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The Diffusion of Innovations: A Review and Explication of Central Concepts

Thomas D. Skill
University of Dayton, tskill1@udayton.edu

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The Diffusion of Innovations: A Review and Explication of Central Concepts

Abstract
The study of the diffusion of innovations attempts to understand how new things or ideas, after a period of time, become widely adopted throughout a group or society.

Everett Rogers (1983), one of the pioneers in this area of research, sees the diffusion process as essential to understanding social change. Diffusion, as Rogers sees it, is essentially a communication activity. Accordingly, social change consists of the introduction of something new - invention, followed by the process of diffusing the invention - this is done through all forms of communication, and finally the process ends with some type of "consequence," or effect. The largest body of research in this area focuses on the adoption of new farming methods. The need to expand crop yields for a growing world population has been a primary goal of many nations. At the same time, farmers work their fields with numerous threats to their livelihood - bad weather, disease, and drought - they are not likely to add to that risk by going with new or unproven ideas. However, they have adopted new ideas over time, so studying the process and in turn, speeding-up the channels in that process, has proved to be quite successful.

Disciplines
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The study of the diffusion of innovations attempts to understand how new things or ideas, after a period of time, become widely adopted throughout a group or society.

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Characteristics of Innovations

Characteristics of innovations, according to Rogers, are the elements of the “decision process” which potential adopters consider prior to involving themselves in a new innovation. The ways that we, as possible adopters, respond to the following five elements provides insight into the different rates of adoption that many innovations experience.

Relative Advantage. This characteristic addresses whether or not the new innovation is viewed as better than its predecessor. We tend to apply a “measure” to this concept. Is it less expensive (economic advantage)? Does it enhance social prestige? Does it facilitate the accomplishment of some task (convenience) or provide us with some higher level of satisfaction? Relative advantage is not particularly objective — the perceived advantage that someone
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sees in an innovation is all that matters. The greater the perceived benefit, the more rapidly an innovation will be adopted.

Compatibility. This component reflects how closely a new innovation fits into the value system, experience, and needs of the person or group considering its adoption. If an innovation contradicts the values or norms of a social system, the rate of adoption will be much slower. Before the innovation can be broadly adopted, new values or norms consistent with the innovation must first be adopted. An example of this can be found in the "innovation" of women smoking cigarettes in the 1920's. Social norms of the time prohibited women from smoking in public. Market-wise cigarette manufacturers realized that this norm would inhibit the sale of cigarettes to one-half of the adult population. They understood that any efforts to sell the product to women, before a shift occurred in the norm that prevented public smoking, would fall on deaf ears. In order to breakdown this norm, the manufacturers convinced a number of young women to march in an Easter parade smoking cigarettes. The cigarettes, according to the demonstrators, were "torches of freedom" which illuminated "men's inhumanity towards women (Bernays, 1984)." Corny as it was, their demonstration was front page news in The New York Times the next day, and shortly afterwards, the norm prohibiting public smoking by women disappeared.

Complexity. This characteristic addresses the level of "difficulty" in using or understanding a new innovation. Television, as a new innovation in the late 1940's was much easier to use and therefore more quickly adopted than the personal computer, a new innovation of the 1980's. The rates of adoption for these two innovations are quite different. The personal computer requires a much more thorough understanding of its operation and application than a television set. The more simple an innovation or the easier it is to use, the greater the likelihood of rapid adoption.

Trialability. This trait explores the relative ease in which a new innovation can be tested or evaluated on a small scale. If you can experiment with the innovation in a controlled setting on a limited basis, it then stands a much better chance of being rapidly adopted as opposed to something that cannot be dealt with in small chunks. The trialability of some innovation permits the potential adopter to reduce uncertainty about the new innovation before committing to it on a broad scale.

