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## DIFFUSION OF INNOVATIONS

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In January 2001, the impeachment trial against Philippine President Joseph Estrada was halted by senators who supported him. Within minutes, using cell phones, the opposition leaders broadcast a text message "Go 2EDSA. Wear blk" to people on their telephone lists. The recipients, in turn, forwarded the message to others. Within an hour, tens of thousands of people had gathered at EDSA, or the Epifanio de los Santos Avenue, to demonstrate against Estrada. The electronic ripples led the military to withdraw support, and the government fell without a shot being fired. The Philippines story illustrates how a technology-enabled rapid (almost instant) diffusion of a text message galvanized a country's citizenry to mobilize against a corrupt political regime, leading to its demise.

*Diffusion* is the process by which an innovation is filtered through certain channels over time among the members of a social system. An *innovation* is an idea, practice, or object perceived as new by an individual or other unit of adoption. This novelty necessarily means that an individual experiences a high degree of uncertainty in seeking information about, and deciding to adopt and implement, an innovation. Although most observers agree that the diffusion of innovations is fundamentally a communication process, communication scholars constitute only one of the many research traditions in diffusion along with geography, education, marketing, public health, rural sociology, agricultural economics, general economics, and political science.

### History and Conceptual Overview of Diffusion

The study of the diffusion of innovations can be traced to the writings of Gabriel Tarde, a French sociologist and legal scholar. Tarde originated such key diffusion concepts as opinion leadership and the S-curve

of adoption (although he did not use the same labels). Tarde's intellectual leads were followed up by anthropologists such as Wissler, who analyzed the diffusion of the horse among the Plains Indians. Wissler argued that adding horses to their culture led the Plains Indians, who had lived in peaceful coexistence, into a state of almost continual warfare with neighboring tribes.

The basic research paradigm for the diffusion of innovations emerged with Ryan and Gross's classic 1943 study of the diffusion of hybrid seed corn among Iowa farmers. This innovation was profoundly important, leading to increased corn yields of 20% per acre. The innovation had spread widely to Iowa farmers in previous years, but state administrators wondered why such an obviously advantageous agricultural technology required a dozen years to achieve widespread use. Ryan and Gross indicated that the average farmer needed 7 years to progress from initial awareness of the innovation to full-scale adoption (indicated by planting all of the corn acreage in hybrid seed), emphasizing how difficult it was for most individuals to adopt an innovation. Hybrid corn had to be purchased from a seed corn company, at a price per bushel not trivial to Iowa farmers in the Depression years. Further, adopting hybrid seed corn meant Iowa farmers had to discontinue their previous practice in which healthy ears of corn were used as seed for the following year.

During the 1950s many diffusion studies were conducted, particularly by rural sociologists, and they were directly influenced by the Ryan and Gross investigation. Meanwhile, the diffusion approach infected other social sciences, spreading to marketing, political science, and education. Everett M. Rogers in his classic 1962 book *Diffusion of Innovations* argued for a general model of diffusion, irrespective of discipline. Another key event leading to wider acceptance of the diffusion paradigm was Coleman, Katz, and Menzel's study of the diffusion among physicians of tetracycline, a new medical drug developed by Pfizer. Data were collected via personal interviews with virtually all of the medical doctors in four small communities in Illinois. Prescription data were also collected from pharmacies so the researchers knew the date when

each doctor first prescribed the new drug. This represented an important methodological improvement—observed actual adoption—over the usual diffusion investigation, which depended upon respondent accuracy in recalling the date at which an innovation was adopted.

The rate of adoption of tetracycline followed an S-shaped curve (see Figure 1), as had the rate of adoption for hybrid corn, although only 17 months elapsed before most doctors had adopted tetracycline (compared to 12 years for the Iowa farmers adopting hybrid seed). The most innovative medical doctors (early adopters) were cosmopolites, making numerous out-of-town trips to medical specialty meetings. As with the Iowa farmers, mass media channels (such as articles in medical journals) were most important in creating awareness-knowledge, whereas interpersonal communication channels with peers were most important in persuading a doctor to try the medical innovation.

