The Process of Innovation and the Diffusion of Innovation

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"Innovate or Perish" is the marketer's cry of the 1960s. And "Perish as You Innovate" could well be the marketing slogan of the 1970s.

But several questions arise.

Can innovation be programmed to occur? What is the nature of the diffusion process? Can consumer "innovators" be identified and appealed to? How do advertising and personal influence compare in effectiveness for new product diffusion?

Here are some answers to these questions.

THEORIES of innovation in business have stemmed mainly from the work of economist Joseph A. Schumpeter. He viewed innovation as distinctly different from invention, which he held occurred in isolation of innovation and which could or could not be coupled with innovation.

He further envisioned innovation as being characterized by: (1) construction of new plants and equipment, (2) introduction of new firms, and (3) the rise to leadership of new men. From this point of view, innovation is a discontinuous event.

Only in the last few years have behavioral scientists devoted much attention to the subject of innovation, although the literature certainly abounds with discussions on creativity—especially as to how the creative process occurs within the self.

Anthropologist H. G. Barnett alludes to innovation as the basis of cultural change, and defines innovation as "any thought, behavior, or thing that is new because it is qualitatively different from existing forms." This is a considerably broader definition than Schumpeter's "setting up of a new production function." Sociologist Everett M. Rogers broadens the definition even further by referring to innovation as "an idea perceived as new by the individual." The present article outlines the process by which innovation occurs. Schumpeter's distinction between invention and innovation merely produces the illusion of separate events.

Innovation takes place via a process whereby a new "thought, behavior, or thing," which is "qualitatively different from existing forms," is conceived of and brought into reality. Given the innovation, we then need to pay particular attention to its diffusion. By this is meant the process by which the innovation spreads from its source of invention to its ultimate users or adopters.

The Innovation Process

Several theories have been proposed to account for the innovation process. Predominant in the literature of economics has been the "transcendentalist" approach, which attributes innovation to

3 Schumpeter, same reference as footnote 1, at p. 87.
5 Barnett, same reference as footnote 2.
the “inspiration of genius.” Such an approach is typified by the following observation: “While at all times there live creative men . . . no prediction is possible as to where they will appear in any particular moment or how they will act. The creative entrepreneur being a deviant, he and his work are unpredictable.”

In sociological thinking, there is the “mechanistic” theory, which emphasizes that innovation represents “an accumulation of many individual items over a relatively long period of time.” Barnett asserts that “No innovation springs full-blown out of nothing: it must have antecedents . . . .”

Economist Abbott Payson Usher combines both views to a certain extent, while rejecting the validity of either view standing alone. He points out that innovation is not an accidental affair, as believed by the “transcendentalists,” but that neither is it a mechanistic affair, as this view would overlook the discontinuities inherent in the process of innovation. Usher proposes the “cumulative-synthesis” approach—that major inventions are the result of the cumulative synthesis of “many individual items of novelty as well as many familiar elements.” To him, the “act of insight” in the synthesis is the crucial stage.

The innovation process which Usher proposes consists of four steps:

1. Perception of the problem. In order for innovation to occur, a problem must first be felt to exist.
2. Setting of the stage. Some particular configuration of events is brought together.
3. The act of insight. Here the solution is found. Insight is needed, due to the uncertainty involved and because of the various possible solutions.
4. The critical revision. The innovation is analyzed, to determine how practical it is.

**Empirical Studies**

The innovation process has been studied empirically in several instances. Of particular value is a study of the machine-tool industry by William H. Brown, whose hypothesis is that innovation in this industry is a planned attempt to increase demand for machine tools. His analysis indicates that innovation occurs when the demand for machine tools falls, and furthermore that innovation need not be discontinuous in nature, as economists such as Schumpeter have suggested. Rather, he holds that innovation can in fact be programed to occur.

Both sociological thinking, which emphasizes that an innovation is merely a recombination of old innovations, and Usher’s “cumulative-synthesis” approach also indicate that innovation need not be discontinuous. When a manufacturer finds through research that a more convenient breakfast drink than a frozen drink is demanded by consumers, he can program the occurrence of such an innovation. Once the problem is perceived, he can bring together in his laboratory all the drinks presently available—from frozen drinks to powdered drinks, and so on. Via an act of insight and a regrouping of the basic elements involved, he can innovate a new soft drink by combining some of the ingredients of a soft drink already in existence with Vitamin C, orange flavoring, and other available ingredients. Market testing and critical revision of the product then follow.

