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Diffusion of Innovations



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Printed in the United States of America

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Collier-Macmillan Canada, Ltd., Toronto, Ontario

Library of Congress Catalog Card Number: 62-15348

Seventh printing February 1969

CHAPTER XI

*Toward a Theory of the Diffusion
and Adoption of Innovations*¹

A science without a theory is blind because it lacks that element which alone is able to organize facts and give direction to research. Even from a practical point of view the mere gathering of facts has very limited value. It cannot give an answer to the question that is most important for practical purposes—namely, what must one do to obtain a desired effect in given concrete cases? To answer this question it is necessary to have a theory, but a theory which is empirical and not speculative. This means that theory and facts must be closely related to each other.

KURT LEWIN, 1936

A search of the diffusion literature reveals (1) a general lack of agreement upon sociological concepts involved in adoption behavior, and (2) absence of a synthesis of these concepts into a general theory that might be tested by empirical research. The many studies that have been completed provide an excellent base for an attempt to formulate a general theory of the diffusion and adoption of innovations.

Ordinarily, one would expect theoretical considerations to appear in the early chapters of a book. They could then serve as a framework for the entire volume. However, in the present case it is our belief that any theoretical statement must be so highly tentative that it is more appropriately

1. With A. Eugene Havens, The Ohio State University. A portion of this chapter was originally presented as a paper at the 1961 Rural Sociological Society.

placed at the end rather than at the beginning of the present work. The purpose of this chapter is to state a direction in which analysis should proceed toward a general theory of the diffusion and adoption of new ideas.

THEORETICAL APPROACH

Perhaps one of the most effective means of conceptualizing adoption and diffusion behavior is first to view this behavior in its most basic and elementary form, and then to develop some of the complex variables affecting this behavior. At one level of conceptualization, adoption of a new idea by an individual is a type of action. According to Parsons and Shils (1952, p. 56), an act consists of three basic elements: (1) an actor (2) orienting to (3) a situation. This conceptualization of human behavior implies:

1. Behavior is oriented toward attaining *ends* or goals.
2. It takes place in *situations*.
3. It is *normatively regulated*.
4. It involves an expenditure of *effort* or "motivation."

The ultimate goal or end which individuals seek to attain is interpersonal security (Sullivan, 1953). *Security* is that subjective state of well-being which minimizes tension. "Ends" are not used in the present case to mean verbalizations or rationalizations for behavior. For example, if a farmer says that he adopted an innovation because he felt it would increase his farm income, higher income is not an end but a verbalization of the end. At a more general level of abstraction, the farmer's goal is security.²

2. The concept of security may be at such a high level of abstraction that difficulties will be encountered in measuring it. There has been no attempt reported in the literature to relate a measure of interpersonal security to innovativeness.

Behavior takes place in situations. Individuals do not exist as a mass of disconnected units. They are members of social systems, and these memberships in social systems have important effects upon their behavior. The situational fields³ in which behavior occurs do not necessarily follow community or organizational boundaries. One may be psychologically identified with a group and take the group's perspective as his own without being on the membership list. Of course, physical proximity, along with social status and other psychological identifications, are factors influencing frequency of interaction.

Behavior is normatively regulated. Interaction with others in a situational field provides the individual with a sense of identity. The "others" in a situational field are significant to the individual and influence his behavior. These "significant others," or reference groups, aid an individual in developing his self-identity. The manner in which an individual identifies himself influences his behavior; an example is the physician who feels, "As a progressive, scientific doctor, I adopt new medical ideas."

Some individuals identify with change agents and scientists to a greater degree than others. Other individuals interact with earlier adopters, develop a similar self-identification, and eventually become more like the persons with whom they interact.

Behavior involves an expenditure of effort or motivation. In the case of adoption and diffusion, the individual must exert energy to seek information about the new idea, to try it out, and to adopt it. In order for adoption to occur, the individual must perceive that the potential rewards of adoption outweigh the expected efforts required for adoption.

