72.2)
TOTAL	60(24.9)	155(64.3)	26(10.8)	241(100.0)

d.f. = 2; X^2 = 2.64; P < .2670; Kendall's Tau B = .10110.

and Tau values are small than when there was no control variable.

Hypothesis (9) is supported by the data given in Tables 14 and 15. Again, it appears that with equal access to communication channels, differential position in the socio-economic hierarchy makes a smaller difference for adoption behavior. For example, when there was no control variable, 62.3% of those in the Low SES group were also Low

TABLE 14.--SES by Innovative Behavior, Controlling for Communication Channels (Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	114(78.1)	125(67.6)	10(45.5)	249(70.5)
High	32(21.9)	60(32.4)	12(54.5)	104(29.5)
TOTAL	146(41.4)	185(52.4)	22(6.2)	353(100.0)

d.f. = 2; X^2 = 11.44; P < .0033; Kendall's Tau B = .16067.

TABLE 15.--SES by Innovative Behavior, Controlling for
Communication Channels (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	43(40.6)	78(36.6)	4(15.4)	125(36.2)
High	63(59.4)	135(63.4)	22(84.6)	220(63.8)
TOTAL	106(30.7)	213(61.7)	26(7.5)	345(100.0)

d.f. = 2; X^2 = 5.76; P < .0560; Kendall's Tau B = .09476.

innovators; by holding the communication variable constant at High level, the percentage drops to 40.6%. The same patterns can be observed for the other SES groups as well.

Attitudinal modernity can also be regarded as an intermediary factor between SES and adoption behavior as is indicated by Tables 16 and 17. Among those with not-modern attitudes, 50% are Low innovators, even when they come from a high socio-economic background. Whereas, with no control variable, only one-third of the same group is categorized as Low innovators.

We decided also to have two and three variables controlled simultaneously. It was expected that with adding more control variable, the relationship between SES and innovative behavior will decrease to a greater extent.

The data are presented for the control variables when they are held constant at either Low or High

TABLE 16.--SES by Innovative Behavior, Controlling for
        Modernity (Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	108(72.5)	111(63.4)	9(50.0)	228(66.7)
High	41(27.5)	64(36.6)	9(50.0)	114(33.3)
TOTAL	149(43.6)	175(51.2)	18(5.3)	342(100.0)

d.f. = 2; X^2 = 5.34; P < .0691; Kendall's Tau B = .11761.

TABLE 17.--SES by Innovative Behavior, Controlling for
        Modernity (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	49(47.6)	92(41.3)	5(16.7)	146(41.0)
High	54(52.4)	131(58.7)	25(83.3)	210(59.0)
TOTAL	103(28.9)	223(62.6)	30(8.4)	356(100.0)

d.f. = 2; X^2 = 9.18; P < .0101; Kendall's Tau B = .12784.

level. The other High-Low combinations are not dealt with
here in order to avoid redundancy. However, the relevant
tables are included in the appendix.

Tables 18 and 19 display the data when economic
inputs and communication channels are held constant. It
seems that, in the absence of the factors included in
these tables, even those upper class farmers are not able
to function as innovators. On the other hand, 76.7% of

TABLE 18.--SES by Innovative Behavior, Controlling for Economic Input (Low) and Communication Channels (Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	103(79.8)	104(74.3)	8(57.1)	215(76.0)
High	26(20.2)	36(25.7)	6(42.9)	68(24.0)
TOTAL	129(45.6)	140(49.5)	14(4.9)	283(100.0)

d.f. = 2; X^2 = 3.99; P < .1355; Kendall's Tau B = .09797.

TABLE 19.--SES by Innovative Behavior, Controlling for Economic Input (High) and Communication Channels (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	10(23.3)	20(18.2)	3(16.7)	33(19.3)
High	33(76.7)	90(81.8)	15(83.3)	138(80.7)
TOTAL	43(25.1)	110(64.3)	18(10.5)	171(100.0)

d.f. = 2; X^2 = .600; P < .7406; Kendall's Tau B = .05498.

the poor farmers are able to utilize the new technology thanks to the availability of modernizing resources.

Also, compare the data given in Tables 20, 21, 22, and 23 with those presented in Tables 11, 12, and 13. For example, among our Low SES respondents, 52.4% are High innovators when they score High on modernity; they become more innovative (63.9%) when they score High on the

TABLE 20.--SES by Innovative Behavior, Controlling for
Economic Input (Low) and Modernity (Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	96(76.8)	94(72.3)	7(58.3)	197(73.8)
High	29(23.2)	36(27.7)	5(41.7)	70(26.2)
TOTAL	125(46.8)	130(48.7)	12(4.5)	267(100.0)

d.f. = 2; X^2 = 2.21; P < .3304; Kendall's Tau B = .07507.

TABLE 21.--SES by Innovative Behavior, Controlling for
Economic Input (High) and Modernity (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	9(25.0)	24(21.8)	3(15.0)	36(21.7)
High	27(75.0)	86(78.2)	17(85.0)	130(78.3)
TOTAL	36(21.7)	110(66.3)	20(12.0)	166(100.0)

d.f. = 2; X^2 = .76; P < .6837; Kendall's Tau B = .06133.

TABLE 22.--SES by Innovative Behavior, Controlling for
Communication Channels (Low) and Modernity
(Low).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	87(83.7)	85(72.6)	7(50.0)	179(76.2)
High	17(16.3)	32(27.4)	7(50.0)	56(23.8)
TOTAL	104(44.3)	117(49.8)	14(6.0)	235(100.0)

d.f. = 2; X^2 = 9.29; P < .0096; Kendall's Tau B = .17787.

TABLE 23.--SES by Innovative Behavior, Controlling for
Communication Channels (High) and Modernity
(High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	22(36.1)	52(33.5)	2(9.1)	76(31.9)
High	39(63.9)	103(66.5)	20(90.9)	162(68.1)
TOTAL	61(25.6)	155(65.1)	22(9.2)	238(100.0)

d.f. = 2; X^2 = 5.94; P < .0511; Kendall's Tau B = .10843.

communication variable as well. In all cases, the addi-
tion of one more control variable decreased the importance
of SES for adoption behavior. This is shown also by the
data given in Tables 24 and 25 where all three variables
are controlled simultaneously. In this case, SES shows
very little relationship whatsoever with adoption behavior.
In the absence of the intermediary factors, 70% of the
upper class farmers are not able to engage in innovative
behavior; on the other hand, 76.75% of the poor farmers
turn out to be innovative when provided with the necessary
supplies.

In sum, the correlation between SES and innovative
behavior was diminished significantly as the intermediary
variables were controlled for. It became less significant
as we added to the number of control variables. We may
conclude here that the analysis of the data, as far as the
role of the intervening variables are concerned, reveals

TABLE 24.--SES by Innovative Behavior, Controlling for
Economic Input (Low), Communication Channels
(Low), and Modernity (Low.)

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	78(83.9)	76(77.6)	7(70.0)	161(80.1)
High	15(16.1)	22(22.4)	3(30.0)	40(19.9)
TOTAL	93(46.3)	98(48.8)	10(5.0)	201(100.0

d.f. = 2; X^2 = 1.86; P < .3928; Kendall's Tau B = .09245.

TABLE 25.--SES by Innovative Behavior, Controlling for
Economic Input (High), Communication Channels
(High), and Modernity (High).

Innovative Behavior	SES			
	Low	Medium	High	Total
Low	7(23.3)	12(14.3)	1(6.3)	20(15.4)
High	23(76.7)	72(85.7)	15(93.7)	110(84.6)
TOTAL	30(23.1)	84(64.6)	16(12.3)	130(100.0)

d.f. = 2; X^2 = 2.55; P < .2781; Kendall's Tau B = .13521.

that socio-economic status affects innovative behavior due
to differential opportunities it provides for potential
adopters. Among those opportunities we have identified
only three; namely, economic resources such as the availa-
bility of credit and labor, exposure to new skills and
ideas via media consumption or inter-personal communication

with modernizing agents, and finally, a disposition to
have more favorable attitudes toward new modes of behavior.

After establishing the significance of the inter-
mediary variables, the relative contribution of each
variable should be determined in this respect. It was
hypothesized that economic input has the most explanatory
power among the three variables, whereas attitudinal
modernity was assumed to play the least important role.
In order to test this hypothesis, the data have to be pre-
sented in such a way that only one intervening variable
operates at a time. Tables 18, 19, 20, 21, 22, and 23
which were presented above provide the required data.

Our hypothesis seems to receive limited support.
Judging from the percentage differents and Tau and Chi-
square values, it appears that the differences among the
variables are not as much as was expected. However, both
the Tau and Chi-square values are the highest when the
economic input variable is operating. In other words, as
long as there is differential access to economic resources,
SES will remain to affect adoption behavior. This is less
true for either the communication variable or attitudinal
modernity.

