Order Number 9315476

A categorization model for innovation theory: Aesthetic and technical factors

Kay, Mark Jeffrey, Ph.D.

City University of New York, 1993

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

A CATEGORIZATION MODEL FOR INNOVATION THEORY:

AESTHETIC AND TECHNICAL FACTORS

by

MARK J. KAY

A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1993

This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirements for the degree of Doctor of Philosophy, City University of New York.

1/5/93
date

Leon Schiffman
Professor Leon G. Schiffman
Chair of Examining Committee

1-12-93
date

Donald Vredenburgh
Professor Donald Vredenburgh
Executive Officer of Ph.D. Program

Professor Yoshi Tsurumi
Professor Roger Millsap
Larry Chiagouris, Ph.D.
Examining Committee Members

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

A CATEGORIZATION MODEL FOR INNOVATION THEORY:

AESTHETIC AND TECHNICAL FACTORS

by

MARK J. KAY

Advisor: Professor Leon G. Schiffman

This dissertation theoretically develops and empirically tests a categorization scheme to further the understanding of motivational processes behind the development, adoption, and diffusion of new products. It is hypothesized that two distinct types of motivational factors, aesthetic and technical factors, drive important processes in the development of new products, affect consumer acceptance and adoption decisions, and affect the development of different types of innovativeness. Involvement is proposed to be a moderating factor which affects the development of category-specific innovativeness.

The motivational scales developed in this study consist of self-report measures which were administered to three different sample groups. These groups consisted of graduate students and specialized groups of people with aesthetic and technical educational backgrounds. Background scales were examined to establish discriminant and convergent validity.

A five item aesthetic and a seven item technical background scale were developed, purified, and confirmed as unidimensional scales with LISREL. A twelve item scale of product class motivational factors was developed to be applied across product categories in a consistent format. Clear support for

aesthetic, technical, and involvement component factors to explain product category innovativeness was indicated. Proposed measures of aesthetic, technical, and involvement component factors exhibit a clearly defined pattern which was consistent across the six product categories studied.

The measures were found to provide an important means for examining product category structure. Technical and aesthetic component factors were found to be independent and separable. The findings indicate that respondents were "rational" to the extent that primary item measures of technical components were uniformly and consistently rated high in importance in every product category studied. Though technical components were recognized by respondents as important, aesthetic product components were better in explaining innovativeness. The examination of the relationship of technical and aesthetic motivational factors to innovativeness also allows renewed consideration of the diffusion decision process model (Rogers, 1982). The importance of aesthetic components to innovativeness breaks new ground in the diffusion research tradition. This research provides support for a process approach to diffusion theory useful to examining motivations which underlie the development of new products at the product class level.

ACKNOWLEDGMENTS

Many sincere thanks go to the members of my dissertation committee who each contributed in different and unique ways to the completion this project. Particular thanks is especially due to the friendship and support of Professor Leon Schiffman who has provided much personal encouragement over the years. Without his encouragement and support I would undoubtedly never have completed this project. I also would like to thank Professor Tsurumi for the numerous lively conversations we continue to have which have provided much insight. Professor Millsap I thank for his willingness to discuss matters, statistical and otherwise, and for his support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1:

INTRODUCTION AND THEORETICAL BACKGROUND

Introduction

The issue of innovation has been recognized as vitally important to the health of companies and the competitive strength of nations. However, firms have found it difficult, if not impossible, to foresee the future course of innovation and change. Though there are literally thousands of new product introductions every year, very few effective tools exist to forecast change in industry and screen products with any degree of accuracy. With the new product failure rate greater than 95% in some product categories, the ability to predict success is obviously lacking.

The interdisciplinary body of research known as the diffusion of innovations has provided marketers the theoretical means of understanding the process of innovation and change. The theoretical contribution of this body of theory is highly significant; however, diffusion theory appears to have had little practical effect on improving the ability of marketers to understand specific adoption decisions and the precisely model the diverse factors which affect new product diffusion processes.

Many of the problems in applying diffusion theory to theoretical and applied marketing problems is a result of the lack of clear definitions or a typology of innovations which would explain the diverse motivational factors underlying diffusion and adoption decisions. There needs to be a categorization scheme to further the understanding of a motivational process view of new product adoption and diffusion.

Purpose of the Study

The purpose of this dissertation is to first develop and then explore the theoretical basis for a categorization scheme or typology of innovations based upon a motivational framework. This dissertation examines the relationship between new product features and the underlying motivations of consumers to be innovative and adopt new products. The proposed scheme of classifying innovations is based upon distinguishing aesthetic and technical motivational factors hypothesized to be fundamental to the adoption of all new products. As will be explained, existing studies of innovation in the diffusion tradition tend to be oriented toward understanding the advantages of technical product components.