3. The term "situational field" (Cottrell, 1942) is somewhat preferable to "situation," as the former does not imply time boundaries, while the latter does. "Situation" tends to connote a given time and place. *Situational field* is defined as that part of the environment which is perceived by an actor as significant for him.

Perception

The concept of perception is a key dimension in understanding the diffusion of ideas. Although a new idea may be regarded as advantageous by experts in some field, a particular actor may not perceive the innovation in a similar manner. *Perception* is the way in which an individual responds to any sense or impression which he detects (Lindesmith and Strauss, 1956, p. 85).

Perception is a function of the situational fields within which the individual operates. Knowledge of these situational fields, the manner in which the individual identifies himself, his sense of security, and the normative regularities may enable the theoretical specification of some of the conditions for adoption behavior.

As Cottrell (1924) stated, "Items of behavior such as attitudes, traits, etc., studied apart from the context provided by the actor's definition of the situation, yield meaningless results." Thus, it is essential that the present model for adoption behavior account for the actor's perceptions of the situation.

DIFFUSION OF AN INNOVATION

The diffusion of an innovation takes place within a social system. A social system may embrace many different situational fields. The segments of a social system employed as a frame of reference cause individuals to display varying degrees of innovativeness. The situational fields themselves, when employed as a frame of reference, display greater homogeneity in characteristics of individuals and a smaller range in the innovativeness of actors. The five categories, innova-

tors, early adopters, early majority, late majority, and laggards, may each be regarded as a situational field.

It is possible to view the individuals within a particular adopter category as employing certain dominant values which determine the means used to achieve the ultimate end of security. These dominant values are most appropriately viewed as ideal types which may be objectively found in actual situations, but which may not be possessed by *each* actor within a particular adopter category.

The dominant value of innovators is venturesomeness. Innovators appear to gain interpersonal security by being more venturesome than other members of a social system. Therefore, innovators are frequently viewed as deviants from the system's norms. In fact, innovators often operate within situational fields external to the social system. In terms of the situational field within which innovators operate, they may not perceive their decisions as venturesome. Innovators frequently bypass change agents and use more cosmopolite sources of new ideas. The innovator may have knowledge of an innovation before a change agent.

The dominant value of those individuals in the early adopter category is respect from their peers. Early adopters may perceive that respect enhances their security. They rate higher in opinion leadership within a social system than other adopter categories, although this depends, in part, upon the norms of the system. Opinion leaders may operate in the same situational field with change agents. Of course, not all opinion leaders are early adopters. To some extent, each adopter category may have its own opinion leaders. Opinion leaders "consensually validate" other individuals' perceptions of a new idea, and enhance or retard the adoption of innovations.

The dominant value of the early majority is deliberation. By deliberating on adoption decisions, they attempt to enhance their own security. The early majority do not adopt a new idea until other respected individuals within their so-

cial system have accepted an innovation and it has been proved successful.

If every individual completely limited his identification to other individuals within a situational field, diffusion would be a slow process. However, some individuals are marginal to two or more situational fields. These marginal individuals bridge the gap between adopter categories.

The late majority category possess a dominant value of skepticism. These individuals doubt the value of innovations until they are convinced by a legion of their peers. Late majority individuals feel more secure in following tradition than in accepting new ideas (until the ideas become somewhat traditional for the social system).

The dominant value of laggards is tradition. When viewed in terms of the total social system, laggards are deviants. However, their deviancy does not derive from too rapid adoption of innovations, but from their unwillingness to accept new ideas even after they have become widely used in the social system. Laggards derive their security by resisting innovations.

ADOPTION OF AN INNOVATION

The paradigm⁴ of the adoption of an innovation by an individual (Figure 11-1) contains three major divisions: (1) antecedents, (2) process, and (3) results. Antecedents are those factors present in the situation prior to the introduction of an innovation. Antecedents are of two major types: (1) the actor's identity, and (2) his perceptions of the situation. The actor's identity, which affects the adoption of in-

4. The paradigm suggested here owes certain of its ideas to the models of Emery and Oeser (1958), Coughenour (1960b), Hobbs (1960), Straus (1960b), Rahudkar (1961), and Fox and others (1961).

novations, is comprised of his sense of security, his dominant values, his mental ability and conceptual skill, his social status, and his cosmopolitanness.