Coming to the comparison of the communication vari-
able with modernity, we had argued, on the basis of theory
and empirical findings in the past, that the process of
communication is more likely to influence one's adoption

behavior than modernity orientations. The general pattern of the data, however, does not confirm this expectation. This is apparent both from the Tau values and the percentage differences across SES categories. In three out of four cases, the value of Tau is rather higher when modernity varies; and in the fourth case, where the difference is in the expected direction, it is quite negligible. In order to come to a more definite conclusion we can check to see which variable has the highest correlation with the dependent variable, innovative behavior. Table 26 presents the values of Chi-square and Tau to be compared.

TABLE 26.--The Chi-Square and Tau B Values for Economic Input, Communication Channels, Modernity, and Innovative Behavior.

Correlated Variables	Chi-Square	Tau B
Econ. input-Innov. behavior	96.78	.37
Communic.-Innov. behavior	81.18	.34
Modernity-Innov. behavior	45.13	.25

Evidently, attitudinal modernity is less crucial for innovatibe behavior than the communication variable.

We may summarize by stating that the analysis of the data revealed some difference among the intervening variables and their relative explanatory power as far as SES-innovative behavior relationship is concerned. The economic input variable had the most significant role in

this respect. With regard to communication channels and psychological modernity, a definite conclusion cannot be reached. Taking all three variables together, the differences were not found to be crucial.

One possible explanation for these findings can be based on the relatively skewed distribution of the economic input variable; as a consequence, our control of this variable was not as effective as it should have been. One of the components of this variable had to do with employed labor. When asked whether they employed any laborer on their farm, only 28% of the respondents gave a positive answer. This is due to the fact that the labor force is mainly provided by the family members, or if needed, by neighbors. Apparently, this item had little discriminatory power, and biased the economic input index rather heavily toward the negative side. Employed labor could also have an inverse relationship with the adoption of such innovations as mechanization. Mechanization naturally means using less labor force and this could weaken the relationship between the economic input variable and innovative behavior.

The significance of the economic input variable would also have increased if we had distinguished the expensive innovations requiring a larger amount of investment from the less expensive ones.

Also, the communication variable would perhaps have made more difference if, rather than using a composite index for both mass communication and inter-personal communication, we had used two separate scales. Waisanen (1969) in an earlier study of these 14 communities found a difference between the effects of these two types of communication. Mass communication was found to be more related to knowledge, whereas inter-personal communication was more related to innovative behavior.

Finally, attitudinal modernity appeared to have a relatively small effect on SES-innovative behavior relationship. The concept of attitude and its theoretical relationship to behavior is a subject of long-standing controversy (Campbell, 1961; Fishbein, 1966; Deutscher, 1966). Some have challenged the validity of attitudinal measures; some have addressed themselves to the realities of social life and their depressing effect on the attitude-behavior relationship. Hyman (1949) has argued that the verbal report of private attitudes by respondents in a "play-like" atmosphere, which is devoid of social context, by no means should be expected to predict one's behavior in real life situations. This has been supported by further studies. Hunt (1965) has shown that the difference in behavior of a single person across situations is often greater than difference in a given behavior across people in the same situation. Minturn and Lambert (1964) in a

cross-cultural study of child rearing found that variables such as family size and living arrangements were more important determinants of the mother's behavior toward her children than psychodynamic factors and her beliefs (see also Frideres et al., 1972; Deutscher, 1966; Fendrich, 1967). Several studies have shown that congruence between social support and attitudes accentuates the attitude-behavior relationship (Frideres et al., 1971; Ajzen and Fishbein, 1970). To engage in this controversy is beyond the limits of this study; for a good review of the subject, see Liska (forthcoming). However, within the framework of the above criticisms, we can examine some of the components of our modernity index to shed further light upon some of our findings.

In item (c) the respondent is asked whether it is good to think about new ways of growing corn (rice) or if the way to grow it is the way the farmer has always done. Many a respondent may choose the latter answer, though, when confronted with the concrete reality of farming, he may decide to try the new way. The farmer is likely to forget his attitude, provided the required resources are available, and the benefits of the new technique are made manifest. Considering the religious situation of the Costa Rican society, the following items are also less likely to be predictive of the respondents' behavior: "Do you think a man can be truly good without having any

religion at all?" or "Which is most important for the future of Costa Rica? The hard work of the people and good planning, or God's help and good luck?" It is not hard to imagine that for many farmers there is not necessarily any conflict between religion and innovative behavior; neither should there be any contradition between God's help and hard work--indeed, they are perceived to complement each other.

Items like these reflect the underlying assumption that tradition and modernity are two polar extremes of a linear continuum and, therefore, they cannot exist together. There is abundant evidence in the literature showing the compatibility of traditional values and modernization of societies (Gusfield, 1967). The fact that, for example, the extended family and industrialization are not mutually exclusive has been proven by several studies (Goode, 1963; Comhair, 1956). Especially, the case of Japan has been repeatedly mentioned to support the idea that old and new can well coexist with little resulting conflict (Dore, 1960; Saniel, 1963).

At this point, we may return to our major independent and dependent variables, SES and innovative behavior, and examine their relationship with further detail in the light of our findings. The correlation obtained between SES and adoption behavior was not as high as was expected at the beginning. It was, nevertheless,

high enough to warrant theorizing about the importance of one's position in a socio-economic structure for his behavior, in this particular case, for his innovative behavior.

Relatively low correlations may be obtained when a linear relationship is assumed, whereas the variables are actually related in a curvilinear fashion. Since the possibility of a curvilinear relationship between SES and innovative behavior was not completely ruled out, the relatively low degree of association found between SES and innovative behavior can partly be attributed to that factor.

Another possibility could be that the SES measures were underestimated by the respondents. Hence, the reported SES measures do not match the innovative behavior of the farmers. Indeed, judging from the SES scores and their corresponding frequencies, one can easily get the impression that the majority of our sample are destitute farmers hardly meeting minimum subsistence standards. This is far from reality. It appears that the value of those items used for the SES index, such as income and the amount of crops cultivated, are underestimated to a certain extent by the respondents. This is not an uncommon problem when the farmers are concerned about the tax to be paid and they mistrust the intentions of the interviewer who is collecting information on their wealth and income.

Another explanation could be found in the distribution pattern of the intervening variables involved. It was explained, in the theoretical framework, that part of the reason why different socio-economic strata display differential adoption behavior is due to their differential access to essential economic, social, and psychological resources. However, two of our intervening variables, access to communication channels and attitudinal modernity, were found to be distributed across SES groups more equally than expected, part of which was attributed to the high literacy rate and the relatively developed mass communication systems in Costa Rica. This brings us to an important factor which has been totally ignored throughout this study, and that is the modernity level of the <u>social system</u>. We may digress here a little to explain briefly how the modernity of a social system can affect the relationship between SES and innovative behavior. Let us add that we are concerned here not with the changes in the stratification system as a result of the modernization process, but with the <u>changing effects</u> of stratification system upon innovative behavior as a social system modernizes. We are not, for example, concerned with the issue as to what happens to the diffusion and adoption of innovations when an ascriptive status paves the way for an achieved one. Instead, we assume that status hierarchies persist in both systems, and thus ask the question whether these status

hierarchies have differential effects on the adoption of
innovations, in traditional and modern social systems.

The concept of "modern" and "traditional" social
systems generates a great deal of controversy in soci-
ological analysis. Some define it in terms of Parsonian
"pattern variables." Others equate it with the features
of modern industrial societies, as existing in the coun-
tries of Europe and North America. Our concern here is
with the relative modernity of a <u>community</u>. We define a
community as "modern" if it has access to institutions
and facilities such as mass communication, transportation,
schools, markets, credit and banking institutions, coopera-
tive societies, formal political organizations, etc.
"Traditional" and "modern" as defined above should not be
regarded as two discrete polarities, but as two points on
a continuum.

It may be relevant to recall here the findings of
Morrison <u>et al</u>. (1972) who noted that in an underdeveloped
society the High Middle rather than the High status group
was the most innovative. Their findings are in sharp con-
trast to the findings of Cancian (1967) who used data
mainly from developed societies. Morrison <u>et al</u>. have
posed the issue whether the relative development or under-
development of the societies studied might explain the
differences between theirs and Cancian's findings.

Waisanen and Kumata (1972) have also noted such differences in the "take-off" points with regard to the effects of education on attitudinal modernity. In their five-nation study, it was found that the "take-off" effects were noticeable earlier in underdeveloped nations as compared with the developed ones. Apparently, the modernizing characteristics of developed societies had something to do with these findings. As the authors have suggested:

> It may be that as development level increases (concomitantly with increases in educational achievement levels), it takes an increasing amount of education to "make a difference" in self-perceptions and behavioral modes.

