

# Diffusion of Innovations<sup>1</sup>

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## Summary Chapter 1 – Elements of diffusion

*Diffusion* is the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideal. *Communication* is a process in which participants create and share information with one another in order to reach a mutual understanding. Diffusion has a special character because of the newness of the idea in the message content. Thus some degree of uncertainty and perceived risk is involved in the diffusion process. An individual can reduce this degree of uncertainty by obtaining information. Information is a difference in matter energy that affects uncertainty in a situation where a choice exists among a set of alternatives.

The main elements in the diffusion of new ideas are: (1) an *innovation* (2) that is *communicated* through certain *channels* (3) *over time* (4) among the members of a *social system*.

### 1.1 Innovation

An innovation is an idea, practice, or object perceived as new by an individual or other unit of adoption. Most of the new ideas discussed in this book are technological innovations. A *technology* is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. Most technologies have two components: (1) *hardware*, consisting of the tool that embodies the technology as a material or physical object, and (2) *software*, consisting of the knowledge base for the tool.

The characteristics of an innovation, as perceived by the members of a social system, determine its rate of adoption. Five attributes of innovations are: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability.

*Re-Invention* is the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation.

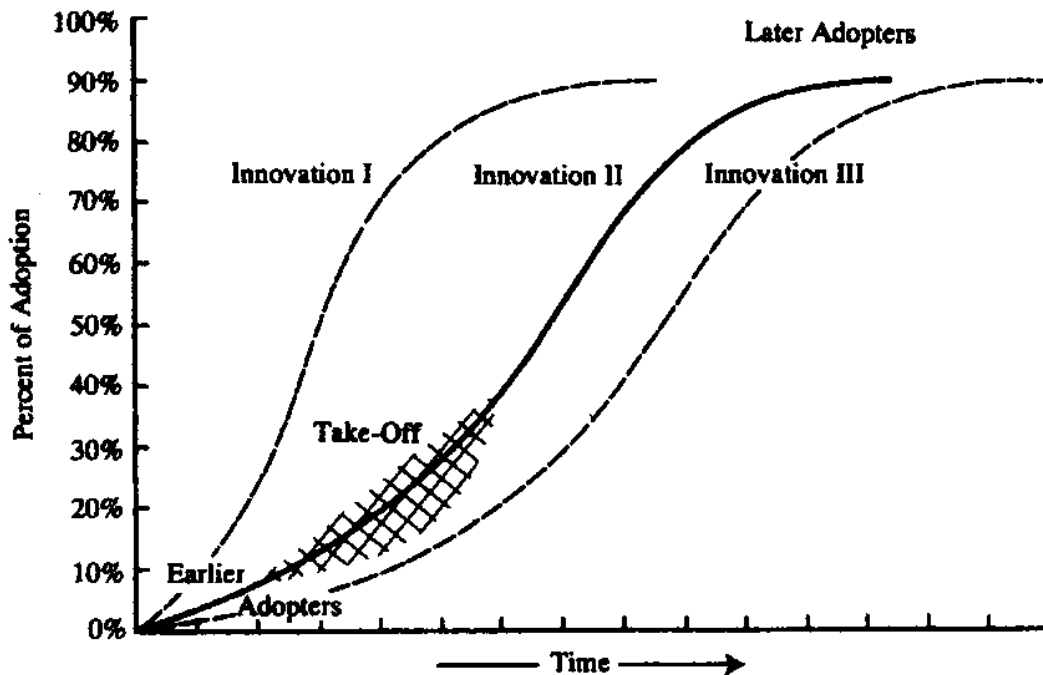
### 1.2. Communication Channels

A *communication channel* is the means by which messages get from one individual to another. Mass media channels are more effective in creating knowledge of innovations, whereas interpersonal channels are more effective in forming and changing attitudes toward a new idea, and thus in influencing the decision to adopt or reject a new idea. Most individuals

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<sup>1</sup> Source: Everett ROGERS, 2003: The Diffusion of Innovations. Fifth Edition. The Free Press, New York.

**Figure 1-2. The Diffusion Process**



*Diffusion* is the process by which (1) an *innovation* (2) is *communicated* through certain *channels* (3) over *time* (4) among the members of a *social system*.

evaluate an innovation not on the basis of scientific research by experts but through the subjective evaluations of near peers who have adopted the innovation. These near peers thus serve as role model, whose innovation behavior tends to be imitated by others in their system.

A distinctive aspect of diffusion is that at least some degree of heterophily is usually present in communication about innovations. *Heterophily* is the degree to which two or more individuals who interact are different in certain attributes, such as beliefs, education, social status, and the like. The opposite of heterophily is *homophily*, the degree to which two or more individuals who interact are similar in certain attributes. Most human communication takes place between individuals who are homophilous, a situation that leads to more effective communication. Therefore, the heterophily that is often present in the diffusion of innovations leads to special problems in achieving effective communication.

### 1.3. Time

Time is involved in diffusion in (1) the innovation-diffusion process, (2) innovativeness, and (3) an innovation's rate of adoption. The *innovation decision process* is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. We conceptualize five steps in this process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. An individual seeks information at various stages in the innovation-decision process in order to decrease uncertainty about an innovation's expected consequences. The decision stage leads (1) to *adoption*, a decision to make full use of an innovation as the best course of action available, or (2) to *rejection*, a decision not to adopt an innovation.

