AN INTERPRETIVE AND POSTULATIONAL MODEL FOR PERCEPTION AND ADOPTION OF INNOVATION

DISSERTATION

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The problem with which this research is dealing is the lack of any explanatory model which explains both the perception and the adoption of new products.

One objective of this study is to advance a new conceptual framework concerning both the perception and the adoption of new products. The second objective of this study is to evaluate this new framework theoretically and empirically. Bunge's evaluative criteria are used to evaluate the new model theoretically while Hunter, Schmidt, and Jackson's meta-analysis technique is used to evaluate the model empirically.

An extensive review of literature pertaining to the definition of innovation, the adoption process, and innovativeness is included in the second chapter. Chapter three covers research plan and methods. The new model and its assumptions are presented in chapter four. The results of both theoretical and empirical investigations of the new model are reported in chapter five. Finally, chapter six includes a discussion of the main findings and provides some suggestions for future research.

An interpretive and postulational model is introduced in this study. The model is built on three main assumptions and contains thirty-one different theoretical constructs. Those constructs are bounded together by forty-six theoretical propositions. Those propositions are the postulates or the axioms which state the nature of the interrelationships among all constructs included in the model.

The new model appears to meet most of Bunge's evaluative criteria. Only two criteria are not met by the model which include strength and empirical interpretability. Several suggestions have been made to improve the model with respect to those two criteria. Empirically, the mechanism on which the new model is built appeared to be valid, and some concepts included in the model as well as those theoretical propositions connecting them proved to be empirically valid. Several suggestions have been offered for further investigations of the model.

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CHAPTER I

INTRODUCTION

Diffusion of innovation has been one of the main interests of many disciplines, which include anthropology; early, rural, and medical sociology; education; communications; and marketing. Although all these disciplines are interested in the diffusion process, each handles it from a different perspective. The main interest of anthropologists was to study parallel innovation, which includes the consequences of the introduction of modern Western ideas into primitive societies, and the effect of the receiver's cultural values on the adoption process (Pemberton 1936; Barnett 1941; Dobyns 1951; and Earsmus 1952).

The work of early sociologists concentrated mainly on the diffusion process itself, as is shown in the work of Tarde (1903). He was the first to realize that the adoption of a new practice will follow an S-shaped curve over time, and that there is a process by which the behavior of innovators is imitated by others in the society.

Rural sociologists were interested in the diffusion of certain new agricultural products and technologies; here the works of Ryan and Gross (1943) and Ryan (1948) are prominent. Medical sociologists were concerned mainly with the adoption of some new drugs and techniques by doctors. Noteworthy in this area are the separate and combined works of Coleman, Katz, and Menzel (1955; 1957; and 1960).

The communications area concentrated primarily on the effects of mass media and interpersonal communication channels on human behavior (Lazarsfeld, Berelson and Gaudet 1948; Whyte 1954). Educational tradition was concerned with the spread of certain new teaching techniques (Rogers and Shoemaker 1971). Marketers studied diffusion in order to guide and control the spread of new products (Rogers 1962).

By the end of 1961, there were 405 publications about the diffusion of innovations on which Rogers (1962) based his first conceptual framework about the diffusion process. Nine years later, the number of diffusion publications had almost quadrupled to approximately 1,500, of which about 1,200 were empirical research reports, and 300 were bibliographies, syntheses, theoretical writings, and other types of nonempirical publications. Such a vast increase in the number of publications led Rogers with Shoemaker (1971) to modify and refine Rogers' first

conceptual framework. The total number of generalizations about the diffusion process increased from 52 in 1962 to 101 in 1971.

By the end of 1983, the total number of diffusion publications had more than doubled to 3,085, and the number of empirical research reports had increased from 1,500 to 2,297. For the second time, Rogers (1983) was forced to modify and refine his conceptual framework.

Following the introduction of Rogers' 1962 conceptual framework, most of the work in the diffusion area leaned heavily on it. Midgley (1977, p. 21) says that the main reason for this is that Rogers had collected and synthesized the work of most others in the field.

The central assumptions of Rogers'conceptual framework may be simplified and stated as follows:

(a) Innovations are introduced into a social system and diffused more or less rapidly through that system;

(b) Individuals vary in the speed with which they adopt innovations. Accordingly, they can be classified, based on their relative times of adoption, into a set of five categories which follow a normal distribution;

(c) Individuals undergo a step-wise decision process in adopting an innovation;

(e) The diffusion of innovations within a social system may be aided or hindered by the efforts of opinion

leaders.

Statement of the Problem

Despite the massive research efforts represented by the existing body of diffusion research reports, there are two frustrating areas of imprecision in the diffusion process. The first has to do with the definition of innovation. What constitutes an innovation? Is every new product in the market an innovation? Why are some new products performing successfully in the market while some others are failing? Does the consumer's perception of a new product affect its diffusion process?

According to Rogers, an innovation is "any idea, practice, or object that is perceived as new by an individual or other unit of adoption" (1983, p. 11). If this definition is accepted, then what constitutes an innovation is the consumer's perception of a new idea, practice or object. As Rogers indicates "it matters little, so far as human behavior is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery" (1983, p. 11).

Unfortunately, in most, if not all, of empirical diffusion research, the determination of whether a product is an innovation is made a priori by the researcher

(Robertson and Myers 1969; Summer 1971; and Darden and Reynolds 1974). Such researchers' decisions suffer from subjectivity, and do not coincide with Rogers' definition of innovation. This subjectivity can confound the results of all empirical research reports. For instance, the classification of consumers into Rogers' adopter categories and what follows from it might not necessarily be valid because the consumer's perception is ignored. For example, a laggard (the person who does not adopt a given new product) might be so, not because he is not innovative, but simply because he does not perceive the new product as an innovation. Accordingly, the perception of innovation is a necessary step in the adoption process.

There are many reasons for ignoring the consumer's perception in diffusion studies. The foremost of these reasons is the lack of a well-defined conceptual framework within which to describe this process. A second reason stems from the fact that perception varies from one individual to the other, and for the same individual across different times. Zaltman, Duncan, and Holbeck (1973) state that perception varies according to the different contextual situations the adopting unit may be in.

The second area of frustration is found within the adoption process and innovativeness concept. Why do some consumers adopt a perceived innovation while others do

not? Why, among those who adopt, do some adopt earlier than others? Why do some innovations take only a few months to diffuse while others take years before being diffused?

Over time, the adoption process had been treated as a step-wise decision process. It is described as the mental sequence through which the consumer passes in arriving at an acceptance or rejection decision. The problem with such treatment can be found in its lack of explanatory power as to why certain innovations are adopted and hence succeed in the market while others are not adopted and hence fail in the market. This treatment does not provide those factors or reasons that make an individual decide to either accept or reject an innovation.

According to the above discussion the problem with which this research is dealing is the lack of any explanatory model which explains both the perceptions and the adoption of new products. No explanation has been yet offered in the diffusion area to explain how new products are perceived as innovations, and how such perception affects their adoption.

Objectives of the Study

One of the objectives of this study is to advance a new conceptual framework concerning both the perception and

adoption of new products. This new framework is an attempt to combine both perception and adoption. It is within this new paradigm that the perception of new products is assumed to be a necessary step for their adoption. This new paradigm will also attempt to explain why some products are perceived as innovations. The second objective of this study is to evaluate the new model theoretically and empirically. Theoretically, the model is evaluated by using Bunge's (1967) theory evaluative criteria which are basically selected because of their comprehensiveness and appropriateness. Empirically, some linkages and concepts advanced in the new model are evaluated by investigating some empirical cumulative findings related to them. Hunter, Schmidt, and Jackson (1982) meta-analysis method is selected to be used in this investigation. This method is selected in particular because of its recency and its inherent ability to avoid some of the major problems associated with other meta-analysis methods.

Importance of the Study

The new conceptual framework that will be introduced in this study is interpretive and postulational in nature. The interpretive character of the model is important because none of the diffusion scholars has followed Rogers' definition of innovation; they have not done so because of

the lack of an explanatory model of the perception process even though such a process is a necessary but not sufficient step for the subsequent adoption process. As Ostlund (1974) says, the perception of innovation by the potential adopters can be a more effective predictor of innovative behavior than personal characteristics.

An explanatory model for the adoption process is also important. It is within such an explanation that marketers can discover the mechanism by which their new products are accepted or rejected in the market by potential consumers. This model can also be used to learn about and understand the different reasons why consumers reject new products, which in turn causes a high degree of new-product failure in the market (Zaltman and Wallendorf 1983). Within this understanding, marketers can design and implement different marketing strategies (such as product, pricing, promotional, and channel strategies) that can enhance the chances of new products succeeding in the market (Midgley 1977; Cooper 1979; and Tushman and Moore 1982).

Organization of the Study

Chapter II is devoted to a review of prior research in the areas of innovation definitions, the adoption of innovation, and the innovativeness concept. The chapter is concluded with a brief discussion of some methods which can be used to integrate results across studies.

Chapter III introduces the research plan and methods. It presents the theory evaluative criteria as developed by the philosophers of science, the plan for selecting some linkages and concepts in the new model to be empirically investigated, the criteria for selecting the empirical research reports to be included in the empirical review, method of selecting those empirical research reports, and the method by which those empirical research reports to be analyzed.

Chapter IV presents the new conceptual framework of this study in details. The assumptions as well as the main components of the new model are described in this chapter. The new model is composed of twenty-eight theoretical constructs that are connected by forty-six theoretical propositions which state the direction of the relationships among those constructs.

Chapter V reports the results of the theoretical evaluation of the new model using Bunge's (1967) evaluative criteria as well as the main findings concerning the linkages and concepts that are tested using Hunter, Schmidt, and Jackson (1982) meta-analysis technique. Chapter VI highlights the implications of the results and findings reported in Chapter V, and suggests some possible future research works needed to test the empirical validity of some linkages in the new model.

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CHAPTER II

REVIEW OF LITERATURE

Definitions of Innovation

There are many definitions of innovation. Most of these definitions, however, do not take into account the perception of the relative unit of adoption. Those definitions could be grouped into two different perspectives: technical and novel item perspectives. Since the emphasis of this research is placed on the behavioral aspects of diffusion, only the second perspective will be treated in detail.

The Technical Perspective

One approach is to define innovation from a technical perspective. For example, Myers and Marquis define an innovation as "a complex activity which proceeds from the conceptualization of a new idea to a solution of the problem and then to the actual utilization of a new item of economic or social values" (1969, p. 1). It is obvious from this definition that the emphasis is placed on how innovation is developed rather than on how it is perceived. Such a definition is of little value to marketers in their study of the diffusion of new products.

The Novel Item Perspective

Another perspective for defining innovation is to describe the process wherein an innovation becomes a part of an adopter's cognitive state and behavioral repertoire (Knight 1967; Mohr 1969). The problem with such a perspective is that it concentrates on the internalization and adoption process rather than on defining innovation. Also, this perspective uses innovation to refer to any idea, product, or practice that is regarded as novel, independent of its adoption. One approach under this perspective is to define an innovation as something that is qualitatively different from existing forms. Collier (1964) argues that true innovation means thinking big and acting big. Barnett views an innovation as "any thought, behavior or thing that is new because it is qualitatively different from existing forms" (1953, p. 7). Hagen defines an innovation as an organization of reality into relationships embodying new mental or aesthetic concepts, with the new relationships being an improvement over the old (1962, p. 8). Weiss (1965, p. 101) argues, however, that over 80 percent of new products are not new, but simply modifications of existing products. The Federal Trade Commission suggests that "a product may properly be called 'new' only when [it] is either entirely new or has been changed in a functionally significant and substantial

respect" (1967, p. 1); a product may not be called new when only the package has been altered or some other change made which is functionally insignificant or insubstantial. Bell (1963, p. 86) divides innovations into those that are either strategic or functional. The former involves a product alteration and requires little change for either the firm or the consumer. The latter involves the performance of a previously fulfilled consumer function in a new way and generally requires more change for both the firm and consumer.

A second approach under "the novel item" perspective is to tackle the problem of innovation definition based on newness in time--that is, length of time on the market as a criterion in defining a new product. The Federal Trade Commission (1967) Advisory Opinion limits the use of the word "new" to six months after the product enters its regular distribution. Nourse (1967, pp. 4-10), on the other hand, argues that a new product is new so long as its performance differs substantially from that of other acknowledged, mature products in the same category. Again, this approach suffers from the failure to take into account consumer perceptions of new products.

A third approach under "the novel item" perspective deals with innovation definition in terms of sales penetration level. Both Bell(1963) and Robertson (1966)

arbitrarily call products innovations if they have not yet secured 10 per cent of their total potential market. This approach also suffers from the subjectivity of the researchers in determining the acceptable percentage for considering new products as innovations, as well as ignoring the effect of the perceptions of the potential adopters on the adoption process.

A fourth approach under "the novel item" perspective is to define innovation in terms of its effect on consumer behavior. Robertson (1971, p. 7) suggests that the critical factor in defining an item as an innovation should be its effect upon established patterns of consumption behavior. He suggests that three possible patterns of effect are (a) an innovation that has little possible disruptive impact on behavior patterns is called a continuous innovation; (b) dynamically continuous innovations are those which have a moderate impact on behavior patterns; and (c) discontinuous innovations involve the establishment of new behavior patterns. Implicit within this approach suggested by Robertson (1971) is the agreement that all new products are innovations regardless of consumer perception, which means that this approach is directed toward classifying innovations in terms of their impact on the consumer's consumption

pattern rather than toward actually defining an innovation.

A final approach under "the novel item" perspective is to define innovation in terms of consumer newness to the product. Rogers and Shoemaker define innovation as "any idea, practice, or object perceived as new by the individual" (1971, p. 19). Zaltman, Duncan, and Holbeck define innovation as "any idea, practice, or material artifact perceived to be new by the relative unit of adoption" (1973, p. 19). Both of these definitions concentrate on the consumer's perception of new products. It seems more logical to depend on this approach to define what is meant by innovation for different reasons:

1. An item can be new to the consumer without being substantially different in function from its predecessors.

2. An item can be new to the consumer without being a very recent one in the market.

3. There are both some new products in the market and some customers who are new to the product.

4. Placing the emphasis on the consumer's perception in defining innovation is consistent with a marketing philosophy that looks to the satisfaction of consumer needs.

5. Classifying consumers into different adopter categories can be more valid if it is based on the adopter's perception of innovation.

As Ostlund (1974) suggests, the perception of innovations by potential buyers can be a more effective predictor of innovativeness than personal characteristics variables.

Adoption and Innovativeness

The Step-Wise Decision Process

The adoption of innovation is treated in the diffusion paradigm as a step-wise decision process. It is described as a process occurring within the mind of the individual, and it is defined as the mental sequences of stages through which the consumer passes in arriving at a decision to accept or reject. Different alternative steps have been presented for this process. The oldest of these, from 1957, includes awareness, information, application, trial, and adoption (Beal, Rogers and Bohlen 1957). In 1971, Rogers and Shoemaker introduced revised steps in the decision process--awareness, interest, evaluation, trial, and adoption.

Campbell (1966) also presented another paradigm of the adoption process that differs from the previous sequence in two aspects. First, the adoption process may not be as rational as commonly assumed. Second, the adoption process may not start at awareness; instead, the beginning of the process may be the perception of a problem. Campbell

specifies four forms of the adoption stages:

(a) Rational/problem solving. The adoption stages in this form are problem, awareness, evaluation, rejection, or trial followed by adoption or rejection.
(b) Rational/innovation. Includes awareness, interest, evaluation, trial and adoption or rejection.
(c) Nonrational/problem solving. Here adoption stages are problem, awareness, adoption or rejection and resolution.
(d) Nonrational/innovation. Here stages are awareness, adoption or rejection, and resolution (1966, p. 460).

In 1983 Rogers introduced a different stages model. He defines the innovation decision process as "the process through which an individual or other unit of adoption passes through from first knowledge of an innovation to a decision to adopt or to reject, to implementation of the new idea, and to confirmation of this decision" (1983, p. 165).

In 1962, however, Mason challenged the notion that five discrete stages were necessary to account for adoption. Using the Guttman Technique of Scalogram analysis, Mason found that (a) the sequences of stages proposed by rural sociologists did not occur and (b) several forms of an adoption process were to be found depending on the practice being studied. Mason also found that (c) an evaluation stage occurred before interest and (d) adoption was not the terminal stage but was followed by interest and information seeking. Later, Mason (1963; 1964) investigated the role

played by different communication sources at different stages in the adoption process.

The Temporal Perspective

In addition to treating the adoption of new practices as a step-wise decision, the adoption process was also treated from a temporal perspective. Beal and Bohlen (1958) were the first to introduce a classification scheme of different adopter categories based on their relative time of adoption. Their classification scheme includes five adopter categories--innovators, early adopters, early majority, majority, and non-adopters.

In 1958 Rogers introduced his method of classifying adopters into five adopter categories. He suggested that the criterion on which classification can be made is either the time of adoption of a single new practice or an adoption scale which is based on the number of innovations adopted by an individual from a list of new practices. He also stated that the distribution of both single practice and the adoption scale over time will follow a normal curve. According to Rogers, the innovativeness dimension is continuous as measured by the time at which an individual adopts an innovation or innovations. It is also partitioned into five adopter categories by laying off standard deviations from the average time of adoption; the

five adopter categories are innovators, early adopters,early majority, late majority, and laggards.

Behavioral Characteristics of Innovators

Since Rogers' (1958) conceptual framework of innovativeness lacks any predictive power, diffusion scholars had to wait until the new product under study was completely diffused. Accordingly, diffusion scholars found themselves obligated to develop certain characteristics for innovators to distinguish them from the rest of adopter categories. Such characteristics were believed to help in predicting those who would be the innovators of a given new practice.

To develop such a list of characteristics, different operational definitions of innovativeness were advanced. One of these operational definitions is to use a formula (N%) for the first consumers to adopt a given new item (Rogers 1957; Roberston 1968). Another operational definition is to use the total number of consumers who purchased the greatest number of innovations from a list of new products (Rogers 1957; King 1970; Summers 1971; and Jacoby 1971). The last operational definition of innovativeness is to use the number of individuals who purchased the new product within a short period of time after its introduction to the market (Engel, Blackwell, and

Kegerreis 1969; Uhl, Andrus, and Poulson 1970).