The actor's perception of the situation affects his adoption behavior. The social system's norms on innovativeness serve as incentives or restraints on his behavior. Individuals in a social system with a modern norm will act differently from the way they would where the norms are traditional. The economic constraints and incentives, and the characteristics of the unit (such as the farm, business, or school) also affect adoption behavior.

Information sources are important stimuli to the individual in the adoption process. The individual becomes aware of the innovation mainly by impersonal and cosmopolite sources such as the mass media. At the evaluation stage the individual forms his perception of the characteristics of the innovation. Localite and personal information sources are more important at the evaluation stage.

The conclusion of the adoption process is either adoption or rejection of the idea. An innovation may be adopted at the conclusion of the adoption process and may be (1) used continuously, or (2) rejected at a later date, a discontinuance. The innovation may be rejected at the end of the adoption process, but adopted at a later date. It is also possible the innovation will be continuously rejected.

It is the authors' opinion that the theoretical position outlined in this section is researchable and may enhance the prediction of innovative behavior. It is not presented as *the* theory of adoption or as the only theory that may be advanced. Instead, it is a summary of current research and theory that has been reported in the fields of social psychology, cultural anthropology, sociological theory, and the traditions of diffusion research. It is hoped that this discussion may stimulate others to give greater attention to the basic theoretical framework upon which future diffusion research might be designed.

