

## Chapter Ten

### Perceived Risk and Diffusion of Innovations

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ANY ONE WHO IS FAMILIAR with the research on diffusion of innovations must have noted that certain characteristics of the diffusion process have been repeatedly researched. For example, major aspects such as rate of adoption of the innovation, the mental process of the adopter supposedly starting with awareness of the innovation and completing with its adoption, the differences between the early adopters and late adopters, and the role of informal word-of-mouth communication are quite common across the research on diffusion of a diverse group of innovations.

A closer look at the research on diffusion of innovations also reveals that seldom has a study been conducted based on prior theoretical considerations.<sup>1</sup> Instead, research has been empirical exploration taking advantage of the available situation. From the viewpoint of the development of the discipline, empirical research without any theory is not only necessary but sometimes desirable in the early stages of its development. Most disciplines have had the same historical path. However, lack of theory inevitably creates a situation where separate research studies are either inconsistent or contradict one another. The research on diffusion of innovations is no exception. Take, for example,

<sup>1</sup> For two recent good exceptions, however, see Johan Arndt, *Word of Mouth Advertising: The Role of Product-Related Conversations in the Diffusion of a New Food Product*, Unpublished Doctoral Dissertation, Graduate School of Business Administration, Harvard University, 1966; and John G. Myers, "Patterns of Interpersonal Influence in the Adoption of New Products," in Raymond M. Haas (ed.), *Science, Technology, and Marketing*, Proceedings of the 1966 Fall Conference of the American Marketing Association (Chicago: American Marketing Association, 1966), pp. 750-757.

the Ryan and Gross study on diffusion of hybrid corn.<sup>2</sup> A clear neglect of the two-step flow of communication was found in the study. Or, for that matter, in the pesticide drug study there existed two-way communication and influence instead of the one-way communication and influence implied in the two-step flow hypothesis.

Katz' has, past facts, attempted to reconcile the two studies on the grounds that (1) values of the two communities differed in the sense that innovating farmers were considered social deviants whereas innovating doctors had the same social integration in the local community and (2) that there existed special importance of interpersonal communication for early adopting physicians because of high risk involved. Two other explanations, however, can be equally advanced. First, in the farm community, certain families are regarded as leaders because of past history of the families, size of their farms and higher social status. This would create a leader-follower situation which may be manifested in the adoption of hybrid corn. Among the doctors however, similarity and homogeneity of background of doctors creates more of an equal status relation than leader-follower relation, hence the influence is likely to be both ways, as was found. Second, in the adoption of a drug, there is no monetary commitment on the part of the physician; economic constraints are lacking. However, there is a good degree of risk which could be reduced by simultaneous widespread adoption of the drug. When it comes to adoption of a substantially new method of farming, the farmer is hanging an economic sword over his head because if the crop fails, he is ruined. This economic constraint forces him to wait and see material results from the adoption of a moderately new farming method by other more well-to-do farmers who can afford economic risk. They also tend not to be opinion leaders.

Another inconsistent finding comes in the area of classification of the mental process of adoption of an innovation. In general, researchers have assumed or found a stochastic process which is described as Awareness - Interest - Evaluation - Trial -

<sup>2</sup> Bryce Ryan and Neal L. Gross, "The Diffusion of Hybrid Seed Corn on Two Iowa Communities," *Rural Sociology*, VII (May, 1942), pp. 15-21.

<sup>3</sup> James G. Galbraith, Elhanan Katz, and Harold M. Miller, "The Diffusion of an Innovation Among Physicians," *Sociometry*, XX (November, 1957), pp. 274-279.

<sup>4</sup> Elhanan Katz, "The Social Structure of Technical Change: A Study on the Diffusion of Innovation," *Journal of Applied Social Psychology*, I (1951), pp. 30-32.

Adoption. However, the only empirical study by Mason<sup>5</sup> has supported at least a stochastic process of Awareness - Adoption.