**Framework for Classifying Innovations**

Is it possible to develop a conceptual framework for classifying innovations as to their effects on established patterns? The following is representative of such a framework.

Innovations may be classified as (1) continuous innovations, (2) dynamically continuous innovations, and (3) discontinuous innovations.

1. A continuous innovation has the least disrupting influence on established patterns. Alteration of a product is involved, rather than the establishment of a new product. Examples: fluoride toothpaste; new-model automobile changeovers; menthol cigarettes.

2. A dynamically continuous innovation has more disrupting effects than a continuous innovation, although it still does not generally alter established patterns. It may involve the creation of a new product or the alteration of an existing

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8 Usher, same reference as footnote 6, at p. 61.
9 Barnett, same reference as footnote 2, at p. 181.
10 Usher, same reference as footnote 6, at p. 68.
product. Examples: electric toothbrushes; the Mustang automobile; Touch-Tone telephones.

3. A discontinuous innovation involves the establishment of a new product and the establishment of new behavior patterns. Examples: television; computers.

Returning to Brown's study of the machine-tool industry and relating it to the innovation process proposed by Usher, we realize that the perception of the problem in the machine-tool industry (a fall in demand) implies the need for an innovative answer. The stage is then set for innovation to occur. A "shelf" or series of design ideas is common to firms in this industry. "The shelf is made up of suggestions, complaints, basic ideas, reports on research done outside the firm, etc." Thus, the configuration of events from which the solution will be drawn is quite readily available.

The act of insight and the critical revision stages in the innovation process were outside the scope of Brown's study; but, as indicated earlier, a whole body of literature is built around the concept of "creativity" or the "act of insight." This literature remains to be related to the total innovation concept.

Much innovation today is programmed innovation. This is true for both industrial goods and for consumer goods, where marketers are constantly trying to differentiate products via innovation in order to increase their market share. The annual automobile "change-over" is an excellent example of psychological obsolescence, or, in the present terms, programmed innovation.

The Diffusion Process

Given the innovation, the problem becomes that of diffusion. However, a theoretical model of the diffusion process is difficult because of the tremendously large number of variables involved.

The questions posed are numerous: Does diffusion occur in some predictable manner? Is there such a person as a consumer-innovator, and can he be identified? (Innovator here is used to refer to the earliest adopter in the diffusion process, rather than the creator or inventor of the product.) How do advertising and personal influence compare in effectiveness for new product diffusion?

If these questions alone could be answered, considerable waste would be avoided in the marketing of new products. For example, if we knew that a set of innovators existed for automobiles, manufacturers could concentrate on this innovative set in introducing a new product and avoid expensive mass-media advertising until the innovator-level of penetration had been achieved and the mass market was ready to adopt the product.

We cannot pretend to arrive at an all-encompassing theory of diffusion here. But we can attempt to build a general model of the diffusion process, and discuss some of the key variables involved.

How the Process Occurs

The diffusion process is looked on by sociologist Everett M. Rogers as an orderly sequence of events. He proposes a diffusion curve, which is essentially a normal curve of distribution, as shown in Figure 1.

Rogers is referring specifically to the adoption of an innovation by farmers over a given period of time. His reference to innovators is to those who are first in the adoption process, which actually stretches from innovators to laggards, or those who adopt last. The question is whether the Rogers model, which assumes 100% adoption, is a valid model to describe diffusion of marketing innovations.

First, let us compare Rogers' rural-diffusion model with an industrial-diffusion process described in a 1961 study of the rapidity with which 12 innovations spread among firms in the bituminous coal, iron and steel, brewing, and railroad industries. This study confirms the Rogers model to a considerable extent. The investigator, Edwin Mansfield, found that the proportion of firms already using an innovation would increase the rate of adoption, in other words, that competitive pressures would create a "bandwagon" effect. This corresponds closely to the Rogers model, where diffusion occurs slowly until the early majority stage and then "snowballs."

Now, let us turn to an empirical investigation of the diffusion of an innovation among physicians in four cities. Here again the Rogers model of

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12 Same reference as footnote 11, at p. 409.
The Process of Innovation and the Diffusion of Innovation stages of diffusion appears to be validated. The study indicates that the socially integrated physicians in the community—that is, those best accepted by their peers—tended to adopt in a "chain-reaction" manner.