Although Waisanen and Kumata avoid any sweeping generalization, their finding is worth further explanation.

In addition, indirect evidence in support of the hypothesis has been provided by a number of studies which have tried to study "system-effects" on individual's adoption behavior. Most of these studies have shown that the normative structure of the social system, or its institutional and physical facilities, can partly explain the rate of adoption in a community. Some have even suggested that social system variables seem to explain a greater percentage of innovative behavior than the individual level variables. Some of these studies may be reviewed very briefly.

Van den Ban (1960) studied 47 Wisconsin townships.
He controlled individual variables to analyze the effects
of social norms on adoption behavior. His conclusion was
that social norms seemed to be better predictors of inno-
vative behavior than individual's characteristics such
as education, size of farm, or 4-H club membership. (These
individual characteristics appear to be the indicators of
one's SES.)

Marsh and Coleman (1954) came to the conclusion
that even when socio-economic characteristics of 393 Ken-
tucky farm operators were held constant, the neighborhood
norms could still explain a part of variation in innovative
behavior.

The above cited studies used the normative dimen-
sion of the social system. There are also studies which
have emphasized institutional and physical facilities
available to the members of a social system.

Qadir (1966) defined modern social systems in
terms of their mean education, media exposure, material
possession, etc. He found that among the Philippino
farmers, those living in "modern" systems were more inno-
vative, even though they lacked a sufficient amount of
resources assumed to be necessary for adoption, such as
modern attitudes, material possessions, education, etc.
His argument was that in modern systems, individuals have
more economic resources, media contact, education, and

more modern psychological orientation which altogether
generate "a social climate in favor of adoption of modern
practices." As a result, even individuals lacking suffi-
cient material resources and modern attitudes are likely
to act as adopters.

The major criticism to the above mentioned study
lies in its operationalization of system variables.
System-level variables have been operationalized on the
basis of individual-level measurements. The dependent
and independent variables are not independent from each
other: individual's behavior is explained by system vari-
ables which themselves are based on the aggregation of
measures for individual characteristics.

This problem of tautology is also confronted in
the study of Saxena (1968) about the effects of the social
system on the innovative behavior of Indian farmers.
Saxena found social system variables to be related to
adoption behavior, even when individual level variables
were controlled.

A more reasonable approach is used by Rogers, et
al. (1970) in their three-nation study. Rogers found that
variables such as the socio-economic development of a vil-
lage, its institutional development (the presence of
cooperatives and businesses in the village), or its contact
with the outside world were predictive of the success of

change agent programs in Brazil, India, and Nigeria (see
also Harjit, 1974).

On the basis of the above discussion, it is reason-
able to assume that the modernization of the social system
might contribute toward the changed function of stratifi-
cation with regard to adoption behavior. What would be
the direction of this change? Within the framework of our
model, the question can be answered as follows:

In the first place, it is suggested that the indi-
viduals belonging to higher classes have greater access to
economic facilities necessary to implement new techniques.
It is thus appropriate to argue that as a social system
modernizes, the necessary resources are made available to
a wider segment of the population: the relative privileged
position of high SES declines. As a result of the expansion
of credit institutions, a wider section of farmers can
secure loans. The availability of means of transportation
makes it easier even for a small farmer to sell his produce
in the urban market. The cumulative effect of these devel-
opments is that even the low SES individuals are able to
make some use of resources which were earlier the monopoly
of the privileged strata.

Secondly, the expansion of mass communication chan-
nels further contributes to the declining importance of
socio-economic status. Even relatively poor farmers can
afford radios, if not television, and learn about new

practices and technology. As an increasing number of children begin to read and write, their parents are also likely to reach the printed media indirectly through their children. Besides, in a more modernized social system, non-official change agents begin to play an important role. Commercial salesmen try to reach a wider market, and persuade farmers to adopt new innovations. School teachers and local doctors also serve as change agents: they become vehicles for disseminating new ideas about the benefits of modern science and technology.

Finally, we think that the above mentioned developments contribute to the decline of psychological barriers to innovations. When mass media, education, and urban contact are available to the majority, whatever their benefits may be in terms of psychological modernity, these benefits are likely to reach the lower socio-economic ranks, as well.

It would have been interesting to have rank ordered our 14 communities on the basis of their "modernity," and tried to find out how the relative development level of these communities influences the relationship between stratification and response to agricultural innovations. The 1973 data did not provide such information. The community level data were collected in 1964. It was felt, however, inappropriate to utilize them. The reason was

due to many possible changes that these communities have undergone during almost a decade period.

There are additional issues to be considered, if the relationship between SES and innovative behavior is to have any reliable meaning. Most of these issues have been discussed extensively in such disciplines as agricultural economics and, in our opinion, must be taken into account in the sociological studies of adoption behavior as well. One such consideration, for example, is the relation between any innovation and other farming elements. If an innovation requires certain farming elements such as irrigation, labor, fertilizer, etc., its adoption is naturally contingent upon the availability of these factors, which may or may not have anything to do with one's socio-economic status. On the other hand, for example, the availability of cheap labor may prevent even a large landowner from mechanizing his farm, especially if the labor force is mainly recruited from his family members, and there may not be any other jobs available in case the laborers have to leave the farm (Mukhoti, 1966). Or a farmer is more likely to resist the new practice, no matter what his economic position, if he is confronted with the following risky situations:

    a.   Great concentration on food and little availability of other food sources. This may result in what is called a "dual" farmer, which means a farmer is adopter in cash crop, but not adopter in food crop.

b. Little opportunity of other alternatives for employment of either family labor or other farm resources.

c. The combined effect of yield variablity-cost variabiltity-product price variability.

d. It is easier to bring a new crop with a new technology, rather than a new technology for a well-established crop (Wharton, 1971).

All of these suggest once more that the study of adoption behavior is far more complicated than what might be implied by our fairly simple model. Our aim was not, and could not be, to include all possible variables which could play any role in the adoption process, but rather to try to show the implications of one's socio-economic standing for his adoption behavior, to find out the nature of the relationship existing between SES and adoption behavior, and finally, to identify some of the mechanisms and intervening variables involved in this relationship. The selection of the variables was based on both theoretical and empirical grounds. Theoretically speaking, it is appropriate to assume that individuals with more privileged position in the stratification system are more likely to have access to certain resources deemed necessary for adoption of new techniques. Empirically, the relationship of these variables with innovative behavior has been consistently shown in the past.

CHAPTER IV

CONCLUSIONS

Summary and Limitations

The general objective of this study is to investigate the relationship between social stratification and modernized behavior. Specifically, the purpose is to study the nature of the relationship existing between socioeconomic status (SES) and adoption of agricultural innovations, and secondly, to identify some of the intermediary factors which may explain this relationship. Other specific questions to be answered by the study are:

1. Is there any relationship between socioeconomic status and adoption of agricultural innovations?

2. Is this relationship linear, as is assumed in most of the literature, or can a hypothesis which suggests a curvilinear relationship be supported?

3. What specific variables intervene between socio-economic status and innovative behavior?

4. How much of the correlation between SES and adoption behavior can be attributed to these intervening variables?

5. Can the curvilinearity between SES and innovative behavior, if any, be explained by the structure of the relationship existing between the intervening variables and adoption behavior?

6. What is the relative contribution of each
    intervening variable in terms of explain-
    ing the effects of SES on adoption
    behavior?

In the first place, a positive relationship was
postulated between socio-economic status and adoption of
agricultural innovations. Secondly, it was hypothesized
that, contrary to what has often been assumed, the relation-
ship between the two variables is not linear, but curvi-
linear, of a monotonic increasing type. Thirdly, in
explaining the above relationship, three sets of inter-
vening variables were identified: "economic inputs,"
"communication channels," and "psychological orientations."
The selection of these variables was based on both the-
oretical reasoning and empirical evidence. The theoretical
rationale was that these economic, social, and psychological
resources are required for the success of agricultural
modernization; moreover, differential position in the class
structure leads to differential access to the above mentioned
resources. Empirically, the relevance of these factors for
innovative behavior has frequently been shown in the social
change literature.

