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Introduction

To a remarkable degree, the Diffusion of Innovations (DOI) framework and particularly Everett Rogers as its primary definer, organizer, and elaborator, never sit still. In edition after edition of this book, whether published under that title or as *Communication of Innovations*, Rogers has provided both a core view which is stable, and at the same time has been responsive to the changes in the scholarly community's perspectives on these issues and has used the framework to address wide-ranging areas of innovation (Rogers, 1995, 2003).

Diffusion theory as summarized and elaborated and defined by Rogers has many theoretical propositions, core conceptualizations, and data to support them. However in the broadest sense it seems to me that there are four big questions that DOI set for us. Sometimes the potential answers come from Rogers and his work; sometimes they come from others, often in deliberate response to DOI.

1. What is the process of invention and adaptation of technologies or ideas subject to diffusion?
2. Why do some people (or collectivities) adopt before others?
3. What is the process that people go through as they adopt?
   - What are the stages they go through?
   - What influences them at each stage (sources)?
4. What are the consequences with regard to social welfare (growth and equity) given particular policies about, or patterns of, diffusion?

In this brief essay my goal is to address parts of second and third of these questions. I want to point to ideas in the DOI framework which seem particularly important for people like me who are interested in the problem of behavior change and the possible role of communication interventions in influencing such change. While I will restrict my comments in this way, I do so only after admitting fascination with each of the four questions. I focus on the three issues described next because I think they reflect particularly valuable contributions of DOI theory to my own thinking.

1. The idea that variations among individuals or institutions in the speed of adoption has many different explanations,
2. The idea of the intra-individual process of adoption of innovation,
3. The idea of different influences at different stages of that process.

Different explanations who adopts early and who adopts late:

One of the best known components of DOI is its normally distributed adoption curve, and its separation of people (or other adopting units) into early innovators and late adopters and such. However that distribution is of interest only as a starting point. A central question stimulated by such an observed distribution is why some people are early adopters and some late adopters. For some there was a tendency to view the timing of adoption as a question largely of individual characteristics, particularly personality. Some people were innovative and some were not. Indeed the term for the slowest to adopt, laggards, certainly suggests such a personal failure. However DOI does not require reliance on a personality explanation. Indeed by setting before us the fact of the distribution, DOI calls on us to sort through what the explanations might be for spacing on the distribution. For some innovations in some contexts for some groups of people, personality may matter. But it quickly became clear for researchers and practitioners that in most circumstances, personality was not the sole, or even a very important, contributor to explain the variance in time of adoption.

Diffusion theory comes out of rural sociology certainly, but as it evolved it has attended to Rogers' and others experience in development. Those who worked in development often ended up with a very different mindset about what explains development than those whose primary experience was with middle-class America. They brought a different set of viable explanations for speed of adoption, tending to choose structural explanations, explanations external to the individual adopter, over individual difference explanations. However, regardless of a priori preferences, any researcher (or practitioner trying to intervene to increase adoption of a new behavior) needs to begin by considering what are all the potential explanations for the current pattern of behavior might be, before he or she begins to formulate an intervention path. Depending on the explanation or explanations considered most important, the way of intervening may be quite different.

As an example, I have found the following explanations to be a productive list to consider as I think about what might account for variation in behavior (Hornik, 1989). It surely overlaps with other similar lists.

Classes of Explanation for Adoption Speed

1. *Relatively fixed characteristics of individuals*. These include variables like personality, drives, intelligence, openness to change, fatalism, empathy, need for achievement, persuasibility, or sensation-seeking. In each case, an argument is made that people who have more or less of the characteristic are more likely to adopt a new behavior, whether that be the case of an agricultural innovation more likely to be ignored by a farmer described as fatalistic, or a willingness to try marijuana among youth described as high sensation-seeking.

2. *Moderately fixed characteristics of individuals*. Innovation is often quicker among those with more education, among those with a greater store of relevant information, or among those with sophisticated communication skills. This education or stored information may permit them to process information about a new innovation more quickly and sort out its relevance to their lives or livelihood. For example, a Guatemalan woman who understands the language of the national radio broadcasts as well as her local language, may be more likely to hear about, and understand, the value of a newly available form of contraception. These moderately fixed characteristics of individuals contrast with the previous category, because there is an assumption that these skills can be readily learned over the life course, while the others are seen as the product of genetic endowment or early upbringing.