#### 1.4. Social System

A social System is a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. A system has *structure*, defined as the patterned arrangements of the units in a system, which gives stability and regularity to individual behavior in a system. The social and communication structure of a system facilitates or impedes the diffusion of innovations in the system. One aspect of social structure is *norms*, the established behavior patterns for the members of a social system.

*Opinion leadership* is the degree to which an individual is able to influence informally other individuals' attitudes or overt behavior in a desired way with relative frequency. A *change agent* is an individual who attempts to influence clients innovation-decisions in a direction that is deemed desirable by a change agency. An *aide* is a less than fully professional change agent who intensively contacts clients to influence their innovation-decisions.

We distinguish among three main types of innovation-decisions: (1) *optional innovation-decisions*, choices to adopt or reject an innovation that are made by an individual independent of the decisions of other members of the system, (2) *collective innovation-decisions*, choices to adopt or reject an innovation that are made by consensus among the members of a system, and (3) *authority innovation-decisions*, choices to adopt or reject an innovation that are made by relatively few individuals in a system who possess power, status, or technical expertise. A fourth category consists of a sequential combination of two or more of these three types of innovation decisions: *Contingent innovation-decisions* are choices to adopt or reject that are made only after a prior innovation-decision.

A final way in which a social system influences diffusion concerns *consequences*, the changes that occur to an individual or a social system as a result of the adoption or rejection of an innovation.

### Summary Chapter 2 – A history of diffusion research

This chapter showed that although diffusion research began as a series of scientific enclaves, it has emerged as a single, integrated body of concepts and generalizations, given though the investigations are conducted by researchers in different scientific disciplines. A *research tradition* is a series of investigations on a similar topic in which successive studies are influenced by preceding inquiries. The major diffusion traditions described are anthropology, early sociology, rural sociology, education, public health/medical sociology, communication, marketing, geography, and general sociology.

Eight main types of diffusion research were identified:

1. Earliness of knowing about innovations.
2. Rate of adoption of different innovations in a social system.
3. Innovativeness.
4. Opinion leadership.
5. Diffusion networks.
6. Rate of adoption in different social systems.
7. Communication channel usage.
8. Consequences of innovation.

When scholars follow an intellectual paradigm in a research field, it enables them to pursue a coherent set of research directions. The paradigm also imposes and standardizes a set of assumptions and conceptual biases that, once begun, are difficult to recognize and overcome. That is the challenge for the next generation of diffusion scholars. In my first book on diffu-

sion (ROGERS 1962,x), I stated, "*This book suggests that students of diffusion have been working where the ground was soft . . . The challenge for future research is to expand the area of digging and to search for different objectives than those of the past. Perhaps there is a need to dig deeper, in directions that theory suggests.*"

### Summary Chapter 3 – Contributions and criticisms of diffusion research

We reviewed four major shortcomings of diffusion research in this chapter. We conclude that the beginnings of diffusion research left an indelible stamp on the approaches, concepts, methods, and assumptions of the field. The biases that we inherited from our research ancestors have been inappropriate for certain important diffusion research tasks of today. It is ironic that the study of innovation has itself been so traditional.

The four major criticisms of diffusion research, discussed in this chapter are:

1. The *pro-innovation bias*, the implication of most diffusion research that an innovation should be diffused to and adopted by all members of a social system, that it should be diffused rapidly, and that the innovation should be neither re-invented nor rejected.
2. The *individual-blame bias*, the tendency to hold an individual responsible for his or her problems, rather than the system of which the individual is a part.
3. The *recall problem* in diffusion research, which may lead to inaccuracies when respondents are asked to remember the time at which they adopted a new idea.
4. The *issue of equality* in the diffusion of innovations, as socioeconomic gaps among the members of a social system are often widened as a result of the spread of new ideas.

Alternatives to the usual diffusion research approaches were proposed for overcoming each of these four criticisms of diffusion research.

### Summary Chapter 4 – The generation of innovations

Past diffusion researches usually began with the first adopter of an innovation, that is, with the left-hand tail of the S-shaped diffusion curve. Events and decisions occurring previous to this point have a considerable influence upon the diffusion process. The scope of future diffusion research should be broadened to include study of the entire process through which an innovation is generated.

The *innovation-development process* consists of all the decisions, activities, and their impacts that occur from recognition of a need or problem, through research, development, and commercialization of an innovation, through diffusion and adoption of the innovation by users, to its consequences. Recognition of a Problem or need may occur when a social problem rises to a high priority on the agenda of topics which deserve research.

Many, but not all, technological innovations come out of research. *Basic research* is defined as original investigations for the advancement of scientific knowledge and that do not have the specific objective of applying this knowledge to practical problems. The results of basic research may be used in *applied research*, which consists of scientific investigations that are intended to solve practical problems. *Lead users* develop innovations and then convince a manufacturing company to produce and sell the innovation, often after the lead user has created a prototype of the innovation. The usual next stage in the innovation development process is *development*, defined as the process of putting a new idea into a form that is expected to meet the needs of an audience of potential adopters. *Technological determinism* is the belief that technology causes changes in society. An opposite viewpoint is *social constructionism*, which states that social factors shape a technology. A next stage, *commercialization*, is defined as the production, manufacturing, packaging, marketing, and distribution of a prod-