To substantiate this categorization scheme for more comprehensive examinations of aesthetic and technical factors in the future, this scheme is tested through the development of scales to measure aesthetic and technical motivational factors in six product categories. The ability of technical and aesthetic factors to explain innovativeness is examined with a specific product class framework. Involvement is examined as a moderating factor.

The examination of product class motivational factors makes it possible to reexamine innovativeness as a learned and relatively enduring trait, an issue not fully resolved in previous empirical research. Issues such as innovation overlap are also reexamined. The direction of research taken here makes it necessary to reconsider various aspects of the diffusion decision process model proposed by Rogers (1982).

In summary, this dissertation develops and tests a categorization scheme of aesthetic and technical motivational factors to support a new framework for diffusion theory. This framework contributes to the theoretical development of the diffusion research tradition. Not only does this provide the impetus for

new empirical study of these issues, but there are many practical applications as well.

Significance of the Dissertation

There is a great deal of attention given to new products both in academic marketing journals and business publications. New product marketing and product development is an important area of research in strategy and marketing. The reasons for this attention are obvious: business needs to develop new products to stay competitive; marketers need to stay in touch with emerging consumer needs and trends.

New product marketing is strongly influenced by the interdisciplinary tradition of research in the diffusion of innovations. However, the practical implications and contributions of diffusion theory to new product marketing have not been very clear. Though diffusion theory is an important interdisciplinary tradition which includes research studies within the disciplines of communications, sociology, and economics as well as marketing, the specific contributions of each field are not always contiguous. Even in fields with overlapping content domains, the findings are not always easily comparable or supportive. For example, studies of the diffusion of news events do not necessarily provide a means to understand the diffusion of advertising messages or advertising content.

This dissertation takes an new approach to issues in new product adoption and diffusion. Rather than simply examine the introduction of a single innovation, as much of the past research in marketing has done, this dissertation examines motivational factors important in the process of innovation at the product category level. Motivational factors influence both the development of new products as well as consumer acceptance and adoption. Motivational

factors are investigated and defined in relation to the product class. It is hypothesized that motivational factors and experience effects influence the growth and development of innovations in each product class differently.

This dissertation is significant to the theory of the diffusion of innovations and the practice of new product marketing. This dissertation originates in diffusion theory, an important tradition which has made significant contributions to many disciplines. The proposed categorization scheme which this dissertation develops and investigates is a step toward integrating the conflicting findings of these fields. This categorization scheme is useful to applied problems in marketing in providing a basis to understand shifting consumer demand and understanding how different consumer motivations can lead to fundamentally different avenues of product development. It is also useful to examining marketing issues such as product innovativeness, customer loyalty, and can be applied to promotional decision-making.

While originating in the behavioral framework of diffusion theory developed by Rogers (1962, 1971, 1983), this research expands and builds upon research in the diffusion tradition. This dissertation examines and the relative weights of motivational factors specifically at the product class level to better understand the drivers of demand for product innovations in greater depth. The results are specifically applicable to modeling processes important to product development in many industries.

Research Scope and Design

This dissertation examines how consumers weigh product class components to test six proposed hypotheses of the study. Motivational scales are developed to examine product class motivational factors in six distinct product categories. The scale is hypothesized to have a specific structure which relates aesthetic,

technical, involvement, and innovativeness measures. These measures were developed out of previous research in the field.

Product class factors are also hypothesized to be related to a person's aesthetic and technical background. This dissertation develops and tests aesthetic and technical background scales with exploratory and confirmatory factor analysis. Background measures include subjective and normed items for technical and aesthetic backgrounds, and other measures previously found to correlate to innovativeness.

The research methods utilized in this dissertation are based upon established scale development practices derived from psychometric theory. The scales developed in this study are self-report survey methods administered to three different sample groups. The scales developed for this dissertation are examined for internal consistency, dimensionality, and discriminant and convergent validity.

This research provides support for a process approach to diffusion theory useful to examining motivations which underlie the development of new products. The implications for opening up new areas of diffusion theory are considerable. The practical applications of this research to applied marketing problems include product development, marketing strategy, and promotion decisions.

Organization of the Study

Key concepts are explored in the next section of Chapter 1 which are important to both the theoretical developments and the empirical tests presented in later chapters. This leads to the discussion in Chapter 2 which examines past attempts at the categorization of innovations within the discipline of marketing. The discussion in Chapter 2 provides the basis for the development of a

new approach to product innovations discussed in Chapter 3. Chapter 3 makes the case for the proposed categorization scheme and formulates research goals and testable hypotheses to examine this scheme.