From different diffusion research reports about innovators' characteristics, Belcher (1958) notes that it was found (from a number of rural sociological studies) that innovators tend to be more educated, have higher incomes, own larger farms, and participate more in social activities than do the rest of adopter categories. Beal and Rogers (1958) found that innovators and early adopters were characterized by having more interest in agricultural research, more favorable attitudes toward scientists, and a more accurate perception of the agricultural scientists. Bose (1962) stated that the adopters of new technological practices would be characterized by (a) the urban traits of business attitudes, (b) rationality, and (c) scientific attitudes.

Feaster (1968) developed an innovativeness scale that is based on attitudes toward changes. His data suggest that positive attitudes toward changes correlate with age, education, level of living, extension service contact, and aspirations. Bell (1963) found that innovators tend to be younger, more educated, and possess higher incomes than do other adopter categories. Cohen (1962) found that the degree of an individual's mobility and his values are good predictors of his innovativeness degree. Robertson and Kennedy (1968) found that the most significant variables

in determining whether or not an individual is an innovator were venturesomeness, and having social mobility, integration, and privilege. A portion of these results is reinforced by Loy (1969); he found that having a higher than average education status, and being venturesome, dominant, cosmopolitan, and self-sufficient are the most discriminating characteristics of innovators.

Engel, Blackwell, and Kegerreis (1969) found that innovators perceive themselves to be active disseminators of new product information, and they also tend to have a greater willingness to experiment with new products. They are more likely to buy new products earlier, have a greater tendency to be rational and logical, and are less likely to switch brands for reasons of price.

Uhl, Andrus, and Poulson (1970) found that the major differences between laggards and innovators appears to be income, brand loyalty, and family size. Donnely and Etzel (1973) indicate that different groups of individuals may be innovators of different products depending on the product's attributes, especially in regard to how similar or dissimilar the new product is relative to previous offerings. This could suggest that the attributes of the new product may be as important as behavioral and demographic factors in identifying innovators.

Baumgarten (1974) and Midgley (1974) found that innovators are more willing to take risks, have more favorable attitudes toward change, and are more socially integrated. Baumgarten (1975) states that greater knowledge of the product category would seem to be a necessary prerequisite for innovativeness. Marks and Hughs (1976) found that innovators are more likely to be employed in professional, managerial, or proprietary occupations; they also tend to listen to the radio less frequently, are likely to perceive risks in buying new products, and they tend to be more mobile. Harrison and Burns (1978) found that age is the only demographic variable that discriminates meaningfully between innovators and others. Innovators were also found to be characterized as being venturesome, mobile, gregarious, financially optimistic, and having a view of wide horizons.

The Psychological Characteristics of Innovators

Meanwhile, the psychological characteristics of innovators were also being investigated. However, the results in this area were less inclusive than those in the previous area, especially for the results related to the personality characteristics of innovators (Pizam 1972). Rogers (1958) found significant relationships between

adoption and rigidity, change orientation, innovative proneness, and adoption self-rations; dogmatism and knowledge were not significantly related to adoption. Robertson (1967) found that the innovators of a consumer appliance were significantly more impulsive, active, and dominant than other individuals. Blacke, Perlof, and Heslin (1970) found that dogmatism is significantly related to the acceptance of recent products but not to novel products. The consumer's tolerance for ambiguity may be negatively related to acceptance of novel products.

Chattopdhyay and Pareek (1967) found that adoption behavior can be related to and explained by three value orientation dimensions. These dimensions are conservatism-liberalism, fatalism-scienticism, and authoritarianism-nonauthoritarianism. Donnelly (1970) and Donnelly and Ivancevich (1974) found that innovators were more inner-directed, i.e., more able to make their own decisions. Jacoby (1971) states that low dogmatic individuals were found to be significantly more likely to be innovators than high dogmatic individuals. Coney (1972) replicated Jacoby's 1971 study, and his data strengthens Jacoby's predicted relationship between dogmatism and innovative behavior. It appears that low dogmatic persons are more willing than high dogmatics to try new products.

The Role of Opinion Leadership

Although the relationship between innovativeness and opinion leadership was also investigated, the results in this area were also inconclusive. Summers (1971), Schrank and Gilmore (1977), and Baumgarten (1975) report the absence of a strong relationship between innovativeness and opinion leadership for consumer products. On the other hand, Myers and Robertson (1972), Feldman and Armstrong (1974), and Greenberg, Lumpkin, and Bruner (1982), report a strong relationship between innovativeness and opinion leadership.

Innovation Characteristics and Innovative Behavior

Finally, the relationship between innovative behavior and innovation characteristics was investigated. Graham (1954) reports that the more closely the behavior demanded for the use of innovation is compatible with the structure of the culture prior to its introduction, the greater the chances are of its acceptance. In a later study, Graham (1956) found that the amount of contact between innovation and potential accepters is crucial in determining the degree of its acceptance. Brander and Straus (1959) and Brander and Kearl (1964) report that familiarity or congruity with the new practice accounts for dramatically higher acceptance of the new practice.

discomfort, divisibility for trial, and most nearly compatible with existing procedures tend to be adopted

Fliegel and Kivlin (1962; 1966; and 1967) found that the new farm practices which are least complex, saving of rapidly. Polgar, Dumphy, and Cox (1963) found that high cost associated with the adoption of the innovation, the insufficient visibility of the innovation, and its complexity are factors that retard the adoption of the innovation under study.

Midgley and Dowling Definition of Innovativeness

Midgley and Dowling (1978) questioned Rogers' conceptual definition of innovativeness. They state that such a definition is essentially an operational definition since it is couched directly in terms of innovativeness measurement. Accordingly, they advance a new conceptual definition which is based on viewing innovativeness as a personality construct and which is possessed to a greater or lesser degree by all individuals. Midgley and Dowling say that innovativeness is "the degree to which an individual is receptive to new ideas and makes innovation decision independently of the communicated experience of others" (1978, p. 233). Furthermore, they make a distinction between innate and actualized innovativeness;

the former is the conceptual definition of innovativeness while the latter is its operationalization.

In 1980 Hirschman (1980) advanced a conceptual framework that represents different theoretical constructs which are believed to cause innovativeness. those constructs are novelty seeking, creativity, and role accumulation.

Integration of Findings Across Studies

There are different methods for integrating results across studies. Seven of these methods are presented with critiques.

The Traditional Narrative Method

The traditional narrative method is the oldest one used to integrate results across studies, and is also described variously as the literary, qualitative, nonquantitative, or verbal method. Using this method the reviewer takes each study at face value and attempts to find an overarching theory that reconciles the findings. Since often the studies included in the review are not likely to be precisely comparable in design, measures, and so forth, the findings will vary across studies in bizarre ways. This method is criticized as having the following problems:

1. The result may be "pedestrian reviewing where verbal synopses of studies are strung out in dizzying

lists" (Glass 1976, p. 3); that is, the reviewer may not even attempt to integrate findings across studies (Glass 1976, p. 4).

basing his conclusions on only a small subset of the

2. The reviewer may simplify the integration task by studies. this approach unjestifiably wastes much information, and, in addition, may focus on unrepresentative studies (Glass 1976, p. 4).

3. The reviewer may actually attempt the task of mentally integrating findings across all studies and fail to do an appropriate and adequate job (Glass 1976).

The Traditional Voting Method

This method was one of the first techniques developed to ease the information-processing burden on the reviewer. It consists of a tabulation of statistically significant and nonsignificant findings. Light and Smith describe this method as follows.

> All studies which have data on a dependent variable and a specific independent variable of interest are examined. The relationship between the independent variable(s) and the dependent variable is either significantly positive, significantly negative, or there is no significant relationship in either direction. The number of studies falling into each of these three categories is simply tallied. If a plurality of studies falls into any of these three categories, with fewer falling into the other two the model category is declared the winner. This model

> categorization is then assumed to give the best estimates of the direction of the true relationship between the independent and dependent variable (Light and Smith 1972, p. 429).

The Voting method is sometimes used to identify correlates of study outcomes (Eagly 1978).

The problems identified with this method can be summarized as follows:

1. The voting method is biased in favor of large-sample studies that may show only small effect sizes. Even where variation is sample size does not cause problems in interpretive significance levels, and where the voting method correctly leads to the conclusion that an effect exists, the critical question of the size of the effect is still left unanswered (Hunter, Schmidt and Jackson 1982, p. 131).

2. This method can and does lead to false conclusions because it fails to take into account all of the sampling errors, measurement errors, and range errors (King, Hunter and Schmidt 1979; Hedger and Olkin 1980; and Pearlman, Schmidt and Hunter 1980).

3. As a result of the first two problems, a third problem is that reviewers who use the voting method often reach the typical conclusion that the research literature is in deplorable shape. Some researchers get significant results; sometimes not. These reviewers almost always call

for better research designs, better experimental controls, better measure, and so on (Glass 1976).

Cumulation of p values Across Studies

By selecting p values across studies, this method attempts to cumulate significance levels across studies to produce an overall p value (significance level) for the group of studies as a whole. If this value is small enough, the reviewer concludes that the existence of the effect has been established (Baker 1952; Rosenthal 1978; and Cooper and Rosenthal 1980). The major problem with this method is that in most sets of studies the combined p value will be significant, but this fact tells nothing about the magnitude of the effect (Hunter, Schmidt and Jackson 1982, p. 133).

Statistically Correct Vote-Counting Method That Yields Significance Levels

The assumption of this method is that if the null hypothesis is true, then the population correlation or effect size is in fact zero. Accordingly, when study results are given in the form of p value, half would expect to be larger than 0.50 and half smaller than 0.50. The sign test can be used to test whether the observed frequencies of findings in the positive and negative directions depart significantly from the 50-50 split

expected under the null hypotheses.

Alternatively, the reviewer can use a count to determine the proportion of studies reporting statistically significant findings that support the theory and then test this proportion against the proportion expected under the null hypothesis. The bionominal test or the chi-square statistic can be used of this test (Rosenthall 1978; Hedges and Olkin 1980).

The problem with this method is that it is one of the most useful techniques only when the null hypothesis is true (due to the assumption of this method as stated previously). However, when the null hypothesis is false, the bionomial or sign tests provide no estimate of effect size. This is a serious disadvantage (Hunter, Schmidt and Jackson 1982, p. 135).

Statistically Correct Voting-Counting Method that Yields Estimates of Effect Size

The assumption of this method is that the probability of positive result and the probability of a positive significant result are both functions of the population effect size and study sample size. If sample sizes are known for all studies, then the effect size can be estimated from either the proportion of positive results or from the proportion of positive significant results.

Hedges and Oklin (1980) have derived formulas for both of these methods of estimating the effect size; they also present formulas for determining the confidence intervals around the effect size estimates.

The only problem with this method is its assumption that effect size is constant across studies. If effect sizes vary across studies, this method yields only an approximate estimate of mean effect size. Further, this method provides no estimate at all of the variance of effect sizes across studies.

Glass's Meta-Analysis Method

The primary properties of Glass's meta-analysis are

1. There is strong emphasis on effect sizes rather than on significance levels. Glass believes that the purpose of research integration is more descriptive than inferential, and he feels that the most important descriptive statistics are those that indicate most clearly the magnitude of effects. His meta-analysis typically employs estimates of the Pearson r or d, where

$$d = (\bar{X}_E - \bar{X}_C)/SD$$

and $\bar{X}_E$ and $\bar{X}_C$ are the means of the experimental and control groups, respectively. SD is the average standard deviation or the standard deviation of the control group (Glass 1972).

2. There is an acceptance of the variance of effect size (S^2ES) at face value. Glassian meta-analysis implicitly assumes that S^2ES is real and should have some substantive explanation. These explanations are sought in the varying characteristics of the studies (e.g., sex, age, or the length of treatment). Study characteristics that correlate with the study effect are examined for their explanatory power (Hunter, Schmidt and Jackson 1982).

3. There is a strongly empirical approach to determining which aspects of studies should be coded and tested for possible association with study outcomes (Glass 1972).

Schmidt-Hunter Meta-Analysis Method

Following are the primary properties of Schmidt-Hunter's meta-analysis methods.

1. There is a strong emphasis on effect sizes rather than p values. This emphasis is similar to that in Glassian meta-analysis. Unlike Glassian meta-analysis, however, this procedure calls for correcting the mean effect size for attenuation due to instrument unreliability and range restriction (if any), which yields more accurate estimates of the mean effect sizes.

2. Unlike Glassian meta-analysis, the Schmidt-Hunter method does not take S^2ES at face value. Instead, the first step after determination of the mean effect size is to test the hypothesis that S^2ES is entirely due to various statistical artifacts, which include (a) sampling error; (b) study differences in reliability of independent variable measure; (c) study differences in range restriction; (d) study differences in instrument validity; and (e) computational, typographical, and transcription errors. Schmidt and Hunter developed methods of estimating and subtracting variance resulting from the first three of these five artifacts. Generally, if these three artifacts account for seventy-five percent of the observed S^2ES, they conclude that the residual S^2ES is probably due to the remaining two artifacts and that true $S^2ES = 0$.

3. If the hypothesis $S^2ES = 0$ is not rejected, S^2ES is adjusted for the effects of the three artifacts to place a confidence or credibility interval around the estimated true mean effect size (Schmidt, Rosenberg and Hunter 1980).

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CHAPTER III

RESEARCH PLAN AND METHODS

This chapter presents the research plan and methods to be used in carrying out both theoretical and empirical investigations of the new model advanced in the next chapter.

Theoretical Evaluation Plan

For the purpose of carrying out the theoretical evaluation of the new model a brief discussion of theory evaluative criteria, as developed by philosophers of science, is presented. This discussion is followed by presenting those evaluative criteria which are developed by Bunge (1967). Those criteria are selected to be used in evaluating the theoretical aspects of the new model because of their comprehensiveness and appropriateness.

Criteria for Evaluating Theories

Philosophers of Science disagree among themselves about which criteria and the number of criterion that should be used to evaluate theories. Dodd (1968) reviewed the literature regarding evaluative criteria, and he was able to assemble seventy commonly used criteria. Clark (1969)

proposed only four criteria including clarity, explanatory power, simplicity and confirmation. Popper also suggested four criteria for evaluating theories that include

1. there is logical comparison of the conclusion among themselves, by which the internal consistency of the system is tested;
2. there is the investigation of the logical form of the theory, with the object of determining whether it has the character of an empirical or scientific theory, or whether it is, for example, tautological;
3. there is the comparison with other theories, chiefly with the aim of determining whether the theory would constitute a scientific advance should it survive various tests; and
4. there is the testing of the theory by way of empirical applications of the conclusions which can be derived from it (1968, p. 32).

Zaltman, Pinson, and Angelmar (1973, p. 104) used the Bunge (1967) groupings to develop their set of sixteen criteria, which they then employed to evaluate different marketing theories and models including the Nicosia model, the Howard-Sheth theory, and the Engel-Kollat-Blackwell model. Later on, Zaltman, LeMaster, and Heffring (1982, p. 164) reduced the number of criteria to only nine and used them to evaluate the theory of buyer behavior in housing markets which are developed by Hempel and Ayal (1977).

Hunt (1983, pp. 230-244) proposed three evaluative criteria that include (a) the systematically related criterion, (b) the lawlike generalization criterion, and (c) the empirical testable criterion. Kaplan (1963, pp. 311-322) suggests that three norms which can be used in

evaluating theory are (a) norms of correspondence, (b) norms of coherence, and (c) pragmatic norms.

Bunge's Evaluative Criteria

One of the most useful and comprehensive groupings of evaluative criteria was developed by Mario Bunge (1967, pp. 352-354). He suggests twenty different criteria that can be used in evaluating existing theory. These criteria are divided into the five main classes of (a) formal criteria, (b) semantic criteria, (c) epistemological criteria, (d) methodological criteria, and (e) metaphysical criteria.

A. Formal criteria

1. Well-formedness: the theory should be well formed--no gibberish.
2. Internal Consistency: the formulas of the theory should be mutually consistent.
3. Validity: the derivations in the theory should follow as closely as possible the patterns set by ordinary logic and/or mathematics.
4. Independence: both the primitive concepts and the primitive assumptions of the theory should be mutually independent.
5. Strength: the initial assumption of the theory should be as strong as truth permits.

B. Semantic Criteria

6. Linguistic Exactness: this means that the axioms forming a theory should have the minimal ambiguity and vagueness.

7. Conceptual Unity: the theory should refer to a definite universe discourse and its predicates should be semantically homogeneous, connected, and closed.

8. Empirical Interpretability: some of the lowest level theorems of the theory should be interpretable in empirical terms, eventually with the help of other theories.

9. Representativeness: the more representational or "mechanistic" a theory is, the deeper it will go beyond appearances, the more effectively it will guide new research and the better testable it will be.

C. Epistemological Criteria

10. External consistency: compatibility with the bulk (not the whole) of reasonably well-tested knowledge; if possible continuity with it.

11. Inclusiveness: the theory should solve to a good approximation a substantial part of the problems that stimulated its construction.

Also, the better theory will be the one which can answer the more ambitious question, but it should not attempt to solve every possible problem.

12. Depth: other things being equal, deep theories, involving fundamentals and basic mechanisms are preferable to shallow systems that do not commit themselves to any unobservable mechanism. But we need both bones and skin to make a growing organism; thus, statistical mechanics does not enable us to dispense with thermodynamics.

13. Originality: bold theories, containing shocking (but not wild) high-level constructs, yielding unheard-of projections and unifying apparently unrelated field, are more valuable than safe, down-to-earth system. Theories systematizing what is known are essentially necessary, but the inspiring reevaluations in knowledge have been those consisting in the introduction of theories which, far from packaging what was known, have forced us to think in new ways, to formulate new problems, and to seek new kinds of knowledge.

14. Unifying Power: capacity to encompass hitherto isolated domains.

15. Heuristic Power: a new theory should suggest and even guide new research. Fertility is often a bonus of representativeness.

16. Stability: the theory should not tumble down in face of the first datum but should be capable of growing. It should be capable to "learn" from the new experience it was not able to predict. Rigid theories, on the other hand, are apt to succumb at the first unobservable evidence because they were designed to slavishly account ex post fact for a handful of data.