The fact and more dramatic example comes from the replication of the drug study by Winick<sup>6</sup> but in a large Metropolitan area. He found no evidence for many of the findings of the drug study which he attributes to the effect of interaction pattern of doctors (sociometry structure) in a metropolitan area as contrasted with that of a small town.

To me it appears that we have sufficient empirical knowledge in the field. I believe that we must research a great deal on good theoretical reasoning rather than blindly obtain data on another innovation on the grounds of convenience and ease in implementation. It also appears to me that the first step in this direction is to consider the adopter's perception of the magnitude of risk involved in an innovation. For such perceived risk is the result of the interaction of the characteristics of the innovation such as relative advantage, compatibility and divisibility,<sup>7</sup> and the consumer's prior experience in the same or similar situation. Depending upon the magnitude of risk perceived in an innovation, two products may exhibit widely different patterns of diffusion on aspects such as rate of adoption, word-of-mouth communication and importance of two-step flow of communication.<sup>8</sup>

In emphasizing these aspects, we see that diffusion theory has offered only limited implications for marketing purposes. Two obvious areas of this limitation can be easily cited. First, most innovations in marketing are product changes and not radically new products or services. The consumer has considerable experience in accurately evaluating the benefits of the innovation. The diffusion research, on the other hand, has emphasized only the radically new products such as hybrid seeds or a miracle drug. Secondly, most successful innovations in marketing have a great relative advantage over existing products. At least, innovations in marketing do not possess negative benefits to the consumer. In other words, the magnitude of perceived risk is low on both the grounds that the consumer is faced off an expert

<sup>5</sup> Robert Mason, "An Ordinal Scale for Measuring the Adoption Process," in Elhanan Katz et al., *Studies of Innovation and of Communication Research*, Stanford, California: Institute for Communication Research, Stanford University, 1962, pp. 49-116.

<sup>6</sup> Charles Winick, "The Diffusion of an Innovation Among Physicians in a Large City," *Sociometry*, XXV (1962), pp. 281-290.

<sup>7</sup> See Elhanan Katz, *Diffusion of Innovations* (New York: The Free Press, 1962).

<sup>8</sup> See Johan Knut, *Word of Mouth Advertising* (New York: Alvers Group, Inc., 1967), pp. 27-32.

and therefore more certain and that the adverse consequences are lessening. The opposite seems to be the case in the Wilkinson research.

An innovation like a miracle drug will be a high-risk innovation because the side effects may be dangerous. The uncertainty about these side effects is high because the drug is radically new, there are few precedents to rely upon, and the time required to find out the side effects is probably very long. A high risk innovation will generally ensure greater deliberation prior to adoption, a slow rate of adoption in the beginning, a snowball effect later on due to word-of-mouth communication and imitation, and greater personal influence in the adoption process.

On the other hand, contrast an innovation like soft margarine, which is likely to be a low risk innovation. There are no adverse consequences, and alternatively it has strong relative advantage on at least one purchase criterion—taste, spreadability. It would appear that this relative advantage is so strong that even butter users may adopt soft margarine. Similarly, the uncertainty is low on at least two grounds: (1) The innovation is only a product change and not a radically new product; the consumer can very easily generalize his experiences with the use of stick margarine and (2) the consumer himself is an expert since both the roles of the buyer and user are vested in the same person. Further, margarine is an edible product which can be evaluated immediately. If the innovation is a low risk innovation coupled with good relative advantage, then we should expect a high rate of adoption in a very short period of time, less deliberation and, therefore, a compressed mental process, less influence of personal sources, and no snowball effect such as found in the drug study.

#### Background Information on Stainless Steel Blades

The study reported in this paper stems from the above theoretical thinking. It is a study on the adoption of stainless steel blades. On a prior grounds, the stainless steel blade seems to be an innovation which is low in risk and high in relative advantage—very similar to the soft margarine example detailed above. It is only a product change and not a radically new product, at least in terms of the consumer's goal satisfaction. The consumer is both the buyer and user and he can easily differentiate and judge both positive and negative uses. There are no precedents in shaving razors. Due to the above reasons, we expect the innovation immediately and in a very short period of time. The adverse consequences are probably very low and, therefore,

stainless steel blades have proved to possess a strong relative advantage both in economy and about all in shaving.