Chapter 4 discusses the methodology of the research design and the measures used to test the hypotheses. Chapter 5 undertakes an analysis of collected data. Conclusions, implications, strategic applications, and future research directions are discussed in Chapter 6.

Theoretical Background

The study of new products and the practice of new product marketing has developed within the context of research and theory of the diffusion of innovations. The purpose of the remaining part of chapter is to review the contributions and interrelationships of diffusion theory and marketing fields. The main focus of this section is to provide the theoretical foundation for the issues which are treated in depth in later chapters of this dissertation. Of particular concern are the theoretical assumptions which have been important for the development of diffusion theory within marketing. This leads to a critique of the issue of innovativeness as it has been treated in marketing.

Diffusion Theory and Marketing

New and innovative products have been understood and analyzed in marketing from the perspective of the diffusion of innovations, especially that version of diffusion theory which has been developed by Rogers (1962, 1971, 1983). Diffusion theory has made important contributions to the development of theory in marketing, especially in the areas of new product marketing and personal influence.

Rogers first book on diffusion theory (1962) pre-dated the development of general or comprehensive theories of consumer behavior by just a few years. The 1960s saw the attempt to develop comprehensive theories of consumer behavior such as those of Nicosia (1966), Engel, Kollat and Blackwell (1968), and Howard and Sheth (1969). Diffusion theory integrated important theoretical concepts which influenced the development of subsequent consumer behavior theories.

The scientific foundation of diffusion theory made it attractive to marketers in the 1960s when scholars were sensitive to the issue of establishing the discipline of marketing on a scientific basis. Diffusion theory developed both as "grounded" theory (Glaser & Strauss, 1967) and as "middle range" theory (Merton, 1957), providing solid conceptual and scientific foundations to diffusion research.

Diffusion theory was integrated into marketing thought by the mid-1960s, being applied to relatively simple studies of packaged goods (Frank, Massy & Morrison, 1964). Diffusion theory fit in with the theory of perceived risk (Cunningham,1967) and the study of information acquisition by consumers. Throughout the 1970s, diffusion theory was recognized as an important area of research in both consumer behavior and new product development, being included in consumer behaviors texts (Schiffman and Kanuk, 1978; Engel, Kollat, and Blackwell, 1973) and in the discussion of new product marketing (Midgley, 1977).

Diffusion theory was perceived to match the multi-stage theoretical approach to decision processes which has had a strong academic history in marketing. The decision model utilized in diffusion theory (awareness, interest, evaluation, trial, and adoption) bears a strong resemblance to such descriptive

models as the AIDA (awareness, interest, desire, and action) model and the decision process models employed in general consumer behavior theories.

Diffusion theory initially provided marketing a behavioral-theoretical framework best suited for understanding the rationale behind individual adoption decisions. Diffusion studies have shown that social and psychological forces can either prevent or enhance the adoption of innovations. Diffusion research has supported the idea that the acceptance of innovations is more frequently attributable to the attitudes and behaviors of consumers than it is to the efforts of the firm -- in short, it has provided support for the "marketing concept," the idea that consumer needs shape markets. Diffusion studies provided a particularly appealing theory to marketers, especially those sharing a behavioral perspective to the field.

The broad acceptance of diffusion theory in marketing is explicable by several interrelated factors: the academic history of the field, the relevance of diffusion theory to promotional thought and segmentation, and the linkage of diffusion theory to the prevalent decision-making models. Diffusion theory was attractive to marketers especially due to the integrated theoretical position which it offered. Though marketers have been quick to apply diffusion theory to the task of marketing new products, diffusion theory and diffusion phenomenon has been studied and articulated within definite limits.

The problem is that attention given to innovation by marketers has generally been confined to the analysis of factors that influence their acceptance. In an effort to produce findings that were managerially useful, marketers have concentrated on the analysis and formulation of methods to spread the acceptance of products. Rogers (1976) calls this the "pro-innovation and pro-source" orientation, noting that this bias has been particularly strong in marketing.

It is clear, however, that firms have found it difficult, if not impossible, to foresee the future course of innovation and change. Very few effective tools exist to forecast change in industry and screen products with any degree of accuracy. With the new product failure rate greater than 95% in some product categories, the ability to predict success is obviously lacking.

Many aspects of diffusion theory have not undergone rigorous empirical examination. The high failure rate of new product marketing efforts certainly raises issues about the utility of diffusion theory and the level of practice of new product marketing. While diffusion theory has been accepted as influential on a theoretical and conceptual basis, certain questions of the utility of diffusion theory to the practice of marketing have never been clear. Gatignon and Robertson (1985, p. 849) note "researchers have merely demonstrated how diffusion theory can be used in consumer research."