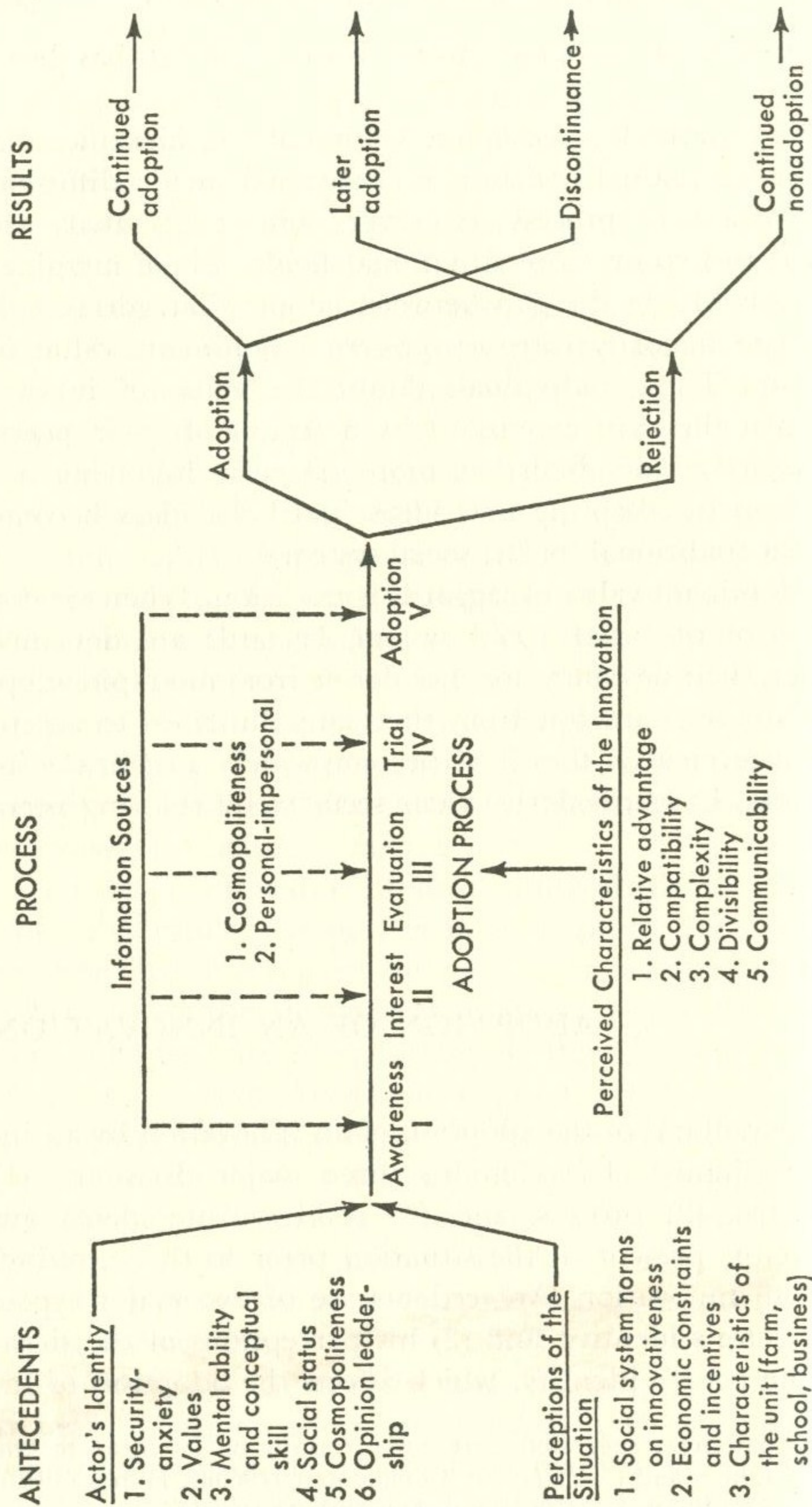


FIGURE 11-1. PARADIGM OF THE ADOPTION OF AN INNOVATION BY AN INDIVIDUAL WITHIN A SOCIAL SYSTEM

GENERALIZATIONS AND HYPOTHESES

This chapter attempted to state an approach to a theory of the diffusion and adoption of innovations. The action theory of Parsons and Shils provided a general frame of reference which was applied to consideration of how ideas spread. This framework suggests (1) generalizations that have been tested in previous research and summarized here, or (2) hypotheses capable of being tested by empirical means. The generalizations will be listed after a brief discussion of conceptual variable analysis.

Conceptual Variable Analysis

Theory consists of the postulated relationships among concepts. The empirical testing of these relationships is the task of research. Conceptual variable analysis is a method of relating theory to research and research to theory.⁵

The essential steps in conceptual variable analyses may be described as follows.

1. The first step is to express all concepts as variables. A *concept* is defined as a dimension stated in its most basic or "primitive" terms. A conceptual variable is thus a concept expressed in variable form. One example of a conceptual variable utilized throughout the present book is innovativeness, defined as the degree to which an individual is relatively earlier to adopt new ideas than the other members of his social system. A concept ideally should be as general or ab-

5. Many of the ideas contained in this section owe their development to Merton (1957) and to Professor Robert L. Hamlin of Washington University. Certain of these notions first appeared in Rogers (1958a). Used by permission.

stract as possible so that it may be utilized to describe behavior in many different types of social systems. For example, the innovativeness concept has been studied in industry, education, farming, and primitive tribes.