The study was undertaken in the Fall of 1963, at a time when there was rapid influx of all the major brands in the market following the success of Wilkinson blades. Wilkinson, a well-known British firm for gardening tools and traditionally famous for making ceremonial swords, had introduced stainless steel blades in England in 1961. In no time, the blades became very popular owing to strong advantages in shaving comfort and Wilkinson obtained about ten per cent of the blade market despite the fact that the blade cost twenty per cent more than the premium blades of Gillette.<sup>1</sup> The rapid success of the stainless steel blades was noted by some dealers in the United States—particularly in New York—who obtained dealerships for Wilkinson blades in this country. The blades became so successful—primarily due to strong favorable word-of-mouth communication—that there existed black market prices for a while. However, Wilkinson Company was more interested in marketing its gardening tools in the United States than its blades. To achieve this end, it gave blade dealership to only those stores who would carry the gardening tools. This resulted in retail selling of blades primarily in hardware and paint shops. Wilkinson blades were introduced in this country in March 1962 but owing to total lack of promotion and an abhorrent distribution policy, it obtained only two per cent of the blade market in 1963.<sup>2</sup>

The impact of the strong word of mouth communication, extensive of black market prices and sufficient write-up in the trade journals, immediately caught the attention of the three big firms in the industry. Gillette had already felt the impact of Wilkinson blades in England, and Every Sharp and American Safety Razor saw the potential market. However, owing to serious manufacturing problems—particularly with regard to maintaining consistent quality and the high unit cost—there existed hesitancy for some time. The first introduction came from Schick in two test markets in early 1963, followed by the national introduction of Personna in May 1963. Schick also began to market the stainless steel blades nationally in August, 1963 and the giant of the industry, Gillette, introduced its brand of stainless steel blades in October, 1963 with a \$4 million promotion campaign.<sup>3</sup> In less than a year, stainless steel blades captured 27 per cent of total blade market. The trend continued to grow and, in 1965, it had slightly less than forty per cent of

<sup>1</sup> *Business Week*, January 28, 1964.

<sup>2</sup> *Business Week*, October 20, 1963, and June 23, 1965.

<sup>3</sup> *Business Week*, May 13, 1964.

the local blade market, its entry on the double-edged blades was even much lighter.

#### Hypotheses of the Study

The following are the specific hypotheses derived from the above discussion. It is a priori assumed that perceived risk is very low in a product like stainless steel blades, although no direct questions were asked on this to the respondents.

(1) The less the perceived risk coupled with a strong relative advantage, the faster the mass adoption of the innovation. Thus, we should expect that relative to adoption of firm equipments or miracle drugs, stainless steel blades would be adopted immediately after they were available in the market. We should also expect that the mental process of adoption will be compressed, time-wise so that a large proportion of respondents would adopt immediately after they become aware of their existence and availability.

(2) The less the perceived risk coupled with a strong relative advantage, the less the resistance of change created by prior usage and loyalty to existing products. *If the relative advantage is high, it is likely that heavy users and more experienced consumers will adopt the innovation sooner.* In the case of the stainless steel blades, we should expect that the more experienced shaver, the quicker he should adopt. Also, the more frequent shaver should adopt the product immediately after he becomes aware of its existence and availability.

(3) The less the perceived risk, the greater the information and influence from impersonal commercial sources. Thus, the influence of personal informal sources on the adoption process should be less. We should expect a large proportion of shavers who are informed by mass media and not influenced by personal sources.

#### Survey Design

The data were gathered by a short personal interview with male respondents on two college campuses during the fall term of 1964. Three female students were recruited to conduct the interviews in order to obtain good cooperation from the respondents. The respondents were approached randomly on the campus grounds and each interview lasted, on the average, for about six minutes.