Nevertheless, diffusion theory remains an important area of research. Diffusion theory has provided the only integrated theoretical framework for new product marketers to understand new product adoption and diffusion. While certain theoretical contributions of diffusion theory to understanding consumer behavior have been recognized as important, the boundaries of diffusion theory have not been clearly articulated in relation to marketing and consumer theory. It is important to understand the limitations and assumptions behind the paradigm of diffusion theory to assess its importance. The theoretical contribution of diffusion theory to marketing requires renewed examination.

Interpersonal Influence and Communication

Innovation and diffusion theory as it has been understood and used by marketers developed largely out of the interdisciplinary framework developed

by Rogers (1983) rather than, for example, the cultural process model of Barnett (1953). Though Rogers' efforts to study diffusion have been encyclopedic in outlook, Rogers particular emphasis has been focused on the communication and spread of innovations. This focus bred a tradition of research on diffusion due to the influence of interpersonal relations.

This development in diffusion theory has been particularly useful to advertisers in understanding the persuasive power of word of mouth communication in relation to advertising (Arndt, 1967; Sheth, 1969). Diffusion research conceptualized the dual spread of information and influence by distinguishing the effects of awareness and persuasion in mass media and interpersonal channels of information. Rogers and Shoemaker (1971, p. 266) note that "mass media channels are relatively more important in the knowledge function and interpersonal channels are relatively more important at the persuasion function in the innovation decision process." Certain sales promotion tools and advertising efforts were built upon stimulating word of mouth communication to persuade people to adopt products and services rapidly.

Katz (1987) points out that diffusion research in interpersonal relations was related to the shift in communication theory to a "limited effects" paradigm of mass media, away from a "mass influence" model. This stress on interpersonal relations in diffusion research grew out of election (Lazarfeld et al., 1944) and mass communication (Katz & Lazarfeld, 1954) research. These influential areas of research demonstrated that the supposed "mass" or "powerful effects model" of the mass media are mitigated by interpersonal communication processes.

The "limited effects" model of media influence which developed from these studies posits that influence can be best understood as a two-step flow process. The media are viewed as providing messages to opinion leaders in the audience

who, in turn, act to spread messages to other members of the audience. The two-step flow concept has since been amended to include talk between equals over opinion leaders, the flow of information within communication networks, and multiple steps over two steps. Nevertheless, the basic but controversial two-step model which differentiates communication and influence still forms the foundation for much thinking and research on the topic (Katz, 1987).

The construct of "opinion leadership," though not originating within diffusion theory, was integrated into its theoretical framework and seized upon by marketers. Theoretically, it became a particularly important goal for marketers to reach opinion leaders in order to diffuse knowledge about new products rapidly. In practice, however, it is difficult to specifically identify and communicate to a selected group of opinion leaders in the population.

This theoretical rationale of attempting to reach opinion leaders for rapid diffusion has not been put to strong empirical tests. Nevertheless, opinion leadership is an appealing explanation for the rapid rise in the mid-section of the classic "S" shaped diffusion curve. Of particular important to diffusion theory is the phase of rapid adoption when increasing numbers of individuals are adopting. Rogers (1983) calls this phase of rapid adoption the "diffusion effect" (though researchers in the organizational literature label this a "bandwagon effect"). While this phase of rapid adoption is frequently thought to be due to social influence, opinion leadership alone may not be enough to explain the phase of rapid adoption (see below).

The study of the flow of information has led researchers to focus on interpersonal relationships as the unit of analysis. The theoretical importance of weak interpersonal relationships in the diffusion process has been recognized (Granovetter, 1974; Liu & Liu, 1974), and distinguished from homophily, i.e.

communication between similar consumers (Brown & Reingen, 1987). More recent empirical work has extended to the study of communication networks (Rogers & Kincaid, 1981) which seek to define and understand the influence of social structure in the communication process. Each of these research areas have raised new questions about the process of interpersonal influence. These studied have mitigated the theoretical importance of the opinion leader as the key influence agent in the diffusion process.

The influence of diffusion theory needs to be re-assessed in the light of a new generation of investigation. Not only has diffusion research taken a new turn, but even the "limited effects" paradigm of mass media in the communications research tradition has come into question (Katz, 1987). New paradigms of the effects of the media in communications theory have opened new avenues of study of the flow of information in the diffusion process.