The intellectual contribution of the drug study was the evidence for diffusion as a social process. Doctors who were linked in more interpersonal networks adopted the innovation more rapidly than the isolated doctors. Even though tetracycline had been scientifically evaluated in numerous clinical trials, and even though Pfizer salespeople gave them free samples, they evaluated the innovation mainly through the personal experiences of their fellow doctors. An early adopting doctor might tell another doctor "Look, I

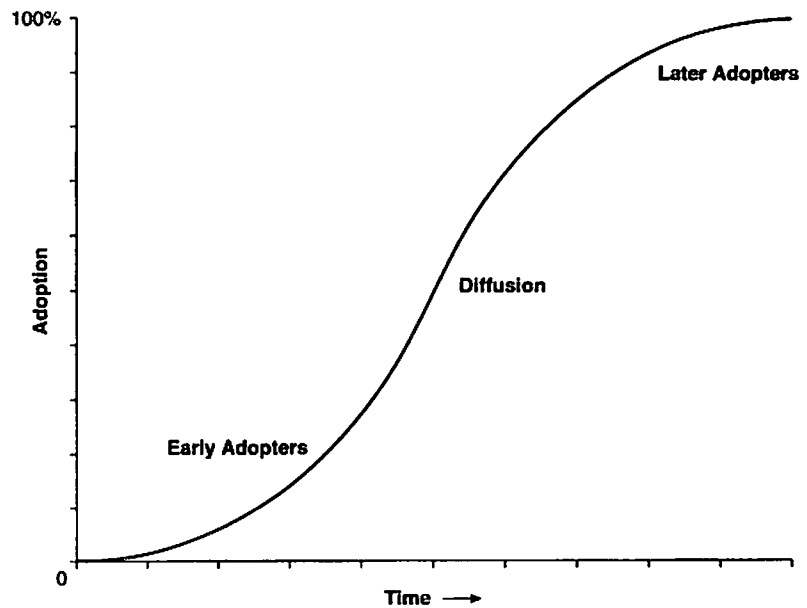


Figure 1 The Diffusion S-Curve

prescribed tetracycline to several patients and it worked great. Want to try it?"

Diffusion of innovations has some distinctive aspects that set it off from other specialized fields of communication study. For instance, the diffusion approach emphasizes interpersonal communication networks more than any other type of communication research. The main function of mass mediated communication in the diffusion process is to create awareness knowledge about the innovation. Further, diffusion research considers time as a variable to a much greater degree than do other fields of communication study. Time is involved in diffusion in (a) the *innovation-decision process*, the mental process through which an individual passes from first knowledge of a new idea to adoption and confirmation of the innovation; (b) *innovativeness*, the degree to which an individual is relatively earlier in adopting new ideas than other members of a system; and (c) an innovation's *rate of adoption*, the relative speed with which an innovation is adopted by members of a system.

The number of diffusion studies has increased steeply in past decades. By 2003, Everett Rogers estimated some 5,200 diffusion publications, increasing at the rate of some 120 to 125 articles per year. By this count, in 2007, the number of diffusion publications should be nearing 6,000.

### Political Contexts and Diffusion

Numerous studies of innovations generated through the political process have been published. These include innovative legislative practices in the areas of juvenile corrections, consumer advocacy, judicial administration, health and human services, responses to HIV/AIDS; and simple public health practices such as fortification of flour to combat stunting or iodization of salt to prevent goiter.

How do political contexts impact diffusion of innovations? Political contexts can inhibit or postpone the adoption of some innovations. For example, the fall of the Berlin Wall, followed by the collapse of the former Soviet Union, led to the development and spread of democratic movements in countries of the former Soviet Union. State policies, the nature of bureaucracies, and the existence (or lack) of political freedoms and legislations affect adoption of innovations. Patent laws, for instance, regulate what technological innovations can be adopted and by whom. Governmental restrictions on the broadcast of certain advertisements

(e.g., condom ads) can affect the adoption of birth control and HIV prevention practices in a society.