The studies referred to do not account for the diffusion of all innovations, of course. In fact, they account for the diffusion process of only a small percentage of innovations—those that are decidedly better than existing forms and where it is only a matter of time before most people adopt. For example, the innovation of concern in the study of physicians was a "miracle drug" which was actually superior to previous drugs then on the market. Most farming innovations studied—hybrid corn, for example—could be proved superior by objective measures of crop yield.

For most marketing innovations, however, not everyone will adopt, because the product will not be actually superior to existing forms or brands—or not seemingly so in the mind of the consumer, because of the lack of objective measuring criteria.

An ever-incomplete curve of adoption is, therefore, the case for innovations in marketing. And yet the conceptual sequence proposed is a considerable aid to understanding the diffusion process.

Advertising Compared with Personal Influence

What are the effects of advertising as compared with personal influence?

The model portraying the impact of mass media advertising has undergone some drastic changes over the years. In the 1920s, the structure of the model was such that the millions of people who read their newspapers or listened to their radios assumedly were aroused to action because of exposure to powerful buying stimuli. In other words, a "vertical" model of communication supposedly existed, whereby the audience was viewed as "a mass of disconnected individuals hooked up to the media but not to each other . . ."°

A study in Albany in 1940 during the course of the presidential campaign showed that this was far from a correct view. This was the first of a series of studies that "rediscovered" the primary group and its influence upon voting, buying, and other forms of behavior.

Radio and the printed page were found to have "only negligible effects on actual vote decisions and particularly minute effects on changes in vote decisions."°° The individual's primary group held the greatest influence over him. Voting decisions, particularly those involving a change in voting behavior, were found to be most often influenced by "other people." Further analysis indicated that those individuals more influential than others in affecting voting behavior were more often influenced by mass media than those who were less influential. Thus, a "two-step flow of communication" model was derived.

The "two-step flow of communication" implies basically that the mass media actually influence opinion-leaders, who in turn influence the less-influential people. Furthermore, opinion-leaders are scattered throughout society at all social-class levels, in all occupations, and in all communities.°°°

In their 1945 Decatur study, Katz and Lazarsfeld specifically analyzed the effects of mass-media advertising as compared with personal influence in the areas of fashion, public affairs, and movies. Again, justification was found for the greater importance for most people of personal influence than for advertising.°°°

Other models of the diffusion effect of the mass media also exist. Elmo Roper has proposed the "concentric-circle" theory, as to how ideas flow throughout society.°°° See Figure 2.

According to the Roper theory, ideas diffuse in circles, much as ripples on the water after a pebble has disturbed the surface. The "Great Thinkers" are the idea men, and these ideas eventually reach the "Politically Inert" who form the bulk of so-


°°°° Katz, same reference as footnote 18, at p. 63.

°°°° Katz and Lazarsfeld, same reference as footnote 19, at pp. 309-320.

Society, approximately 70% of the people. Roper says, "There is some evidence that ideas can be communicated to the Politically Inert by way of the mass media. But I think it is an assumption worthy of greater research that the Politically Inert come to accept ideas more readily from their Participating Citizen neighbors . . ."\(^{23}\) His concentric-circle theory does not conflict with the two-step model, but in a sense is an extension of it.

Some sociologists hold that "the average person is likely to be affected more strongly by social pressures, group associations, and the attitudes of 'opinion leaders' he knows than by direct use of the mass media."\(^{24}\) If this is true, we should hypothesize that a company, in introducing an innovation, should advertise less to the masses and more to opinion leaders. It should use specialized media to reach group influencers, rather than using mass media to reach the masses.

However, there are practical difficulties. For the most part, advertisers have not oriented their product-messages in line with a two-step theory of communication. Part of the difficulty is due to the fact that different opinion-leaders may exist for different consumption systems. Clothing may be looked upon as a consumption system, as well as entertainment or food. Influentials may exist for each such system; but finding out specifically who the influentials are for any one system would be difficult, to say the least.

Advertisers can question the two-step model, arguing that it may be effective in the dissemination of ideas, but that it is not valid in the dissemination of information about products and services because everyone is interested in them.

The value of the two-step theory comes in realizing that mediating factors do exist between the product message and the act of adoption. Other people are a major factor in the communications-flow. Where it is possible to take advantage of personal-influence channels, this should be done. Media selection is only one part of the total possible communications mix.