D. Methodological Criteria

17. Testability: the theory, its propositions, and even the techniques employed in its test must be capable of test. They must all be open to scrutiny, control, and criticism. The theory as a whole must be both confirmable and refutable.

18. Methodological Simplicity: if the tests proposed for the theory are so complicated that there is no fear of refutation within the foreseeable

future, it will not be possible to pass judgment on the inclusiveness and the testability of the theory.

E. Metaphysical Critera

19. Level-Parsimony: the theory should be parsimonious in its reference to levels other than those directly concerned. Particularly, the higher levels of reality should not be appealed to if the lower is enough, and distant levels should not be introduced whenever possible, without the intermediate ones.

20. World-View Compatibility: consistency with the prevailing outlook or, at least, with the common core of world views held by the most competent scientists at the moment.

Bunge (1967,p. 355) suggests that these criteria are not mutually independent. Thus, depth depends on strength, and heuristic power depends on depth, representativeness, originality, and unifying power. Nor are they all mutually compatible. Thus inclusiveness is greater for phenomenological and traditionalist theories than for representational and revolutionary ones. He also argues that probably none of these requirements can be entirely satisfied. For example, syntactical correctness and

linguistic exactness may not be perfect in the initial stages; the important thing is that they can be improved. Bunge also suggests that some of these criteria are double edged, in particular methodological simplicity and world-view compatibility.

Empirical Investigation Plan

The methodology that is used to evaluate some linkages in the new model presented in Chapter III. The objective of this review is twofold:

1. To check on the empirical validity of those interrelationships in the model, and to determine the degree to which some moderator variables can be taken into account to improve the predictive validity of the model.
2. To determine those interrelationships that have not been tested before which provide good research possibilities in the future.

The methodology of this review includes three important aspects:

1. The criteria for selecting empirical reports to be reviewed.
2. The method of selecting those empirical reports to be reviewed; and
3. The method of analyzing the results of those empirical reports to be reviewed.

Criteria for Selecting Empirical Reports to be Reviewed

Due to the nature of this research certain methodological criteria should direct the selection of those research findings to be reviewed and reanalyzed. Since the objective of such a review is to check on the empirical validity of the theoretical propositions that specify both the nature and direction of relationships among the conceptual constructs in the previous new models, it seems illogical to ignore the methodological correctness of this empirical research. Of course, there is no research without methodological inadequacy. Most empirical studies will have some methodological weaknesses (Hunter, Schmidt and Jackson 1982, p. 151). However, this does not mean that the methodological aspects of the empirical studies to be reviewed should be ignored completely. If this is done, no valid conclusion can be made about the interrelationships to be investigated in the theoretical models. At least certain minimum methodological requirements should be considered both when reviewing the findings of a given research project and attempting to reach a valid and general conclusion about specific relationships under investigation.

Hartman and Hedblom (1979, p. 10) state the evaluation of a research project is a way of examining the validity

the results, the sampling procedure, resulting sample, measurement device, and analysis techniques. Furthermore, the conclusions must be reviewed before an existing theory can be tested, challenged, or modified.

Additional criteria are imposed by the method of analysis to be used in evaluating and cumulating the findings across the results of studies (meta-analysis). Meta-analysis, which is a method for cumulating the findings across studies (to be explained later), requires that the research design under review should be analytical in nature and use either correlation coefficients of r, t, or F as the comparison statistic. The criteria are discussed in detail in the following section.

A Theoretical Framework as the Basis for Research

No matter how carefully data are collected, they make sense only within the totality of the research problem's specification, theory, and analysis. The more clearly the theoretical assumption underlying the empirical research, the more precise data interpretation may become. As Hartman and Hedblom (1979, p. 6) state:

> Loosely specified theoretical generalizations are difficult to test. A research design's theoretical base outlines the variables and relationships that may be examined within that design. The variables that may be included in a particular research design must logically be derived from its theoretical orientation. Tools must never be allowed to structure research

> interest problems. It is the process of logical deduction or induction that form new propositions to be tested and used to expend theory and its predictive or explanatory power.

When Good and Hatt (1952, pp. 68-73) specified their criteria for a scientific hypothesis, one of those criteria was that the hypothesis should be related to a body of theory. Theory is inferentially tested. In other words, it is possible to test a portion of theory and not theory as a whole. The hypothesis testing process is usually, though not always, a test of the theory itself. A major consideration is that one understands the nature of the scientific process, which includes a willingness to recast, amend, or modify existing theory when research studies fail to support evidences should lead to a change in or expansion of existing theory.

Dubin (1969, p. 6) states that the distinction between "reporting" and "doing science" lies in whether it is used to measure the values associated with units of a theory. Dubin also assumes that as a starting point research is more than question asking. According to him, a piece of research tests a hypothesis or an hypothetical prediction. The predicting in turn has antecedents in an explicit or

implicit theoretical model. The research test of the prediction always provides a feedback to the model from which it is derived, either to subtantiate the model's continued viability or to require its modification. Furthermore, theorizing is integral part of empirical investigation, just as empirical analysis has meaning only by reference to a theory from which it is generated. Furthermore, theorizing is integral part of empirical investigation, just as empirical analysis has meaning only by reference to a theory from which it is generated.

Furthermore, Dubin defines a research hypothesis as the predictions about values of unit of a theory in which empirical indicators are employed for the named units in each theoretical proposition.

> It is the linkages between the empirical world and our theories; it mirrors the propositions of the theoretical model. Accordingly, every hypothesis is homologous with the theoretical proposition for which it stands (1969, p. 212).

Merton (1957) claims that empirical research goes far beyond the passive role of verifying and testing theory. It does more than confirm or refute hypotheses. Research plays an active role; it performs at least four major functions which help shape the development of theory. It initiates, it reformulates, it deflects, and it clarifies theory.

Operational Definition of Research Variables

Philosophers of the Received View distinguish between theoretical and observational terms. Suppe (1977, p. 17) says definitions that coordinate theoretical terms with corresponding combinations of observation terms are called correspondence rules. Theoretical terms are allowed only if they can be provided with correspondence rules which give them an explicitly phenomenal (observational) definition. Correspondence rules are referred to variously as coordinating definitions, dictionaries, interpretative systems, operational definitions, epistemic correlations, and rules of interpretation.

Correspondence rules serve three functions in the Received View. First, they define theoretical terms; second, they guarantee the cognitive significance of theoretical terms; third, they specify the admissible experimental procedures for applying a theory to phenomena (Suppe 1977, p. 18).

Initially, correspondence rules have to have the form of explicit definitions that provided necessary and sufficient observational terms. A special case version is the requirement that correspondence rules be explicitly defined and operationally defined. This version was popularized by the physicist, P. W. Bridgman, and was widely adopted in the social and biological sciences.

P. W. Bridgman (1938) distinguishes between several kinds of operations that may be invoked in specifying the meanings of theoretical terms. The principal ones are

1. Instrumental operations which consist of various devices of observation and measurements;

2. Paper-and-pencil operations which include verbal operations, mental experiment and the like.

Hempel's (1954) term for the latter kind is symbolic operations.

According to Bridgman and Hempel, the concept of operational definition serves to state the basic principles of operational analysis, of which the following are of specific importance:

1. Meanings are operational: to understand the meaning of a term, we must know the operational criterion of its application and every meaningful scientific term must therefore permit of an operational definition. Such definition may refer to certain symbolic operations and it always must ultimately make reference to some instrumental operations (Bridgman 1938; 1950).

2. To avoid ambiguity: every scientific term should be defined by means of one unique operational definition. Even when two different operational procedures have been found to yield the same results, they still must be considered as defining different concepts, and these should be distinguished terminologically because the presumed coincidence of the results is inferred from experimental evidence, and it is not 'safe' to forget that the presumption way be shown to be spurious by new, and perhaps more precise, experimental data (Bridgman 1927; 1951).

3. The insistence that scientific terms should have unambiguously specifiable operational meanings serves to insure the possibility of an objective test for

> hypotheses formulated by means of those terms. Hypotheses incapable of operational test, or rather, questions involving untestable formulations are rejected as meaningless (Hempel 1954).

As stated in the above principles, it is clear that operational definitions safeguard the objectivity of science. Bridgman (1945) states this issue very clearly. All operational definitions are required to be intersubjective in the sense that different observers (researchers) must be able to perform the same operation with reasonable agreement in their results.

Representative Samples

Since the knowledge (data) that researchers obtain about a population is always based on a sample, the degree to which that knowledge is accurate depends on how well the sample represents the population. As Drew (1976, p. 125) concludes, if the sample does not accurately represent the population, then interpretations of the results may not be accurate for individuals other than those actually used as subjects. It follows then, that only the research that is able to produce valid generalizations about the strength and the directions of the relationships in the new models should be included in this review. Furthermore, as stated by Hunter, Schmidt, and Jackson (1982, p. 29), reliance on studies that have convenience samples always involves some risk in reaching generalized conclusions.

Relative Reliability and Validity of Measurement

Scientific definition and measurement are very closely related. As Peter Caws (1959, p. 3) observes:

> Definition and measurement certainly have functional similarities which make it almost inevitable that a discussion of one should sooner or later involve the other.

Ackoff, Gupta, and Minas (1969, p. 177) made a distinction between scientific definition (operational) and measurement. The scientific definition of a concept states the conditions under which stated observations should be made. Measurement concerns itself with how observation should be made and treated so that the defined concept may be represented by symbols that have certain properties. Therefore, although measurement is an essential part of scientific definition, it is not all of it.

Measurement is important because it is necessary that intelligent choices be made of both a method for collecting data and of a method for analysis. Festinger and Katz (1966, p. 473) points out that the various methods of collecting data contain information which may differ both quantitatively and qualitatively. Similarly, they say, the various methods of analyzing data may differ in the degree to which they rely on information contained in the data as contrasted with the structure and relationships they impose on the data.

It should be clear that all types of measurement are subject to error, and an estimate of the magnitude of this error is necessary in order to know whether or not the measures obtained are usable in any specific research situation. The value of measurement can be appreciated if one realizes that the range of uses to which measurement of a property, an object, or an event can be put increases with its exactness.

Ackoff, Gupta,and Minas (1969, p. 206) identify four possible sources of error in measurement which may contribute separately or in combination. These are (a) error due to the observer; (b) error due to instruments; (c) error due to environment; and (d) error due to the observed.

According to Hoover, although measurement has been the principal stimulus of progress in science, "the main point to be made here is that sloppy or inappropriate measurement is generally worse than no measurement at all." As Hoover continues "interpreting the results of measurement requires an understanding of the measurement itself" (Hoover 1979, p. 29).

Analytical Research Design

The objective of this review is to check on the empirical validity of the interrelationships specified in

the previous model. The analytical design according to Hartman and Hedblom (1979, p. 32), is based on the assumption that enough is presently known in an area of interest to designate theory, concepts, hypotheses, variables, and data collection techniques, and to begin addressed questions of association or causality. It seems logical to include only analytical research in this review.

Also, the selected method of analysis (meta-analysis) requires (as well be shown subsequently) that research findings to be reviewed should provide some statistical indicators of association, which usually are provided by analytical research (Hunter, Schmidt, and Jackson 1982).

Correlational and Effect Size Studies

As will be shown, the meta-analysis technique is relatively new. The most recent techniques of meta-analysis, as developed by Hunter, Schmidt and Jackson (1982), are procedures that deal with the cumulative results of correlational studies and the two-group intervention studies that use either the *t* or *F* statistic as a measure of the relationships and its strength between the variables under study.

Availability of Some Cumulative Research Reports Across Each Area to be Investigated

All meta-analysis methods require that a moderate number of empirical research reports should be available

across any area to be investigated. Without such condition it would be practically impossible to reach a valid conclusion and generalization about the relationship under review.

Selection Method for Reviewed Empirical Research Studies

The selection of the research reports to be reviewed in this research is based on a computer search that employed two database files. The first is known as PSYCINFO (Psychological Information). The second is known as ABI (Abstract of Business Information). Those two database files are selected because of their immediate relationships to those areas in which the new model is dealing.

The search uses some key words which are derived from the new model. Since the new model is essentially dealing with the behavior of consumers when they make decisions with regard to new products all the key words relate to either consumer behavior, consumer attitudes, or consumer in general. Those key words are:

1. Dissatisfaction.
2. Disappointment.
3. Frustration.
4. Satisfaction.
5. Cognitive Congruity.

6. Cognitive Dissonance.
7. Individual's Scripts.
8. Individual's Interconcept Networks.
9. New Products Perception.
10. Interest.
11. Social Learning.
12. Stimulus Novelty.
13. Risk Taking.

Method of Analyzing the Findings of Reviewed Empirical Research Studies

The cumulative results of the research reports to be reviewed are analyzed using Hunter, Schmidt, and Jackson's (1982) meta-analysis. This method is primarily selected for the following reasons:

1. It represents the state-of-the art for meta-analysis methods.
2. The emphasis of this method is on effect sizes rather than on significant level.
3. It calls for correcting the mean effect size for attenuation due to sampling error, instrument unreliability, instrument validity, and range restriction error. Accordingly, this method yields more accurate estimates of the mean effect sizes. No other meta-analysis method is calling for such correction.

Schmidt, Hunter, and Jackson (1982) have developed two procedures that deal with the cumulative results of correlational studies and the two-group intervention studies. Discussion of these procedures follow.

First: Cumulating Correlations Across Studies

The correlation coefficient is subject to three sources of error that can be eliminated at the level of meta-analysis; these are sampling error, error of measurement, and range variation. The procedures for these eliminations are detailed in the following subsections.

Sampling error.--At the level of meta-analysis, sampling error can be estimated and eliminated. First, if the population correlation is assumed to be constant over studies, then the best estimate of that correlation is not the simple mean across studies but a weighted average in which each correlation is weighted by the number of persons in that study:

$$\bar{r} = \frac{\Sigma [N_i \; r_i]}{N} ,$$

where r_i is the correlation in study i and N_i is the number of persons in study i.

The corresponding variance across studies is not the usual sample variance but the frequency weighted average

squared error:

$$S^2_r = \frac{\sum[N_i(r_i - r)^2]}{\sum N_i} .$$

To correct the variance for sampling error, one needs to calculate not only $\bar{r}$ and S^2_r but also σ^2_e and σ^2_p

$$\sigma^2_e = \frac{(1-\bar{r}^2)^2 K}{N} ,$$

where K is the number of studies under review and $N = \sum N_i$ is the total sample size

$$\sigma^2_p = S^2_r - \sigma^2_e$$

$$= \frac{S^2_r - (1 - r^2)^2 K}{N} ,$$

where σ^2_p is the sum of the variance in population correlations and σ^2_e is the variance due to sampling error. If σ^2_p turns out to be equal to zero or relatively small, then the variance across the results of studies were due only to sampling error. Then, how much smaller should it be before one can conclude that there is no variation across studies?

Schmidt, Hunter, and Jackson (1982) developed a formula to test for variation significance across studies. The null hypothesis to be tested using this formula is that there is no true variation across studies

$$\chi_{K-1} = \frac{N}{(1-\bar{r}^2)^2} S^2_r,$$

where $N = \Sigma N$ is the total number of persons across studies and k is the number of studies in review. If the chi-square is not statistically significant, this is a strong evidence that there is no true variation across studies; if, however, it is significant, the variation may still be negligible in magnitude. Then, if one corrects the variance for the sampling error and it is still relatively large, one should correct this variation for the error of measurement.

Error of measurement.--Variables in social sciences are never perfectly measured. Indeed, sometimes the measurement is very rough. Error of measurement can be eliminated from meta-analysis in either of two ways: at the level of single studies or at the level of averages across studies. If the reliability of each variable is known in each study, then the correlation for each study can be separately corrected for attenuation. However, many studies do not report the reliability of their instruments; this reliability information is only sporadically available.

Schmidt, Hunter, and Jackson (1982) developed a procedure to deal with error of measurement in the lack of

information about the reliability of the instruments in some study reports. This procedure is composed of the following steps:

1. Compile studies that have estimates of any of the three numbers r_{xy} (correlation coefficient) between independent variable X and dependent variable Y, r_{xx} (reliability coefficient for independent variable X), and r_{yy} (reliability coefficient of dependent variable Y);

2. Take square roots of r_{xx} and r_{yy}, which are called a and b, respectively;

3. Then go across the studies three times to compute and compile distributions for r_{xy}, a, and b separately. That is, using data from whichever studies have it, compute three means and three variances: $\bar{r}_{xy}$, $\sigma^2 r_{xy}$ from studies with r_{xy}; $\bar{a}$ and σ^2_a from those studies with r_{xy}; and $\bar{b}$ and σ^2_b from those studies with r_{yy}.

Having finished this procedure, the next step is to eliminate the effect of error of measurement. This involves (a) elimination of the systematic downward bias in the average correlation and (b) elimination of the variance across studies due to the variation in reliability from one study to the next. To do this, the reliability distribution is used that was computed from a and b in the first steps.

Two formulas can be used to correct the variance across results of studies for both sampling error and error in measurement:

$$\bar{P}_{tu} = \frac{\bar{P}_{xy}}{\bar{a}\bar{b}},$$

where P_{tu} is the desired mean true score correlation and $\bar{P}_{xy} = \bar{r}_{xy}$ is correlation weighted average across studies, so

$$\bar{P}_{xy} = \frac{\Sigma [N_i r_i]}{\Sigma N_i}.$$

$$\bar{a} = \frac{\Sigma \sqrt{r_{xx}}}{K},$$

where a is the reliability coefficient for dependent variable X and K is the total number of studies reports a.

$$\bar{b} = \frac{\Sigma \sqrt{r_{yy}}}{K},$$

where b is the reliability coefficient for dependent variable Y and K is total number of studies reports b.