To explain the curvilinear structure of the rela-
tionship between SES and innovative behavior, an analysis
of the relationship between the three intervening variables
and innovative behavior was undertaken. The relationship
between each one of the intervening variables and innova-
tive behavior was also hypothesized to be of a monotonic

increasing type with two stages, "take-off" and "optimum point." The reasoning behind this hypothesis was as follows. To adopt modern technology in agriculture requires a minimum of economic assets, skills, and information which are not at the disposal of members of the lowest social strata. Adoption of innovations which implies a new production function cannot be made in the fashion of small increments in the allocation of resources. In other words, innovations are not totally divisible, although they may differ somewhat in this respect. Therefore, in order to engage in innovative behavior, the members of the lowest class have to reach a point of "take-off" in terms of their possession of the necessary resources. However, according to the law of "diminishing returns," further availability of resources after an "optimum point" is reached is not likely to contribute much to adoption behavior. This argument is based on the assumption that the pace of adoption of innovations in agriculture is relatively slow. Moreover, the technical reforms introduced by the governments in underdeveloped societies are generally restricted to relatively simple practices, which do not involve huge economic or social investments. The logical conclusion of the foregoing premises is that among the members of the lowest and the highest classes, a weak relationship should be expected between SES and innovative behavior. It is only for members of the middle socio-economic strata that

a strong positive linear relationship can be assumed. It must be pointed out, however, that due to the complex nature of psychological variables, we have refrained from generalizing our assumption of curvilinearity to the case of attitudinal modernity.

The relationship between socio-economic status and each of the intervening variables was, however, assumed to be of the positive linear type. The higher one's status, the better he is able to secure the required capital and skills, and therefore is more likely to display those modernity orientations favorable to the acceptance of new ideas.

The invervening variables themselves were not given equal weights. Economic variables were expected to have the most explanatory power as far as the SES-innovative behavior relationship is concerned, to be followed by the communication and attitudinal variables, respectively.

The above mentioned theoretical framework differs from the earlier conceptualizations in several respects:

First, unlike most of the diffusion literature, in which socio-economic status has been treated as only one of the multiple independent variables for innovative behavior, this study places the main emphasis on the stratification system.

Secondly, departing from most of the past studies, a curvilinear relationship is hypothesized between stratification and innovative behavior.

Thirdly, several of the variables discussed frequently in the diffusion literature are brought within the framework of a single theoretical model. To our knowledge, this systematic connection of the variables has not been given serious attention in the diffusion literature.

The major underlying assumptions of the study are:

First, the organization of production is not collective; thus, each individual is capable of making his own farming decisions independent of any formal collective authority.

Secondly, it is assumed that this is a stratified society with a differential allocation of resources.

Finally, in the case of the communication channels, their contents are assumed to be "modern," and consequently conducive to dissemination of "modern" information and outlooks.

The data utilized were collected by F. B. Waisanen of Michigan State University during the summer of 1973. The sample is comprised of 698 farmers from 14 communities in the province of San José, Costa Rica.

A compositive additive scale was constructed for each one of the five variables. SES was measured by annual income and the number of square blocks of coffee, sugar, corn, and beans planted. For the sake of accuracy, each one of the above items was in turn divided by the number

of family members. The economic input variable included the amount of loans received during the past year, labor employed, and the economic initiative taken by the respondent to improve his farming. The index for the communication variable was made up of three sets of components: (1) Mass communication (the frequency of newspaper reading, reading magazines, watching TV and going to the movies). Radio listening proved to be a weak item, as was indicated by the inter-item correlation coefficients. Interestingly enough, this was also the case for the earlier study of these communities (Waisanen, 1969). (2) Inter-personal communication (the frequency of contact with change agents, bank agents, and the manufacturers of commercial fertilizer). (3) Physical mobility (the number of trips made to urban centers). Psychological modernity was measured by a modernity scales developed by Inkeles and Smith called the "Minimum Scale of Individual Modernity: Short Forms 5 and 6" (Smith and Inkeles, 1966, pp. 372-73). The scale includes 14 items on attitudinal and behavior-information items, as follows:

political activism

educational aspirations

readiness for new experience

belief in distributive justice

achievement orientation

faith in science and technology

fatalism

cosmopolitanism

empathy

religiosity

organizational membership

general information

Innovative behavior was measured by asking the respondents
whether they are presently using either one of the follow-
ing nine agricultural innovations:

soil conservation	weed killer
seed selection	diesel tractor
fertilizers	corn sheller
insecticides	plow
fungicides	

All items were selected by using the inter-item correlation
technique. The minimum correlation coefficient of .25 or
.30 was required to include the item in the index.

The ordinal nature of the data justified the use
of such statistics as Chi-square and Kendall's Tau B to
test for significance of independence and measure the
degree of association.

The results were partially consistent with the
postulated model. As far as the hypothesis of curviline-
arity is concerned, no definite conclusion could be reached.
It was felt that more accurate measures were needed to
justify the use of sophisticated techniques such as curve-
fitting.

The relationship between SES and the intervening variables was, however, assumed to be positive linear. The results provided partial support for this assumption, since the relationships were not as strong as were expected. SES proved to have a higher correlation with the economic input variable than with either the communication variable or psychological modernity. The obtained differences were partly attributed to the relatively well-developed state of mass communication and education in Costa Rica, which may have resulted in a relatively more equal distribution of the latter two variables across different socio-economic strata. Additionally, in the case of attitudinal modernity, the validity and relevance of some of the items included in the modernity scale were questioned.

The role of the intervening variables in explaining the relationship between SES and innovative behavior was confirmed by the results. The addition of each control variable had a further attenuating effect on the relation- ship between SES and innovative behavior. Economic variables were found to play the most significant role in this respect, as was hypothesized. We also expected the communication variables to have more explanatory power for the SES-innovative behavior relationship; however, the results did not favor any definite conclusion in this respect.

In sum, although the significance of social stratification for innovative behavior was confirmed to a certain extent, some of our hypotheses were not proven to be valid for the situation of rural Costa Rica. There are several limitations involved which restrain us from making any premature generalizations. In addition to a number of questionable assumptions mentioned earlier, there are certain methodological shortcomings which must be borne in mind before interpreting the findings of this study.

First of all, the division of the sample into three SES categories is arbitrary. This, nevertheless, poses less of a problem than it could have, were the data analyzed on the basis of the curvilinearity assumption. In that case, the identification of each one of the SES groups as Low, Middle, or High would have had more serious implications for the strength of the relationships involved. Moreover, the extensive use of High-Low dichotomies in our analysis, though not very different from the tradition of sociological research, poses further limitations on our findings. First, the cutting points are arbitrary, and secondly, it cautions us to the difficulties of controlling intervening variables. Our control variables were kept at either the high or low level in order to test their attenuating effect on the relationsip between the independent and dependent variables. However, within each dichotomy there still remains some variation to make our controls less than ideal.

The second set of limitations has mainly to do with the operationalizations of concepts and the construction of the indexes. Part of this is to be attributed to the fact that the data utilized were not specifically collected for this study; therefore, certain compromises had to be made. In some cases, such as the economic input variable, our choice was greatly limited. Some of the problems have to be attributed to our neglect of certain factors which would have improved this study. For example, we would probably have obtained more reliable results had we treated each innovation individually, rather than combining them all in a single composite scale. The reason is that not only do innovations differ in terms of their requirements for capital and other resources, but it is also likely that some innovations have more relevance for certain groups than others. Similarly, in the case of communication variables, it was felt that we should have distinguished between mass and inter-personal communication. The reason for this distinction, as mentioned earlier, is that the specific items used for inter-personal communication seem to be more class-bound than those for mass media exposure, and also there seems to be differential effects of these two types of communication for innovative behavior. More-over, we have omitted from our communication index items indicating contact with local opinion leaders, a factor shown to affect the disposition of farmers toward new practices.

Finally, the present study does not, and could not, include all the variables which may possibly intervene between social stratification and the success of agricultural modernization. However, as Rosenberg (1968, p. 65) has pointed out:

> When the survey analyst deals with intervening variables, then, he is essentially dealing with an intervening variable, not the intervening variable. The discovery of an intervening variable thus cannot serve as a complete explanation of the original relationship, but may serve as a land mark on the intellectual journey from cause to effect.

Conclusions

In conclusion, although the actual findings do not provide any definite support for the assumption of curvilinearity between stratification and innovative behavior, such a possibility should not be ruled out in future hypothesis formation. However, the assumption of linearity is almost taken for granted in the sociological research, and this tradition, in our view, must give way to searching for new types of relationships. Frequently, the findings have a new meaning, if the relationship between the variables is not unquestionably assumed to be linear. Studies such as those conducted by Cancian (1967), Waisanen and Kumata (1972), and the present study, despite its limitations, can have some fruitful implications for future research in terms of re-evaluating some of the old assumptions, and suggesting new kinds of relationships.

