

Diffusion of Innovation Theory

by Marianne S. Hornor¹

One of the greatest pains to human nature is the pain of a new idea. It... makes you think that after all, your favorite notions may be wrong, your firmest beliefs ill-founded... Naturally, therefore, common men hate a new idea, and are disposed more or less to ill-treat the original man who brings it.
-Walter Bagehot, *Physics and Politics*

Definition of Diffusion of Innovation

In his comprehensive book *Diffusion of Innovation*, Everett Rogers defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Rogers' definition contains four elements that are present in the diffusion of innovation process.

The four main elements are:

- (1) innovation - an idea, practices, or objects that is perceived as new by an individual or other unit of adoption.
- (2) communication channels - the means by which messages get from one individual to another.
- (3) time - the three time factors are:
 - (a) innovation-decision process
 - (b) relative time with which an innovation is adopted by an individual or group.
 - (c) innovation's rate of adoption.
- (4) social system - a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

Make a better mousetrap, and the world will beat a path to our door.

-Ralph Waldo Emerson

Background on Diffusion of Innovation

The original diffusion research was done as early as 1903 by the French sociologist Gabriel Tarde who plotted the original S-shaped diffusion curve. Tarde's 1903 S-shaped curve is of current importance because "most innovations have an S-shaped rate of adoption". (Rogers, 1983) The variance lies in the slope of the "S". Some new innovations diffuse rapidly creating a steep S-curve; other innovations have a slower rate of adoption, creating a more gradual slope of

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the S-curve. The rate of adoption, or diffusion rate has become an important area of research to sociologists, and more specifically, to advertisers.

In the 1940's, two sociologists, Bryce Ryan and Neal Gross "published their seminal study of the diffusion of hybrid seed among Iowa farmers" renewing interest in the diffusion of innovation S-curve. The now infamous hybrid-corn study resulted in a renewed wave of research. "The rate of adoption of the agricultural innovation followed an S-shaped normal curve when plotted on a cumulative basis over time". This rate of adoption curve was similar to the S-shaped diffusion curve graphed by Tarde forty years earlier.

Ryan and Gross classified the segments of Iowa farmers in relation to the amount of time it took them to adopt the innovation, in this case, the hybrid corn seed. The five segments of farmers who adopted the hybrid corn seed, or adopter categories are:

- (1) innovators,
- (2) early adopters,
- (3) early majority,
- (4) late majority, and
- (5) laggards.

"The first farmers to adopt (the innovators) were more cosmopolite (indicated by traveling more frequently to Des Moines) and of higher socioeconomic status than later adopters". One of the most important characteristics of the first segment of a population to adopt an innovation, the innovators, is that they require a shorter adoption period than any other category. Rogers identifies several additional characteristics dominant in the innovator type:

- (1) venturesome, desire for the rash, the daring, and the risky,
- (2) control of substantial financial resources to absorb possible loss from an unprofitable innovation.
- (3) the ability to understand and apply complex technical knowledge, and
- (4) the ability to cope with a high degree of uncertainty about an innovation.

Characteristics Rogers identified in the Early Adopters:

- (1) integrated part of the local social system,
- (2) greatest degree of opinion leadership in most systems,
- (3) serve as role model for other members or society,
- (4) respected by peers, and
- (5) successful.

Characteristics Rogers identified in the Early Majority:

- (1) interact frequently with peers,
- (2) seldom hold positions of opinion leadership,
- (3) one-third of the members of a system, making the early majority the largest category.
- (4) deliberate before adopting a new idea.

Characteristics Rogers identified in the Late Majority:

- (1) one-third of the members of a system,
- (2) pressure from peers,
- (3) economic necessity,
- (4) skeptical, and
- (5) cautious.

Characteristics Rogers identified in the Laggards:

- (1) possess no opinion leadership,
- (2) isolates,
- (3) point of reference in the past,
- (4) suspicious of innovations,
- (5) innovation-decision process is lengthy, and
- (6) resources are limited.