The desired variance of the true score correlations is calculated using the following formula:

$$\sigma^2 P_{tu} = \frac{\sigma^2 P_{xy} - \bar{P}^2_{tu} (\bar{a}^2 \sigma^2_b + \bar{b}^2 \sigma^2_a)}{\bar{a}^2 \bar{b}^2}.$$

where

$$\sigma^2 P_{xy} = \sigma^2 rxy - \sigma^2 e \ .$$

$$\sigma^2 e = \frac{K\ (1-\bar{r}^2)^2}{N} \ .$$

$$\sigma^2 rxy = S^2{}_r = \frac{\Sigma[N_i\ (r_i - \bar{r})^2]}{\Sigma N_i} \ .$$

$$\sigma^2 a = \frac{\Sigma\ (\sqrt{r_{xx}} - \bar{a})^2}{K} \ .$$

$$\sigma^2 b = \frac{\Sigma\ (\sqrt{r_{yy}} - \bar{b}\ )^2}{K} \ .$$

Now P_{tu} can be calculated, which represents the true variance across studies after the correlation is corrected for both sampling error and error in measurement:

$$\sigma P_{tu} = \sqrt{\sigma^2 P_{tu}} \ .$$

If such variation is still relatively high (large), then it should be corrected for the range restriction effect (if any).

Range variation error.--In many contexts, the distribution of the independent variable is approximately the same across studies. In such cases, meta-analysis need not correct for range variation. However, if the standard deviation of the dependent variable differs radically from one study to another, then there will be

corresponding differences in the correlation from study to study. These differences across studies will appear to be differences produced by a moderator variable. The true picture of the stability of results appears only if the effects of range variation are eliminated.

Range variation can be corrected at the level of the single study if we know the standard deviation of the independent variable in the study, and if we know the standard deviation in the reference population. Since, however, most research reports do not include a table of standard deviations, information on range departure is only sporadically available. If it is possible to compile information about the distribution of range departure across studies, there is a formula for correcting the meta-analysis to eliminate the effects of range variation.

The final correlation formulas for sampling error, error in measurement, and range variation error are as follows:

$$\bar{P}_{tu} = \frac{\bar{r}_{xy}}{\bar{a}\ \bar{b}\ \bar{c}}, \text{ and}$$

$$\sigma^2 P_{tu} = \frac{\sigma^2 P_{xy} - \bar{P}^2_{tu} (\bar{b}^2\ \bar{c}^2\ \sigma^2_a + \bar{a}^2\ \bar{c}^2\ \sigma^2_b + \bar{a}^2\ \bar{b}^2\ \sigma^2_c)}{\bar{a}^2 \bar{b}^2 \bar{c}^2},$$

where:

$$a = \sqrt{r_{xx}}\ .$$

$$b = \sqrt{r_{yy}}\ .$$

$$c = \sqrt{\mu^2 = (1 - \mu^2)\ P^2_{xy}}\ .$$

$$\mu = \frac{\text{the ratio of the standard deviation of the reference population}}{\text{the ratio of the standard deviation of the study population}}\ .$$

$$P^2_{xy} = \bar{r}^2_{xy}.$$

$$\bar{a} = \frac{\sqrt{r_{xx}}}{K}\ .$$

$$\bar{b} = \frac{\sqrt{r_{yy}}}{K}\ .$$

$$\bar{c} = \frac{\sqrt{\mu^2 + (1 - \mu^2)\ P^2_{xy}}}{K}\ .$$

P_{tu} can be calculated, which represents the remaining variance across studies after eliminating the effect of sampling error, error in measurement, and range variation error. If such number is still too large, then meta-analysis should be performed on the findings.

Meta-analysis.--Once the variance has been corrected across studies for the effect of sampling error, error in measurement, and range error, it is possible to see if there is a large amount of variance across studies. If this is the case, some moderator variables may explain

that variance; a moderator variable is a variable that causes the differences in the correlation between two other variables.

To test a hypothesized moderator variable, the set of studies under review is broken into subsets using the moderator variable. Then separate meta-analysis is done within each subset of studies. If there is a large difference between subsets, the hypothesized variable is indeed a moderator variable. The meta-analysis within subsets also shows how much of the residual variance within subsets is due to sampling error and how much is real; that is, the meta-analysis shows whether or not it is necessary to look for a second moderator variable.

Second: Cumulation Formulas for Effect Sizes

This procedure of meta-analysis is applicable to the cumulative study of experimental effects in which there are comparisons between an experimental group versus a control group. The effect of the experimental intrusion is often assessed by comparing the performance of the experimental group with the performance of the control group. The usual comparison statistic is *t* or *F*. However, this is very poor statistic since its size depends on the amount of sampling error in the data. The

optimal statistic (which measure size of effect in ametric suitable for path analysis, covariance, or other effects) is the point-biserial correlation r. However, most meta-analysis have chosen to use a measure of effect size called d , i.e., the difference between the group means divided by the standard deviation.

The d statistic is affected by all the same artifacts as the correlation, including sampling error, error of measurement, and range variation, but the terminology is the same only for sampling error. Range variation goes under another name in experimental work, namely, strength of treatment.

Effect size d.--If the variance for the experimental group is S^2_E and the variance for the control group is S^2_c, then the variance within-group S^2 is defined as

$$S^2 = \frac{(N_E - 1)\, S^2_E + (N_c - 1)\, S^2_c}{N_E + N_c - 2} .$$

The effect-size statistic d is then defined by

$$d = \frac{\bar{Y}_E - \bar{Y}_c}{S} ,$$

where $\bar{Y}$ is the mean of the group and S is the standard deviation.

Sampling error.--The population value of the effect size statistic is denoted by δ . The observed value d

will then deviate from δ by sampling error. Using the large sample approximation, the sampling error in $\underline{d}$ can be computed:

$$E(d) = \delta$$

$$\sigma^2_e = \frac{4\ (1 + \frac{\delta^2}{8})}{N} .$$

The basic cumulation process is the same for effect sizes as for correlation. First, the frequency weighted mean and variance of the effect size is computed over studies, then the variance for sampling error is corrected. The formulas are as follows.

$$\bar{d} = \frac{\Sigma [\ N_i d_i]}{\Sigma N_i} .$$

$$\sigma^2_d = \frac{\Sigma [N_i (d_i - \bar{d})^2]}{\Sigma N_i} .$$

$$\sigma^2_e = \frac{\Sigma [N_i 4/N_i\ (1 + \frac{\bar{d}^2}{8})]}{\Sigma N_i} .$$

$$= \frac{4(1 + \bar{d}^2/8)K}{N} ,$$

where K is the number of studies and N is the total sample size across studies.

The variance of effect size across studies corrected for sampling error is

$$\sigma^2_{\sigma} = \sigma^2_d - \sigma^2_e.$$

Thus, the observed distribution is characterized by the values $\bar{d}$ and σ_d, then the actual distribution of effect sizes is characterized by $\bar{\sigma}$ and σ_{σ} where

$$\bar{\sigma} = \bar{d}$$
$$\sigma_{\sigma} = \sqrt{\sigma^2_d - \sigma^2_e}.$$

Correcting effect size estimates for unrealiability.--Mainly such an objective can be achieved by multiplying the variance for uncorrected d values by the square of the correlation factor, i.e., by the reciprocal of the reliability. The formulas are as follows.

$$\sigma^2_e = \frac{\sum N_i \, (1/r_{xxi}) \, \frac{4(1 + \frac{\bar{d}^2}{8})}{N_i}}{\sum N_i}.$$

$$= \frac{4 \, (1 + \frac{\bar{d}^2}{8}) \sum_i 1/r_{xxi}}{N}.$$

$$= \frac{[4(1 + \frac{\bar{d}^2}{8}) \, K \,]}{N} \times \left(\frac{1}{K} \cdot \sum \frac{1}{r_{xixi}}\right).$$

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CHAPTER IV

PERCEPTION AND ADOPTION OF NEW PRODUCTS: AN INTERPRETIVE AND POSTULATIONAL MODEL

Introduction

A new model of perception and adoption of new products is introduced in this chapter. This new model is both postulational and interpretive in nature. It is postulational because the emphasis is placed on the system as a whole, bound by logical derivation. The foundation for the whole system is a set of propositions; these are the postulates, which often are also called axioms. Postulates have an empirical content, and their validity is dependent on facts. Theorems are derived from the postulated, and theorem verification indirectly validates the postulates by which they are proved. The model is also interpretive because it provides an interpretation of the formal diffusion theory advanced by Rogers (1963).

According to Kaplan (1963), behavioral scientists are interested in and attracted to the postulational style of models for many reasons. Kaplan says,

> First: Postulational models provide us with a way of handling complex phenomena without

> introducing artificial simplifications of the "other things being equal" type.
>
> Second: The construction of the postulational model reveals gaps in our knowledge. It allows us to identify the propositions that are needed for us to be able to drive the conclusion in which we are interested; gaps in knowledge are revealed by the gaps in "proofs."
>
> Third: Perhaps the most important advantage conferred by the postulational model lies in its deductive fertility. It allows us to process our information so that we can squeeze out of our data a great deal of content not otherwise available to us.
>
> Fourth: The postulational model simplifies and shortens the process of verification in that a verification of the postulates constitutes at once a verification of all theorems that follow from them.
>
> Fifth: Finally, the postulational style makes it possible to have an economical summary of our actual or anticipated findings (1963, pp. 258-272).

The interpretive character of the model is also important. As it appears from the literature review, the innovation definition advanced by Rogers (1962; 1983) which is based on the perception of innovation has been followed by none of the diffusion scholars because of the lack of an explanatory model of the perception process.

The interpretive model of perception of innovation is important because such perception is a <u>necessary</u> but not <u>sufficient</u> step for the adoption process later on. As Ostlund (1974) says, the perception of innovations by the

potential adopters can be a more effective predictor of innovative behavior than personal characteristics.

An explanatory model for the adoption process is also important because it would provide marketers with a mechanism that explains why their new products are accepted or rejected by potential consumers. Such a mechanism would in turn provide marketers with information that could help them in the design of different marketing strategies to accompany the introduction of new products; the mechanism could help to increase the probability of product acceptance in the marketplace from such stategies as promotion, pricing, packaging, and distribution (Midgley 1977; Cooper 1979; and Tushman; 1982).

In the remainder of this chapter the new model will be introduced and followed with a discussion of theory evaluative criteria as developed by philosophers of science. Finally, selected criteria are applied to evaluate the structure of the new model.

The Primary Assumptions of the New Model

Before introducing the new theoretical framework of both perception and adoption of new products, it seems important to determine and state the main assumptions of this framework as follows.

1. Perception and adoption processes are inseparable. This means that the perception of a new product as innovation is a prerequisite step for the adoption process. It is a necessary condition but not a sufficient one for the adoption process.

2. The new model is individualistic in nature. It emphasizes the internal processes through which an individual goes as he perceives and adopts or rejects a new product. The effect of social influences on the adoption process is not treated in this model.

3. Throughout this model, the adoption process is defined as "the purchase of an item perceived as an innovation by an individual for at least one time." Accordingly, it is not essential to have the individual commitment to the new item over time; rather, it is sufficient for the individual to buy the new item for only one time to be considered as an adopter. Given this definition of adoption, the model is assumed to work better when dealing with the adoption of those new items which are highly infrequently purchased; that is, durable products such as furniture items, major appliances, etc.

The Primary Components of the Model

As Figure 1 indicates, the new model is composed mainly of four sets of constructs or variables. Those are input,

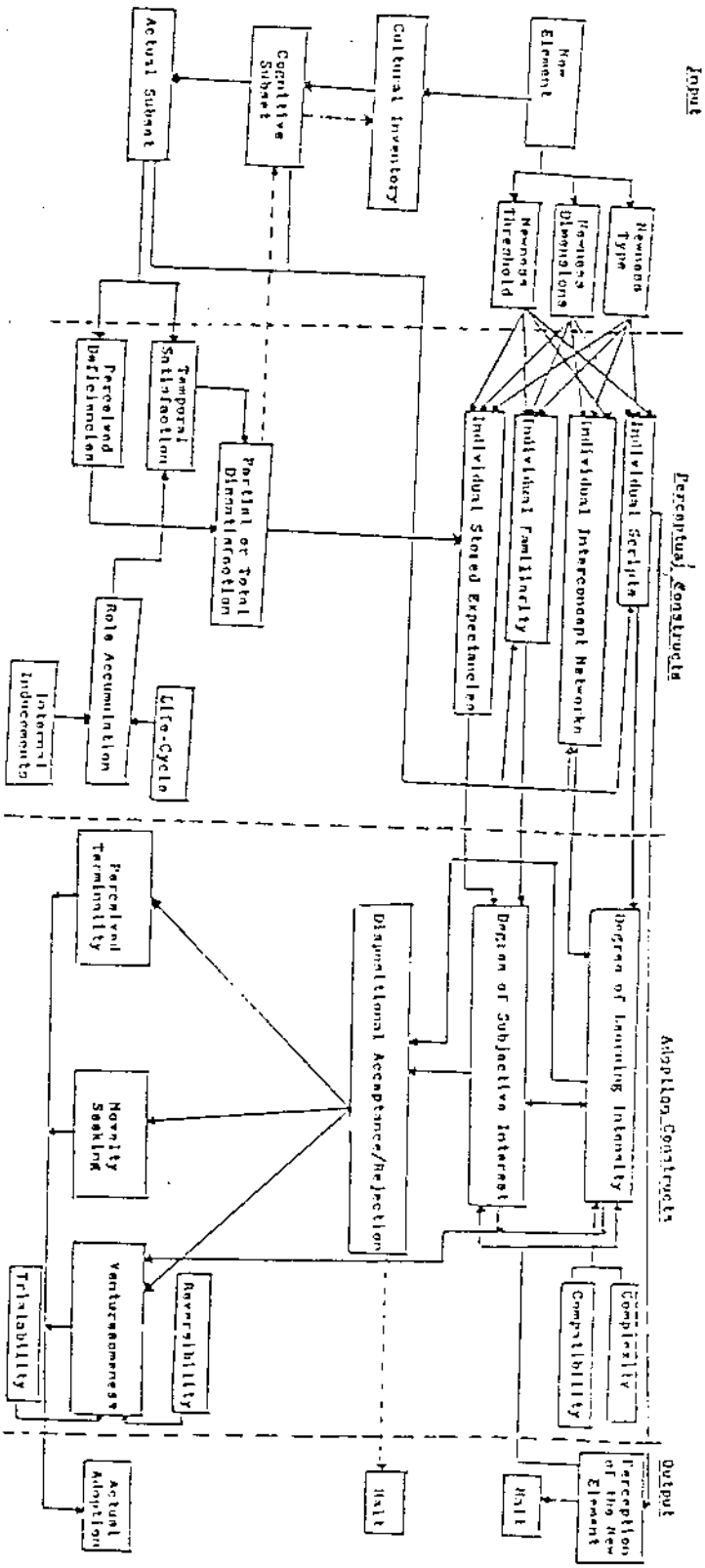

Fig. 1.--Perception and adoption of innovation.

output, hypothetical, and exogenous variables. The input and the output variables are the least abstract; they are anchored directly to reality and operationally well defined. The hypothetical variables are more abstract, and only indirectly related to reality and not operationally defined. They constitute the heart of the model. Some are more realistic and objective than others, although quite formal because of the linkages stated in the model. Finally, they give a discription of the consumer's mental state as it is related to the perception and adoption processes, and therefore they map it by identifying, classifying, and labeling various conditions. They encourage speculative theorizing and to that extent serve the generative function. The exogenous variables describe the context in which both the perception and adoption processes occur. They are powerful influences that the consumer takes into consideration. The model isolates them, labels them, and shows their relationship to the hypothetical variables but does not explain changes in them.

The Cultural Inventory and Its Subsets

The perception model postulates that in any society, regardless of its degree of civilization, there is a cultural inventory. This term introduced by Alderson (1978),

the marketing theoretician, refers to "the total products and services owned or used by a given society at a given time" (1978, p. 267). For the purpose of illustration, assume a very simple inventory that might be designated bythe twenty-four letters a through x. Each individual in this society would know an assortment of products and services that represents his cognitive subset. Hence, the individual cognitive subset can be defined as

> The total assortment of products and services that an individual knows from the total products and services in the cultural inventory regardless of the actual use of them.

At the same time, each individual would hold an assortment of products and services that serves to equip the individual for future action and is related to the principal contingencies he can foresee as requiring action. This represents the individual actual subset. Accordingly, the actual subset can be defined as

> The total assortment of products and services that an individual uses to satisfy his needs at a given point in time.

From the foregoing definitions, it is obvious that a cognitive subset is selected from the cultural inventory, while the actual subset is selected from the cognitive subset. Hence,

$$A_c \cap C_i, \text{ and}$$

$$A_a \cap A_c$$

where

A_c is the cognitive subset,

C_i is the cultural inventory,

A_a is the actual subset, and

$\cap$ reads a subset.

This in turn means $C_i \longrightarrow A_c \longrightarrow A_a$

where

$\longrightarrow$ means implies.

Since it is more probable that an individual will not know every item in the cultural inventory, it is logical to say that

The probability that $C_i > A_c$ is very high;

The probability that $C_i = A_c$ is very low; and

The probability that $C_i < A_c$ is zero.

On the other hand, it is more likely that an individual will not use all the items in his cognitive subset. Accordingly, it is logical to assume that

The probability that $A_c > A_a$ is very high;

The probability that $A_c = A_a$ is very low; and

The probability that $A_c < A_a$ is zero.

This can lead to the conclusion that

the probability that $C_i > A_c > A_a$ is very high;

The probability that $C_i = A_c = A_a$ is very low; and

The probability that $C_i \prec A_c \prec A_a$ is

zero.

Certain theoretical postulates can be advanced based on the above discussion, as follows.

P 1: Every society will have its own dynamic cultural inventory. The assortment of products and services in this inventory changes over time by the factors of social inventions and obsolescence.

P 2: The more advanced the society is, the more likely that the cultural inventory will change rapidly and vice versa.

P 3: An individual will neither know nor use all the products and services in the cultural inventory. It follows that every one in the society will have his own cognitive subset, and an actual subset that is a part of the cognitive subset. In symbolic form,

$$C_i \longrightarrow A_c \longrightarrow A_a$$

P 4: Over time, an individual cognitive subset is increasing, and in no way is this subset going to decrease; that is,

A_{ci} at time (t) = a + b + c.