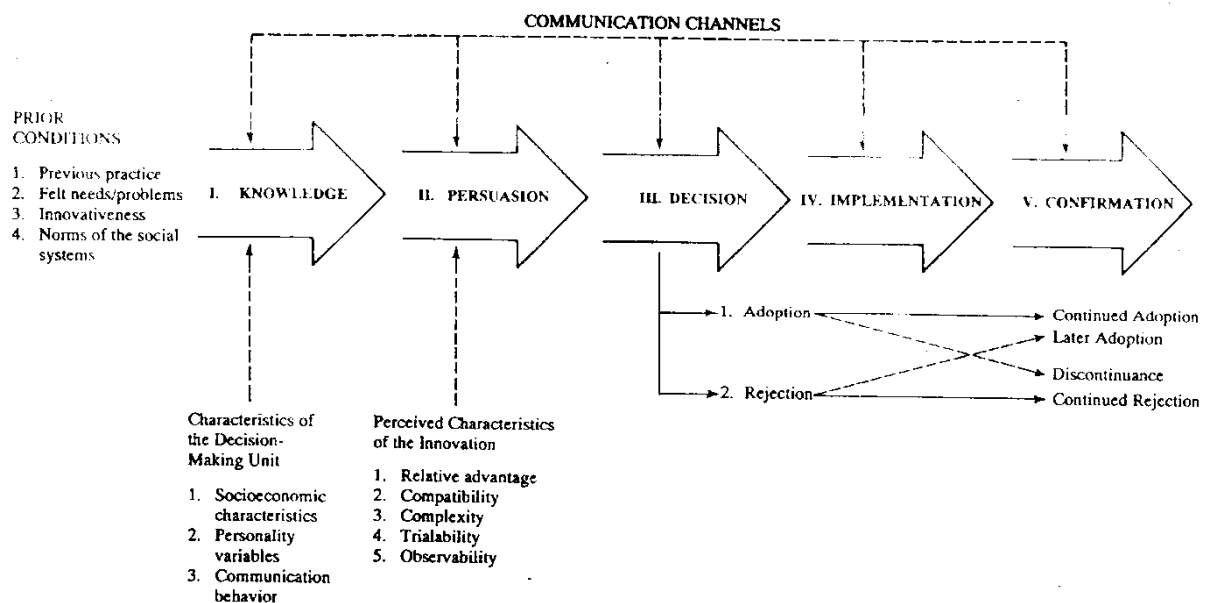
uct that embodies an innovation. Commercialization is carried out mainly by private firms.

A particularly crucial point in the innovation-development process is the decision to begin diffusing an innovation to potential adopters. How are innovations evaluated for their efficacy, safety, and other factors? Finally, an innovation may diffuse, be adopted, and, eventually, cause consequences, the final stage in the innovation-development process. The six stages described here may not always occur in a linear sequence, the time order of the stages may be different, and certain stages may not occur at all.

## Summary Chapter 5 – The innovation-decision process

The *innovation-decision process* is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. This process consists of five stages: (1) *knowledge*, when the individual is exposed to the innovation's existence and gains an understanding of how it functions; (2) *persuasion*, when the individual forms a favorable or unfavorable attitude toward the innovation; (3) *decision*, when the individual engages in activities that lead to a choice to adopt or reject the innovation; (4) *implementation*, when the individual puts an innovation into use; and (5) *confirmation*, when the individual seeks reinforcement for an innovation-decision already made but may reverse the decision if exposed to conflicting messages about it.

Figure 5-1. A Model of Five Stages in the Innovation-Decision Process



The *innovation-decision process* is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

Earlier knowers of an innovation, when compared to later knowers, are characterized by more formal education, higher social status, greater exposure to mass media channels of communication, greater exposure to interpersonal channels of communication, greater change agent contact, greater social participation, and greater cosmopolitaness.

*Re-invention* is the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation. Re-invention occurs at the implementation stage for many innovations and for many adopters. A higher degree of re-invention leads to (1) a faster rate of adoption of an innovation and (2) a greater degree of sustainability of an innovation. *Sustainability* is the degree to which an innovation is continued over time after a diffusion program ends.

*Discontinuance* is a decision to reject an innovation after having previously adopted it. Discontinuance can be of two types: (1) *replacement discontinuance*, in which an idea is rejected in order to adopt a better idea which superseded it, and (2) *disenchantment discontinuance*, in which an idea is rejected as a result of dissatisfaction with its performance. Later adopters are more likely to discontinue innovations than are earlier adapters.

We conclude that stages exist in the innovation-decision process, although further study of this issue is needed.

A *communication channel* is the means by which a message gets from a source to a receiver. We categorize communication channels (1) as either interpersonal or mass media in nature and (2) as originating from either localite or cosmopolite sources. *Mass media channels* are means of transmitting messages that involve a mass medium such as radio, television, newspapers, and so on, that enable a source of one or a few individuals to reach an audience of many. *Interpersonal channels* involve a face-to-face exchange between two or more individuals.

Mass media channels are relatively more important at the knowledge stage, and interpersonal channels are relatively more important at the persuasion stage in the innovation-decision process. Cosmopolite channels are relatively more important at the knowledge stage, and localite channels are relatively more important at the persuasion stage in the innovation-decision process. Mass media channels are relatively more important than interpersonal channels for earlier adopters than for later adopters. Cosmopolite channels are relatively more important than localite channels for earlier adopters than for later adopters.

The *innovation-decision period* is the length of time required for an individual or organization to pass through the innovation-decision process. The rate of awareness-knowledge for an innovation is more rapid than its rate of adoption. Earlier adopters have a shorter innovation-decision period than do later adopters.