Questions related to the consumer's shaving habits - whether he is a dry or a wet shaver, for how long he has been shaving, etc.

frequency of shaving per week were asked. Then his awareness of the existence of stainless steel blades, his adoption of the blades, his recurrent use of the blades, and his brand preference as well as knowledge of other brands in the market were obtained. Finally, he was asked to recall the time he became aware of the stainless steel blades, what source informed him, whether he adopted immediately after he became aware or some time later, and whether friends and relatives were influential in his adoption of the blades. He was also asked if he had attempted to influence someone else after his own adoption.

More than 900 consumers were interviewed over a period of eight weeks. Completed interviews numbered 877. These were classified into four groups: (1) dry shavers only (245), (2) those who use blades only once a week (38), (3) those who use blades two to four times a week (157), and those who use blades daily (436). The dry shavers were not questioned on their awareness and adoption of stainless steel blades and, therefore, do not become a part of the study. Those who shaved only once a week with blades were generally dry shavers and used the blade for special social occasions. Although they were asked about their awareness and adoption of stainless steel blades, they are not included in the study because of their use of blades as a secondary method of shaving. The study, therefore, is limited to 801 respondents consisting of 444 daily shavers and 357 occasional shavers.

Before we discuss the findings of the study, it must be pointed out that an important definitional problem remains unresolved regarding adoption. Rogers<sup>11</sup> has shown that adoption of an innovation is diversely defined in the diffusion research and very often what amounts to a sample trial of the innovation is considered adoption. In this study, adoption is defined as consideration of stainless steel blades as one additional alternative available to the consumer. All the respondents were not only aware of the existence of stainless steel blades but everyone had tried them. Furthermore, only 30 respondents in the daily shaver group and 14 respondents in the occasional shaver group (total of 44 respondents) discontinued the use of stainless steel blades after using them for some time. In other words, only 7.3 per cent of the respondents discontinued after they tried the stainless steel blades. Others continued to use them at the time of the survey. In view of the fact that only a very small percentage of respondents discontinued their use we have included the effective sample of 601 respondents as adopters.

<sup>11</sup> Rogers, op. cit.

adopted the stainless steel blades immediately after they became aware.

It is worth noting that the time interval between awareness and adoption is generally much shorter for the daily shavers than the occasional shavers. Particularly, there is a vast difference between the two groups in whether they adopted immediately after they became aware.

From the two tables, it can be easily seen that for a low risk innovation also possessing strong relative advantage, the diffusion is faster both in terms of time of adoption and the mental process of adoption.

**TABLE 2**  
Cumulative Number of Respondents Who Adopted Within a Given Time After Becoming Aware of S. S. Blades

Time of Adoption from Time of Awareness	Daily Shaver		Occasional Shaver		Total
	No.	Percentage	No.	Percentage	
Immediately	232	52	60	38	292
Within 2 months	291	65	89	57	380
Within 6 months	346	77	107	68.5	453
Within 9 months	371	83	119	76.5	490
Within 12 months	407	91	137	86.0	544
Within 18 months	415	93	144	92.5	559
Over 18 months	424	95	153	98.0	577
Non-respondent	30	6.5	5	3.0	35
TOTAL	414	100.0	157	100.0	571

Table 2 also provides some data to support the second hypothesis. If the innovation is low in risk and possesses a strong relative advantage, the heavy users of the product seem to adopt faster than the light users. Similarly, Table 3 gives the percentage of adopters who adopted immediately, given that they had a certain number of years of experience in shaving with blades. At the aggregate level, the greater the experience in shaving, the greater is the proportion of respondents who adopted immediately after they became aware. However, when we look at the data for each of the sub-groups (daily and occasional shavers), there seems to be a non-monotonic relation. The proportion to adopt quickly is greater at some critical level of experience and this level is not the same for the two groups. In the case of daily shavers, it appears that there is no relation between the relation between past experience and immediate adoption. In the case of occasional shavers, the relation between past experience and immediate adoption seems to be true for occasional users, except that the

**Findings**

Several sets of data are presented below to test the four specific hypotheses described before. All the hypotheses are supported except that regarding the importance of personal communication and influence. Previous sources were found to be quite important in the adoption of stainless steel blades, and reasons for lack of support of the hypothesis are discussed below.