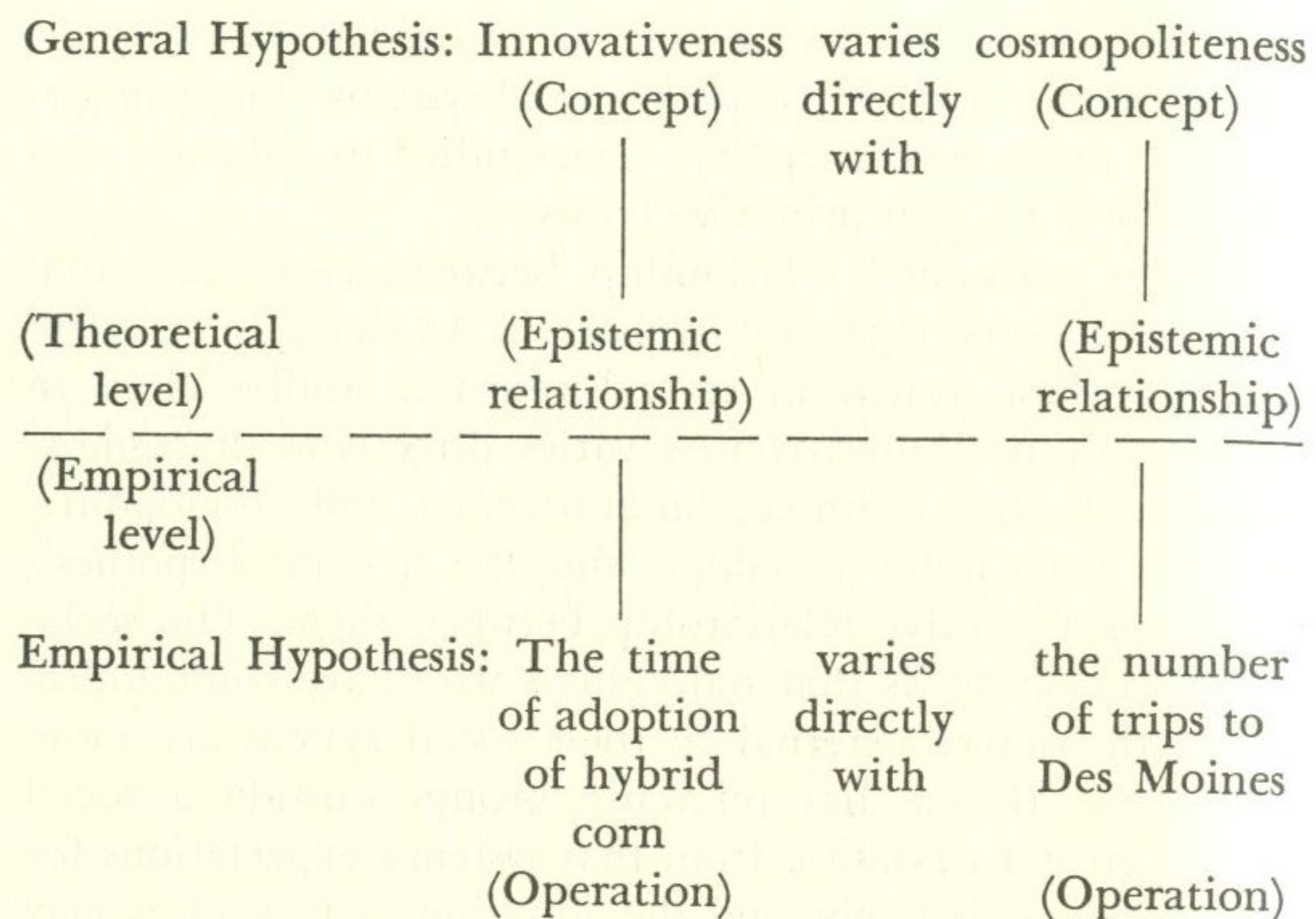
2. The postulated relationship between two conceptual variables is called a *general hypothesis*. An example of a general hypothesis tested in several research studies cited in Chapter VI is: innovativeness varies directly with cosmopolitanism. In this example, innovativeness and cosmopolitanism are conceptual variables, and the general hypothesis postulates a positive relationship between them. The sociological reasoning⁶ is that individuals who have communication with sources external to their social system are more innovative. If one has reference groups outside a social system, greater deviation from that system's expectations for one's behavior is likely, and the adoption of new ideas may result.

3. A general hypothesis is tested by means of testing an *empirical hypothesis* (or hypotheses), defined as the postulated relationship between two operational measures of conceptual variables. An *operation* is the empirical referent of a concept and may be a scale, index, or other measure. The degree to which an operation is a valid measure of a concept is called an *epistemic relationship*. Unfortunately, this linkage between concept and operation cannot be tested except by intuitive means.

A conceptual variable analysis of the relationship between innovativeness and cosmopolitanism is illustrated with an example from the Ryan and Gross (1943) hybrid corn study in Iowa.