The second major conclusion of our study is that no matter what the structure of the relationship between status and acceptance of innovations, the analysis of innovative behavior--at least in the area of agriculture--is best approached within the framework of social stratification. It is not the individual per se who makes the difference in the adoption of new practices, but rather his relative position in the socio-economic hierarchy that accounts for most of the variation. Throughout the study, it has repeatedly been shown that members of the upper class tend to be better innovators. This must be attributed to the fact that, ultimately, the decision of a farmer to accept or reject an innovation is limited by serious constraints, most of which can be identified through the application of stratification theory.

We intended to select those variables most emphasized in the diffusion literature, and see if they could be integrated into a single model. In this respect, communication variables (such as inter-personal contact with change agents and exposure to mass media), cultural and personality variables (openness to new experience and aspirations), status and economic variables (education, farm size, income, and occupation) have been repeatedly studied in the past. Their importance to the success of social change has been pointed out time and time again, although in some cases, such as those studies stressing

psychological factors, there has been considerable disa-
greement. The studies, however, have failed to integrate
these variables into a single theoretical perspective.
We may conclude, on the basis of our findings, that most
of these variables can be brought together within the
perspective of social stratification. Differential posi-
tion in a socio-economic ranking system results in dif-
ferential access to political, economic, and socio-
psychological resources.

Since our unit of analysis is the individual, the
socio-economic status of the individual should reflect his
relative rank in a social hierarchy. In most of the dif-
fusion studies, socio-economic status has been included
as one of the economic variables. Our hypothesis, however,
distinguishes between SES representing one's actual pos-
session of material wealth and social standing, and his
potential access to required economic goods and services,
conceptualized as the "economic input" variable. Therefore,
socio-economic status was selected as the major independent
variable determining variation in access to three types of
modernizing resources, namely, economic inputs, communi-
cation facilities, and psychological modernity.

As far as the relative importance of these modern-
izing resources for innovative behavior is concerned, the
major emphasis must be placed on economic factors. The
implication for the future studies then is to explore more

rigorously the relevance of economic variables for adoption behavior. The inclusion of such variables will, by no means, make those studies less "sociological"; rather, it will place sociological variables in a broader perspective. The disciplinary parochialism prevailing in the social sciences prevents scholars from viewing the phenomenon under investigation in its totality, and each discipline presents an incomplete picture of reality.

Turning to attitudinal modernity, this variable should not be regarded as significant as either economic or communication variables. This assertion does not imply that the role of values and attitudes for the modernization process should be ignored. Indeed, our results indicate that values partly explain the differential adoption of agricultural innovations; however, attitudes were found to be more or less determined by socio-economic rank. This brings us to the crucial issue of conceptualizing the relationship between attitudes and behavioral modernity in an either/or fashion. In the social change literature a debate has developed between proponents of "congruence theory" and those advocating a model based on "economic man," representing a disagreement over the importance of cultural and psychological variables and economic factors. "Economic man" is motivated to change his behavior by sheer profitability. The "congruence" theorists, on the other hand, assert that, in directing social change, compatibility

with the existing cultural patterns is more important than economic incentives (Bradner and Strauss, 1959).

Rather than posing the question in this way, it is more appropriate to ask under what specific circumstances either of the two factors takes precedence over the other. Thus, the approach of universal generalization, in our opinion, should give way to greater historical specificity. For example, during the early periods of independence, nationalist sentiments are likely to be expressed by reviving and reinforcing age-old traditions. This phenomenon, sometimes called "traditionalism," may overshadow economic motivations and, as a result, hinder economic development for some time. Another example is the relationship between some specific values and the acceptance of certain innovations. A set of values may be in conflict with certain types of innovations, but not with others. Therefore, the conflict between values and innovative behavior, if any, cannot be generalizable across time and space.

The relationship between values and behavior can best be explained within the context of the social structure encompassing both. Most likely, the structural factors which foster or inhibit certain modes of behavior are also conducive to the development of particular values and attitudes. Thus, an analysis of innovative behavior is more accurately carried out in light of social structural

factors, rather than within the framework of value systems. For example, the peasantry in Third World societies may be found to resist any new technology introduced into their farming, and at the same time may display a very "traditional" set of outlooks and attitudes. No doubt these attitudinal and behavioral modes are associated. Is it appropriate, however, to infer a causal relationship on the basis of such an association? It seems more legitimate to search for those conditions which give rise to both "traditional" attitudes as well as "traditional" behavior. For example, the passivity and the lack of initiative among the Mexican peasantry, which may account for their resistance to new ways of life, is depicted by an empathic researcher as follows:

> The exploitation which these people have suffered and the subhuman conditions in which they live, made them timid, suspicious, resigned and apathetic. They have lost all hope, they lack all initiative or fear to exercise it, and they do not have the courage to break with the traditions which throttle them. To expect people who live under such conditions to take part in the efforts to improve their living standards at their own initiative is to expect the impossible. These people will not climb out of the bottom of the well until some outside force raises them at least to the landing where the ladder starts (Buitron, 1961).

We may thus ask ourselves, do these peasants resist innovations because of their distrust of outsiders, or is their distrust a rational outcome of circumstances which also make unfeasible the implementation of new technology? What Western observers call the "familism" of Third World

societies will have a new meaning if it is regarded as a necessary outcome of certain socio-economic arrangements, rather than considered a cultural norm or value. In the absence of other institutions to protect the individual against risks and uncertainties, the family and the kin groups are inevitable sources of support and security. If, under these circumstances of uncertainty, the son is "expected" to look after his aged parents, this is not merely a "norm" without any structural foundation; rather, the expectation itself is deeply rooted in the institutional arrangements of a society which does not provide any shelter for the aging except in the framework of family relationships. Is the individual "traditional" if he chooses not to leave his family in order to seek a better job in the city?

The above arguments are not meant to imply that the relationship between structural and value dimensions are simplistic. Indeed, one of the questions raised in our study is whether we should differentiate between two sources of attitudinal modes: first, attitudes are the outcome of the appraisal of reality by individuals belonging to different classes; secondly, part of the variation in psychological orientations can be attributed to differential "psychic mobility" and socialization. Although these two sources of attitudes are likely to be interrelated, the distinction between them becomes significant

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for our study. The reason is twofold. Theoretically
speaking, we may speculate that values and attitudes
fostered by "diffusion" and "psychic mobility" can be
analyzed and explained more or less independently from the
social and economic structure of the society; these psycho-
logical orientations are also more likely to be subject to
manipulation, as far as directed change and policy making
are concerned. The rationale for this statement is that
"psychic mobility" experiences may lose their class-
boundness as a result of the development of educational and
mass communication systems. "Modern" ideas and information
will spread even among the lower social strata. It is
much more difficult to manipulate those mental orientations
deeply rooted in the realities of social milieu.

However, some modernity theorists have emphasized
psychic mobility and diffusion in the generation of modern
attitudes. Thus they have identified four "modernizing"
variables: formal education, mass media exposure, urban
experience, and finally, participation in factory life
(Kahl, 1968; Inkeles, 1969; Rogers and Svenning, 1969;
Waisanen and Kumata, 1972). The space does not allow us
to present the explanations given for the effect of these
"modernizing" variables on one's attitudes and values. Our
question is whether the above mentioned factors are of
any effect in eliminating, for example, the suspicion and
fear of a peasant whose situation is described in the fol-
lowing passage:

> A peasant whose animal is taken away by the estate
> owner will not complain, since fear of patronal
> disapproval or even incarceration is stronger than
> fear of property loss or hunger. The whole com-
> plex of complementary, or at times competing fears
> makes the peasants seek to avoid any danger and
> risk involved in contact with outsiders and new
> situations. The culture of repression reinforces
> itself through these fears, and makes the introduc-
> tion of change extremely difficult (Huizer, 1972,
> p. 9).

The point, then, is that contrary to the assumptions of modernity theorists, while some values and attitudes are readily manipulated, others cannot be modified with ease.

It is on the basis of the above reasoning that we suggest the reexamination of the modernity scales. Portes, himself, (1973, p. 27) has acknowledged that his scale of psychological modernity covers two major aspects: a cognitive or informational aspect represented by General Information, Urban Experience, and Numerical Definition of Family; and an emotional or expressive aspect, operationalized by such factors as Religiosity, Intrafamily Orientations, and Reproductive Orientations. This distinction of items in the modernity scales then challenges the assumption of coherence among these items, which has often been represented by the concept of "modernity syndrome." Indeed, the syndrome approach is increasingly questionable given recent empirical evidence (Kumar, 1973; Portes, 1973).