**Social Integration of Innovators**

In a study referred to earlier regarding physicians, it was concluded that "the degree of a doctor's integration among his local colleagues was strongly and positively related to the date of his first use of the new drug," and that "the more isolated doctors, on the average, introduced (the product) considerably later than the socially more integrated doctors."\(^{25}\)

However, findings concerning social integration are not consistent. Rogers' conclusions imply that innovators are "marginal" members of the community—the least socially integrated of all. States Rogers, "Agricultural innovators were perceived as deviant by other members of their local social system . . . Thus, innovators are in step with a different drummer."\(^{26}\)

Says anthropologist Barnett, "There are biographical determinants for the lack of satisfaction that is characteristic of individuals who are predisposed to accept a substitute for some accustomed idea . . ."; and "acceptance probabilities are weighted on the side of the dissenter."\(^{27}\)

Can the differences in findings be reconciled? Elihu Katz concludes that whether innovators will be socially integrated or not is a function of the **risk** in adoption and the **norms** of the social system.

In regard to the study of physicians, Katz reasons that "innovation in medicine is risky business." He continues: "A new drug represents a highly ambiguous stimulus . . . In this kind of situation, communication among colleagues serves to spread, and thus to reduce, the individual risk."\(^{28}\) Furthermore, there is no question for the doctor, as there is for the farmer, of emancipation from local primary groups as a prerequisite to the acceptance of innovation.\(^{29}\)

In agriculture, risk in purchase is considerably reduced through the scientific efforts of the Agricultural Extension Service. Even commercial sources frequently offer financial proof of greater farm productivity for many innovations. Such is not the case in the realm of physicians. In agriculture, the normative structure typically has been considered more traditional than that existing in the rest of society. Whereas the farming innovator must "emanipate" himself from such traditional norms, the physician innovator need not.

How socially integrated will marketing innovators be? Purchase of an innovation can seldom amount to a financial saving. At the most, the consumer can hope for a savings in time or energy. Raymond A. Bauer has considered the topic of risk in marketing and concludes, "Consumer behavior involves risk in the sense that any action of a consumer will produce consequences which he cannot anticipate

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\(^{23}\) Katz and Lazarsfeld, same reference as footnote 19, at p. xix.


\(^{25}\) Coleman, Katz, and Menzel, same reference as footnote 17, at pp. 257 and 267.

\(^{26}\) Rogers, same reference as footnote 4, at p. 207.

\(^{27}\) Barnett, same reference as footnote 2, at pp. 379, 381.


\(^{29}\) Katz, same reference as footnote 28, at p. 80.
with anything approximating certainty, and some- of which at least are likely to be unpleasant.30

Consumers, like physicians, are faced with an “ambiguous stimulus.” Sources of objective communication are scarce. Communication with other consumers, however, can reduce risk in the purchase decision; and socially-integrated persons are in a more advantageous position than others to engage in such communications and to innovate.

The overall norms in marketing favor innovation, as evidenced by the American consumer’s fascination with new products and the advertiser’s continued emphasis upon “new.” Accordingly, the marketing innovator should be aware of the socially integrated, since such individuals are the most norm-conscious and norm-abiding.31

In Conclusion

Innovation has been defined as a process whereby a new thought, behavior, or thing is conceived of and brought into reality. Several conclusions can now be drawn:

1. An innovation can be programmed to occur.
2. An innovation can be classified according to its effects on established patterns, from almost no disrupting influence to establishment of new behavior-patterns.
3. In many ways personal influence may be superior to advertising; but it is difficult to utilize personal-influence channels.
4. When significant risk is present in the purchase situation and when the norms of the group favor innovation, the innovators will be socially-integrated members of the community.


31 Katz, same reference as footnote 28, at p. 73.

MARKETING MEMO

A Basic Organizational Concept . . .

The work of mankind is done through three principal groupings, the family, the state, and in between, the groups that willingly join to achieve common purposes. Primitive and feudal societies knew little of the vast resources that are represented by sustained voluntary group action. It is this unforced coming together of human energy and effort, outside the family and apart from political instrumentalities, which has fueled material progress and expanded the range of personal choice in what have come to be identified as pluralistic societies. Of all voluntary associations, the business corporation is today perhaps the most significant.