Observability. This component deals with the degree to which the benefits of an innovation are noticeable to others. If the benefits of an innovation are readily visible to other people, the likelihood of rapid adoption is increased. An outcome of visible
results is the open discussion of the new innovation, thereby enhancing its potential adoption. Seeing is believing holds true in this instance.

*Personal Influence: The Role of Opinion Leaders and Change Agents*

While there are a number of areas in which the mass media exercise a demonstrable influence—especially with regard to agenda setting and socialization—the evidence seems to suggest that the true power of persuasion and behavior change lies in our personal relationships with other people. Elihu Katz and Paul Lazarsfeld, in their seminal study of individuals’ decision-making behavior in political elections (Personal Influence, 1955) found that our decisions were primarily guided by our friends and relatives who we saw as “opinion leaders.” These are the people who we view as knowledgeable on the subject and who share attributes that are similar to our own. Lazarsfeld and Merton (1964) called this resemblance of traits and perspective among like peoples “homophily.” In addition to the research that supports such a position, our own personal experiences tell us that we are more inclined to accept guidance from informed individuals who we know, trust, and perceive to be like us.

The mass media, however, still play an important role in this opinion leadership process. The opinion leaders whom we look to for advice gain much of their “expertise” through contact with the mass media. This “multi-step flow” of information from the “mass media” to “opinion leaders” to “others” is crucial to the spread of new innovations from outside one’s limited sphere of experience to the inside. While the mass media often plays a significant role in building public awareness of new innovations, it is the opinion leaders in each group or community who hold the power of influence with respect to the acceptance or rejection of most innovations.

Change agents, on the other hand, are the individuals who act as links between an agency that seeks to introduce some new innovation into a community. When the U.S. Department of Agriculture wants to encourage farmers to use a new hybrid corn seed which has disease resistant qualities, they employ a change agent—generally the people who work in an Agricultural Extension office near the farming community. As part of their attempt to introduce the new innovation, they will use the mass media to build awareness of the new seed, but they will also seek out the opinion leaders in the community and attempt to persuade them of the seeds’ benefit.

The change agents need to identify and communicate with the opinion leaders in each community because they recognize that they are not known, trusted or particularly similar to the members of a particular community. Change agents are usually “heterophilous,” or unlike those they seek to influence. However,
change agents are essential to the innovation process because they provide the information and knowledge that opinion leaders require in order to effect the spread of the new innovation throughout their respective communities.

The Innovation-Decision Process
Our resistance to the adoption of any new innovation is most often the result of our desire to avoid uncertainty. A good deal of our communication activity focuses on our efforts to limit or reduce the "unknown" in our environment. We encounter enough difficulty in managing those elements that are familiar to us, so we don't need to complicate things even more by attaching new or untested elements to an already difficult situation. It follows then, that we will not openly embrace those things which we don't fully understand. The innovation — decision process, attempts to explain the cautious evaluation steps that individuals or groups engage in prior to embracing some new innovation.

The innovation — decision process has five essential steps:
1) Knowledge
2) Persuasion
3) Decision
4) Implementation
5) Confirmation

It is important to remember that each of these stages serves to reduce our uncertainty about an innovations' ability to be appropriate and useful within our own specific situation. We might state, then, that the innovation — decision process is essentially an increasingly more detailed cost/benefit analysis. If, in our judgment, the costs of adopting the innovation outweighs the benefits in the early stages of the process, we are likely to reject the innovation prior to completing all the steps.

Knowledge. This is the stage where the individual first becomes aware of the innovation. This initial introduction, which could occur by accident or through intentional effort, serves two essential functions: 1) It provides primary exposure to the innovation and 2) It gives us a basic understanding of how the innovation works. During this stage, the potential adopter is least evaluative. Until we know what the innovation is and how it works, we tend to overlook the personal costs/benefits of the innovation. The communication activities surrounding the innovation can incorporate both the mass media and personal contact.