4. An empirical hypothesis is often accepted or rejected on

6. The development of general hypotheses may also be a result of derivations from other general hypotheses. For example, if concept *A* varies directly with concept *B*, and concept *B* varies directly with concept *C*, then it is postulated that concept *A* varies directly with concept *C*.



the basis of statistical tests of significance, but other criteria might be used. In the hybrid corn study, Ryan and Gross (1943) reported a positive significant relationship between time of adoption of hybrid seed and the number of trips outside of the Iowa communities in which the respondents resided.

5. A general hypothesis is supported or rejected on the basis of the tests of corresponding empirical hypotheses. Truth claims may be added to a general hypothesis by similar findings from other analyses of the two conceptual variables in a variety of different social systems. As additional support is added to a general hypothesis, greater confidence may be placed in the relationship between the two concepts, and this relationship may be considered a generalization and eventually perhaps a principle.

6. The relationships between each of the two concepts and other concepts may be analyzed, and, as findings of this na-

ture gradually accumulate, a body of general sociological theory is developed. In this fashion evidence is accumulated in an integrated and consistent manner. The eventual goal is the development of a body of more general sociological theory composed of the matrix of interrelationships among a number of relevant concepts.

Some critics of conceptual variable analysis might argue that most scientists intuitively use the essential features of this approach to theory without going through the mechanics of specifying concepts, operations, and epistemic relationships. This is undoubtedly true, but in the case of diffusion research, there is probably need more adequately to formalize the wealth of findings available in terms of more general concepts than have been used in most past studies. Conceptual variable analysis not only offers potential usefulness in future diffusion research but also provides one method for synthesizing past research findings.

Generalizations

Throughout the book, a number of generalizations have been presented to synthesize the major findings. A total listing of these generalizations provides a skeleton summary of the major conclusions of what is now known about the diffusion of innovations.

1. Innovativeness of individuals is related to a modern rather than a traditional orientation.
2. An individual's innovativeness varies directly with the norms of his social system on innovativeness.
3. Relatively later adopters are more likely to discontinue innovations than are earlier adopters.
4. Impersonal information sources are most important at

the awareness stage, and personal sources are most important at the evaluation stage in the adoption process.

5. Cosmopolite information sources are most important at the awareness stage, and localite information sources are most important at the evaluation stage.

6. There is little evidence that lack of knowledge about innovations actually delays their adoption.

7. Awareness occurs at a more rapid rate than does adoption.

8. The first individuals to adopt innovations require a shorter adoption period than do relatively later adopters.

9. The awareness-to-trial period is longer than the trial-to-adoption period.

10. The awareness-to-trial period is shorter for relatively earlier adopters than for later adopters.

11. The trial-to-adoption period is longer for relatively earlier adopters than for later adopters.

12. Earlier adopters try innovations on a smaller scale than later adopters.

13. A crisis emphasizes the relative advantage of an innovation and affects its rate of adoption.

14. The relative advantage of a new idea, as perceived by members of a social system, affects its rate of adoption.

15. The compatibility of a new idea, as perceived by members of a social system, affects its rate of adoption.

16. The complexity of an innovation, as perceived by members of a social system, affects its rate of adoption.

17. The divisibility of an innovation, as perceived by members of a social system, affects its rate of adoption.

18. Relatively earlier adopters may perceive divisibility as more important than later adopters.

19. The communicability of an innovation, as perceived by members of a social system, affects its rate of adoption.

20. Adopter distributions follow a bell-shaped curve over time and approach normality.

21. Earlier adopters are younger in age than later adopters.

22. Earlier adopters have higher social status than later adopters.

23. Earlier adopters have a more favorable financial position than later adopters.

24. Earlier adopters have more specialized operations than later adopters.

25. Earlier adopters have a type of mental ability different from that of later adopters.

26. Impersonal sources of information are more important than personal sources for relatively earlier adopters of innovations than for later adopters.

27. Cosmopolite sources of information are more important than localite sources for relatively earlier adopters of innovations than for later adopters.

28. Earlier adopters utilize information sources that are in closer contact with the origin of new ideas than later adopters.