A_{ci} at time (t + 1) = a + b + c + z + x.

where

a + b + c is the assortment of individual i at time (t); and
a + b + c + z + x is the individual assortment at time (t + 1).

P 5: The more the individual is integrated in the social system, and the more he is socially and physically mobile, the larger his cognitive subset will be.

P 6: Every individual will select certain assortments of products and services to use from the cognitive subset. The probability of future use of the elements remaining in the cognitive subset after his selection decreases when the individual is satisfied with his assortment in the actual subset, and increases when the individual is not satisfied with his assortment.

P 7: There is no direct relationship between the size of an individual's cognitive subset and his actual subset except that the actual subset will in no way exceed the cognitive subset. It follows that each of the following situations has equal probability.

$A_{ci} > A_{cb}$, however,

$A_{ai} < A_{ab}$, or

$A_{ci} < A_{cb}$, however,

$A_{ai} > A_{ab}$, or

$A_{ci} > A_{cb}$, and

$A_{ai} > A_{ab}$, or

$A_{ci} < A_{cb}$, and

$A_{ai} < A_{ab}$.

P 8: An individual's actual subset increases or decreases over time. It increases by adding a new element from the cognitive subset without dropping any element from the old assortment, and it decreases by dropping an element from the actual subset without replacing it by another item from the cognitive subset. This means in turn that either situation (a) or (b) has equal probability:

A_{ai} at time (t) = a + b + c.

A_{ai} at time (t + 1) = a + b + c + z...(a), or,

A_{ai} at time (t + 1) = a + b.....(b).

P 9: The assortment of an individual's actual subset may change over time for reasons of variety, improved products, complementary products, response to new contingencies, desire for distinction, or desire for conformity.

P10: It is harder for the individual to perceive innovation when the assortment of his cultural inventory is characterized by a high degree of variety and a lesser degree of stability, and vice versa.

Perceived Deficiencies, Temporal Satisfaction, Role Accumulation, and Partial or Total Dissatisfaction

Once an item becomes part of an individual's actual subset, the individual might either be temporally satisfied with it or perceive certain deficiencies in its performance package. An individual will be satisfied with the elements in the actual subset as long as their performance packages satisfy his needs. If this is the case, then it is more likely that the individual will perceive those elements that make up the actual subset as the best from among those that make up the cognitive subset. For example, suppose a given consumer is using product X as an element in his actual subset while there are similar products to X in the cognitive subset, say products Y, W, and Z. If the consumer is satisfied with the performance package of X, then it is more likely that he will perceive X's performance package as the best from among X, Y, W, and Z.

Unfortunately, such actual satisfaction with an item cannot last forever. Rather, an item performance package is more likely to provide the individual with temporal satisfaction for many reasons. The first reason can be found within the dynamic nature of the cultural inventory. The introduction of new and improved products into this inventory over time might result in changing the cognitive components of the individual. If a new item is perceived as better than that in the actual subset, then the individual may begin to experience either a partial or total dissatisfaction with the item in the actual subset. In the previous example, if product R is introduced into the cultural inventory, and if it is perceived as better than X, then the consumer will begin to experience some feelings of dissatisfaction with product X.

Another factor that creates temporal satisfaction with an item in the actual subset can be found in the new individual's contingencies. Such a factor is known as role accumulation. An item that performed satisfactorily for the individual under certain contingencies might not do so when the individual is faced with new roles in his life.

In 1980, Hirschman introduced a conceptual framework of the interrelationships among three constructs which are relevant to the behavior of consumer-innovativeness, novelty seeking, and creativity. Within this framework

Hirschman postulates that the key factor which influences both adoptive innovativeness (acquisition of new products) and use innovativeness (the use of a previously adopted product to solve a novel consumption problem) is the confrontation by the consumer with a novel consumption experience or problem. Faced with new problems to solve, the consumer must undertake some type of innovative activity. According to Hirschman, role accumulation is a construct that would seem to be a valuable conceptual linkage to both types of innovativeness. According to Wallendorf (1979), role accumulation refers to the number of nonoverlapping roles which the individual is performing.

It would appear logical, according to Hirschman's framework, (1980) to assume that when the individual adopts a new role for which the responsibilities are not redundant with currently played roles, a new set of consumption problems will often be encountered. This is what is described in the new model as perceived deficiencies in the products (or some of them) currently in use.

Hirschman further postulates two reason or types of agents that may initiate role accumulation. First, there are a variety of life-cycle related factors that may provide external impetus for the accumulation of new roles. For example, as the individual matures, certain roles are acquired due to the socialization or social

expectations. With each of these additional roles, the consumer is confronted with new consumption situations and must change or adapt the products he uses. A second probable source of role accumulation is internal inducements. Many roles acquired by an individual may be due to one's desire for novel experiences, to seek self-fulfillment, or to express his talents.

According to the foregoing discussion, three concepts in the model can be defined, as follows.

A temporal satisfaction can be defined as:

> The satisfaction with an item in the actual subset that can be interrupted by either or both an improved item added to the cognitive subset or role accumulation.

A total or partial dissatisfaction can be defined as:

> The individual's needs which are not satisfied with some or all aspects of the performance package of a given item in the actual subset.

Role Accumulation can be defined as:

> The number of nonoverlapping roles the individual is performing.

The following tentative postulates can be advanced based on the foregoing discussion and definitions

P 11: Given the fact that the same stimulus can be perceived differently by different people, it is not expected that all individuals will perceive the same deficiencies in the same product or service.

P 12: Perceived deficiencies in a product's performance package will result in the

experience of total or partial dissatisfaction, which might force the individual to substitute that product with another from the cognitive subset or from the cultural inventory.

P 13: An individual will be temporally satisfied with the elements in the actual subset so long as no dificiencies are perceived in their performance packages or the perceived deficiencies are regarded as tolerable. In the first situation, the individual may perceive the elements in his actual subset as the best compared to those that make up the cognitive subset.

P 14: If a new product in the cultural inventory becomes a part of the individual's cognitive subset, and if it is perceived as better than the one in the actual subset, the probability of replacement of the old item by the new one is very high.

P 15: If the individual's temporal satisfaction with any item in the actual subset is interrupted by any change in his role accumulation, then the individual will start to experience either a partial or total dissatisfaction with some or all items in the actual subset. In this case, proposition 12 would apply again.

Individual's Scripts, Interconcept Networks, Familiarity, and Stored Expectancies

Once an individual begins to perceive certain deficiencies in the performance package of any item and to experience a partial or total dissatisfaction with it, it is natural for the individual to search for a better substitute--at which time a replacement is most likely to take place. If he could not find a better alternative in the cognitive subset, then the individual might seek more

information about other items in the cultural inventory. If an item in the cultural inventory is perceived to perform better than the item causing the dissatisfaction, then a replacement will be made.

In some cases, the individual might not be able to locate a better substitution in either the cognitive subset or in the cultural inventory; or all items that he is able to locate are perceived to perform the same or even worse than the one in use. In this case, no substitution is expected. Rather, certain expectancies will be developed and stored in the individual's mind. These expectancies represent the belief of the individual that in the future a better and new product will be available in the market. Accordingly, stored expectancies can be defined as

> The better performance aspects that an individual expects to find in a new item which may be added to the cultural inventory in the future.

Given these stored expectancies, and the individual's familiarity with the items in his actual and cognitive subsets, an individual is more likely to be able to detect and ascertain the newness dimensions of a new item added to the cultural inventory. Thus, an individual's familiarity can be defined as

> The degree to which an individual knows the performance package of an item in either his actual or cognitive subsets.

In addition to stored expectancies and familiarity, there are two more concepts that aid the individual in detecting and judging the newness dimensions in new products. First is the individual interconcept networks. It refers to the linkages existing among concepts based on the perceived inter-correlations of their respective attributes. It therefore can be defined as

> The establishment of networks of interconcept linkages among the information of different elements and their attributes.

This definition is based on the works of Hirschman (1980), Scott, Osgood, and Peterson (1979), and Simon (1979). It stands to reason that the more diversified the consumption experiences an individual has had, the more attributes he will associate with each concept whether or not this experience is based on and acquired from the cognitive or the actual subsets.

The second concept is that of an individual's scripts, which represent the mental storage in which a system of temporally and causally related events are stored. They represent a repertoire of consumption situations that the individual has stored over the years. Since scripts come from actual consumption experiences, then they are related only to the individual's actual subset. Scripts, then can be defined as

> All notes of episodic schema that represent a system of temporally and causally related events.

This definition is based on the works of Hirschman (1980), Norman (1976), and Schrank and Abelson (1977).

Newness Dimensions, Newness Types and Newness Threshold

Three important concepts affect the individual's ability to detect and ascertain new products: The newness dimensions; the newness threshold, and the newness type. The first refers to the magnitude of the observable or noticeable differences between the items an individual knows or uses and the new item. It stands to reason that when such magnitude is large, the probability of perceiving the new item as innovation is relatively high. However, the magnitude of the differences would depend on the expectancies stored in an individual's mind, and the individual's consumption experiences that are reflected in his interconcept networks and scripts.

Type of newness refers to whether or not newness is progressive or regressive. The progressive type refers to non-cyclical newness, examples of which are comparing color and black and white TV sets, or microwave and ordinary ovens. The regressive type refers to cyclical and seasonal newness, examples of which are wearing apparel items and cosmetic products.

It is logical to assume that an individual would find it easier to detect and ascertain newness dimensions when

the type of newness is progressive. In the case of regressive newness, the magnitude of the difference between the new and the old items (i.e., the newness threshold) should be large enough to enable the individual to detect and ascertain the newness dimensions of the new item. If such a difference is not noticeable enough, it is more likely that the individual will not perceive the new item as an innovation.

The newness dimensions of a new item can be found within any component of the item performance package. According to Wasson (1960), there are fourteen ways in which a product can be new:

1. New cost or better price;
2. New convenience in use;
3. New performance,
4. New availability in time or place;
5. Conspicuous-consumption experience;
6. Easy credibility of benefits;
7. New method of use;
8. Unfamiliar patterns of use;
9. Costliness, fancied or real, of possible errors in use;
10. Unfamiliar benefits;
11. New appearance, or other sense differences;
12. Different accompanying or implied services;
13. New Market (1960, p. 54).

Wasson (1960) says that the first six attributes are positive in the sense that they ease the job of introduction. The next four attributes are classified as negative in the sense that they make the introduction of the new product more difficult and costly. The last three

attributes are ambivalent in their effects. A fourteenth characteristic (new construction or composition) is omitted by Wasson because he believes that this characteristic is neutral--that is, it has no consumer meaning except to the extent that it is identified with, or can be associated with, one or more of the thirteen consumer oriented characteristics listed before.

Fourteen years later, Wasson (1974) re-analyzed his fourteen newness characteristics and concluded that the list can be reduced to two factors--the positive factors of more values and the negative factors of some learning price. In his new categorization, only the first five characteristics are classified as positive; the next five characteristics are classified as negative; and the last three characteristics are classified as ambivalent (1974, p. 52).

Regardless of the categorization of the new dimensions, it is apparent that the newness dimensions of a new item can be found within the performance package of that item, which include

1. New cost or better price;
2. Greater or better convenience in use;
3. More reliable and dependable product;
4. Better availability in time or place;
5. Better perceived status symbolism;
6. New methods of use;
7. New use-system;
8. New and unfamiliar benefits;
9. New appearance, style, or texture;

10. New market or channels;
11. Different accompanying or implied services.

From the foregoing discussion, several final postulates can be advanced:

P 16: If an individual experiences either a total or a partial dissatisfaction with the performance package of an item in the actual subset, and if he could not find a better alternative in either the cognitive subset or the cultural inventory, he will develop certain expectancies about a new item with a better performance package that could be available in the future.

P 17: The strength of stored expectancies held by an individual will depend on (a) the length of usage time; (b) the strength of dissatisfaction, and (c) the importance of the performance aspects causing dissatisfaction.

P 18: The more the individual uses some items in the actual subset, or the more he knows about an item in the cognitive subset, the more familiar he will be with those items.

P 19: The familiarity with an item is enhanced by transferring it from the cognitive subset to the actual subset.

P 20: The more diversified the consumption experiences of an individual, the more product concepts he will have, and more attributes he will associate with each product concept.

P 21: The more an individual is integrated into the social system, and the more he is physically and socially mobile, the more well developed his interconcept networks will be.

P 22: Every individual will have his own scripts which can be used to solve novel consumption situations.

P 23: The number of an individual's scripts will depend on (a) the number of environmental

stimuli the individual is exposed to, and (b) the diversification degree of the actual consumption experience.

P 24: The probability of perceiving a new item as innovation is a function of stored expectancies, individual familiarity, individual interconcept networks, individual scripts, newness dimensions, newness threshold, and newness type. In symbolic form, it is

$$P_I = f\ (S \times D \times I \times P \times D \times H \times T).$$

Where

P_I is the probability of perceiving a new item as an innovation;
S is stored expectancies;
F is the individuals familiarity with the items replaced by the new items;
I is the individual interconcept networks;
P is the individual scripts;
D is the number of new dimensions in a new item;
H is the newness threshold; and
T is the newness type; and

Given proposition 17 that

$$S = f(L \times V \times M),$$

Where

L is the length of usage time of an item;
V is the strength of dissatisfaction with an item; and
M is the importance of the performance aspects causing the individual dissatisfaction; and

Given proposition 18 that

$$F = f(G \times K),$$

Where

G is the length of usage time of an item causing the individual dissatisfaction; and

K is the knowledge of an item in the cognitive subset; and

Given propositions 20 and 21 that

$$I = f(E \times R \times Y),$$

Where

E is the individual consumption experiences;
R is the individual social integration degree; and
Y is the individual physical mobility degree; and

Given proposition 23 that

$$P = f(U \times N),$$

Where

U is the number of environmental stimulus an individual is exposed to; and
N is the diversification degree of an individual consumption experiences;

it follows then that the perception of a new item as innovation is a function of

$$P_I = f[(L \times V \times M)\ (G \times K)\ (E \times R \times Y)\ (U \times N)\ (D)\ (H)\ (T)].$$

Degree of Learning Intensity

If the individual perceives a new item which is introduced into the cultural inventory as innovation, his next step is to decide whether or not to adopt it. In the previous discussion it is obvious that the perception process is based on the individual's ascertainment of the newness dimensions in the new product. Such ascertainment process is affected by the degree of the individual's

familiarity with the old item (product) replaced by the new one, the individual's interconcept networks, the individual's scripts, and the individual's stored expectancies. Those concepts play an important role in the adoption step.

There are two main factors that can affect the individual's decision with regard to adopting or rejecting a new item. The first is the learning degree required of the individual to adopt an innovation. The second is the individual's degree of subjective interest in the innovation.

Any adoption of a new product would require some degree of changes in one's habitual purchasing and use behavior. The amount of learning required determines to a large degree the individual's ability to accept the new product. Wasson (1974) specifies that the introduction of a new product may require any or all of four kinds of learning:

> (a) Motor learning, which is a change in habitual muscular system sequences;
> (b) Value-perception learning, which is learning how to value the improvement as greater than the cost;
> (c) Role-perception learning, which is learning to accept a changed social role as a result of the "new" product use; and
> (d) Use-perception learning, which is involved in crediting a new satisfaction source as reliable improved fulfillment of a given desired set (1974, p. 58).

It is within this degree of required learning that Robertson's classification of innovation fits. According

to Robertson (1971, p. 7), the critical factor in defining a new item as innovation should be its effect upon established pattern of consumption or behavior.

Obviously, not all new products will require all types of learning. Furthermore, among those products that require certain types of learning, the intensity of that learning will vary from one product to another and from one individual to another.

The individual's scripts will determine in part the amount of motor learning required for a new product since they are systems of temporally and causally related events. Also, the individual's familiarity with the old product will affect the perceived amount of motor learning necessary for an individual to adopt a new product. The more familiar one is with doing something a certain way, the harder it is to learn how to do it a different way. The harder the degree of motor learning required to adopt a new product, the lower probability of mental acceptance of it, or at least, the more the time would be that is required to accept it.

Stored expectancies will determine in part the amount of value-perception learning required to adopt a new product. If the newness dimensions of the new product meet what an individual has expected to have, then the amount of value-perception learning required will be at its minimum

and the probability of accepting the new product will increase. On the other hand, if the newness dimensions are not expected by the individual, then the perceived degree of value-perception learning would be high, and the probability of accepting the new product will decrease. Thus

If $S \approx D$, then VPL is low; and

If $S \not\approx D$, then VPL is high.

where

S is the stored expectancies;

D is the set of new dimensions;

VPL is the amount of value-perception learning;

$\approx$ is similar to; and

$\not\approx$ is not similar to.

and

If VPL is low, then $P(A_m)$ is high; and

If VPL is high, then $P(A_m)$ is low.

where

$P(A_m)$ is the probability of mentally adopting the new item, it follows then that

If $S \approx D$, then $P(A_m)$ is high; and

If $S \not\approx D$, then $P(A_m)$ is low.

Interconcept networks as well as the degree of familiarity with the old product will affect the degree of

role-perception learning required. Every product has its own concept in people's minds. People usually know how, why, and where a product might be used. When a new product is introduced, it will introduce new concepts that sometimes result in new social roles. It stands to reason that when the new product introduces new social roles, certain people tend to resist it. Such resistance increases when the new product's concept is perceived to downgrade the individual's social role. For example, the introduction of instant coffee was met with some resistance because it was perceived to downgrade the women's skills required for making coffee. Another example is found with the introduction of the fully automatic clothes washer. Housewives resisted it on the basis that they preferred to trust their own judgment about the proper variation of the various elements of the wash cycle; the fully automatic washer was also perceived to downgrade women's social roles in the families. When a new product downgrades the individual's social role, the amount of role-perception learning required will be very high, and the time required for its adoption will be very long.

Stored expectancies will affect, to a certain degree, the amount of use-perception learning required. Whenever the newness dimensions meet the individual's stored expectancies, the degree of use-perception learning

required will be at its minimum. Simply stored expectancies are consumer's desires that are not satisfied by the performance package of the replaced product. Once those expectancies are found in the performance of a new product, the individual will not need a high degree of use-perception learning to adopt the new product. Thus,

If $S \approx D \longrightarrow$ UPL is low; and

If $S \not\approx D \longrightarrow$ UPL is high, and

If UPL is low, then $P(A_m)$ is high; and

If UPL is high, then $P(A_m)$ is low,

It follows then that

If $S \approx D$, then $P(A_m)$ is high; and

If $S \not\approx D$, then $P(A_m)$ is low,

where

UPL is the use-perception learning.