Persuasion. Having established an awareness of the innovation and having acquired some limited knowledge of its function and use in stage one, we now begin to formulate an attitude toward the innovation. The degree to which we form a positive or negative view of the innovation is largely dependent upon how we perceive its advantages and disadvantages within our own specific situation. As we begin to evaluate the innovations' costs and benefits, we seek advice from our informed peers. It is at this point that the significant
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role of the opinion leader emerges.

**Decision.** The decision stage is essentially concerned with making a very detailed evaluation of the innovation through “try outs” and testing. These activities are critical to the adoption or rejection of the innovation because they serve to further reduce uncertainty about the costs or benefits of the innovation. Few people will actually adopt a new innovation without trying it on a small scale. So, the decision stage most often involves a limited trial, followed by an evaluation. A successful and satisfying try-out very often leads to a further reduction of uncertainty about an innovation and a decision to adopt.

Innovations that are easily “tested” on a small-scale are generally adopted more rapidly than those innovations which cannot be pre-tested on a limited basis. However, successful adoption experiences by one’s peers can serve the same function as a trial, thereby circumventing one’s own test or overcoming the problem of not being able to evaluate the innovation on small scale.

**Implementation.** During the decision stage, if all went well, the decision to adopt was made, but it is not until the implementation stage that the actual “use-behavior” occurs. The previous stages involved evaluations of an innovation’s advantages and costs, as well as a desire to reduce uncertainty about adoption. In the implementation stage, concern focuses on the operational logistics of the innovation. The adopter, while implementing the innovation, must now face the possibility of operational problems. Uncertainty now revolves around issues of acquiring and using the innovation. Consequently, our desire for information and technical assistance remains very high during this stage. The role of change agents are crucial during implementation of new innovations because they are seen as the primary resource for operational information and assistance.

**Confirmation.** Far too often we assume that once an innovation has been adopted and implemented that the innovation-decision process is complete. Our need for reassurance is of critical importance. While we may have carefully weighed, tested, evaluated, and used the innovation, we still have a good deal of insecurity about our adoption decision. This internal uneasiness is called “dissonance.” Our dissonance can be heightened if we encounter negative information about the innovation. If this conflicting information is not resolved, we may find ourselves discontinuing the use of the innovation in an effort to regain consistency or “equilibrium” in our minds. Once again, change agents play a critical role in reassuring and confirming a person’s decision to adopt. Confirmation is an essential communication function in the innovation-decision process, particularly in an environment where conflicting informa-
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Adopter Categories

In order to fully understand the process whereby new innovations or ideas spread throughout a society we need to look at a critical component of the innovation-decision process — the degree to which individuals within a social system are willing to try new things. Rogers calls this concept adopter innovativeness. Every individual in a society has a different level of innovativeness, but for the sake of analysis he has identified five broad categories which encompass these varying degrees of willingness by individuals to adopt new innovations:

1) Innovators
2) Early Adopters
3) Early Majority
4) Late Majority
5) Laggards

Innovators. These persons are the "risk-takers" who take cues from people outside their local peer groups. Innovators many times are the ones who carry a new idea into their social system or community, thereby becoming what Rogers calls the "gatekeepers" — the people responsible for the flow (or stoppage) of new things into the group. While innovators are very important in setting the stage for the diffusion process to begin, they are not recognized as opinion leaders by their peer group because they are seen as much too daring in their adoption of new innovations. Members of the “innovator” category account for only 2.5% of all the members of a given group. They are characterized as individuals who can cope with very high levels of uncertainty about a new innovation, can understand and apply complex technical knowledge, and possess both the willingness to risk failure and the resources to absorb the possible costs of that failure.

Early Adopters. These persons are the respected and recognized leaders of their peer groups. They have a reputation for making careful and considerate adoption decisions. The act of adoption by these persons serves to reduce uncertainty in minds of other members of the group. Early adopters, who comprise about 13.5% of a groups' membership, are seen as the most potent opinion leaders. Peers and near-peers routinely consult with early adopters prior to using a new innovation. Consequently, change agents seek out early adopters as allies in speeding the diffusion process.