## **Summary Chapter 6 – Attributes of innovations and their rate of adoption**

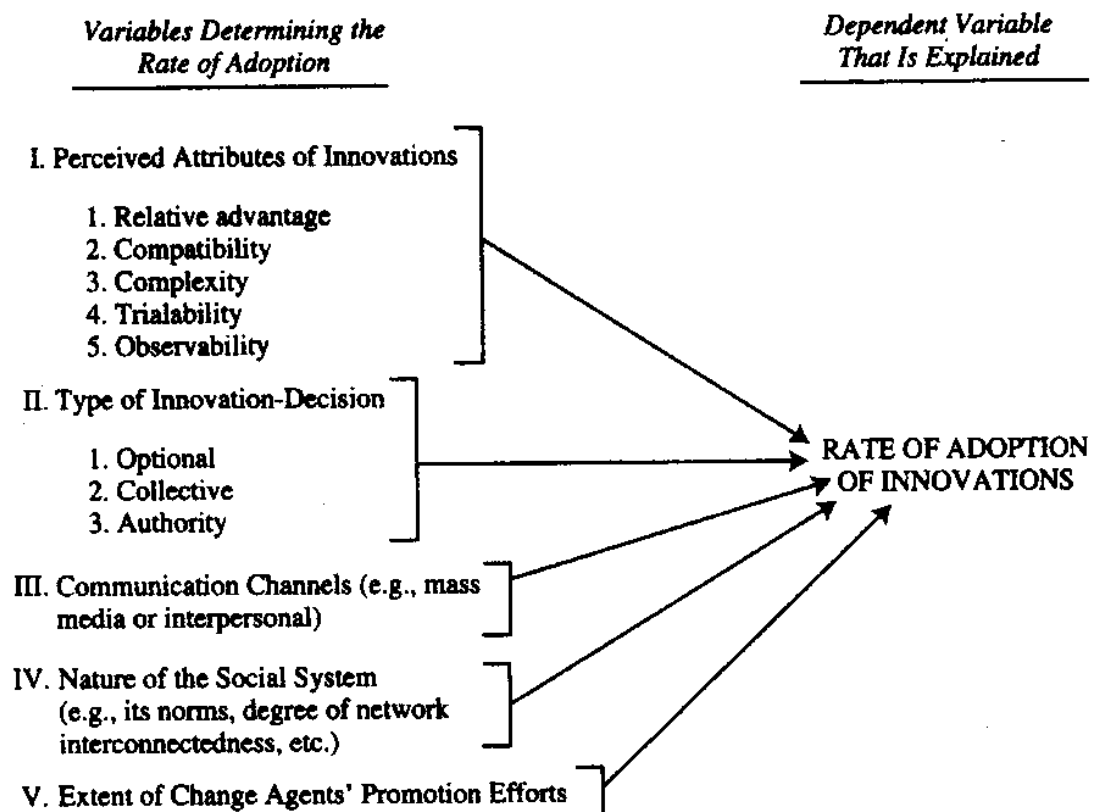
This chapter suggested five attributes of innovations by which an innovation can be described. Individuals' perceptions of these attributes predict an innovation's rate of adoption. We recommend that measures of the five perceived attributes should be developed in each diffusion study, rather than utilizing existing scales borrowed from previous investigations.

*Rate of adoption* is the relative speed with which an innovation is adopted by members of a social system. In addition to the perceived attributes of an innovation, such other variables affect its rate of adoption as (1) the type of innovation-decision, (2) the nature of communication channels diffusing the innovation at various stages in the innovation-decision process, (3) the nature of the social system; and (4) the extent of change agents' efforts in diffusing the innovation. Most past research, however, concentrated on predicting the rate of adoption by the five perceived attributes of innovations.

*Relative advantage* is the degree to which an innovation is perceived as better than the idea it supersedes. The relative advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. *Overadoption* is the adoption of an innovation when experts feel that it should be rejected. *Preventive innovations*, defined as new ideas that an individual adopts now in order to lower the probability of some unwanted future event, diffuse more slowly than incremental (nonpreventive) innovations.

*Compatibility* is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. The compatibility of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. Naming an innovation and positioning it relative to previous ideas are important means of making

**Figure 6-1. Variables Determining the Rate of Adoption of Innovations**



The five types of variables that determine an innovation's rate of adoption have not received equal attention from diffusion scholars. The five perceived attributes of innovations have been most extensively investigated and have been found to explain about half of the variance in innovations' rates of adoption.

an innovation more compatible. Change agents often ignore indigenous knowledge systems, which provide one means by which individuals give meaning to an innovation.

*Complexity* is the degree to which an innovation is perceived as relatively difficult to understand and to use. The complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption.

*Trialability* is the degree to which an innovation may be experimented with on a limited basis. The trialability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption.