In addition to these four concepts that affect the individual's perception of the learning type and degree required to adopt a given new item mentally, there are two additional concepts that include the degrees of the new product's complexity and compatibility. According to Rogers (1983, p. 230), complexity is the degree to which an innovation is perceived as relatively difficult to understand and use.

As reported earlier, Fliegel and Kivlin (1969; 1966; and 1969) found that the complexity of farm innovation was negatively related to its rate of adoption. It stands to reason therefore, that the more complex the new product, the more the perceived learning requirements by the individual. Complex products might require more than one type of learning and also might require more intensive learning within each type.

Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experience, and needs of potential adopters (Rogers 1983, p. 223). Obviously, compatibility is related to some types of learning, especially role-perception learning. When the new product is compatible with the individual's social roles and values, then the amount of learning perceived by the individual is low.

Based on the foregoing discussion, several theoretical postulates can be advanced:

P 25: The probability of adopting a new product is inversely related to the number of learning types required for its adoption.

P 26: The individual's scripts will determine the new motor-learning degree required; however, the intensity of this type of learning is a function of the individual's familiarity with the old product.

P 27: The ability of an individual to accept the required value-perception learning is

determined by the individual's stored expectancies. Thus,

$$VPL = f(S),$$

But since

$$S = f(L \times V \times M)$$

It follows then that

$$VPL = f(L \times V \times M).$$

This means that the ability to accept the value-perception learning is a function of (a) the length of usage time of the replaced product; (b) the strength of the dissatisfaction with the replaced product; and (c) the importance of the performance element causing the individual dissatisfaction.

P 28: The degree of an individual's consumption experience in this interconcept networks will affect the degree and ability of accepting role-perception learning required for adopting the new product. So,

$$RPL = f(I).$$

P 29: The degree of an individual's ability to accept use-perception learning is a function of stored expectancies and newness dimensions;

If $S \approx D$ then, UPL is low, and
If $S \neq D$ then, UPL is high.

accordingly,

$$UPL = f(S \ \& \ D).$$

P 30: The perceived degree of new product complexity is directly related to the perceived degree of learning required and inversely related to its adoption probability.

P 31: The more the new product is compatible with the individual's social roles, values and needs, the less degree of learning will be required and perceived by the potential consumer.

Degree of Subjective Interest and Dispositional Acceptance or Rejection

Individual interests can be viewed as stimulating objects and activities in the individual's environment; they are the objects and activities that stimulate pleasant feelings in the individual. Aversions are the objects and activities that stimulate unpleasant feelings in the individual. Psychologists divide interests into subjective(dispositional) interests and objective (occurrent) interests (White 1964, p. 102).

Subjective interests are of two kinds which are determined by feelings of pleasantness and unpleasantness. Subjective interests are likes or estimated experiences characterized by feelings of pleasantness. They can be present in varying degrees under stimulating objects and activities.

Objective interests are reactions. The two types of objective interests are determined by the two movements toward or away from the stimulus. Again, there are varying degrees of objective interests.

Both subjective and objective interests may be viewed as either acceptance-rejection activities which are observed in the behavior of the individual. It should be noted, therefore, that interests stem from the objects and

activities which are regarded as stimuli (Fryer 1931, pp. 14-16).

Thorndike (1935) divides interests into those that are either intrinsic or extrinsic. He defines as intrinsic those interests in certain objects or activities themselves regardless of their ulterior consequences. Extrinsic interests are those stimulated by the consequences of an object or activity. Accordingly, subjective interest in a new product can be divided into intrinsic and extrinsic interest. Those who are stimulated by the new product itself are intrinsically interested, while those who are stimulated by the consequences of the new product are extrinsically interested.

White (1967, p. 85) defines interest as an inclination to engage in one or more perceptual, intellectual, or practical activities that are appropriate to the particular object of interest. To feel interested in anything is to feel attracted to it--to feel inclined to give attention to it. Naturally, this also involves feeling disinclined to attend to other things, and feeling vexed, unhappy, and uncomfortable when prevented from giving attention to the object of interest.

According to Hunt (1963, pp. 89-104), an interest passes through three necessary formative stages. First, it

is essential to experience some sort of orienting response to something in the environment or to any optimum variation in sensory input. In other word, if one noticed nothing, one would not become interested in anything. Second, after repeated encounters with a noticed object, there begins to develop an emotional attachment that derives from cognitive familiarity. Third, the established interest is kept alive by the occurrence of continued novelties or incongruities within the familiar situation. To sustain interest, there must be a sort of optimum discrepancy, the calculating of which Hunt calls "the problem of the match."

From the foregoing discussion, an individual subjective interest can be defined as

> An inclination to engage in some one or more perceptual, intellectual, or practical activities that are appropriate to the object of interest.

Both the stored expectancies and familiarities of an individual will affect the degree to which he will become subjectively interested in the new product. An individual is more likely to compare the newness dimensions of the new product with his stored expectancies. If such comparisons proved that the newness dimensions are compatible with or better than the individual's expectations, it is more likely that the individual will become interested in the new product. On the other hand, if such comparisons

indicate that the newness dimensions are less than the individual's expectations, then it is more likely that the individual will not become interested in the new product.

Obviously, the degree of an individual's interest will affect his ability to accept the kind (type) of learning required to adopt a new product and the intensity of each type. The more the individual becomes interested in the new product, the more likely he is to accept different and intense learning requirements and vice versa. On the other hand, the learning requirements can affect the degree to which an individual will become interested in the new product; although this seems to contradict the first statement, in reality, which comes first will determine the other. If the individual becomes interested in the product first, then he will be willing to accept the learning requirements; this is more likely to happen if the product fits within the individual's spheres of interests. On the other hand, if the new product does not fall within the individual's spheres of interest, then it is more likely that the individual will compare the newness dimensions of the new product with his expectations. If such comparison results in a favorable attitude toward the new product, then it is more likely that the individual will become interested in it.

Both learning degree and the individual's subjective interest will determine the individual's dispositional acceptance or rejection. Dispositional acceptance or rejection can be defined as

> The degree to which an individual mentally accepts or rejects the adoption of a new product.

Based on the foregoing discussion, the following postulates can be advanced:

P 32: If a new product falls within the individual's spheres of interest, it is more likely that the individual will become subjectively interested in it.

P 33: Dispositional acceptance or rejection is a prerequisite if an individual is to go through the actual adoption process.

P 34: The degree of newness in the new product is more likely to affect the individual's degree of interest. Too much incongruity with a familiar product will create dissonance, while too little incongruity with the familiar product would create boredom.

P 35: An individual may become either intrinsically interested or extrinsically interested in a new product.

P 36: An individual who become intrinsically interested in the new product is more likely to collect more information about it from the media, while it is more likely the individual who becomes extrinsically interested will collect more information from both media and personal channels.

P 37: The degree of the individual's dispositional acceptance or rejection is a function of both his degree of interest and the learning requirements.

Therefore,

$$DAR = f(SI \times L)$$

Where

DAR is the dispositional acceptance or rejection;
SI is the subjective interest degree; and
L is the learning requirements for adopting a new product.

Since the individual's degree of subjective interest is a function of the degree of congruity between the newness dimensions and the individual's expectations, the individual's familiarity degree with the replaced product, and the individual's general spheres of interest, it follows then that

$$SI = f(S \approx D + F)\ (GI)$$

Where

GI is the individual's general spheres of interest.

Furthermore, since the learning requirements are the sum of learning types required for adopting a given new product--that is

$$L = (L_m + L_{vp} + L_{rp} + L_{up}),$$

it follows then that

$$DAR = f(S \approx D + F)\ (GI)\ (L_m + L_{vp} + L_{rp} + L_{up}).$$

Venturesomeness

Given that the individual becomes mentally disposed toward a new product, three factors will affect his movement to the actual adoption of it. These factors are the individual's venturesomeness degree, novelty seeking, and perceived innovation terminality.

Venturesomeness can be defined as

> the degree to which an individual is willing to take risks in the adoption of a new product.

Although most of the empirical studies concerning venturesomeness have proved that this concept is one of the leading predictors of an individual innovativeness [e.g., Robertson (1966) and Popierlarz (1967)], it is not known whether or not the venturesome consumer sees less risk in a new product or whether or not the risk concerns him.

Within this model, venturesomeness is a major factor that affects the individual's decision to buy a new product. Every decision to adopt a new product requires a certain degree of venturesomeness. This degree would vary from one product to another depending on the degree of learning requirements for such adoption and the amount of investment in the new product. For those products that require a minimum degree of learning, the degree of an individual venturesomeness required is not as high as it would be in the case of adopting those products that require a high degree of learning.

The degree of venturesomeness will be affected by the ability of an individual to try a new product before its full adoption. In other words, the trialability degree of a new product will affect the amount of venturesomeness

required to adopt it. Rogers defines trialability as "the degree to which an innovation may be experimented with on a limited basis" (1983, p. 231). An innovation which is trialable is less risky to the adopters. Trialability can be either actual or vicarious. When a new product requires a large and intense amount of learning, vicarious trialability would not be as effective as in the case of low learning new product.

Reversibility can also affect the venturesomeness degree required for adopting a given new product. Reversibility is defined as "the degree to which and the ease with which the status quo ante can be reinstated after the actual adoption of an innovation" (Zaltman 1973, p. 42). There is evidence to show that when a number of alternative innovations are available, the more reversible ones are more likely to be adopted earlier (Taylor 1970).

Divisibility is related to reversibility. The common view of divisibility is the ability to try to implement the innovation on a limited basis. The more limited that basis--that is, the smaller the amount of resources committed--the more easily the preinnovation status quo can be reinstated. Coughlan, Cooke, and Safer (1972) distinguish between two types divisibility. The first reflects the extent to which a complete innovation can be implemented without entirely abandoning current practices.

The second type concerns the extent to which the innovation can be broken down into a set of components that can be implemented gradually with the benefits of feedback.

Based on the foregoing discussion, the following postulates can be advanced

P 38: For those new products that require a large degree of learning, their actual adoption would require a higher degree of venturesomeness than is the case with the adoption of those products that require a small amount of learning.

P 39: The degree to which a new product is trialable would affect the required venturesomeness degree for its adoption. An inverse relationship is expected between the product trialability degree and required venturesomeness degree.

P 40: For those products that require a high and intense amount of learning, actual trialability would reduce the venturesomeness degree required for their adoption more so than vicarious trialability.

P 41: Venturesomeness degree is inversely related to the product's reversibility.

Novelty Seeking

The second factor that affects the individual's decision to adopt or reject a new product is the individual's degree of novelty seeking. Novelty-seeking behavior has been the subject of a systematic program of research since the late 1950's. Different approaches are advanced to explain this behavior.

The first approach is found within the cognitive consistency perspective. Under this perspective there are at least two theories--the balance theory and the congruity principle theory.

The balance theory assumes that imbalanced states will lead to activities that will change them to balanced states. However, this theory is not concerned with the modes or methods of obtaining balanced states (Cartwright and Harary 1956; Heider 1958; and Zajonc 1968).

The congruity principle theory is concerned with an identifiable source making an assertion for or against a particular object or concept. The individual generally maintains many types of attitudes toward many number of concepts and sources. Any assertion by a source relates the source and the concept held by the individual. If the individual is favorably disposed toward the source and the concept prior to the assertion by the source and if the assertion is favorable, then there is no incongruity. If the same condition obtains with the exception that the assertion by the source is not favorable toward the concept, then incongruity is said to prevail. The state of incongruity generates a pressure for change in the attitude held toward the source or the concept, and the changed attitudes are expected to lead to a congruity (Tennenbaum 1968).

The second perspective that investigates novelty-seeking behavior is known as the cognitive dissonance perspective. According to the cognitive dissonance theory as developed by Festinger (1957), relations exist between the relevant cognitions of an individual. If there is a satisfactory relationship between two relevant cognitions, they may be said to exist in a "fitting" or consonant relationship. However, if for one reason or another they do not fit, the relationship is characterized by dissonance. Since dissonant relations between cognitions are psychologically uncomfortable, the organism is aroused to find ways to reduce dissonance.

As Festinger (1964) recognizes, the relationship between his theory and novelty-seeking behavior can be found in the individual's attempt to seek out new information as a result of having experienced dissonance. He points out that "active curiosity and the sheer pleasure of acquiring information for its own sake cannot be ignored in any discussion of voluntary seeking out of new information" (1964, p. 124).

A third perspective that deals with novelty-seeking behavior can be found within the complexity theory and novelty seeking. There are two approaches under the complexity theory--the collative approach and variation-seeking approach. The collative approach, as

introduced by Berlyne (1960; 1963; 1966; and 1968), postulates that for novelty-seeking behavior to take place, the organism has to be aroused. Berlyne (1963, p. 290) identifies some of the important and outstanding attributes of the new stimuli pattern that can lead to arousal situations. The items called "collative properties" are novelty, surprisingness, change, ambiguity, incongruity, and the power to induce uncertainty. According to Berlyne, the novel object is responsible for the arousal and it can help to relieve it. The individual could engage in any one or all three of the exploratory behavior forms that include (a) orienting response, (b) locomotor exploration, and (c) investigatory responses. Generally, all three or any one of them can be used in the reduction of tension created by the arousal.

The variation-seeking approach, as introduced by Maddi (1968), starts with the proposition that novelty or varied experience is sought out for its inherent satisfaction--that is, for its own sake. The theory posits that variation is important and basic to the arousal of exploratory behavior or novelty-seeking. Variation refers to the variation in stimulation, and thus novelty and surprisingness constitute variation. For Maddi, the motivational significance of novelty-seeking lies in the need for variation.

Nevertheless, other alternatives explanations for novelty-seeking behavior can be found in the congruity theory and in the general incongruity adaptation level hypotheses. The incongruity theory, as introduced by Hunt (1963), explains novelty-seeking behavior. Any time there is an incongruity between an incoming stimulus (novelty) and some standard within the organism, this incongruity instigates the motivation inherent in information processing to start operations or activities aimed at reducing the incongruity or until congruity appears.

The general incongruity adaptation level hypothesis, as introduced by Driver and Strufert (1965), postulates that since the organism has had experience with the deviation from adaptation level in each area where an adaptation level occurs, the organism form expectations regarding the probably amount of incongruity it will encounter in each area. Furthermore, human beings are capable of pooling and averaging their experiences of incongruity in specific areas into a more general incongruity experience. General incongruity means the total amount of novelty, imbalance, dissonance, inconsistency, disagreement, failure, and conflict that an organism encounters, summed over all specific adaptation levels. The general incongruity adaptation model defines the optimal incongruity level within an organism, and any deviation is expected to lead

to cognitive activity.

In this new model, novelty-seeking behavior is conceptualized as a function of the newness dimensions and the degree of an individual's subjective interest in a given new product. It is postulated that every individual during his ascertainment process is more likely to compare the new product's newness dimensions with his expectations. The newness dimensions can be closer, higher, or lower than what he expected. In the first two cases, the individual would perceive certain novel aspects in the new product; if so, the individual will become subjectively interested in the novel aspects and hence in the new product. Such an interest would create uncomfortable feelings that would lead the individual to seek out and adopt this new product. So, the newness dimensions creates an arousal state in the individual and this state is terminated by acquiring the new product. On the other hand, if the comparison between newness dimensions and expectations resulted in perceiving the newness dimensions as less than what the individual expected, the individual will neither perceive the relative advantages of the new product nor become interested in it. In this case, no novelty-seeking behavior is expected to be aroused. This means that:

If $D \approx S$, then it is more likely that the novelty-seeking behavior will be aroused; and
If $D \not\approx S$, then it is not likely that the novelty-seeking behavior will be aroused.

The foregoing discussion leads to the following postulates

P 42: Novelty-seeking behavior is aroused by the results of the comparison between the newness dimensions of the new product and the individual's stored expectancies. When the results of this comparison indicate that newness dimensions are equal to or more than the individual's expectations, then it is expected that novelty-seeking behavior will be aroused. If the comparison indicated that the newness dimensions are lower than the individual's expectations, then novelty-seeking behavior is not expected to be aroused.

P 43: New products that create a high degree of novelty-seeking behavior are more likely to be actually adopted than those products that do not create novelty-seeking behavior.

Perceived Terminality

A third factor that can influence an individual's decision to actually adopt a new product is perceived product terminality. According to Zaltman, Duncan, and Holbek, terminality can be defined as "the point in time beyond which the adoption of an innovation becomes less rewarding, useless, and even impossible" (1973, p. 43). An innovation can have either its own intrinsic terminals or

it can have extrinsic terminals such as offers good for a limited time. Both intrinsic and extrinsic terminals can affect the adoption of an innovation and the time at which this innovation is adopted. Moreover, the spacing of terminals in terms of time affects the amount of pressure imposed on the individual to adopt the new product. Products with very short-time terminals are more likely to be adopted faster than those characterized by relatively longer time terminals.

Still another type of terminals that can retard the adoption of an innovation is if a given new product was perceived by the individual to be susceptible to refinement or improvement in technology. In this case, the product that exists in the market might become obsolete in a relatively short time. If the product requires a large amount of investment, then the time required for its adoption is going to be relatively long. In this case the individual's degree of venturesomeness will determine to a large degree how soon the individual will adopt the product.

Given the foregoing discussion of terminaltity, the following final postulated can be advanced

P 44: New products that have some intrinsic terminals are more likely to be adopted in a relatively shorter time than those that do not have some intrinsic terminals.

P 45: The spacing time of the product's terminals affects the relative time of its adoption; the shorter the spacing time, the shorter the time of its adoption by interested individuals.

P 46: The adoption of a new product is a function of the individual's dispositional acceptance his venturesomeness degree, novelty seeking degree, and perceived product terminality. That is,

$$A = f(DA)\ (X)\ (P)\ (Z)\ ,$$

where

A is the actual adoption of a new product;
X is the individual venturesomeness degree;
DA is the individual dispositional acceptance;
P is the novelty seeking degree; and
Z is the perceived product terminality.