Early Majority. These persons are "deliberate" adopters who do so just prior to the innovations' spread to the average members of the group. Early majority adopters make up about 34% of the groups' membership, comprising what might be termed the "cost effective persuadables." The deliberate evaluation of the innovation by this group serves an important persuasion link (peer pressure) to the remaining
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members of the community.

**Late Majority.** These persons tend to be a bit distrustful of new innovations and will adopt them rather reluctantly. Usually peer pressure is necessary to get them to go along. This group, which accounts for about 34% of the population, is very concerned about the risk involved, however slight. The late majority views the presence of any uncertainty that surrounds an innovation as a possible drain on their very limited resources. Adoption for these persons is made only when the innovation is seen as very safe.

**Laggards.** Rogers describes these individuals as extremely traditional—distrustful and suspicious of innovations and change agents. Laggards, who comprise about 16% of the groups’ population, tend to adopt new innovations at a point when the innovation is being replaced by something newer. Rogers suggests that “while most individuals in a social system are looking to the road ahead, the laggard’s attention is fixed on the rear-view mirror.” (p.250)

All members of a given population can be placed into one of these five categories. This is not to say that we fit the same category for all innovations. As individuals considering the adoption of a new innovation, we will be classified into one of the five groups depending on how early or late we are in adopting the new innovation. Innovativeness is a measure of our willingness to adopt something over a period of time. If we are among the first to employ the innovation, we will be seen as innovators, however, if we are among the skeptical masses, we will be seen—as members of the Late Majority, and if we are the last to adopt the innovation, we are classified as Laggards.

**Identifying Potential Opinion Leaders**

The degree of success that a change agent might enjoy in introducing a new innovation to a given group or society depends very much on his or her ability to identify the innovativeness of individuals within the target population. Laggards would make very poor opinion leaders on the adoption of new innovations. Likewise, innovators tend to be a bit too progressive in their willingness to embrace new innovations, thereby making them poor choices as opinion leaders for the larger population. The most effective change agents recognize the importance of identifying the differing degrees of innovativeness among the various members of a population and understand the need to develop unique communication strategies that will persuade members of those different subgroups.

The research on, and the ultimate success of, the adoption process indicates a number of important considerations must be addressed. The willingness of people to adopt new ideas depends heavily on the role of opinion leaders. When we lack information about some specific topic
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or new idea, we go to people whose opinion we respect for guidance. These opinion leaders will vary depending on the issue at hand. Some friends might be great advisors on our personal relationship problems, but haven’t the faintest idea as to who might be a good person to vote for. We will go to someone else for advice on elections.

On the other side of the coin, there are those we know who are the experimental types or “innovators.” They’ll be the first to try things and even adopt innovations before they themselves have evaluated them. Most people tend to discount the advice of these adopters — innovators take too many risks. Early adopters tend to emerge as the best opinion leaders. They tend to be much more cautious in their adoption of new things, and once they begin employing the innovation, the Early Majority are soon to follow, with the Late Majority not too far behind.

Their remains one group that will never adopt an innovation. These non-adopters, or “Laggards” as Rogers calls them, will never employ the innovation, no matter how strong the evidence is in support of it. We all know the people who don’t use hand calculators or refuse to own a TV. Many times these non-adopters take such a position because of a personal commitment or religious belief. The Amish people, who live in Pennsylvania and Ohio, farm their land with plow horses and refuse all modern conveniences, including electricity. The horse and buggy remains their primary mode of transportation. New innovations are prohibited by their religious beliefs — innovation is not compatible with their value system.

Consequences

As the use of some new innovation spreads throughout a group or society, concern must ultimately shift away from “how it happened” to “what impact has it had or will it have.” If we desire to possess an understanding of the role and impact of mediated communications in our contemporary society we must explore the outcomes that have resulted from adoption of innovations. The difficulty surrounding the assessment of consequences is based on a number of inhibiting factors. First and foremost is the fact that most consequences resulting from some type of innovation occurs over a long period of time. It is hard to measure and track changes of this kind.