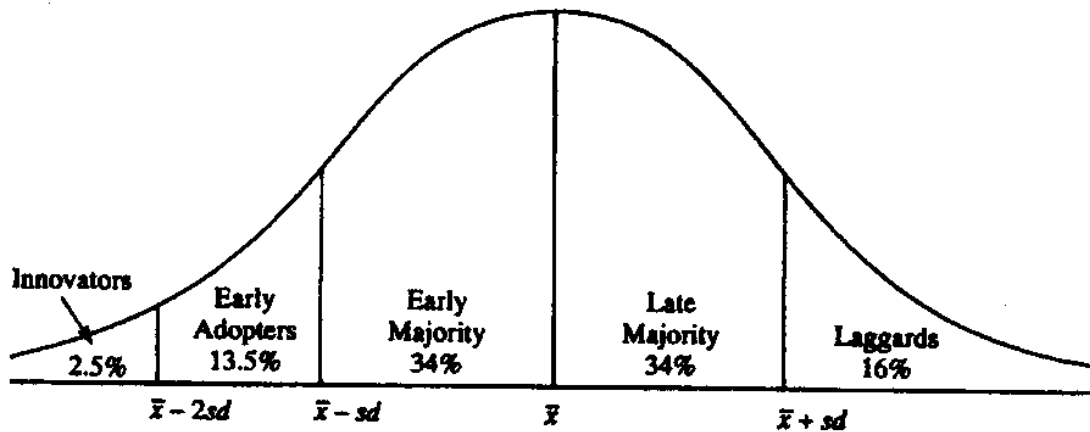
*Observability* is the degree to which the results of an innovation are visible to others. The observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption.

A basic theme of this chapter is that change agents and diffusion scholars must understand how potential adopters perceive new ideas. Such perceptions count in determining the nature of the diffusion process.

## Summary Chapter 7 – Innovativeness and adopter categories

*Adopter categories* are the classifications of the members of a social system on the basis of *innovativeness*, the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system. A variety of categorization systems and titles for adopters have been used in past studies. This chapter described the standard five adopter categories that are widely followed today in diffusion research, and their applications.

**Figure 7-3. Adopter Categorization on the Basis of Innovativeness**



The innovativeness dimension, as measured by the time at which an individual adopts an innovation or innovations, is continuous. The innovativeness variable is partitioned into five adopter categories by laying off standard deviations ( $sd$ ) from the average time of adoption ( $\bar{x}$ ).

Adopter distributions tend to follow an S-shaped curve over time and to approach normality. The continuum of innovativeness can be partitioned into five adopter categories (innovators, early adopters, early majority, late majority, and laggards) on the basis of two characteristics of a normal distribution, the mean and the standard deviation. The dominant attributes of each category are: Innovators-venturesome; early adopters-respect; early majority-deliberate; late majority-skeptical; and laggards-traditional. The relatively earlier adopters in a social system are no different from later adopters in age, but they have more years of formal education, are more likely to be literate, and have higher social status, a greater degree of upward social mobility, and larger-sized units, such as farms, companies, schools, and so on. These characteristics of adopter categories indicate that earlier adopters have generally higher socioeconomic status than do later adopters.

Earlier adopters in a system also differ from later adopters in personality variables. Earlier adopters have greater empathy, less dogmatism, a greater ability to deal with abstractions, greater rationality, greater intelligence, a more favorable attitude toward change, a greater ability to cope with uncertainty and risk, a more favorable attitude toward science, less fatalism and greater self-efficacy, and higher aspirations for formal education, higher-status occupations, and so on.

Finally, the adopter categories have different communication behavior. Earlier adopters have more social participation, are more highly interconnected in the interpersonal networks of their system, are more cosmopolite, have more contact with change agents, greater exposure to mass media channels, and greater exposure to interpersonal communication channels, engage in more active information seeking, and have greater knowledge of innovations, and a higher degree of opinion leadership.



Past research thus shows many important differences between earlier and later adopters of innovations in (1) socioeconomic status, (2) personality variables, and (3) communication behavior. The distinctive characteristics of the five adopter categories mean that these adopter categories can be used for *audience segmentation*, a strategy in which different communication channels and/or messages are used to reach each sub audience.

## Summary Chapter 8 – Diffusion networks

This chapter dealt with opinion leadership, communication networks, and the critical mass. *Opinion leadership* is the degree to which an individual is able to influence informally other individuals' attitudes or overt behavior in a desired way with relative frequency. Opinion leaders play an important role in diffusion networks, and are often identified and utilized in diffusion programs.

*Homophily* is the degree to which individuals who communicate are similar. *Heterophily* is the degree to which individuals who interact are different in certain attributes. Interpersonal diffusion networks are mostly homophilous. Homophily can act as an invisible barrier to the rapid flow of innovations within a social system, as similar people interact in socially horizontal patterns, thus preventing a new idea from trickling down from those of higher socioeconomic status, more education, and greater technical expertise.