The Problem of Modeling the Diffusion Curve

Bass (1969) initiated a period of work in marketing on mathematically-based diffusion models to forecast the rate of diffusion. The Bass model has been extended and elaborated upon by many (e.g. Mahajan & Peterson, 1985; Mahajan & Wind, 1986). The structural complexity of mathematically-based diffusion models have grown as well as the statistical estimation techniques used by them. Norton and Bass (1987), for example, build upon the earlier work of Bass (1969) to incorporate effects of product improvements and replacements in modeling technological product diffusion.

The ostensible complexity of diffusion models should not lead one to believe that the diffusion effect is understood very well. In fact, the factors which define and predict the diffusion curve in different product categories are not understood very well. Both the rate of diffusion and the extent of acceptance

of an innovation are extremely difficult to predict without a previous product history of some kind. Precedents in an established product category are needed to predict consumer reactions to a new product.

The simplifying assumptions used by mathematical models have been criticized. Bernhardt and Mackenzie (1972) note that such models worked well in only certain cases. It is not clear in which particular categories that particular models apply. By simplifying factors, mathematical models ignore the necessity of fully understanding all the complex factors which may influence behaviors and attitudes of potential consumers. A gap then develops between the mathematical explanation and the theoretical rationale to explain diffusion. For example, Tanny and Derzko (1988) argue that the mathematical model which Bass developed does not correspond to the qualitative theoretical description of the diffusion process which Bass posited.

The mathematical problems of the goodness of fit of proposed diffusion models do not answer the theoretical problems of these models. It is true that mathematical models can be adapted to fit the data pattern adequately "well" in relative terms. However, as Gatignon and Robertson (1986, p. 42) note, "there are doubts as to what the underlying behavioral process really is." Without strong theoretical grounding, the question of the fit of the data to the predicted diffusion or adoption curve is practically meaningless.

The proof of any given mathematical diffusion model cannot be resolved by empirical evidence. Mahajan and Peterson (1985, p. 10) note that "because *any* unimodal distribution function will generate an S-shaped curve, it is often not possible to empirically determine which of several competing trend or distribution functions best describes a given distribution curve." Mathematically based models need to address the empirical problem of finding valid behavioral tests of diffusion and adoption effects.

The problem is that the "S" shaped diffusion curve, or any other observed diffusion curve, is an aggregate of all processes which result in adoption. Even if the diffusion curve would forecast new product sales perfectly, the mathematical model would not be sufficient proof for establishing the theoretical assumptions which they attempt to model. The underlying social processes producing the diffusion curve would not necessarily be understood or explained. In fact, the social processes which operate on the population to result in earlier adoption, later adoption or rejection are insufficiently explained by mathematical models. Given the behavioral emphasis of diffusion theory, mathematical diffusion models appear weak in providing much psychological insight to the major issues described by Rogers.

Granovetter (1978) points out additional problems in making inferences from observations of a collective type. Utilizing a threshold model he shows that very small changes in the distribution of preferences can generate very large differences in the outcome of certain situations. Granovetter writes (p. 1441) "we observe mainly the outcomes and tend to assume that the preferences generating them were consistent with them." Granovetter demonstrates that the most important causal influence on outcomes can be due to the variation in norms and preferences within the interacting group.

The complications to which Granovetter calls attention suggests that the conditions under which studies of the diffusion curve will yield useful findings are highly limited. Diffusion models are weak in their ability to reliably predict the market potential of a new product before it is launched, especially in the case of radically new products or breakthroughs. Mathematical diffusion models cannot reliably predict the extent of adoption of a given innovation within a population. Mathematical diffusion models are simply weak forecasting tools.

In addition, the lack of acceptance or non-adoption of innovations has always posed certain theoretical problems to mathematically modeling the diffusion curve. To apply and study diffusion rates in the case of limited diffusion, it is necessary to identify and segment the population. This segmentation problem has not, however, been treated to the satisfaction of many researchers. Frank (1968) summarizes consumer segmentation research, noting "for the most part socioeconomic characteristics are not particularly effective bases for segmentation either in terms of their association with household differences in average purchase rate or in response to promotion." The fact that the market for an innovation may be difficult to identify complicates the empirical study of adopting groups.

Marketers are faced with a dual segmentation problem in marketing an innovation. First, marketers frequently have only rather weak means to segment the market making it difficult to specifically identify and define the adopters of a new product. Secondly, since diffusion theory proposes that these buyer groups change over time, marketer need to change their tactics to reflect these changing target segments. Wind et al. (1982) have shown that different market segments can have different diffusion rates.

Mathematical diffusion models may be more useful in providing a more precise means to study, rather than predict, the complex factors which determine how a new product is received in the marketplace. It would be a mistake to dismiss the importance of mathematical models in understanding the diffusion process. However, the underlying social and psychological processes need further theoretical development and empirical study for diffusion theory to progress. New approaches need to be taken to these issues.