Secondly, those who “sponsor” such investigations tend to be the agencies that introduced the innovation. As might be expected, these agencies tend to think only in terms of the beneficial changes that occur. Undesirable consequences, whether direct or indirect, are very often overlooked or never recognized.

Thirdly, it is very difficult to directly identify a resultant effect because they are very often mixed together with other changes that have occurred.

And finally, evaluations of positive versus negative consequences

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can be a relative or subjective decision. Cultural, political, and personal bias will play a major role in how we view the outcomes of some new innovation. In spite of these difficulties, we must still strive to access the changes that new modes of communication inject into our social environment. Rogers suggests that we analyze consequences across three dimensions:

1) Desirable versus undesirable consequences.
2) Direct versus indirect consequences.
3) Anticipated versus unanticipated consequences.

Desirable/Undesirable Consequences
Desirable consequences are those outcomes which are seen as functional to the social system and individual members of the group or society. On the other hand, undesirable consequences are those which are seen as having dysfunctional impacts on individuals or society. The consequences of an innovation are rarely completely desirable or undesirable, so many times we must weigh and assess the functional contribution of some innovation against the dysfunctional effects. Because most new innovations have a tendency to displace the older, more established methods or technologies, we can find the weighing of desirable versus undesirable consequences difficult — new innovations benefit some and hurt others.

For example, in the 1960’s, the widespread adoption of cable television was strongly opposed by local television broadcasters. This innovation was seen as very undesirable by this group because it would very likely shrink the audience for their programs. While the possible economic impact on local broadcasters was dysfunctional to their financial interests (and their concerted lobbying efforts resulted in strict regulation of cable operators), the broader availability of program options were seen as a functional outcome which would benefit a larger portion of the public. An important issue surrounding the evaluation of desirable versus undesirable consequences is that it is generally not possible to eliminate the dysfunctional effects and keep only the functional ones. We must accept the good with the bad.

Direct/Indirect Consequences
Direct consequences are the immediate and causally-linked changes that occur due to the adoption of an innovation. For example, in the early 1950’s the widespread adoption of television caused a significant and severe drop in attendance at movie theaters. A direct consequence of television was the displacement of the local movie house as a primary source of family entertainment. Indirect consequences are the changes that occur in response to the direct consequences. The film industry attempted to attract families back to the movie theaters by introducing Panavision (wide screens), 3-D, and
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color films — enhancements that television couldn’t offer at the time. These changes that occurred in the film industry are indirect consequences of television’s widespread adoption in the 1950’s.

Anticipated/Unanticipated Consequences

Anticipated consequences are recognized and intended changes that occur as a result of the adoption of a new innovation. For example, the widespread “computerization” of banking has made credit purchases and financial transactions quick and painless. We can now make credit purchases anywhere in the world — with no questions asked — as long as our computer-based financial file indicates that we are “credit worthy.” This is an anticipated outcome of the computer-based credit systems. Financial transactions are now easy, fast, and convenient.

However, the introduction of this innovation to banking has brought some unanticipated consequences as well. Unanticipated outcomes are changes brought on by an innovation that are not expected, recognized, or intended. Very few of us anticipated that the widespread availability of credit would alter our sense of privacy. Historically, our individual financial dealings were looked upon as very private and personal. This information was held in the strictest confidence by our banker. But now, our “credit worthiness” and our financial profiles are part of the “semi-public” computer files that provide us with the fast and convenient credit we have come to expect. A financial “blueprint” of our lives can be accessed at the touch of keyboard by the companies and individuals with whom we do business. This loss of privacy has come to be viewed as one of the costs of instant credit — an unanticipated outcome that is, at the very least, an undesirable but tolerable consequence.

References