Although additional names and titles for the adopters of an innovation have been used in other research studies, Everett Rogers labels for the five adopter categories are the preferred or standard for the industry. Moreover, the specific characteristics that Rogers' identifies for each adopter category is of significance to advertisers interested in creating an integrated marketing plan targeting a specific audience.

Ideas confine a man to certain social groups and social groups confine a man to certain ideas. Many ideas are more easily changed by aiming at a group than by aiming at an individual.

-Josephine Klein, *Working with Groups: The Social Psychology of Discussion and Decision*

The Adoption Process

In his book *Diffusion of Innovations*, Rogers defines the diffusion process as one "which is the spread of a new idea from its source of invention or creation to its ultimate users or adopters".

Rogers differentiates the adoption process from the diffusion process in that the diffusion process occurs within society, as a group process; whereas, the adoption process is pertains to an individual. Rogers defines "the adoption process as the mental process through which an individual passes from first hearing about an innovation to final adoption".

Five Stages of Adoption

Rogers breaks the adoption process down into five stages. Although, more or fewer stages may exist, Rogers says that "at the present time there seem to be five main functions". The five stages are:

- (1) awareness,
- (2) interest,
- (3) evaluation,
- (4) trial, and
- (5) adoption.

In the awareness stage "the individual is exposed to the innovation but lacks complete information about it". At the interest or information stage "the individual becomes interested in the new idea and seeks additional information about it". At the evaluation stage the "individual mentally applies the innovation to his present and anticipated future situation, and then decides whether or not to try it". During the trial stage "the individual makes full use of the innovation". At the adoption stage "the individual decides to continue the full use of the innovation".

Why is the Adoption Process of any relevance to advertisers? The purpose of marketing and advertising is to increase sells, which hopefully results in increased profits. It is through analyzing and understanding the adoption process that social scientists, marketers and advertisers are able to develop a fully integrated marketing and communication plan focused at a predetermined stage of the adoption process.

Be not the first by who the new is tried, nor the last to lay the old aside.

-Alexander Pope, *An Essay on Criticism, Part II*

Rejection and Discontinuance

Of course, as Rogers points out, an innovation may be rejected during any stage of the adoption process. Rogers defines rejection as a decision not to adopt an innovation. Rejection is not to be confused from discontinuance. Discontinuance is a rejection that occurs after adoption of the innovation.

Rogers synopsis many of the significant research findings on discontinuance. Many "discountenances occur over a relatively short time period" and few of the "discountenances were caused by supersedence of a superior innovation replacing a previously adopted idea". One of the most significant findings was research done by Johnson and Vandan Ban (1959):

The relatively later adopters had twice as many discountenances as the earlier adopters. Previous researchers had assumed that later adopters were relatively less innovative because they did not adopt or were relatively slow to adopt innovations. This evidence suggests the later adopters may adopt, but then discontinue at a later point in time.

Rogers identifies two types of discontinuance:

(1) disenchantment discontinuance - a decision to reject an idea as a result of dissatisfaction with its performance, and

(2) replacement discontinuance - a decision to reject an idea in order to adopt a better idea.

One must learn by doing the thing, for though you think you know it, you have no certainty until you try.

-Sophocles, 400 BC

The Innovation - Decision Process

Rogers defines the innovation-decision process as the "process through which an individual (or other decision making unit such as a group, society, economy, or country) passes through the innovation-decision process".

There are five stages in the Innovation-Decision Process:

(1) from first knowledge of innovation,

(2) to forming an attitude toward the innovation,

(3) to a decision to adopt or reject,

(4) to implementation of the new idea,

(5) to confirmation of this decision.

It should be noted that prior conditions affect the innovation-decision process. Prior conditions such as:

(1) previous practice,

(2) felt needs/problems,

(3) innovativeness, and

(4) norms of the social systems.