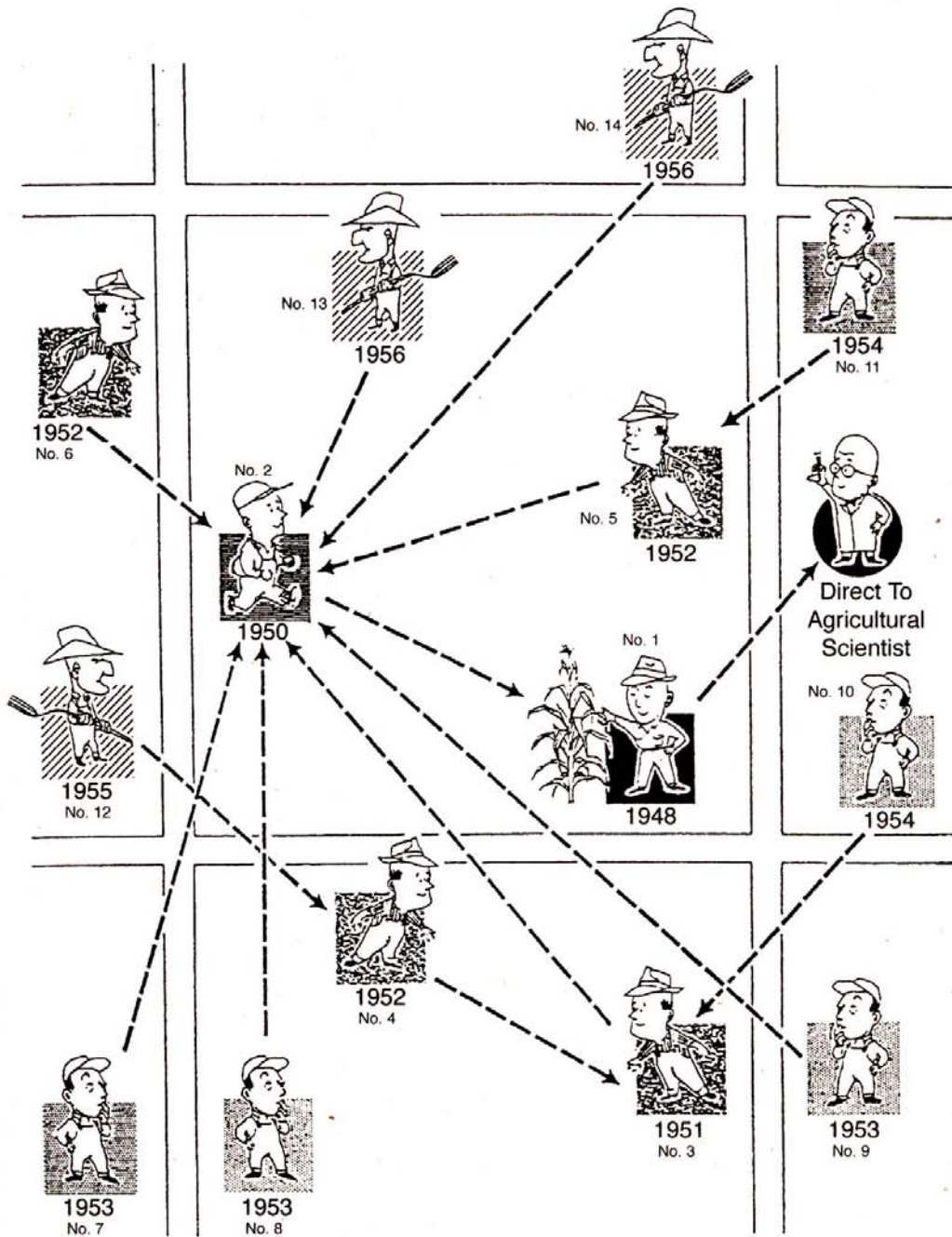
When interpersonal diffusion networks are heterophilous, followers generally seek opinion leaders of higher socioeconomic status, with more formal education, greater mass media exposure, more cosmopolitanism, greater contact with change agents, and more innovativeness. Compared to followers, opinion leaders have greater mass media exposure, more cosmopolitanism, greater contact with change agents, greater social participation, higher social status, and more innovativeness. Opinion leaders conform more closely to a system's norms than do their followers. When a social system's norms favor change, opinion leaders are especially innovative.

A *communication network* consists of interconnected individuals who are linked by patterned flows of information. An individual's network links are important determinants of his or her adoption of innovations. The network interconnectedness of an individual in a social system is positively related to the individual's innovativeness. *Interconnectedness* is the degree to which the units in a social system are linked by interpersonal networks.

Networks provide a certain degree of structure and stability in the predictability of human behavior. *Communication structure* is the differentiated elements that can be recognized in the patterned communication flows in a system. This structure consists of the cliques within a system and the network interconnections among them that are provided by bridges and liaisons. Individuals are identified as belonging to cliques on the basis of *communication proximity*, the degree to which two linked individuals in a network have personal communication networks that overlap. A *personal network* consists of those interconnected individuals who are linked by patterned communication flows to a given individual. Personal networks that are radial (rather than interlocking) are more open to an individual's environment, and hence play a more important role in the diffusion of innovations. The information exchange potential of communication network links is negatively related to their degree of (1) communication proximity and (2) homophily. This generalization expresses Mark GRANOVETTER's theory of "the strength-of-weak-ties." Individuals tend to be linked to others who are close to them in physical distance and who are relatively homophilous in social characteristics.

The *critical mass* occurs at the point at which enough individuals in a system have adopted an innovation so that the innovation's further rate of adoption becomes self-sustaining. The critical mass is particularly important in the diffusion of interactive innovations such as e-mail, where each additional adopter increases the utility of adopting the innovation for all adopters.

**Figure 7-4.** The Diffusion of a New Weed Spray in an Iowa Farm Neighborhood



The fourteen Iowa farmers in this neighborhood network were asked by the author, "Where or from whom did you obtain information that convinced you to adopt 2,4-D weed spray?" The innovator, who adopted in 1948, said that he had learned about the innovation from an agricultural scientist. The early adopter served as an opinion leader for eight of the thirteen other farmers in this small system.

*Source:* Bohlen and others (1958).

*Interactivity* is the degree to which participants in a communication process can exchange roles in, and have control over, their mutual discourse. As more individuals in a system adopt

a noninteractive innovation, it is perceived as increasingly beneficial to future adopters (this is a *sequential* interdependence effect on later adopters). However, in the case of an interactive innovation, the benefits from each additional adoption increase not only for all future adopters, but also for each previous adopter (this is *reciprocal* interdependence).