Adoption as the Central Problem

While many aspects of diffusion theory have been studied by marketers, adoption remains the central problem for new product marketers. The problem is that the adoption process model employed by Rogers in which adopters move from awareness to trial and finally to adoption is descriptive rather than predictive. The adoption model cannot predict if a given individual will adopt a particular innovation with any degree of accuracy. It cannot predict the extent of adoption of an innovation within a population at a given point in time. Given the frequent failure rate of firms to understand the reaction to new products, it appears obvious that this adoption model is simply inadequate.

Though Rogers (1962) first characterized adoption as "one type of decision-making," the adoption process has not been fully updated in response to developments in decision theory. The field of decision research has become exceedingly complex as psychologists have struggled with issues posed by decision models for decades. New theoretical and empirical work may help marketers to improve upon the simple descriptive adoption models. For example, the Petty and Cacioppo (1986) model of the central and peripheral routes to persuasion frames the study of rationality and social influence in a new way. In short, the adoption decision model needs to be reassessed in the light of a new generation of investigation in decision processes.

The problem of understanding the adoption process is at least partially attributable to the large variety of phenomenon which have been studied under the rubric of diffusion theory. Explaining the adoption of the innovation of boiling water in a Peruvian village is a completely different problem to that of explaining the adoption of a new snack food in contemporary America. This dissertation is an attempt to address some of the shortcomings and limitations

of diffusion theory by looking at the differences in classes or types of innovation.

Progress in diffusion research will require better clarification of the elusive and equivocal issue of what constitutes an innovation. How is an innovation defined? Do we base our understanding of an innovation on what the innovation is in terms of its attributes, on what effect the innovation has on the society or its target consumers, on what the innovations means to adopters or non-adopters, or on other factors? Diffusion theory needs to consider how different types and dimensions of innovations are understood to make further progress as an interdisciplinary body of theory. The most powerful theory of innovation and diffusion would include many or all of these dimensions.

Classes of Innovation

Every new product is, to some degree, an innovation. A product which many consider "old" is an innovation to someone who experiences it for the first time. The perception of a product as "new" is relative to the experience of the individual. Some researchers argue there is no absolute empirical measure of the innovativeness or newness of a product. For this reason, defining and categorizing innovations on an empirical basis is no easy task. Without clear definitions of newness and innovation, it is difficult if not impossible to formulate testable theories and use empirical evidence to support them.

Empirical studies of new products are, in fact, plentiful. The literature on the diffusion of innovations provides thousands of empirical studies of new products, new ideas, and new inventions. Diffusion researchers have studied not only innovations which are new products, but also innovations which are new ideas, new methods, and new procedures. This interdisciplinary character of diffusion theory has been a strength in that certain hypothetical

propositions have been tested in different contexts. Prominent examples include studies of the spread of a new drug among doctors (Coleman, Katz & Menzel, 1957), and studies of the spread of hybrid seed corn among farmers (Ryan & Gross, 1943). The problem is in the generalizability of the findings. Can findings from rural communities and less developed countries legitimately apply to urban communities in economically advanced countries?

The factors and measures which are important to, for example, the diffusion of a news story (Rosengren, 1973) are different from the factors and measures important to studying the diffusion of a new drug (Coleman, Katz, & Menzel, 1957). For this reason, conceptualizations and empirical findings about innovations are often difficult to compare. Without precise criteria for measurement or classification, theory is limited and important differences between innovations are lost.

Diffusion theory needs to address these differences. Is the diffusion model appropriately applied to all new products, many of which are simple brand extensions, style changes, and minor product modifications? Marketers may have employed the framework of diffusion theory in formulating product adoption models, but important social and psychological differences are necessary to consider in understanding the diffusion process in different situations. Very different types of social processes distinguish different types of innovations in different types of societies.

Problems in definition and measurement have hindered both theory and practice. Imprecise measures of newness and innovation have clouded and befuddled theories of innovation and new product marketing. After reviewing further theoretical problems in diffusion theory, Chapter 2 will examine and critique the problems in the definition and classification of innovations.

The Argument for Categories of Innovation

Rogers and Shoemaker (1971) accomplished the formidable task of citing and organizing approximately 1200 studies, showing the extent to which their list of 102 generalizations from diffusion theory are empirically supported. However, the large amount of past research (which has certainly more than doubled since that time) should not lead one to believe that all aspects of diffusion theory are well-grounded. In fact, certain generalizations have either not been studied or relevant empirical findings are not conclusive.