Since

$$DA = f(S \approx D + F)\ (GI)\ (L_m + L_{vp} + L_{rp} + L_{up}),$$

it follows then that

$$A = f(S \approx D + F)\ (GI)\ (L_m + L_{vp} + L_{rp} + L_{up})\ (X)\ (P)\ (Z).$$

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CHAPTER V

THEORETICAL AND EMPIRICAL FINDINGS

According to the research plan, the new model introduced in the previous chapter is evaluated theoretically and empirically. Theoretically, the model is evaluated using Bunge's (1976) evaluative criteria. Empirically, the model is evaluated by reviewing those cumulative empirical findings related to some linkages and concepts making up the new model. Findings across both types of evaluation are reported in this chapter.

Theoretical Findings

The theoretical structure and aspects of the new model are evaluated using Bunge's (1976) evaluative criteria. The following are the results of such evaluation:

1. The propositions contained in the new model and the ways in which they are interconnected appear to follow the rules of formation and transformation that correspond to what is required by elementary logic or more complex syntax.

2. The model appears to meet the internal consistency criterion. The presentation of the model is quite logical and no contradicted propositions are found within the model.
3. Since the model is built on a nomological deductive logical system, which is one of the ordinary logic systems for building theory, the model appears to be logically valid.
4. The new model satisfies the independence criterion. Throughout the model explanations, a consistent concern exists for defining the primitive concepts and postulates underlying the comprehensive scheme of the model. The major primitive assumption, which concerns the selection of perception as the proper theoretical basis for studying the adoption behavior, and the primitive concepts in the model seem to be mutually independent.
5. The model does not satisfy the strength criterion because it is not a general model but is instead a restricted one in the sense that it deals only with the innovative behavior of the ultimate consumer. The model covers neither the noninnovative behavior nor the adoption of innovations by groups or organizations. The model is also a restricted one in terms of looking

at the internal steps of the ultimate consumer in adopting a new product and ignores the effect of social groups on this step. However, the model can entail other existing models, which can increase its relevant strength.

6. The model appears to exhibit minimal ambiguity and vagueness. Most of the concepts and their relationships are clearly defined.
7. The explicit statements of propositions and assumptions of the model, and the lack of variables or concepts that are opportunistically introduced, indicate that the new model meets the conceptual unity criterion.
8. Due to the fact that the model contains some highly abstracted concepts, the model itself raises some problems with regard to its empirical interpretability. Of course, those problems can be solved by introducing some kinds of bridges between the languages of theory and research. Indeed, the introduction of some operational definitions that can be used in an empirical test is crucial to the success of the model.
9. The new model involves a very fundamental mechanism in both perception and adoption of new items. This model aims at developing explanations of why consumers behave the way they do with respect to innovative products.

Most of the concepts in the model are treated in detail; however, since the model is an a priori model, its representativeness can be evaluated further when it becomes subject to empirical validations.

10. On the whole the new model is externally consistent with the definition of "innovation," as introduced by Rogers (1983), and with the bulk of existing empirical results concerning the adoption process. The model is also deeply rooted in different theories developed outside of marketing (such as the post-purchase dissonance theory, the cognitive theory, the social learning theory, and the perception theory). Most of the parts of the various elements of the model are linked very well with existing empirical research data in marketing.
11. The new model satisfies the inclusiveness criterion. Since the model represents an attempt to solve the problem of defining innovation by addressing both the perception of the consumer to the new products and to tackle the problem of new products adoption process, the model provides answers to some ambigious question with regard to those problems.
12. Since the unobservable mechanism on which the new model is built is highly abstracted, the new model can be

considered as a "deep" model.

13. The new model satisfies the originality criterion. The model aims at increasing the knowledge about the perception and adoption of new products by describing and deriving new propositions from premises in conjunction with relevant information. This new model is certainly among the very first to attempt to explain these processes. Though it is an attempt which is built on the effort of others, the model represents a new way of thinking with respect to these processes.
14. Since the aim of the new model is to present systematized knowledge by establishing logical relations among previously disconnected items, the model satisfies the unifying power criterion. Such aim can be found in the attempt of the model to tie the perception process to the adoption process and also in the attempt of the model to bring together relatively confirmed hypotheses from the cognitive theory, the perception theory, the diffusion theory, and the social learning theory.
15. The heuristic power of the model is relatively high since it suggests the gathering of new data, which would be unthinkable without it, and since it suggests entirely new lines of investigation for the adoption process. This model is the first to suggest that the

study of the adoption process should be preceded by the study of the perception of the new product by the potential adopter.

16. The model appears to be highly stable as far as the component parts are concerned. Changes in the particular relationships between these parts are to be expected.
17. Although the structure of the model is not really testable due to its complexity, all of its propositions are subject and open to empirical testability. Different empirical hypotheses can be derived from each proposition and can be subject to empirical investigation.
18. As a result of the comprehensiveness of the model, a greater possibility of control should result in the testing of hypotheses derived from its propositions. Most of the research done in consumer behavior is correlational in nature, and a list of potentially operative variables could greatly increase the control of the rival hypotheses.
19. Most of the concepts in the model are to a large extent parsimonious. No high levels of reality have been appealed to in each construct or in the connections related to those constructs. Although the model contains some highly abstract concepts, several of them

were operationally defined and empirically measured before. For example, concepts such as satisfaction, social learning, individual's interest, and perceived risk were empirically measured before. Even some of those concepts which are still under theoretical debate, such as individual's interconcept networks and scripts, were subject to an attempt to define them operationally (Hirschman, 1980). Furthermore, the model does not contain any concept or construct which is opportunistically introduced. Rather, all concepts or constructs contained in the model are regarded as essential and important in explaining both perception and adoption of new products by consumers.

20. Finally, the new model appears to be consistent with the prevailing outlook and the common core of knowledge about the diffusion process.

Findings Across the Empirical Review

In order to carry out the empirical review of the concepts and linkages contained in the new model, two computer search tasks are conducted. According to the research plan, two database files are used to locate those empirical studies related to consumer behavior areas identified by the thirteen key words stated earlier in Chapter III. The results of those two search tasks are reported in Table I. As Table I indicated, some consumer

behavior areas were subject to only a few empirical investigations, if any at all. Areas such as individual's scripts and individual's interconcept networks were not

Table I

NUMBER OF EMPIRICAL STUDIES REPORTED ACROSS DIFFERENT CONSUMER BEHAVIOR AREAS USING TWO DATABASE FILES AND THIRTEEN KEY WORDS

Consumer Behavior Area	Number of Empirical Studies
Consumer Satisfaction	44
Cognitive Dissonance	22
Individual's Scripts	0
Individual's Interconcept Networks	0
New Products Perception	1
Consumer Interests	2
Consumer Social Learning	1
Perceived Risk	22

subject to any empirical investigations. Those areas are relatively new and still in the conceptualization process (Abelson 1981). Only one study is detected in new products perception area (Ostlund 1974). Consumer social learning and its effect on the adoption of new products was subject to only one empirical investigation (Wasson 1968). Finally, consumer interests were investigated through only two empirical studies (March and Swinbourne 1974; and Wells and Tigert, 1971).

Since the method of review selected in this research requires the existence of some cumulative studies across each area to be reviewed, those areas with few empirical studies were eliminated. Without cumulative findings across the area to be reviewed, no general and valid conclusion can be reached about the relationship under investigation. Accordingly, only three consumer behavior areas were subject to investigation. Those areas are consumer satisfaction, perceived risk, and cognitive dissonance.

Empirical Findings Across Consumer Satisfaction Area

1. The review of consumer satisfaction concept provides some conceptual elaboration to that concept as one of the major concepts in the new model. This review revealed that the conceptual ground of this concept can be traced back to either economic, cognitive, affective, or communication-effect models. The economic conceptualization of consumer satisfaction is based mainly on the consumer "surplus" idea. Consumer "surplus" is defined as the difference between a higher price that a given consumer is prepared to pay, in order to gain some subjective benefits, and the actual price paid for an item in the market. According to the economic model, the greater the consumer surplus, the

more likely there will be consumer satisfaction (Pfaff, 1977). The cognitive model postulates that consumer satisfaction is determined by the difference between an ideal set of product attributes, which a particular individual considers to be relevant for himself, and his perception of the actual product attributes. The greater the difference, the more dissatisfied the individual is likely to be. If, on the other hand, the ideal confirms to the actual, then the individual is likely to be satisfied with the product. The affective model assumes that the individual evaluates goods and services not simply on the basis of some kind of rational calculus but also on the basis of subjectively felt needs, aspirations, and experience.

Dissatisfaction is not caused by the difference between ideal and actual expectations but by some other psychological or personality change which may also carry over into the attitudes pertaining to goods and services in question. Finally, the communication-effect model explains consumer satisfaction as a result of some communication messages which have been received in either an interpersonal, intergroup, or mass communication situation (Day 1977).

2. Most of the empirical attempts which are made to measure satisfaction relied on a model known as the

"confirmation of expectations." According to this model, the consumer is assumed to bring to the purchase situation a set of expectations which is a function of his past experience as well as his current situation. A further assumption is that this set of expectations is not fixed but rather can be modified by active information search and by selective biases in the consumer's perception and retention (Miller 1977). In addition, the model assumes that the consumption experience of the consumer will result in either positive feelings toward the product in question; that is, satisfaction, or negative feelings; that is, dissatisfaction.

3. The relative strength of satisfaction or dissatisfaction is a function of the magnitude of the difference between perceived product performance and the level of expectations with which the consumer entered the consumption process, the relative strength of those expectations, and the particular psychological theory which is working on the consumer at the consumption time. Three psychological theories received a considerable amount of attention in this area. Those theories are assimilation (Olshavsky and Miller 1972), contrast, and assimilation-contrast theories (Anderson 1973).

4. Although most of the empirical attempts to measure satisfaction are based on the confirmation of expectations model, researchers in this area seemingly disagree among themselves on the main components of this model. Some subscribe to a very simple model which contains only two-main concepts; that is, expectations and satisfaction. They argue that satisfaction response is implicitly inclusive of disconfirmation. This concept means that a product performance disconfirmation is a major facet of satisfaction (Cardozo 1965; Olshavsky and Miller 1972; Anderson 1973; and Aiello, Czepiel and Rosenberg 1977). On the other hand, some researchers argue that disconfirmation should be regarded as a psychologically unique and independent concept (Olson and Dover 1975; Swan and Combs 1976; Swan 1977; Oliver 1977a; 1977b; 1979a; 1979b; 1980; Swan and Trawick 1981; Westbrook 1981; Swan, Trawick and Carroll 1981; Bearden and Teel 1983; and Ross and Craft 1983). Finally, some researchers argue that the inclusion of the disconfirmation concept in the model depends on the product type (Churchill and Suprenant 1982). To test whether the disconfirmation concept should be regarded as a psychologically unique and independent concept in the confirmation model, Hunter, Schmidt, and Jackson

(1982) meta-analysis is performed on all correlational studies measuring either the relationship between expectations and disconfirmation or the latter and satisfaction.

Table II shows those correlational studies testing the relationship between consumer expectations and disconfirmation.

TABLE II

STUDIES REPORT CORRELATIONAL COEFFICIENT r BETWEEN EXPECTATIONS AND DISCONFIRMATION

Study	Year	Sample Size	Value of r	Significance Level
Swan & Trawick	1981	243	0.21	0.001
Bearden & Teel	1983	375	0.29	0.001

Both studies report a statistically significant relationship between consumer expectations and disconfirmation. The effect size of the relationship is almost similar in both studies as indicated by the insignificant chi-square listed under Table III. Such finding supports, to some degree, the existence of a positive relationship between consumer expectations and disconfirmation. Table IV shows those correlational

TABLE III

TOTAL VARIATION ACROSS STUDIES
TESTING THE RELATIONSHIP BETWEEN
EXPECTATIONS AND DISCONFIRMATION

r_i	$(r_i - r)^*$	$(r_i - r)^2$	N_i	$N_i (r_i - r)^2$
0.21	-0.05	0.0025	243	0.6075
0.29	-0.03	0.0009	375	0.3375

$^*r = 0.26$; $\chi^2 = 0.9942$

studies testing the relationship between disconfirmation and satisfaction. As indicated in this table, all coefficient r were statistically significant. However, the null hypothesis which states that there is no true variation across those studies should be rejected given the value of chi-square which is reported under Table V. This chi-square three degrees of freedom is statistically significant at the 0.01 level. This means that a true variation exists across those studies. To correct the variance for sampling error, the frequency weighted average is calculated. This average is equal to 0.0103. The variance due to sampling error amounts to 0.0022. Accordingly, the sum of the variance in population correlations after removing the variance due to sampling error is 0.0081.

TABLE IV

STUDIES REPORTING A CORRELATION COEFFICIENT r
BETWEEN DISCONFIRMATION AND SATISFACTION

Study	Year	Sample Size	Value of Reported r	Significance Level
Oliver	1977	243	0.61	0.01
Westbrook	1981	206	0.63	0.01
Swan & Trawick	1981	243	0.45	0.05
Bearden & Teel	1983	375	0.36	0.05

Such value is relatively small indicating the majority of the variance across studies is mainly due to sampling error. Of course, it would be much safer to correct the remaining variance for attentuation due to error in measurement. Unfortunately, none of those studies reports the reliability coefficients of its measures. However, since sampling error accounts for more than 21 percent of the total variance, it would be possible to draw a general statement about the nature of the relationship between disconfirmation and satisfaction. It can be said that there is a positive moderate relationship between those two concepts. This supports, to some degree, this view which argues that it would be better to add the disconfirmation variable as a psychologically unique concept to the confirmation model. The inclusion of the disconfirmation concept

TABLE V

TOTAL VARIATION ACROSS STUDIES MEASURING THE RELATIONSHIP BETWEEN DISCONFIRMATION AND SATISFACTION

r_i	$(r_i - r)^*$	$(r_i - r)^2$	N_i	$N_i(r_i - r)^2$
0.61	0.12	0.0144	243	3.4992
0.63	0.14	0.0196	266	4.0376
0.45	-0.04	0.0016	243	0.3888
0.36	-0.09	0.0081	375	3.0375

*$r = 0.49$; $\chi^2 = 14.9$

in the confirmation model is further supported by the findings of some other noncorrelational studies reported in Table VI.

TABLE VI

NONCORRELATIONAL STUDIES REPORTED A SIGNIFICANT RELATIONSHIP BETWEEN DISCONFIRMATION AND SATISFACTION

Study	Year
Swan and Combs	1976
Swan	1977
Oliver	1980
Churchill and Surprent	1982*
Ross and Kraft	1983

*Only partial support for non-durable products.

5. The confirmation of expectations model lends some empirical support to the mechanism on which the new

model is built. Both models are based on a comparison mechanism. In the confirmation model, the assumption is made that consumers evaluate the actual product performance on certain attributes and compare it to their set of expectations. If expectations are positively confirmed, consumers are more likely to be satisfied. If, on the other hand, expectations are not met, consumers are more likely to be dissatisfied. In the new model, the assumption is made that consumer evaluates new aspects of a new product against his stored expectancies. If expectations are positively confirmed, the consumer is more likely to perceive the new product as an innovation. If, on the other hand, expectations are not confirmed, the consumer is less likely to perceive the product as an innovation. Apparently both models use a similar mechanism; and if such a mechanism proved, so far, to be useful in knowing about consumer satisfaction, it could also prove useful in increasing our knowledge about new products perception by potential adopters. Of course, this similarity between the two mechanisms provides some empirical validity to those theoretical propositions in the new model which are built upon this mechanism. This includes propositions two, thirteen, sixteen, thirty-seven, and fourty-two.

6. The expectations concept in the confirmation model provides some empirical validity and interpretability to the concept of stored expectancies in the new model. According to the confirmation model, expectations are regarded as a set of anticipated product performance on different attributes that a consumer brings to the purchase situation. Such a view coincides with the definition of stored expectancies in the new model.
7. The review across consumer satisfaction area shows that a serious methodological problem exists with regard to the best time at which consumer satisfaction should be measured. Two different views pertaining to this issue are identified through this review. Some argue that satisfaction measures should be made as close as possible to the time of use or consumption (Miller 1977; Hunt 1977). On the other hand, Day (1977) argues that satisfaction measures taken soon after the purchase do not appropriately reflect the fluctuation in satisfaction that can occur throughout the product consumption time. Most of the empirical research designs in satisfaction area follow the first view; that is, most of their satisfaction measures are taken sooner after the purchase is made. Only one empirical study dealt with possible shifts that may occur in

consumer satisfaction over time (Kennedy and Thirkell 1982). A logical argument can be made that a satisfied consumer will not remain as such forever. Several factors exist that might alter such initial satisfaction with the product. Some of those possible factors are stated clearly in propositions twelve and fifteen. Such factors can be subject to some future empirical research works to test their empirical validity in explaining possible shifts in consumer satisfaction with a given product over time.

8. The relationship between consumers' satisfaction and their repeated purchase behavior was not subject to any empirical investigation across consumer satisfaction areas. Only some attempts were made to measure the effect of satisfaction on consumer attitudes toward the product under study (Oliver 1977a; 1980). Both propositions thirteen and fourteen in the new model are dealing with this area, and they can provide a solid basis for some future empirical research possibilities testing this relationship.

Empirical Findings Across Perceived Risk Area

1. The application of Hunter, Schmidt, and Jackson (1982) methodology to perceived risk area is hampered due to a lack of cumulative correlational or experimental

TABLE VII

PERCEIVED RISK STUDIES

Study	Year	Sample Size	Statistical Technique
Cox	1967	0002	NA*
Cunningham	1967	1200	Correlation r
Arndt	1967	0449	Chi-square
Sheth & Venkatesan	1968	0104	Chi-square
Perry & Hamm	1969	0101	Correlation r
Roselius	1971	0472	Chi-square
Shiffman	1972	0100	Goodman-Kruscal
Hisrich, Dornoff, & Kernan	1972	0300	Goodman-Kruscal
Jacoby and Kaplan	1972	0150	Multivariate
Donnelly & Etzel	1973	0250	Chi-square
Bettman	1973	0123	Regression
Dash, Schiffman, & Berenson	1976	0267	Chi-square
Peter & Rayan	1976	0217	Regression
Durnad, Davis, & Bearden	1977	0155	MANOVA
Locander & Hermann	1979	0365	MANOVA
Bearden & Shimp	1982	0268	t-test

*Not applicable.

studies dealing with one specific domain of perceived risk concept. As shown in Table VII, only two correlational studies are reported. Furthermore, each of these studies was dealing with different domains of perceived risk.