Our findings raise another question about the usefulness of the modernity scales and the relevancy of the

present modernity items in studying the psychological orientations of the peasantry. Currently, modernity studies rely on urban samples, and are thus not only tautological in their reasoning, but biased heavily against the rural populations. The consistency among components of the modernity scales have been attributed to this fact by some researchers (Feldman and Hurn, 1966, p. 293). As an example Kahl (1968), who studied psychological modernization among Brazilians and Mexicans, found that the 14 dimensions of his modernity scale cohered together. His conclusion was that there exists a so-called "modern" man, and he described him as follows:

> A "modern" man is activist; he attempts to shape his world instead of passively and fatalistically responding to it. He is individualist, who does not merge his work career with that of either relatives or friends. He believes that an independent career is not only desirable but possible, for he perceives both life chances and the local community to be low in ascribed status. He prefers urban life to rural life, and he follows mass media (Kahl, 1968, p. 37).

Although a few of the major modernity studies (Smith and Inkeles, 1966; Schneiberg, 1970) are based on both urban and rural samples, the only study which has explicitly differentiated between these two types of samples is that of Portes in Guatemala (1973). This urban bias of modernity scales raises a question of whether modernity, defined as such, is beneficial for development. We raise this question because one of the arguments of modernity theorists is that psychological modernity is

necessary and desirable for societal modernization. The

rationale behind this attribution of a causal role to

attitudinal modernity, as Portes (1973, pp. 33, 34) has

pointed out, is that:

> . . . modernity is generally viewed as an asset
> --the more an underdeveloped nation has of it,
> the better . . . . Underlying this value orien-
> tation is the assumption that a greater number
> of modern men will promote "dynamic entrepreneur-
> ship" and hence, accelerated economic growth.

But he continues that,

> It is often forgotten that much of what goes into
> forming a modernity syndrome in the developed West
> is the consequence of historical processes of
> urbanization and industrialization. Defining
> modernity as a positive force in the socio-economic
> growth of developing countries may amount to an
> uncritical extrapolation of consequences into
> causes. There is a historical naivete in believing
> that if the psycho-social products of centuries of
> social and economic evolution can just be repro-
> duced in an underdeveloped context, it will bring--
> by association--the structural arrangements that
> gave rise to it in the first place . . . emergence
> of individual modernity in an underdeveloped con-
> text does not find a "free" social field in which
> to exercise its initiative but is in fact restrict-
> ed by previously existing institutional arrange-
> ments. Modern man is usually portrayed as
> "dynamically self-seeking," with high aspirations
> and high technical expertise. What occurs, how-
> ever, when social and economic restrictions are
> such that aspirations cannot be met, and technical
> know-how does not find opportunities for implemen-
> tation? Individual modernity under the structural
> constraints of underdevelopment may not lead to
> societal modernization at all but may, alternatively,
> result in massive frustration and discontent (see
> also Merkx and Valders, 1972).

Our aim here is not to challenge the causal role of

values per se, but rather to question the utility for devel-

opment of those particular values emphasized in the modernity

studies. "Modernity," in this respect, is more descriptive of those behavioral and consumption patterns <u>diffused</u> from the West to underdeveloped societies. What has often been called "cultural imperialism" by the advocates of conflict approach has been delineated as "modernity" by some other thinkers. The utility of "modernity" orientations for societal development may be questioned given the immense gap found between socio-cultural modernization and economic development in some studies. It has been shown, for example, that a country like Argentina ranks alongside the United States, Germany, and England on a cultural scale of "modernism," while on a scale of "industrialism" it is closer to Mexico or Brazil (Horowitz, 1970, p. 507; Cantril, 1965). In our view, then, some of those modernity orientations, with the emphasis on Westernization and Western consumption patterns in material and cultural goods, are detrimental to economic development and industrialization.

Furthermore, some of the items included in the modernity scales betray the naiveté of the researcher about "modernism." Doob (1967), for example, constructed a scale to study the psychological modernity of the people of Eastern African societies. The scale included such items as confidence in and optimism about life, belief that the present government is beneficial, approval of countries leaders and their policies. The question can be raised, how can the support of the government--especially

if its benevolence is doubtful--be indicative of one's "modernity"?

The last point to be mentioned on the subject of values is our contention that all "traditional" values are not necessarily in conflict with economic development. More studies should be addressed to the utility of tradition for societal modernization. Several examples support the idea that traditional values can be channeled to overcome underdevelopment. The Japanese case is well known. Traditional traits such as low personal aspiration and collective identification were instrumental in early stages of Japanese economic development (Bellah, 1965; Bendix, 1966). In Israel, the extended family has proven to be a useful basis for programs of agricultural modernization (Weintraub and Lissak, 1964). Huizer (1972) in his study of Latin American peasantry has shown that the exaggerated conformity of the peasantry, a reaction against the culture of repression, can form a basis for consensus and solidarity. If properly directed, such values can facilitate the execution of modernization projects. Indeed, as Hoselitz (1961, pp. 110, 111) has argued, tradition can very well provide the needed <u>integration</u> at times of rapid change:

> . . . where we find societies straining their energies to overcome the initial inertia to set in motion programs of economic development, we will find that often, indeed, almost universally, some widely held and generally understood part of a

> traditional ideology is mustered in support of
> these efforts . . . traditionally transmitted
> norms . . . may provide stability in a situation
> of constant and rapid change. They may tend to
> carve out areas of social action in which known
> and well-understood behavior patterns prevail, and
> they may in this way provide a feeling of security
> in a situation in which there are strong forces
> pulling into the direction of disorganization,
> fear and anxiety.

The final issue raised in our study is how the development level of a social system affects the relationship between stratification and innovative behavior. We do not have empirical evidence to support our hypothesis, but suggest that the study of agricultural modernization within the framework of stratification theory should also pay attention to such system level variables. This suggestion is based on the assumption that the inclusion of system variables will have an attenuating effect on the relationship between social stratification and acceptance of innovations. It is argued that with further socio-economic development, more modernizing resources, now monopolized by the privileged strata, will become available to members of the lower class as well. Moreover, the risks involved in the adoption of innovations will decrease to a certain extent.

This notion of system effects leads us to the final and, in our view, the most crucial point to be mentioned in our conclusion: that, in order to study the adoption process, the social system must be taken into account as a

<u>whole</u>. Economic behavior of the peasantry should be regarded as a part of the larger socio-cultural system (Firth, 1964). Although our research reveals the far-reaching effects of the stratification system for agricultural modernization, some of the issues raised during the data analysis suggest the importance of other variables. For example, it has been consistently shown that when the new technology does not fit into local conditions, it will be rejected (Castillo, 1969). The positive relationship between rank and innovative behavior is not likely to hold true under some circumstances; if the innovation has to do with mechanization, and there is a surplus of cheap labor, a large landowner is likely to reject mechanization. Similarly, the availability of jobs in nearby towns, adding to the income derived from farming, is likely to affect the pattern of adoption behavior. Finally, in the case of some institutional arrangements, like marketless economies, the individual has no specific institutional framework to provide guidance into rational economic activity (Polanyi <u>et al</u>., 1957).

Policy Implications

Before citing the policy implications of our research, a word of criticism on some of the existing community development programs is in order.

A major shortcoming of the present agricultural modernization programs is their negligence of local

conditions. Often, the policy guidelines are instituted at a place quite remote from the locality they are intended for. In this respect, a report filed by the United Nations (1967, par. 5, p. 4) indicates the following:

> While the soundness of the strategy incorporated in community development has generally been accepted, this is not true for its conceptual components. As most of the concepts and "principles" associated with community development were formulated--largely by "Western" specialists--at a time when systematic knowledge about rural societies in developing countries and the process of development had not sufficiently advanced, some of them were rooted in somewhat unrealistic assumptions and incorporated a utopian view of traditional rural communities. They were stated as if they had universal validity regardless of the context in which they were applied . . . .

There remains to be answered a very important question, and that is, are these programs concerned with production increase per se, or with improving the farming practices of the bulk of the peasantry, generally belonging to the lower socio-economic strata? It appears that most of the agricultural reform programs have been mainly oriented towards production increases. Consequently, the focus has been on the large-scale landowner, who has the best chance to raise production. Some have argued further that since most problems arising in the agricultural extension projects are blamed on the change agents, they should concentrate on the developed communities as much as possible. The following advice on client selection is given to extension agents:

> When change agents wish to identify those clients
> who are most receptive to innovations, they should
> look for clients who have literacy, more formal
> education, higher farm income, larger sized farms,
> etc. (Rogers, 1970, Chapter 8, p. 26).

As long as this practice prevails, the development programs

will continue to benefit the well-to-do farmers at the

expense of small farmers, who are most in need of help.

For example, in the case of the Green Revolution in India

and Pakistan, the concentration of wealth and power in a

few hands has led to elitist selectivity in extension ser-

vices (Rogers, 1971; Ladejinsky, 1970). The investments

have been made in the most productive, irrigated, and

fertile lands in order to maximize profit. The result has

been the intensification of class conflicts: the rich

peasants benefited most from the project, while small

farmers and rural laborers were driven from the villages

to become part of the swelling urban proletariat (Cleaver,

1972).