Although we still have much to learn about how innovative ideas and practices gain prominence on policy agendas, social scientists have identified some factors as being salient. For instance, scholars have emphasized the role of policy entrepreneurs and "knowledge coaches"; some have emphasized the importance of research evidence to inform the drafting of policies and programs; some have highlighted the role of social networks; and others have emphasized the importance of media agenda-setting processes in the diffusion and adoption of new policies and practices.

### Agenda Setting and Diffusion

Why did the tragedy involving cyanide-laced Tylenol in the United States, which claimed seven lives in 1982, get front-page, top-of-the-news coverage, while the issue of AIDS languished in the U.S. media? *The New York Times* ran four front-page articles on the Tylenol tragedy; however, it took 4 years and 20,000 AIDS deaths before *The New York Times* began to pay attention to the issue of AIDS. Communication scholars and political scientists have been studying this agenda-setting process.

### The Media Agenda

The agenda-setting process begins with getting an issue on the *media agenda*, which consists of the hierarchy of news issues ranked by their degree of news coverage. What puts an issue on the media agenda? Seldom does an issue get media attention or stimulate public discourse (unleashing interpersonal channels) due to indicators of the severity of a social problem. In the early years of the epidemic, the weekly reports by the Centers for Disease Control and Prevention (CDC) on the number of HIV infections and AIDS deaths did not put the issue of AIDS on the U.S. media agenda. The media reported these data, but AIDS did not yet have a human face.

Research suggests that two factors can help put an issue on the national agenda: (1) when a news article about the issue appears on the front page of *The New York Times* and (2) when the U.S. president gives a talk about the issue. *The New York Times* is the most respected U.S. news medium. Other media follow its lead in judging the news value of various issues. In the case of AIDS in the 1980s, a news article about the

epidemic did not appear on the front page of *The New York Times* until May 25, 1983, 2 years into the epidemic. *The New York Times'* lack of attention to the AIDS issue resulted in a relatively silent mainstream media and a barely audible public discourse. Further, the morally conservative U.S. President Ronald Reagan did not give a speech about AIDS until May 1987, 6 years into the epidemic, a time when 35,121 AIDS cases had been reported by the CDC. Starting in mid-1985, two important tragic figures, actor Rock Hudson and schoolboy Ryan White, helped give AIDS a human face. AIDS rapidly climbed on the media, public, and policy agenda.

### **The Public Agenda**

After the media agenda is set, an issue like AIDS climbs the *public agenda*, defined as the priority of issues that the public perceives as important. The public's agenda of issues is usually indexed by questions asked in public opinion polls, such as "What is the most important problem facing the nation?" Not until late 1985, soon after AIDS climbed the media agenda, did sizeable numbers of the American public begin to identify AIDS as an important social problem. Eventually, in early 1986, the AIDS issue was rated in national polls as the most important health problem facing the nation. In essence, the AIDS issue was not just on the TV screen, but increasingly gained momentum on people's interpersonal radar.

### **The Policy Agenda**

Finally, an issue like AIDS climbs the *policy agenda*, the set of issues that public officials consider as they allocate funding, pass laws, and make policies. Despite the resistance of the White House and *The New York Times*, once the media began giving heavy news coverage to the epidemic after mid-1980, the public began expressing concern about AIDS, and policy-makers began to increase appropriations sharply for HIV/AIDS prevention, treatment, and research. This third step in the agenda-setting process is really the bottom line, when policies are implemented, budgets are determined, and programs are put into practice.

Why has diffusion of innovations research persevered for so many years? Few other areas of communication research have such a lengthy history and represent such a tremendous scholarly outpouring. The popularity of diffusion research is in large part

due to its practical importance and its applied nature whether in the field of communication studies, marketing, or political science.

Imagine how different the path of the AIDS epidemic in the world might have been had the United States moved more quickly to stem the tide than it did. Perhaps the world could have mitigated the HIV/AIDS catastrophe, which by 2007 had claimed 30 million lives and had some 50 million living with the virus. In retrospect, the 4 years from 1981 to 1985, during which the agenda-setting process was held up by the inaction of the U.S. government and the inattention of *The New York Times*, proved costly.

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*See also* Agenda Setting; Interpersonal Communication; Rogers, Everett M.

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