A *threshold* is the number of other individuals who must be engaged in an activity before a given individual will join that activity. An innovator has a low threshold of resistance to adopting a new idea, and so few (or no) interpersonal network influences are needed for adoption. In contrast, a late majority individual has a much higher threshold that must be overcome by near-peer network influences in order to overcome resistance to the innovation. Thresholds act for individuals in a somewhat parallel way to the critical mass at the system level. An individual is more likely to adopt an innovation if more of the other individuals in his or her personal network adopted previously.

## Summary Chapter 9 – The change agent

Change agents operate *interventions*, defined as actions with a coherent objective to bring about behavior change in order to produce identifiable outcomes. For example, an HIV prevention program such as ‘stop AIDS’ in San Francisco was designed to slow the rate of HIV infection. *Targeting* (defined as the process of customizing the design and delivery of a communication program on the basis of the characteristics of an intended audience segment) is one means of segmenting a heterogeneous audience so that customized messages that fit each individual's situation are delivered. Currently, the Internet is often utilized to deliver such targeted messages.

A *change agent* is an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency. Change agents face two main problems: (1) their social marginality; due to their position midway between a change agency and their client system, and (2) *Information overload*, the state of an individual or a system in which excessive communication inputs cannot be processed and used, leading to breakdown. Seven roles of the change agent are: (1) to develop a need for change on the part of clients, (2) to establish an information exchange relationship, (3) to diagnose problems, (4) to create an intent to change in the client, (5) to translate intentions into action, (6) to stabilize adoption and prevent discontinuance, and (7) to achieve a terminal relationship, with clients.

A change agent's relative success in securing the adoption of innovations by clients is positively related to (1) the extent of the change agent's effort in contacting clients, (2) a client orientation, rather than a change agency orientation, (3) the degree to which the diffusion program is compatible with clients' needs, (4) the change agent's empathy with clients, (5) his or her homophily with clients, (6) credibility in the clients' eyes, (7) the extent to which he or she works through opinion leaders, and (8) increasing clients' ability to evaluate innovations.

Further, we propose that contact by change agents is positively related to (1) higher socioeconomic status among clients, (2) greater social participation, (3) higher formal education, and (4) cosmopolitaness.

An *aide* is a less than fully professional change agent who intensively contacts clients in order to influence their innovation-decisions. Not only do aides provide lower-cost contacts with clients than is possible with professional change agents, but they are also able to bridge the heterophily gap between professionals and clients, especially lower socioeconomic status clients. Aides have less *competence credibility*, the degree to which a communication source or channel is perceived as knowledgeable and expert, but they have greater *safety credibility*, the degree to which a communication source or channel is perceived as trustworthy. An aide's safety credibility is due to his or her homophily with the client system. *Inauthentic professionalism* is the process through which an aide takes on the dress, speech, or other identifying,

marks of a professional change agent. In recent decades diffusion scholars have become aware that an alternative to the classical diffusion model exists in the form of decentralized diffusion systems. These diffusion programs have outrun the classical model (a relatively centralized approach). In *centralized* diffusion systems, such as the agricultural extension services in the United States, overall control of diffusion decisions (such as which innovations to diffuse, which diffusion channels to use, and to whom to diffuse innovations) is held by government officials and technical subject-matter experts. Diffusion in centralized systems flows from the top down, from experts to users. In contrast, *decentralized* diffusion systems are client-controlled with a wide sharing of power and control among the members of the diffusion system. Instead of coming out of R&D systems, innovations in decentralized systems bubble up from local experimentation by non expert users. Local units decide which innovations should diffuse through horizontal networks, allowing a high degree of re-invention. Decentralized diffusion systems are based upon convergence communication, in which participants create and share information with one another in order to reach a mutual understanding. Decentralized diffusion systems are (1) most appropriate for certain conditions and (2) can be combined with elements of centralized systems to form a hybrid diffusion system.

## Summary Chapter 10 – Innovation in organizations

An *organization* is a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor. Individual behavior in an organization is relatively stable and predictable because organizational structure is characterized by predetermined goals, prescribed roles, an authority structure, rules and regulations, and informal patterns. Although behavior in organizations is relatively stable, innovation is ongoing.

At first, innovation in organizations was mainly studied by correlating independent variables with organizational innovativeness in cross-sectional data analysis. A consistent finding in this organizational innovativeness research was that larger organizations are more innovative. Rather low correlations of characteristics variables with organizational innovativeness were found, perhaps because the organizational structure variables that were studied were related to innovation in one direction during the initiation subprocess of the innovation process and in the opposite direction during the implementation subprocess. For instance, low centralization, high organizational complexity, and low formalization facilitate innovation in the initiation subprocess, but impede implementation. Today, research on organizational innovativeness is much less likely to be conducted than is study of the innovation process in organizations.

The presence of an innovation champion contributes to the success of an innovation in an organization. A *champion* is defined as a charismatic individual who throws his or her support behind an innovation, thus overcoming the indifference or resistance that the new idea may provoke. Research has shown that innovation champions may be powerful individuals in an organization, or they may be lower-level individuals who possess the ability to coordinate the actions of others. The degree to which champions are powerful seems to depend on the nature of the innovation and the organization in which it is gaining acceptance.