Table 1 provides the number and percentage of respondents who adopted the stainless steel blades at different points in time. It will be seen that as high as 89 per cent of total respondents adopted the stainless steel blades in slightly more than a year's time from the influx of three major brands in the market in 1963. Surprisingly, however, is the fact that, as many as 51 per cent of total respondents tried the stainless steel blades two or more years ago when only Wilkinson was available in the market. There are at least three explanations for this high penetration. First, a good percentage of respondents had exposure to stainless steel blades in Europe, probably in their summer travel. Secondly, the sample came from the northeast region of the country, where Wilkinson was available and had an unusual magnitude of word-of-mouth communication. Finally, as will be described below, a very large proportion of respondents adopted the stainless blades immediately after they became aware of their existence. Thus the mental process of adoption was compressed in time, resulting in quick mass diffusion.

**TABLE 1**

Time of Adoption	Daily Shaver		Occasional Shaver	
	No.	%	No.	%
Immediately	232	56	60	38
Within 2 months	291	70	89	57
Within 6 months	346	84	107	68.5
Within 9 months	371	90	119	76.5
Within 12 months	407	98	137	86.0
Over 12 months	415	100	144	92.5
Over 18 months	424	102	153	98.0
Non-respondent	30	7	5	3
TOTAL	414	100	157	100

In Table 2 is a tabulation of the cumulative number of respondents who adopted the stainless steel blades within a given time after they became aware of their existence. It will be seen that 95 per cent of daily shavers and 98 per cent of occasional shavers adopted the stainless steel blades within 18 months of becoming aware of their existence.

of Fig. 3. In fact, in the process of adopting a new product, there is a certain degree of hesitancy on the part of the adopter. He is not sure that he will be able to change his behavior. Before that level, however, one would be inclined to expect exploratory behavior in the hopes of gaining complete knowledge of the environment. The difference of two years in the two groups also suggests that frequency of usage may modify this critical level.

TABLE 3  
Percentage of Respondents Who Adopted Innovativeness Given a Certain Level of Shaving Experience

Level of Shaving Experience	Heavy Shavers	Intermediate Shavers	Light Shavers
1	40	65	30
2	34	67	30
3	53	51	40
4	43	29	54
5	50	31	51
6	53	40	50
7	52	32	52

It should be pointed out that the tendency of the heavy and more experienced users of a product to adopt the innovation more readily is likely to occur only if there is a strong relative advantage in the innovation. Since there are more involved in the product and have greater economic or social benefit coming from the advantage, they should be more inclined to change and adopt. This tendency of greater adopter adoption of an innovation possessing a strong relative advantage on the part of the heavy users or more experienced users may enable us to reconcile several contradictory findings. In the diffusion of Folger's coffee,<sup>12</sup> there seemed to exist no strong advantage (and, therefore, incentive) to heavy users to adopt. It may be that the light users, on the other hand, in the diffusion of tourism offices,<sup>13</sup>

<sup>12</sup> Ronald E. Frank, William F. Mass, and Donald G. Armstrong, "The Determinants of Innovator Behavior with Respect to a Brand-Name Product: Perceived Brand Benefit," in George Smith (ed.), *High-Technology in Marketing: Proceedings of the 1964 Educators Conference of the American Marketing Association* (Chicago: American Marketing Association, 1967), pp. 212-221.  
<sup>13</sup> See John Smith, *Report of Youth Advantages for the Adoption of Product-Related Innovations in the Diffusion of a New Product* (New York: Applied Behavioral Development Institute, School of Business Administration, Baruch University, 1966).