29. Earlier adopters utilize a greater number of different information sources than do later adopters.

30. Earlier adopters are more cosmopolite than later adopters.

31. Earlier adopters have more opinion leadership than later adopters.

32. There is considerable shifting of individuals in a social system from one category to another over time.

33. Laggards are most likely to drop out of the social system.

34. Innovators are perceived as deviants by other members of their social system.

35. Innovators perceive themselves as deviant from the norms of their social system.

36. Personal influence from peers is most important at the evaluation stage in the adoption process and less important at other stages.

37. Personal influence from peers is more important for relatively later adopters than for earlier adopters.

38. Personal influence from peers is more important in uncertain situations than in clear-cut situations.

39. Opinion leaders conform more closely to social system norms than the average member.

40. There is little overlapping among the different types of opinion leaders.

41. Opinion leaders use more impersonal, technically accurate, and cosmopolite sources of information than do their followers.

42. Opinion leaders are more cosmopolite than their followers.

43. Opinion leaders have more social participation than their followers.

44. Opinion leaders have higher social status than their followers.

45. Opinion leaders are more innovative than their followers.

46. Each adopter category is mainly influenced by individuals of the same or a more innovative adopter category.

47. Social system norms on innovativeness seem to determine, at least in part, the innovativeness of opinion leaders.

48. Differences in innovativeness between individuals are a more important barrier to the flow of ideas in a social system where the norms are modern than where they are traditional.

49. The extent of promotional efforts by change agents is directly related to the rate of adoption of an innovation.

50. Commercial change agents are more important at the trial stage than at any other stage in the adoption process.

51. Commercial change agents are more important for earlier adopters than for later adopters at the trial stage.

52. Change agents have more communication with higher-status than with lower-status members of a social system.

It is not difficult to criticize the wording of most of these generalizations in terms of (1) their lack of succinctness and (2) their lack of generality. As an example of the former criticism, consider the generalization that "opinion leaders have higher social status than their followers." In more succinct terms this generalization would be "opinion leadership varies directly with social status." In the case of several generalizations, succinctness was sacrificed for the added clarity of a more lengthy statement.

The lack of general sociological concepts in many of the generalizations indicates these statements are, at best, in the "middle range" and need to approach greater generality before they are considered at the level of general sociological theory. As an example, consider the generalization that "earlier adopters have more specialized operations than do later adopters." Perhaps after further research findings are available from a wider range of contexts, the more general statement may be made that "innovativeness varies directly with specialization."

Future Directions

Many specific suggestions for future research were mentioned in each of the preceding ten chapters. At this point, only one further methodological recommendation should be made, the need for "survey experiments" or "field experiments" to test some of the basic generalizations listed in this chapter. There is a limit to what findings from the usual type of correlational analysis of survey data can tell us. For example, little of a cause-and-effect nature about innovativeness can be definitely determined until a research design with a before-after measurement with an adequate control is utilized. There are remarkably few before-after designs with a control that have been used in natural or field conditions,

and it is this type of study that offers great promise in testing the present generalizations under more adequately controlled conditions.

This book is actually the first of two volumes. The second volume can perhaps be written in ten or fifteen years after the leads for research suggested here have been followed up and expanded upon.

Bibliography

The references included in this bibliography are organized under two general headings (1) the research studies on diffusion cited in the present book, and (2) general references cited for their relevance to the diffusion of innovations but which are not diffusion research studies. The former heading of "research cited" includes annotations for some of the major diffusion investigations. The research tradition for each diffusion study is coded in the following fashion.*

- A — Anthropology
- ES — Early Sociology
- RS — Rural Sociology
- E — Education
- I — Industrial
- MS — Medical Sociology
- O — Other studies not included in the six major diffusion research traditions.

DIFFUSION RESEARCH CITED

HELEN C. ABELL (1951), *The Differential Adoption of Homemaking Practices in Four Rural Areas of New York State*, Ph.D. Thesis, Ithaca, N.Y., Cornell University.—RS

* The assignment of research studies to traditions was somewhat arbitrary in a few cases.