Studies of organizational innovativeness tended to be replaced by research on the innovation process in organizations. We divide the innovation process into two subprocesses: (1) *initiation*, all of the information gathering, conceptualizing, and planning for the adoption of an innovation, leading up to the decision to adopt and (2) *implementation*, all of the events, actions, and decisions involved in putting an innovation into use. The two initiation stages are

(1) agenda-setting and (2) matching. The three implementation stages are (1) redefining/ restructuring, (2) clarifying, and (3) routinizing.

*Agenda-setting* occurs in the innovation process when a general organizational problem that

may create a perceived need for an innovation is defined. A *performance gap*, the discrepancy between an organization's expectations and its actual performance, can trigger the innovation process. *Matching* is the stage in the innovation process at which a problem from the organization's agenda is fit with an innovation, and this match is planned and designed.

*Redefining/restructuring* occurs when the innovation is re-invented so as to accommodate the organizations needs and structure more closely and when the organization's structure is modified to fit with the innovation. Both the innovation and the organization usually change during the innovation process.

*Clarifying* occurs as the innovation is put into more widespread use in an organization, so that the meaning of the new idea gradually becomes clearer to the organization's members.

*Routinization* occurs when the innovation has become incorporated into the regular activities of the organization and loses its separate identity. Sustainability, a closely related concept to routinization, is defined as the degree to which an innovation continues to be used after the initial effort to secure adoption is completed. Sustainability is more likely if widespread participation has occurred in the innovation process, if re-invention took place, and if an innovation-champion was involved. This fifth stage, routinization, marks the end of the innovation process in an organization.

## Summary Chapter 11 – Consequences of innovations

*Consequences* are the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation. Although obviously important, the consequences of innovations have received inadequate attention by change agents and by diffusion researchers. Consequences have not been studied adequately because (1) change agencies have overemphasized adoption per se, assuming that an innovation's consequences will be positive, (2) the usual survey research methods may be inappropriate for investigating consequences, and (3) consequences are often difficult to measure.

Consequences are classified as (1) desirable versus undesirable, (2) direct versus indirect, and (3) anticipated versus unanticipated. *Desirable consequences* are the functional effects of an innovation for an individual or for a social system. *Undesirable consequences* are the dysfunctional effects of an innovation for an individual or for a social system. Many innovations cause both positive and negative consequences, and it is thus erroneous to assume that the desirable impacts can be achieved without also experiencing undesirable effects. We conclude that the effects of an innovation usually cannot be managed so as to separate the desirable from the undesirable consequences.

*Direct consequences* are the changes to an individual or a system that occur in immediate response to an innovation. *Indirect consequences* are the changes to an individual or a system that occur as a result of the direct consequences of an innovation. They are the consequences of the consequences of an innovation.

*Anticipated consequences* are changes due to an innovation that are recognized and intended by the members of a system. *Unanticipated consequences* are changes due to an innovation that are neither intended nor recognized by the members of a system.

The undesirable, indirect, and unanticipated consequences of an innovation usually go together, as do the desirable, direct, and anticipated consequences. An illustration is provided by the introduction of the steel ax among Australian aborigines, which caused many undesirable, indirect, and unanticipated consequences, including breakdown of the family structure, the emergence of prostitution, and misuse of the innovation itself. The case of the steel ax illustrates three intrinsic elements of an innovation: (1) *form*, the directly observable physical appearance and substance of an innovation, (2) *function*, the contribution made by the innovation

to the way of life of individuals or to the social system, and (3) *meaning*, the subjective and frequently subconscious perception of the innovation by members of the social system. Change agents more easily anticipate the form and function of an innovation for their clients than its meaning.

*Stable equilibrium* occurs when almost no change is occurring in the structure or functioning of a social system. *Dynamic equilibrium* occurs when the rate of change in a social system is commensurate with the system's ability to cope with it. *Disequilibrium* occurs when the rate of change is too rapid to permit the system to adjust. Change agents generally wish to achieve a rate of change that leads to dynamic equilibrium, and to avoid disequilibrium.

One goal of diffusion programs is to raise the level of Good in a system. A second dimension of consequences is whether the *distribution* of Good among the members of a system becomes more or less equal. The consequences of the diffusion of innovations usually widen the socioeconomic gap between the earlier and later adopting categories in a system. Further, the consequences of the diffusion of innovations usually widen the socioeconomic gap between the audience segments previously high and low in socioeconomic status.

A system's social structure partly determines the equality versus the inequality of an innovation's consequences. When a system's structure is already very unequal, the consequences of an innovation (especially if it is a relatively high-cost innovation) will lead to even greater inequality in the form of wider socioeconomic gaps.

What strategies could be followed in order to narrow gaps? The answer depends on three main reasons why socioeconomic gaps ordinarily widen as a consequence of diffusion: (1) "ups" have greater access to information that creates awareness of innovations; (2) they have greater access to innovation-evaluation information from peers; and (3) "ups" possess greater slack resources for adopting innovations than do "downs". When special efforts are made by a diffusion agency, it is possible to narrow, or at least not to widen, socioeconomic gaps in a social system. In other words, widening gaps are not inevitable.

The *digital divide* is the gap that exists between individuals advantaged by the Internet and those individuals relatively disadvantaged by the Internet. This inequality exists both within the United States and between North America and Europe versus developing nations. Efforts to bridge the digital divide, such as providing public access to computers and the Internet in cyber cafés and telecenters, are under way.