3. *Learned beliefs/skills of individuals*. Much of behavioral theory focuses on the role of what benefits or costs people think will result if they engage in particular behavior (adopt an innovation.) The balance of such beliefs, often called outcome expectancies, are seen as likely determinants of whether or not someone will engage in a behavior(cf. Fishbein and Ajzen, 1975). Those who believe that immunizing their child for measles will produce more benefit than cost are expected to be readier to bring their child for a measles vaccine. A second type of explanation that falls in this category is what Bandura (1986) called self-efficacy, the belief that one has the specific skills to engage in a recommended behavior. The person who has confidence that he or she knows the skills needed to stop smoking is more likely to adopt that innovation.

4. *Structural characteristics of individuals*. Personality and skills and beliefs are not the only characteristics of individuals that may matter in their speed of adoption. Often income or wealth may constrain adoption—for example, high costs of drugs may force some people to fail to adopt recommended regimens. However, income may not be the

only individual structural characteristic that matters: for example people working full-time with families to take care of may have income but given their free time may be less likely to engage in recommended daily physical exercise than their non-working peers.

5. *Social context*. There are also characteristics which are not defined by individuals which may affect speed of adoption. Individuals who are embedded in particular social networks may have better access to information about an innovation, or they may feel more normative pressure to act according to the social networks' preference. These social influences may lead them toward or away from a recommended innovation adoption; a youth social network may create pressure to initiate smoking; a person considering taking up running as exercise may find that easier because of a close friend who lets her know about all the means for getting past the inevitable hurdles.

6. *Structural characteristics of communities*. Previously structural characteristics of individuals were cited as potential explanations for innovation speed. However, the location of the ''blame'' for these is a slippery matter. Equally well these can be recharacterized as structural characteristics of communities. Individual income constrains individual adoption of a recommended drug regimen; from another perspective, the failure of a nation to subsidize drugs to make them affordable constrains individuals' abilities to follow recommended drug regimens. Similarly, low immunization rates in a developing country can be explained because of individual failures to make the trip to a health facility or by health system failures to reach out to their target audience. Obesity can be blamed on the failure of individuals to add 30 minutes a day of exercise, or by the failure of city designers to assure that the locations of residential areas, schools, shopping areas and working sites encourage walking rather than car riding.

7. *Characteristics of the innovation*. Some innovations are more difficult to adopt than are others (it is harder to start rock climbing than to begin walking as an exercise strategy.) Thus one would expect quicker times of adoption for some innovations than for others. Rogers (1995) described characteristics which he expects will predict the ease (and thus the speed) of adoption, including relative advantage, compatibility, complexity, trialability, and observability. However, it might also be said that various versions of one innovation will vary in their ease of adoption for the same reasons. Thus, a slow-release medication which need be taken once in 24 hours may be more readily accepted than a medically identical one drug that requires administration every four hours.

8. *Characteristics of the diffusion system*. Finally, the speed of adoption may be explained by characteristics of the diffusion system itself. If the innovation involves the actual distribution of a physical commodity (a vaccination, a new seed variety, a condom) people are likely to vary in their ease of access to the distribution system: some people live next door to the vaccination clinic and some live a half day's walk away. (These characteristics of the diffusion system are differentiated from the broader set of community characteristics only in that they are specific to the diffusion system for the particular innovation, rather than more general structural characteristics). And whether or not a physical commodity is involved, the communication system used to diffuse the idea may also affect the speed of adoption. Thus, a diffusion campaign which purchases heavy advertising across media which reach a range of target segments to market its idea (e.g., smoking cessation, initiation of exercise) may show a sharply different pattern of diffusion than a campaign which depends on personal diffusion and begins with an elite population and hopes for trickle down.