TABLE 4

Source of Awareness of S. S. Blades\*

Time of Adoption	Television			Store Display			Newspapers			Magazines			Radio			Calendars			Father			Friend			Other		
	O	D	T	O	D	T	O	D	T	O	D	T	O	D	T	O	D	T	O	D	T	O	D	T	O	D	T
Immediately	21	57	108	11	24	42	7	15	26	1	10	11	0	3	0	2	12	12	9	18	27	11	26	90	6	11	17
1 to 3 mos.	21	30	51	1	2	3	1	2	3	2	4	6	3	0	3	0	0	0	2	1	1	3	10	21	0	1	1
4 to 6	10	25	35	0	5	5	0	6	6	0	8	0	1	5	6	1	1	2	0	5	5	1	11	15	7	2	1
7 to 9	10	8	18	1	5	6	0	2	2	11	3	3	1	1	2	0	0	0	0	1	1	2	2	3	0	1	1
10 to 12	6	22	30	1	1	2	3	2	3	3	3	6	2	3	5	1	1	2	11	3	3	3	2	11	1	1	1
12 to 18	4	3	7	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	5	2	0	2
Over 18	4	4	8	1	1	1	0	1	1	0	3	3	1	2	3	0	0	0	0	0	0	0	3	3	1	0	1
Total	16	150	235	12	31	60	7	31	36	0	31	37	8	19	27	1	14	18	12	20	11	12	121	131	12	21	37

O = Original Source  
D = Direct Source  
T = Total Sample

\* The total number exceeds the sample size because some respondents give more than one source which made them aware.





had adopted the blades. Out of 601 respondents, only 44 or 7.3 per cent discontinued the use of stainless steel blades after adoption. As many as 82 per cent of the respondents had adopted the blades to slightly more than a year's time.

The adoption process was compressed in time. More than 80 per cent of the respondents adopted within one year after becoming aware of availability of stainless steel blades. More importantly, as many as 49 per cent of the respondents adopted immediately after they became aware.

Heavy users of blades (daily shavers) manifested much shorter adoption process than occasional users of blades (two to four times a week shavers). Fifty-two per cent of the former group, as contrasted to 38 per cent of the latter, adopted immediately after becoming aware. Also, more experienced shavers manifested a shorter adoption process. For example, only 38 per cent of the respondents who had one year's shaving experience adopted the innovation immediately after becoming aware. However, 52 per cent of the respondents who had seven or more years of experience adopted it immediately.

Personal sources were not more important in informing the respondents. Only 35 per cent of the respondents were informed by personal sources. However, personal sources were found to be important in influencing the respondents to adopt the stainless steel blades. Close to 40 per cent of the respondents admitted that personal sources were influential in their decision to adopt the stainless steel blades. More importantly, most of the respondents who were influenced by personal sources were also informed by personal sources. This suggests that there is a segment of respondents which relies on interpersonal relations for information and evaluation of new products.

Finally, an interesting finding which has implications for the two-step flow hypothesis is that respondents who were influenced by personal sources, in turn, attempted to influence others much more (close to four times) than those who were not influenced by personal sources. It suggests that there existed a *structure of opinion leadership* in the diffusion of stainless steel blades. This implies that word of mouth is a very powerful channel of communication.

## Chapter Eleven

ONE OF THE MOST interesting findings from the 1940 study of the "two-step" opinion leaders were in leaders and that was important source of information. Berelson, and Gaudet<sup>1</sup>

"Ideas often flow from them to the less active"

In its original form it was restated as follows:

1. Messages (information) (mass media) to
2. The opinion leader affected by the information—the second

This conceptualization of the mass media-opinion leaders between few formulations in the past than the two-step model contributed to the "word and lead to the rejection." Second, the the

<sup>1</sup> Paul F. Lazarsfeld, *People's Choice*, 2nd ed., p. 151.

<sup>2</sup> For a discussion of "discovery of people" in a Paul F. Lazarsfeld, *Personality and Mass Communication*, 17-22.