Down and Mohr (1976) argue that certain of Rogers and Shoemaker's generalizations show "extreme variance" among findings. In the Rogers and Shoemaker (1971) inventory of findings, several generalizations only received empirical support from 60% of cases, and in one case support went as low as 47%. Careful comparisons of findings which differentiate between different types or classes of innovations have not been undertaken. There is clearly a need to study variations in the rate of adoption, types of adoption decision processes, and other significant differences in empirical findings. Diffusion theory could clearly benefit from a classification scheme of innovations which could account for this variation.

The diffusion research tradition is replete with examples illustrating that many different reasons may account for the adoption or rejection of an innovation. Factors important to the acceptance of one innovation are not necessarily important for others. Given this problem, it may be more useful to postulate the existence of distinct types of innovations whose adoption can best be explained by a number of correspondingly distinct theories. Downs and Mohr (1976, p. 701) argue that "the existence of empirically distinguishable categories of innovations and their associated models would help to explain why studies employing roughly the same predictors achieve widely varying R^2s

and why the explanatory power of individual variables is unstable across them." Downs and Mohr argue in support for a typology of innovations to improve the consistency of findings and explanations of the adoption process.

Diffusion theory has reached a point where it is necessary to study the differences between types of innovations in order to progress. The classification of innovations is an important issue in marketing. At a time when many products are advertised as "new," it is not always easy to identify the truly new and innovative products in the marketplace. What criteria are used to distinguish a "real" innovation from a line extension or a product improvement? Both objective and subjective factors need to be considered. The following research study attempts to classify innovations and innovators and addresses the difficulties involved in making such classifications.

The Argument for Categories of Innovators

A parallel problem to the issue of categories of innovation is the issue of categories of adopters. Rogers (1962) provided a schema by which the population is divided into five groups based upon the time of adoption. The basic idea is that innovations diffuse through a population beginning with innovators and ending with laggards in a normal distribution curve. In providing a rationale to identify and target "early adopters" with new product information and promotional efforts, this segmentation scheme has been used in the attempt to augment the speed of the diffusion process.

This aspect of diffusion theory has contributed to marketing the theoretical basis for understanding that segments which buy a particular product may change. Diffusion theory posits that the characteristics of the buyers of a product may change over time -- different traits characterize early and later adopters. Diffusion theory has been particularly influential to new product

marketers in providing this segmentation scheme and rationale to reach early adopters of a product.

This schema has several flaws. First, this schema is retrospective rather than prospective. It is only possible to label an individual an innovator or a laggard if the researcher can retrospectively look back on the diffusion process as a whole. In fact, individuals cannot be accurately classified with a large degree of certainty in one of the five categories until almost complete adoption when the parameters of the distribution can be accurately estimated.

Secondly, as Peterson (1973) and Mahajan et al. (1991) argue, new product adoption is not likely to follow a normal distribution pattern. There is no justification as to why innovators should constitute the first 2.5% of adopters and laggards the last 16%.

The marketing literature has recognized that the five adopter categories of Rogers may not apply in every instance. However, little empirical research has been done to either expand upon or define the conditions where these adopter categories apply. Though diffusion theory has called attention to the idea that markets change over time, little empirical attention has been given to the specific issue of change in consumer segments in various stages of the product life cycle.

The Problem of Innovativeness

"Innovativeness" is a key concept to the study of diffusion theory. Much of the criticism of adopter categories has centered around the construct and measures of this central concept. Though there are many studies of early adopters of new products, many aspects of innovative behavior have not yet been fully explored.

Rogers (1962) characterized innovators as particular types of deviants. In contrast to early findings from rural sociology and anthropology portraying innovators as misfits and risk-takers, studies in marketing have found innovators to be socially integrated, mobile, showing higher than average participation in social groups, and having more contact with information sources (Schiffman, 1972; Reynolds & Darden, 1971; Painter & Pinegar, 1971).

The numerous characteristics related to innovativeness have long been studied. The Rogers and Stanfield (1968) review of 1100 studies of innovators included social and attitudinal variables, relationship variables, characteristics of the innovation, and strategies of the change agent. While certain variables seem consistently correlated to innovativeness, a certain degree of variance has been consistently observed. Since findings are largely correlational, causal relationships cannot be established.

Profiles of innovators appear to vary by product type. While some studies found early adopters to be younger (Feldman & Armstrong, 1975; McClurg & Andrews, 1974), Rogers and Shoemaker (1971) listed more studies which found older consumers more likely to be innovators. Some studies have found that innovativeness varies by product category with no overlap of a "general innovator" across product categories (Robertson, 1968). Others studies gave indications that generalized opinion leaders may exist (Marcus and Bauer, 1964) and Feick and Price (1987) have argued the case for the existence of an influential marketplace expert or "market maven."