2. The review across perceived risk area shows that the concept has gone under at least two conceptualization attempts. The first attempt is made by Bauer (1960) when he introduces the concept for the first time. The second attempt is made by Bettman (1973) when he distinguishes between two different types of perceived risk--inherent risk, which refers to the latent risk a product class might hold for a consumer and handled risk, which is expressed in terms of amount of conflict the individual product is able to arouse when the consumer chooses a specific brand from a product class.
3. All the attempts made to measure the concept of perceived risk are based on Cunningham's (1967) work. According to him, the concept can be measured using two main components; that is, uncertainty and consequences. His study revealed that the consequences component is made up of three types of consequences--performance, physical safety, and social risks. Later, the contents of risk are expanded to include psychologicl, social, performance, physical safety, and

financial risks. Those five types of consequences account for about 74 percent of the variance in the overall perceived risk measures (Jacoby and Kaplan 1972; and Kaplan, Jacoby, and Szybillo 1974).

4. Several empirical studies investigated a wide variety of risk reliever strategies. Among those strategies are reliance on past experience or the experience of others (Cox 1967; Arndt 1967; Perry and Hamm 1969; and Roselius 1971), reliance on brand image (Sheth and Venkatesan 1968; and Roselius 1971), product endorsement, private testing, store image, free samples, money back guarantee, government testing, shopping, expensive model (Roselius 1971), product warranty, manufacturer reputation, and price (Bearden and Shimp 1981).
5. Several attempts have been made to relate perceived risk to the individual willingness to try new products (Cunningham 1967; Arndt 1967; Popielarz 1967; Shiffman 1972; and Donnelly, Etzel, and Roeth 1973). While Cunningham (1967) did not find a statistically significant relationship between perceived risk level and the individual ability to try new products, Arndt (1967) found that consumers who perceived less level of risk were more willing to try new products than those who perceived high level of risk. Popielarz (1967),

Shiffman (1972), and Donnelly, Etzel, and Roeth (1973) attempt to test the effect of individual category, as a moderator variable between perceived risk and innovative behavior, on the individual ability to try new products. Their findings tend to support the conclusion that those consumers who adopt an error inclusion strategy rather than an error exclusion strategy are more likely to try new products.

6. Most of the empirical studies that aimed at measuring the concept of perceived risk suffer from one serious methodological problem. When the concept was originally introduced by Bauer (1960), the assumption was made that a given consumer would perceive risk only when he faces a new buying experience. Accordingly, the concept is of little value to marketers when they are dealing with the study of repeated purchase behavior by consumers. If a consumer is certain about all possible consequences resulting from buying or using a given product, the argument can be made that he might perceive no risk at all or perceive little amount of risk that he can handle. In both cases, perceived risk has no effect whatsoever on his buying decision. Unfortunately, most of the studies attempting to measure the concept did not take this requirement into consideration when products under study were selected

or when the research design did not allow for isolating those respondents with previous experience with the product under study from those who do not. Even the reliance on the respondents' abilities to give estimates of their initial perceived risk when they made their decisions to buy the product for the first time can confound the findings and result in biased estimates of perceived risk.

7. Throughout this area, no single attempt was made to conceptualize the concept of venturesomeness or to relate it to the concept of perceived risk and measure their joint effects on the individual innovative behavior. Venturesomeness is defined as the individual ability or his willingness to accept or take risks associated with the innovative decision. Furthermore, this characteristic is considered as a major element in any treatment of the adoption process (Robertson and Kennedy 1968; Loy 1969; Rogers 1983). Unfortunately, the new model does not provide a conceptualization of this concept; however, it stipulates those factors that determine the level of venturesomeness required for different innovative decisions. This stipulation can be seen in propositions thirty-nine, forty, and forty-one. Of course, a good conceptualization of the concept is required to enhance the empirical

interpretability of this concept in particular and the total model in general.

Empirical Findings Across Cognitive Dissonance Area

1. Although most of the empirical works cited in this area used one type or another of experimental designs, none of them reported either the means of their experimental groups and control groups or their respective standard deviations. Furthermore, as Table VIII indicates, only three correlational studies are reported, and not all of them dealing with the same aspect of cognitive dissonance. Such condition creates a major problem with carrying out Hunter, Shmidt, and Jackson's (1982) methodology in this area.
2. All the empirical works cited in this area are based on Festinger's (1955; 1957) conceptualization of the cognitive dissonance concept. According to him, a behavioral element is said to be consonant with some other environmental elements if, considering those elements in isolation, the behavioral element would follow from the environmental elements. A behavioral element is said to be dissonant with some other environmental elements if, considering those environmental elements in isolation, the behavioral

TABLE VIII

STUDIES REPORTED IN THE
POST-PURCHASE DISSONANCE AREA

Study	Year	Sample Size	Statistical Technique
Brehm	1956	225	Correlation r
Mills	1957	125	Chi-square
Engel	1963	186	Chi-square
Taylor	1966	144	ANOVA
Lasciuto & Perloff	1967	075	Chi-square
Holloway	1967	080	NR*
Oshikawa	1969	154	Chi-square
Mittelstaedt	1969	NR*	Chi-square & Fisher test
Hunt	1970	152	Kruskal test
Donnelly & Ivancevich	1970	NR*	Chi-square
Cohen & Houston	1972	200	ANOVA
Oshikawa	1972	085	Regression
Hawkins	1972	043	Correlation r
Winter	1974	490	ANOVA
Menasco & Hawkins	1978	173	Correlation r

*Not reported.

element would not follow from the environmental elements. Two cognitions are said to be irrelevant if one cognition implies nothing at all concerning the other. According to Festinger, dissonance can be aroused in three different ways. First, after making an important and difficult decision. Second, after being coerced to say or to do something which is contrary to private attitudes, opinions, or beliefs. Third, after being exposed to discrepant information. Furthermore, dissonance gives rise to pressure to reduce or eliminate it. The strength of this pressure, according to the theory, is a function of the magnitude of dissonance. The magnitude of the dissonance is, in turn, a function of the relative importance or value of the element involved.

3. The majority of the empirical works in this area are criticized as having several methodological problems (Chapanis and Chapanis 1964; Hummings and Vendatesan 1967; and Oshikawa 1968; 1969; and 1972). Among those problems are the existence of a ceiling effect, measuring dissonance under forced choice conditions, failure to meet some prerequisite conditions for producing dissonance, failure to shield against alternative modes of dissonance reduction when

measuring the effect of one or some of those modes, and measuring the concept of anxiety rather than the dissonance concept.

4. No attention whatsoever was given to answer the question of why some individuals seek variety and novelty rather than seeking cognitive consistency as the dissonance theory predicts. An attempt to reconcile both concepts in one model might prove useful in explaining when an individual will seek variety and when he seeks cognitive consistency. Such a model is also useful in measuring the concept of novelty seeking which plays a vital role in the innovative decision-making process.

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CHAPTER VI

FINDINGS, DISCUSSION AND SOME SUGGESTED FUTURE RESEARCH

The theoretical structure of the new model is supported through its evaluation using Bunge's (1967) evaluative criteria. From this review, the model appears to satisfy most of those criteria. Few problems are identified, however, and further discussion of them is warrant.

The results of the theoretical review indicate that the relative strength of the model is not general. Rather, the model is restricted in the sense that it deals only with innovative behavior of ultimate consumers. The model covers neither the non-innovative behavior nor the adoption process by groups or organizations and ignores the effect of social groups on the individual innovative behavior.

Fortunately, the relative strength of the model is not a serious theoretical problem due to several reasons. First, the model represents the first attempt to explain how an individual's perception of new products affects his adoption decision. In that sense, the new model can be regarded as a new way of looking at the individual's

innovative behavior. The model is the first attempt to tie both the perception and the adoption processes in one explanation.

Second, non-innovative behavior is eliminated due to the fact that the whole model is dealing with consumers' innovative behavior. Third, both of the social groups effects on the individual's innovative behavior and the adoption of new products by groups and organizations are treated in detail before. Finally, the ability of the model to entail other existing models dealing with individuals' innovative behavior can increase its relative strength.

The new model raises some questions with regard to its empirical interpretability. Those questions stem from the fact that the model includes some highly abstract concepts such as individual's familiarity, individual's interconcept networks, individual's scripts, and others. While this problem represents a serious shortcoming, it can be solved by introducing some kind of bridges between the languages of theory and research.

As it appeared from the empirical review some of those highly abstract concepts are already operationally defined and empirically tested. Concepts such as satisfaction and stored expectancies are operationally defined and measured

across the consumer satisfaction area. Several other concepts in the model are not measured empirically before, and defining them operationally seems to be necessary before one can conclude anything about the empirical interpretability of the whole model. Furthermore, the introduction of those operational definitions increases the hueristic power of the model and provides researchers with unlimited research possibilities.

Generally speaking, the review across the consumer satisfaction area supports the mechanism on which the model is built. In measuring consumer satisfaction, the assumption is made that consumers enter the consumption situation with some previously held expectations. Consumers then evaluate the actual performance of the product on some specific attributes and compare it with their expectations. If expectations are confirmed, consumers are said to be satisfied. If, on the other hand, expectations are not confirmed, consumers are said to be dissatisfied.

In the new model, the assumption is also made that consumers evaluate and compare the newness aspects of a new product to their sets of stored expectancies. If those expectations are confirmed, consumers are presumably more likely to perceive the new product as an innovation. If, on the other hand, expectations are not confirmed,

consumers are presumably more likely to perceive the new product as non-innovation.

Apparently, both models use a similar mechanism. If this mechanism proved to be useful and valid in explaining and measuring consumers' satisfaction, it is possible to be also sound and valid in explaining and measuring consumers perception of new products. Several theoretical propositions in the new model are built on this mechanism, including propositions number two, thirteen, sixteen, thirty-seven, fourty-two, and forty-six.

Findings across the consumer satisfaction area show how researchers conceptually define satisfaction and how the concept is empirically measured. As it appeared from the review of this area, the measurement of satisfaction concept is based on a model known as the "confirmation of expectation." Several operational definitions are offered across this area to measure consumer expectations and his satisfaction level. Such operational definitions provide the concepts of satisfaction and stored expectancies in the new model with some empirical referents which increase the representativeness of the whole model and its empirical interpretability.

The application of Hunter, Schmidt, and Jackson (1982) meta-analysis to this area shows that the inclusion of disconfirmation as a psychologically unique and independent

concept in the confirmation model can improve, to a large degree, the conceptualization as well as the measurement of satisfaction concept. Such finding supports Oliver's position on this issue (1977a; 1977b; 1979a; 1979b; 1980; and 1981).

The conceptualization as well as the measurement of individual expectations across the consumer satisfaction area support the concept of stored expectancies which plays a vital role in the new model. Researchers across this area seem to agree that the strength of an individual's satisfaction, to some degree, is a function of the relative strength of his expectations with which he enters the buying situation. While this sounds logical, no attention whatsoever is given to those factors which determine the relative strength of individual's initial expectations. According to proposition seventeen in the new model, an hypothesis can be made that the relative strength of the individual's expectations is a function of the length of usage time of similar products, the strength of dissatisfaction with those similar products, and the relative importance of those products aspects causing the individual dissatisfaction. Of course, those factors should be subject to some empirical investigations in the future to determine their empirical validity.

The time issue with regard to when it is best to measure consumer satisfaction appears to be a major methodological problem in measuring consumer satisfaction. Specifically, the time issue deals with whether it is better to measure satisfaction immediately after the consumption process (Miller 1977; and Hunt 1977) or to measure it after some time of consumption and over the life of the product (Day 1977).

For several reasons, the researcher supports the position that measurement of satisfaction should be made over the life of the product. First, satisfaction measures taken soon after the purchase is made do not reflect the fluctuation in this concept throughout the product life. Second, an initial level of satisfaction with the product may change over time as the result of several factors, including the introduction of better products or changes in the individual contengencies. Finally, and more importantly, the major concern of marketers is not measuring the initial consumer satisfaction, but rather how to keep the consumer satisfied with their products after buying them. Since an initial satisfaction can change over time, marketers are interested in knowing about those factors that might cause an initial satisfaction to be altered with time.

The researcher's position on this issue is reflected in the conceptualization of satisfaction concept in the new model. Specifically, this position is reflected in propositions twelve and fifteen. Those propositions offer several possible future research works that can improve the measurement of consumer satisfaction.

The review across perceived risk area also proves to be useful. Some major problems are identified which are associated with the application of the findings across this area to the new model.

Conceptually, perceived risk proves to be useful in the study of consumers' behavior pertaining to new purchase tasks. Since buying a new product is one form of new purchase tasks, the concept is considered to be essential in any attempt to conceptualize the adoption process. This view is well documented across the diffusion literature. All diffusion researchers agree that an individual's ability to try new products is determined, to a large degree, by his ability and willingness to accept risks associated with such adoption.

Most of the attempts that have been made to relate perceived risk to the adoption process deal only with one moderator variable between the risk involved in the adoption process and the individual innovative decision. This variable is called the individual "category width"

(Popielarz 1967; Schiffman 1972; Donnelly and Etzel 1973a; and 1973b). Of course, the argument cannot be made that an individual's venturesomeness degree is determined by only his category width. A better assumption is that there are some other factors which determine venturesomeness.

Unfortunately, the new model does not offer any explanation to the venturesomeness concept, although it is one of the most operating variables on the individual's decision to try new products. This concept, therefore, is one of the model's areas which provide some theoretical and empirical future research works.

Another problem pertaining to the measurement of perceived risk is identified through this review. Most of research designs to measure perceived risk were not able to isolate those respondents with past experience with products under study from those without experience. Furthermore, the measurement of the concept relied very heavily on the respondents' abilities to give approximate estimates of their perceived risk when products under study were bought for the first time. Both of those problems can result in invalid measurement of the concept.

Finally, most of the attempts that have been made to measure the cognitive dissonance concept were criticized strongly on several methodological grounds. More importantly, no attempt whatsoever is made across this area

to relate the concept of cognitive consistency to the concept of variety seeking. In other words, researchers did not explain why some consumers seek novelty or variety rather than cognitive consistency.

Modeling the concept of novelty or variety seeking and explaining when consumers will seek cognitive consistency and when they will seek varieties and novelties seems to be very important. Any attempt to conceptualize consumers innovative behavior should give some attention to this area. The new model does not provide such explanation, which leaves the door open to some theoretical and empirical research in the future.

Suggested Future Research

The theoretical and empirical investigations as well as the new model offered in this study provide several future research possibilities. Theoretically, two concepts in the new model require further modeling and explanations. The first is the concept of venturesomeness. A conceptual model dealing with this concept should define it, relate it to the concept of perceived risk, and determine those factors which determine the venturesomeness degree of an individual.

The second is the concept of variety or novelty seeking. A conceptual model dealing with this phenomenon

should theoretically define it and determine those factors which motivate an individual to seek consistency versus those which motivate the individual to seek variety.

Empirically, the new model provides researchers with a wide variety of possible future research works. The following are just some examples of those research possibilities:

1. Several theoretical concepts which play an important role in explaining the perception of new products were not operationally defined or measured before. To increase the empirical interpretability of the new model, those concepts should be operationally defined and empirically tested. This includes such concepts as individual's scripts, individual's interconcept networks, and individual's familiarity.
2. If those previous concepts are operationally defined and empirically measured, several theoretical propositions stating the relationships between those concepts and consumers' perception of new products should provide several empirical future research works. From propositions eighteen through twenty-four, several testable hypotheses can be derived and tested.

3. The new model offers the possibility of carrying out some cross-cultural research dealing with consumers perception of new products. Both propositions two and twenty can represent the theoretical grounds from which several testable hypotheses can be derived and empirically tested.
4. Proposition seventeen in the new model offers some tentative explanations to those factors which determine the relative strength of an individual's expectations, which in part affects the relative strength of the individual's satisfaction. Those factors can be subject to several future tests.
5. With regard to the best time at which consumer satisfaction should be measured, propositions twelve and fifteen provide some future research possibilities in this area. Different testable hypotheses can be derived from each proposition and tested.
6. The relationship between consumer satisfaction and his future purchase behavior is modeled in proposition thirteen. Since little attention is given to this relationship, proposition thirteen provides the possibility of future research to examine the nature of this relationship. Already some aspects of this proposition are tested across

consumer satisfaction area. However, several other aspects included in this proposition should be tested further in the future.

7. The degree to which the adoption of new products is influenced by the type and intensity of social learnings required for such adoption is not covered very well in any consumer behavior area. This area includes the effects of motor learning, value-perception learning, role-perception, and use-perception learning. This area seems to be important when dealing with consumers' innovative behavior. Exploring this area and learning about its effect on innovative decisions seems to be vital to the success of the new model. Of course, there are several propositions exist that can be helpful in exploring this area, including propositions twenty-five through thirty-one.
8. Although the degree of an individual's subjective interests seems to be very promising in explaining innovative behavior, few studies dealt with this concept. The new model offers an extensive explanation of this concept and its effect on innovative decisions. However, before any valid conclusion about this concept and its role in the adoption process can be reached, several research

types should be designed and carried out. Several theoretical propositions in the new model pertaining to this concept can serve as a basis from which some testable hypotheses can be derived and tested, including propositions thirty-two, thirty-four, thirty-five, and thirty-six.

9. The joint effects of an individual's subjective interests and types and intensity of social learnings on the adoption decision can be the subject of some research works in the future. From propositions thirty-three and thirty-seven, several testable hypotheses can be derived and tested empirically to explore the nature of such joint effects.

10. The degree of product terminality and its effect on the relative time required for its adoption can be the subject of many future research works. Proposition fourty-four and fourty-five seem to be very useful in testing this area.

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