This particular organization of the classes of explanations may or may not work well for all applications. However the deeper arguments embedded in this or any parallel typology are these:

1. There are many legitimate explanations for adoption speed worth attention, not just the individual or collective psychology of adopters or adopting institutions, which may dominate some areas of applied adoption work. Depending on which explanations are considered and which are found to be consistent with the evidence, the path for the most promising intervention will vary sharply.
2. The same facts can often be characterized from different perspectives. As an example, differences in speed of adoption of fertilizer can all involve the same story but each fall into a different class of explanations: One explanation points to individual structural characteristics—lack of cash—as an explanation for the failure to adopt a new behavior—the use of fertilizer. The same ‘‘failure’’ can also be explained as a characteristic of the innovation—that its up-front cost has to be borne by the individual—or by a community structural characteristic—the lack of affordable loans available in a community, or by a fixed individual characteristic, a reluctance to accept the risks involved in taking out a loan, or by a social process, the lack of models of adoption on nearby farms, or by a lack of confidence that the outcome will be a beneficial one. Sometimes there are differences of evidence to support one explanation or another; often it is a matter of perspective, or ideology, which drives the interpretation.

The idea of the intra-individual process of adoption of

innovation

A second of the core ideas of DOI is that people just do not move from not doing a new behavior to doing it, they go through decision phases. Rogers (2003) called these phases: awareness-knowledge-persuasion-decision-implementation-confirmation. Some would challenge these as the specific, discrete phases that people go through, and in any case the boundaries between the stages are imprecise, but that is not their essence. The core idea is the idea that adoption is a process, not a discrete event

This is a lovely idea; indeed it is so lovely that it has essentially been duplicated (but I think not acknowledged) by one of the current ''hot'' conceptualizations of health behavior change theory—called stages-of-change (SOC) theory (Prochaska & DiClemente, 1984). That theory says that there are stages-of-change in behavior adoption, too (it often calls them pre-contemplation, contemplation, ready for change, action and maintenance.) It is difficult to see just why this SOC version is an advance over the DOI argument. It has provided some methodological procedures for assessing stage, and that can be useful. There is one conceptual distinction, but perhaps not such a successful one. SOC theory tries to argue, sensibly, that different theoretical processes are influential at each stage. However, as far as I know the literature, it has not been consistently successful in finding empirical support for that claim.

DOI also focuses on influences at different stages, but I think it is possible to see a somewhat different focus there. Its explicit concern was about differential sources of influence at different stages rather than on differential psychological influences at different stages. Its best known contrast perhaps has been to argue that mass media influences are most important at the earlier, awareness stages of the process of innovation, whereas interpersonal sources are seen to be more important at later stages. This issue is the third one that I want to consider.

The idea that there are different influences at different stages of that process

Like the other ideas, this too was sensible, and supported by evidence from respondents when they were asked about reliance on different sources at different stages in the adoption process. But I am concerned that this idea has led us down a problematic path, at times. Many interveners have decided that they can use mass media for awareness, but that they must organize an interpersonal outreach network to actually close the deal and accelerate the process of innovation adoption.

This seems to me to have been a questionable conclusion on several grounds: Even if one takes the assumption at face value—that when

people make important decisions about new behavior they do that in the context of their social networks—it is not the same as assuming that interveners need to organize an outreach network. It seems perfectly reasonable to assume that mass mediated information is sometimes processed by a social network (and reinforced or rejected by that network). That does not mean one needs to take the second step, and assume that this implies that interveners need to create an outreach network to serve that social diffusion role.

The problem with the assumption that one must create an outreach network, or exploit an existing one, is that as a practical matter it is difficult to do, and hard to maintain such a network. This may often mean that an intended intervention founders, or reaches only advantaged respondents. It relieves interveners who may not control the outreach network, but do control the mass media activity of an essential responsibility—actually trying to achieve behavior change. Too often I have seen programs which assign to their mass media component the responsibility of awareness raising, but do not see themselves as responsible for achieving behavior change. Often the basis for this claim is that mass media are for awareness and interpersonal networks are for behavior change. I think the evidence is that behavior change can be influenced by any source or no source, depending on many other factors—those outlined in the explanations for behavior, already presented. Also, even when social networks are crucial in the process of behavior change, they are open to activation by mediated sources, and may not require deliberate organization of those processes by interveners, except when such networks are actually required to deliver a material product (like vaccinations, or condoms) and then their role may be more distributional than persuasive.

So DOI played and continues to play an important role in setting questions for us, and in providing some of the answers to those questions: It tells us to look at a variety of explanations for behavior; it tells us to look at adoption of innovation as a process, rather than a distinct event, and even though I worry that some interpretations of it have sent us astray, it has told us to be aware of the possibility of different influences at different stages. This is a very powerful framework, and just as it has proved a rich stimulus for investigation in the past, it will surely continue to serve as an important foundation for future research.

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