Of course, it is questionable that the lot of the

small peasantry can be improved within the framework of the

existing socio-political structure. Some disagree.

Schultz (1965), for, example, has presented some insightful

contentions to explain the underdevelopment of agriculture

in Third World societies. The core of his argument is

that, considering the state of technology available in the

rural areas of these societies, the farmers have exhausted

all possibilities for improving production. The result

has been low marginal productivity of labor and lack of
incentives in agricultural enterprises, superficially
termed "idleness" by some. The solution he offers is the
introduction of new techniques to increase labor produc-
tivity. There are numerous studies similar to Schultz's
which give prime importance to so-called "technical
reforms." However, as is suggested by our study, the
adoption of these new techniques is very much related to
the class structure. The criticism is, as Feder (1970,
p. 211) has pointed out, that

> [these reforms] completely divorced from the fun-
> damental problem of agriculture, which is the
> political issue of social justice and the redis-
> tribution of resources and political power, are
> simply used to postpone social change. "Technical
> reform" aims at reversing the process of land
> reform. Instead of solving the political issue
> first through large-scale expropriations . . . it
> postpones it until all the elements for proceeding
> with the reform are known--somtimes ad infinitum.

Indeed, even the redistribution of land has encoun-
tered many difficulties within the framework of prevailing
polities. Feder (1970, p. 204) in his study of the history
of land reform in Latin America concluded that:

> The fact that in thirteen countries with military
> or quasi-military governments controlling about 90
> per cent of the hemisphere between Mexico and the
> South Pole, land reforms have either been squashed,
> or never came off the ground, or have stagnated,
> would indicate that military rule and social
> reforms are, to put it conservatively, not com-
> patible in today's Latin America.

The same has happened in the Asian countries such as India
or Iran, where loopholes in the land reform law have

prevented the division of large tracts of land for redistribution to small farmers (Nair, 1962; Khamsi, 1970). Kraenzel (1970), who worked in connection with the Land Reform project and the related community development programs in Iran, has observed that the Land Reform program failed for many reasons, the main one being the shortage of water and irrigation facilities. His conclusion was that:

> Only separation of water from land rights, and the cooperative taking of water as a package from area to area onto the more plentiful land, would have solved the problem. But such a cooperative water management system would have been too close to the "soviet communal" system to set well with Americans, and with Iranian politicians too . . . the push for land division was the Western World's answer to improving the lot of the peasants by programs other than those communal in nature. Even cooperative operation of villages seemed to be too socialistic, except with reference to credit, store functions, marketing, and tractor power operations. The friends of America, in the arid and semi-arid parts of the world also felt they wanted, if possible, to avoid the communal and even the cooperative way in land reform (pp. 273, 268).

The logical conclusion of the above statements is that we cannot advocate piecemeal reform, and ignore the very fundamental political and economic issues so crucial to the countries of the Third World. In this study, it has been demonstrated (though in a limited way) that the so-called "technical reforms" and their acceptance by the peasantry is very much conditioned by the social hierarchy. Gradualist community development projects are ultimately

controlled by the traditional elite, who have a vested

interest in maintaining the status quo. And as long as

this is the case, the peasantry will tend to resist change

programs. We conclude by quoting Paulson (1964, p. 49):

> . . . an effective development programme cannot
> overlook the need for changing the structure of
> society in the area, which inevitably involves it
> with potentially volatile political factors. The
> fear of these political dimensions associated with
> structural change is a main reason for the mar-
> ginal impact of many development programs on the
> community.

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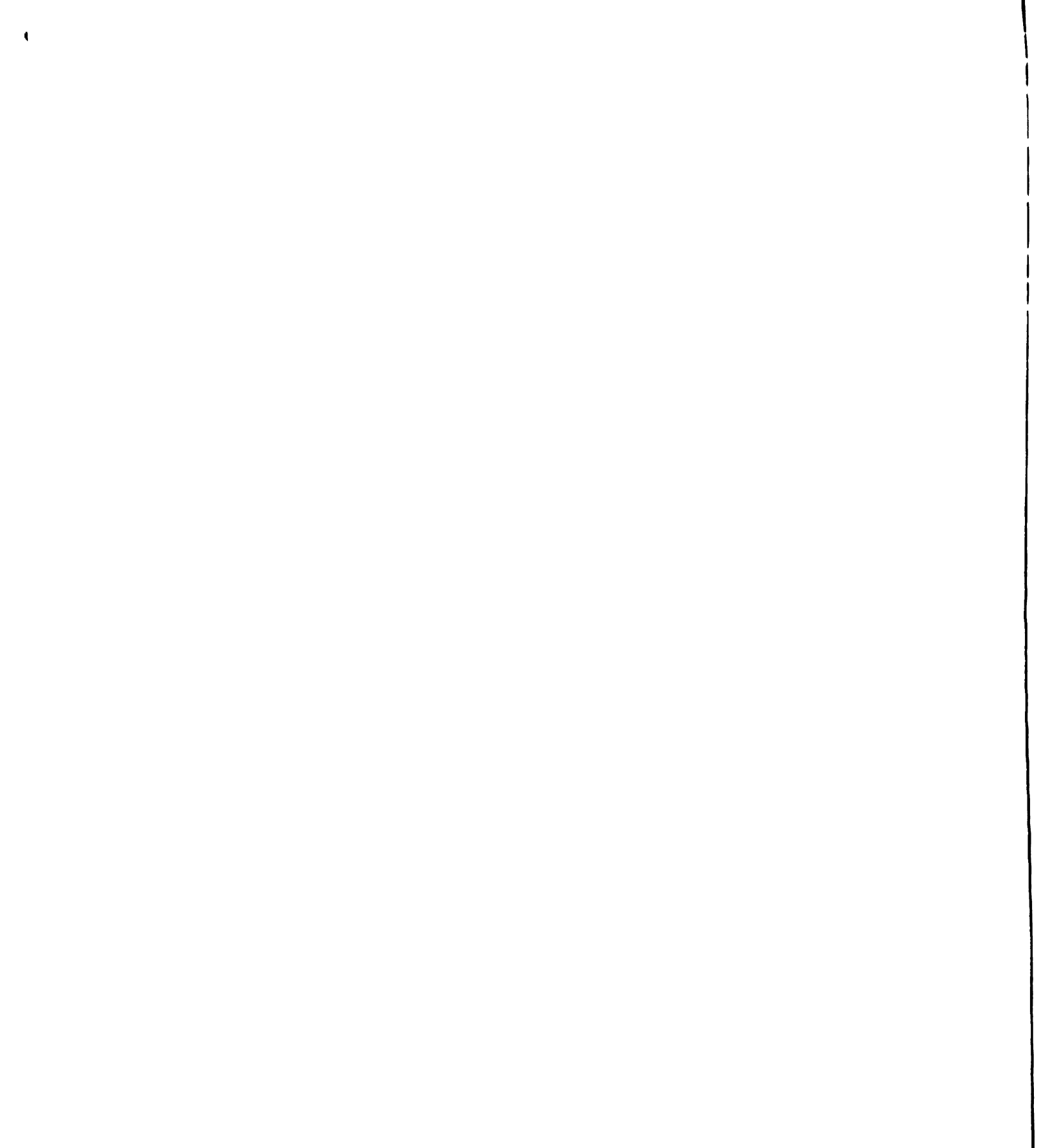
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APPENDIX

TABLE 27.--Economic Input by Communication Channels.

Communication Channels	Economic Input		
	Low	High	Total
Low	283(61.9)	70(29.0)	353(50.6)
High	174(38.1)	171(71.0)	345(49.4)
TOTAL	457(65.5)	241(34.5)	698(100.0)

d.f. = 1; X^2 = 66.93; P < .0000; Kendall's Tau B = .31268.

TABLE 28.--Economic Input by Modernity.

Modernity	Economic Input		
	Low	High	Total
Low	267(58.4)	75(31.1)	342(49.0)
High	190(41.6)	166(68.9)	356(51.0)
TOTAL	457(65.5)	241(34.5)	698(100.0)

d.f. = 1; X^2 = 45.98; P < .0000; Kendall's Tau B = .25969.

TABLE 29.--Communication Channels by Modernity.

Modernity	Communication Channels		
	Low	High	Total
Low	235(66.6)	107(31.0)	342(49.0)
High	118(33.4)	238(69.0)	356(51.0)
TOTAL	353(50.6)	345(49.4)	698(100.0)

d.f. = 1; X^2 = 86.85; P < .0000; Kendall's Tau B = .35563.