The first stage of the innovation-decision process entails seeking one or more of three types of knowledge about the innovation. Rogers describes these as:

. Awareness knowledge is information that an innovation exists.

. How-to-knowledge consists of the information necessary to use an innovation properly, and

. Principles knowledge consists of information dealing with the functioning principles underlying how the innovation works.

Rogers states that awareness and knowledge of an innovation can be made most efficiently through mass media. It will be interesting in twenty years or so, to ascertain if mass media will still be considered the most efficient means to create product awareness and knowledge.

The following chart identifies seven characteristics consistently found in ‘early knowers.’ These characteristics should be taken into consideration when targeting the early or late knowers segment of the population.

1	Earlier knowers of an innovation have more formal education than later knowers.
2	Earlier knowers of an innovation have higher socioeconomic status than late knowers.
3	Earlier knowers of an innovation have more exposure to mass media channels of communication than later knowers.
4	Earlier knowers of an innovation have more exposure to interpersonal channels than later knowers.
5	Earlier knowers of an innovation have more change agent contact than later knowers.
6	Earlier knowers of an innovation have more social participation than later knowers.
7	Earlier knowers of an innovation have more cosmopolite than later knowers.

The knowledge stage of the innovation-decision process is of great value to advertisers because at this vulnerable stage of the innovation-decision process, advertisers are able to create an impressionable impact on their target audience. Advertisers should focus their efforts on creating awareness and knowledge when promoting a new product or innovation.

Consequences of Innovations

Before concluding our discussion on the innovation-decision process, it is important to consider the consequences or changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation. Rogers identifies three consequences or changes:

(1) Desirable versus undesirable consequences

(2) Direct versus indirect consequences, and

(3) Anticipated versus unanticipated consequences.

Diffusion research is emerging as a single, integrated body of concepts and generalizations, even though the investigations are conducted by researchers in several scientific disciplines.
-Everett M. Rogers with F. Floyd Shoemaker (1971), *Communications of Innovations: A Cross-Cultural Approach*

For the most part, the world of advertising is concerned with the diffusion of innovation process in terms of how such research studies can facilitate product adoption and therefore market segmentation. But it should be mentioned that additional research exists on the diffusion of innovation theory in other scientific disciplines, such as economic development and in the technological sector.

The Process of Innovation

In *The Innovative Choice: An Economic Analysis of the Dynamics of Technology*, Mario Amendola and Jean-Luc Gaffard compare the process of innovation with the diffusion of innovation as "the extent and the speed at which the economy proceed to adopt a superior technique." The concern is on how the economy adjusts or 'diffuses' to the new technology. This adjustment or diffusion can be instantaneous or gradual.

Amendola explains a 'new', expanded interpretation of the process of innovation has emerged. Less emphasis is on the actual absorption of a given technology, and more importance is placed on the actual process through which a new technology is developed step by step. "The economy, in this context, no longer adjusts passively to the technology but becomes the instrument for determining the extent, the nature and the articulation through time of the development of the technology." (Amendola, 1988)

Although, we are most concerned with how the diffusion of innovation theory relates to the field of advertising, it is meaningful to give a brief description of other existing research that is based on and integrates the diffusion on innovation process into its' study.

A slow advance in the beginning, followed by rapid and uniformly accelerated progress, followed again by progress that continues to slacken until it finally stops: These are the three ages of...invention...if taken as a guide by the statistician and by the sociologists, (they) would save many illusions.

-Gabriel Tarde, *The Laws of Imitation*, p 127.

Five Stages of the Diffusion Process

In his book *Inventive Activity, Diffusion, and Stages of Economic Growth*, Stanislaw Gomulka identifies five stages of technological growth that any economy in the world can be divided. They are:

(1) by and large balanced growth at a low rate,

(2) transition phase of gradually increasing the characteristic rate of growth.(Gomulka states that there are four characteristic rates of growth),

(3) high level of roughly semi-balanced growth,

(4) transition phase of gradually decreasing characteristic rate of growth,

(5) by and large balanced growth at a relatively low rate, possibly close to the rate of growth of the country's population.