TABLE 30.--SES by Innovative Behavior, Controlling for Economic Input and Communication Channels.

Innov. Behav.	Econ. Input (High); Comm. Channels (Low)				Econ. Input (Low); Comm. Channels (High)			
	SES				SES			
	Low	Medium	High	Total	Low	Medium	High	Total
Low	11(64.7)	21(46.7)	2(25.0)	34(48.6)	33(52.4)	58(56.3)	1(12.5)	92(52.9)
High	6(35.3)	24(53.3)	6(75.0)	36(51.4)	30(47.6)	45(43.7)	7(87.5)	82(47.1)
TOTAL	17(24.3)	45(64.3)	8(11.4)	70(100.0)	63(36.2)	103(59.2)	8(4.6)	174(100.0)

d.f. = 2; X^2 = 3.61; P < .1639.

Kendall's Tau B = .21733.

d.f. = 2; X^2 = 5.72; P < .0570.

Kendall's Tau B = .03998.

TABLE 31.--SES by Innovative Behavior, Controlling for Communication Channels and Modernity.

Innov. Behav.	Comm. Channels (High); Modernity (Low) SES				Comm. Channels (Low); Modernity (High) SES			
	Low	Medium	High	Total		Low	Medium	High	Total
Low	21(46.7)	26(44.8)	2(50.0)	49(45.8)		27(64.3)	40(58.8)	3(37.5)	70(59.3)
High	24(53.3)	32(55.2)	2(50.0)	58(54.2)		15(35.7)	28(41.2)	5(62.5)	48(40.7)
TOTAL	45(42.1)	58(54.2)	4(3.70)	107(100.0)		42(35.6)	68(57.6)	8(6.8)	118(100.0)

d.f. = 2; X^2 = .06; P < .9684.

Kendall's Tau B = .01024.

d.f. = 2; X^2 = 2.01; P < .3652.

Kendall's Tau B = .10217.

TABLE 32.--SES by Innovative Behavior, Controlling for Economic Input and Modernity.

Innov. Behav.	Econ. Input (High); Modernity (Low) SES				Econ. Input (Low); Modernity (High) SES			
	Low	Medium	High	Total	Low	Medium	High	Total
Low	12(50.0)	17(37.8)	2(33.3)	31(41.3)	40(59.7)	68(60.2)	2(20.0)	110(57.9)
High	12(50.0)	28(62.2)	4(66.7)	44(58.7)	27(40.3)	45(39.8)	8(80.0)	80(42.1)
TOTAL	24(32.0)	45(60.0)	6(8.0)	75(100.0)	67(35.3)	113(59.5)	10(5.3)	190(100.0)

d.f. = 2; X^2 = 1.13; P < .5666.

Kendall's Tau B = .11769.

d.f. = 2; X^2 = 6.22; P < .0446.

Kendall's Tau B = .07532.

TABLE 33.--SES by Innovative Behavior, Controlling for Economic Input, Communication Channels, and Modernity.

Econ. Input (High); Comm. (High); Mod. (Low)[a]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	3(23.1)	8(30.8)	2(100.0)	13(31.7)
High	10(76.9)	18(69.2)	0(0.0)	28(68.3)
TOTAL	13(31.7)	26(63.4)	2(4.9)	41(100.0)

Econ. Input (High); Comm. (Low); Mod. (High)[c]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	2(33.3)	12(46.2)	2(50.0)	16(44.4)
High	4(66.7)	14(53.8)	2(50.0)	20(55.6)
TOTAL	6(16.7)	26(72.2)	4(11.1)	36(100.0)

Econ. Input (Low); Comm. (Low); Mod. (High)[e]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	25(69.4)	28(66.7)	1(25.0)	54(65.9)
High	11(30.6)	14(33.3)	3(75.0)	28(34.1)
TOTAL	36(43.9)	42(51.2)	4(4.9)	82(100.0)

Econ. Input (High); Comm. (Low); Mod. (Low)[b]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	9(81.8)	9(47.4)	0(0.0)	18(52.9)
High	2(18.2)	10(52.6)	4(100.0)	16(47.1)
TOTAL	11(32.4)	19(55.9)	4(11.8)	34(100.0)

Econ. Input (Low); Comm. (High); Mod. (High)[d]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	15(48.4)	40(56.3)	1(16.7)	56(51.9)
High	16(51.6)	31(43.7)	5(83.3)	52(48.1)
TOTAL	31(28.7)	71(65.7)	6(5.6)	108(100.0)

Econ. Input (Low); Comm. (High); Mod. (Low)[f]

Innov. Behav.	SES			
	Low	Medium	High	Total
Low	18(56.3)	18(56.3)	0(0.0)	36(54.5)
High	14(43.8)	14(43.8)	2(100.0)	30(45.5)
TOTAL	32(48.5)	32(48.5)	2(3.0)	66(100.0)

[a] d.f. = 2; X^2 = 4.76; $P < .0923$; Kendall's Tau B = -.21073.
[b] d.f. = 2; X^2 = 8.41; $P < .0149$; Kendall's Tau B = .46781.
[c] d.f. = 2; X^2 = .38; $P < .8266$; Kendall's Tau B = -.09288.
[d] d.f. = 2; X^2 = 3.69; $P < .1575$; Kendall's Tau B = .01852.
[e] d.f. = 2; X^2 = 3.18; $P < .2031$; Kendall's Tau B = .10598.
[f] d.f. = 2; X^2 = 2.47; $P < .2901$; Kendall's Tau B = .06455.

TABLE 34.--Economic Input by Innovative Behavior, Controlling for SES.

Innov. Behav.	Low SES			Medium SES			High SES		
	Lo.Econ.	Hi.Econ.	Total	Lo.Econ.	Hi.Econ.	Total	Lo.Econ.	Hi.Econ.	Total
Low	136(70.8)	21(35.0)	157(62.3)	162(66.7)	41(26.5)	203(51.0)	9(40.9)	5(19.2)	14(29.2)
High	56(29.2)	39(65.0)	95(37.7)	81(33.3)	114(73.5)	195(49.0)	13(59.1)	21(80.8)	34(70.8)
TOTAL	192(76.2)	60(23.8)	252(100.0)	243(61.1)	155(38.9)	398(100.0)	22(45.8)	26(54.2)	48(100.0)

d.f. = 1; X^2 = 23.48; P < .000.

Kendall's Tau B = .31492.

d.f. = 1; X^2 = 59.64; P < .0000.

Kendall's Tau B = .39228.

d.f. = 1; X^2 = 1.76; P < .1843.

Kendall's Tau B = .23764.

TABLE 35.--Communication Channels by Innovative Behavior, Controlling for SES.

Innov. Behav.	Low SES			Medium SES			High SES		
	Lo.Comm.	Hi.Comm.	Total	Lo.Comm.	Hi.Comm.	Total	Lo.Comm.	Hi.Comm.	Total
Low	114(78.1)	43(40.6)	157(62.3)	125(67.6)	78(36.6)	203(51.0)	10(45.5)	4(15.4)	14(29.2)
High	32(21.9)	63(59.4)	95(37.7)	60(32.4)	135(63.4)	195(49.0)	12(54.5)	22(84.6)	34(70.8)
TOTAL	146(57.9)	106(42.1)	252(100.0)	185(46.5)	213(53.5)	398(100.0)	22(45.8)	26(54.2)	48(100.0)

d.f. = 1; X^2 = 35.22; P < .0000.

Kendall's Tau B = .38215.

d.f. = 1; X^2 = 36.71; P < .0000.

Kendall's Tau B = .30877.

d.f. = 1; X^2 = 3.86; P < .0494.

Kendall's Tau B = .32963.

TABLE 36.--Modernity by Innovative Behavior, Controlling for SES.

Innov. Behav.	Low SES			Medium SES			High SES		
	Lo.Mod.	Hi.Mod.	Total	Lo.Mod.	Hi.Mod.	Total	Lo.Mod.	Hi.Mod.	Total
Low	108(72.5)	49(47.6)	157(62.3)	111(63.4)	92(41.3)	203(51.0)	9(50.0)	5(16.7)	14(29.2)
High	41(27.5)	54(52.4)	95(37.7)	64(36.6)	131(58.7)	195(49.0)	9(50.0)	25(83.3)	34(70.8)
TOTAL	149(59.1)	103(40.9)	252(100.0)	175(44.0)	223(56.0)	398(100.0)	18(37.5)	30(62.5)	48(100.0)

d.f. = 1; X^2 = 15; P < .0001.   d.f. = 1; X^2 = 18; P < .0000.   d.f. = 1; X^2 = 4.54; P < .0330.

Kendall's Tau B = .25269.   Kendall's Tau B = .22016.   Kendall's Tau B = .35504.