The first stage.

In this phase of development the technological sector as well as the level of technology are in their "embryonic" stages. Both the share and rate of growth are low. The society is frequently faced with a great scarcity of primary commodities, living on a low level of subsistence, and with a lack of medical facilities (Gomulko 1971). Although the birth rate is high, the expansion rate of the technological sector is almost zero. There are two channels for diffusion to a less developed country. The first channel for diffusion is the exchange of knowledge and the second channel for diffusion is innovations from other countries. For either one of these channels to be utilized, so that the diffusion rate of a less developed country expands, is dependent upon two factors:

(1) the degree of openness and receptivity from the underdeveloped country, and

(2) the rate of growth of exports.

The 'degree of openness and receptivity' of an underdeveloped country is influenced by three main conditions:

(1) transportation sectors within the country,

(2) communication sectors within the country, and

(3) the general education levels of the population.

All of these conditions tend to be low in underdeveloped nations. Low levels of transportation, communication, and education produces a low degree of openness, making the less developed country almost closed to the diffusion process.

Gomulka summarizes that the above hypothesis of a low rate of growth during the first stage can be due to the following three main reasons:

(1) low rate of growth of the total population,

(2) very limited growth of the technological sector,

(3) relatively little communication with more advanced countries.

The second stage.

The rate of growth of the total population gradually begins to accelerate due to increased

knowledge and achievement of a certain level of technology. The increased knowledge and technology achievement is due to improvements in food production and medical facilities. "New expanded supply and demand by society necessitates a larger absorption of foreign-made innovations and augmentation of the technological sector." (Gomulka 1971)

The third stage.

The third stage is a continuation of the growth rate at the end of the second stage. Growth is brought about by the high rate of growth of the technological sector and/or by massive diffusion.

The fourth stage.

The rapid rate of the third stage decreases due to an exhaustion of one or more of the growth rate variables.

The fifth stage.

The fifth stage is congruent with the growth of the country when it:

- (a) is already a part of the technologically leading area of the world,
- (b) expansion of the economy follows growth of the country's population. The growth of the country's population is the independent variable, or principal determinant of the former.

Just as the adoption process relates to market segmentation, Gomulka presents an example of how the diffusion process can be applied to the economy and technological levels of less developed countries.

The New Learning about Innovation

Mark Dodgson and John Bessant in their book *"Effective Innovation Policy: A New Approach"* recognize that 'success' in innovation is not simply a matter of moving a resource from A to B, but "the capability on the part of the recipient to do something useful with that resource", in other words, to innovate effectively.

Dodgson and Bessant acknowledge that innovation is not an "instantaneous event, but a time-based process involving several stages". They have identified these stages as:

- (1) initial recognition of opportunity or need,
- (2) search,
- (3) comparison,
- (4) selection,
- (5) acquisition,
- (6) implementation, and
- (7) long-term use (involving learning and development).

Every herd of wild cattle has its leaders, its influential heads.
-Gabriel Tarde, *The Laws of Imitation*

Summary

The diffusion of innovation process consists of four main elements: the innovation, communication through certain channels, over time, and among the members of a social system. Research concerning the diffusion of innovation process has increased significantly the past several decades due to its' versatility. A universality or similarity found amongst the various research studies on the diffusion of innovation process is that the adoption process or the rate of diffusion can be charted on an S-shaped curve.

Of vast importance to those in the advertising field is the innovation-decision process. Rogers defines the innovation-decision process as the process through which an individual passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision.

The diffusion of innovation process can be tracked on a micro level as is the case of an individual who is a targeted member of an audience, or traced at the macro level when considering economic development or technological advances. In either instance, during the course of the twentieth century the diffusion of innovation theory has proven to be versatile, universal, but most important relevant.

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