Profiles of innovators have received less attention in recent years. Robertson and Myers (1969) questioned the statistical significance and the practical value of the early work which related basic personality variables to early adopters of a product. Enthusiasm for work on the relationship between personality and consumption has been dampened by Kassarjian's (1971) cri-

tique which summarized research findings as "equivocal." While the shortcomings of personality studies are many (e.g., low predictive power of tests, tests constructed for other purposes, etc.), the appropriate use of psychometric tests has something to offer diffusion theory. Innovativeness and adopter categories are too important in theory and practice for the issue to be ignored. Innovativeness is a central construct of the theory of the diffusion of innovations which needs to be examined with appropriate tools.

The variance among the findings does not necessarily indicate that profiles of innovators are empirically invalid or mistaken in a particular study. Variance among profile findings may be due to the fact that products under study differed and that researchers have paid little attention to classifying groups by category to account for this variation. Midgley's (1987) meta-analysis of empirical finding in diffusion research did not break down research findings by category. Variance in findings may also be due to conceptual problems in definitions and measures.

Problems with Measuring Innovativeness

Being able to define an innovator or any other adopter category is predicated upon being able to clearly define an innovation. Lacking clear definitions, marketers have frequently relied upon operational definitions. Innovators were operationalized in early diffusion research in several ways, most commonly as either the first two percent or ten percent to purchase a new product.

Jacoby (1971) notes that taking one indication of an individual's tendency to innovate (i.e., the early trial of a single product) limits the ability to validly generalize about the characteristics of individuals who tend to be innovators in general. Profiles of innovators may entirely depend upon the product cate-

gory chosen to be examined. For example, given the luxury and high cost products frequently selected to study, it is not surprising that innovators are found to have greater incomes. The finding that innovators take greater risks may be a function of financial ability rather than a function of a personality trait.

As an alternative, Jacoby employed a cross sectional method to measure innovators, using several indexes of innovation proneness across a variety of low-priced, commonly purchased items. With a more rigorous definition of an innovator, Jacoby had a much sounder basis to conclude that innovators were less dogmatic (as measured by the widely-tested Rokeach Dogmatism scale).

However, even the Jacoby measure is theoretically flawed in measuring innovativeness. Innovativeness cannot be theoretically defined and limited to measures which depend upon low-priced goods. There may be other types of innovativeness.

Kohn and Jacoby (1973) hypothesized that much of the variance in findings is due to method variance in using different operational definitions of the construct of innovativeness. Comparing three different operational measures of innovativeness in five different product categories, they found little correlation, even of a small magnitude. This implies that different operational definitions do not measure the same thing.

Innovativeness as a Trait

Midgley and Dowling (1978) criticize the time of adoption method of measuring innovativeness as one which is basically flawed. They argue that this measure is a temporal construct that does not have an isomorphic relationship with the latent construct it is supposed to operationalize. Any "time of adop-

tion" measure of innovativeness cannot avoid the inherent problems of failing to adequately sample and measure an "innovativeness trait."

Such operational measures apply to measuring what Midgley and Dowling (1978) call "actualized innovativeness," the rate of actual behavioral instances of adoption. They argue that methodologies that equate time of adoption with innovativeness ignore complex situational and communication effects that intervene between individuals' innovativeness and the time of adoption. Temporal measures employed in marketing do not provide reliable measurements of the personality trait "inherent innovativeness." Conceptualized as a trait which individuals possess to varying degrees, "inherent innovativeness" as a hypothetical construct can only be inferred from attitudes and behaviors rather than directly observed.

If innovativeness is hypothesized to be a personality trait, operational measures based upon actual purchases become unimportant and largely irrelevant. An innovative person, i.e., a person with an "innovativeness trait," may not adopt earlier in time than others due to the fact that she/he learned of the innovation at a later time.

While Midgley and Dowling have made the case for the necessity of a new conceptualization of innovativeness, the existence of an innovativeness as a personality trait is by no means empirically established. While it is easy to propose that the trait "innovativeness" explains certain behavioral dispositions of consumers to try new products, this needs to be empirically examined in much greater depth. In short, the construct validity of innovativeness as a trait needs to be established.

Innovativeness Overlap

The Midgley and Dowling hypothesis of "inherent innovativeness" is complicated by the debate over the extent of overlap between innovativeness among various product categories. The literature tends to show that innovativeness is category specific. However, a certain degree of innovativeness overlap between related product categories has been shown to exist (Summers, 1971; Ostlund, 1972, 1973; Goldsmith & Hofacker, 1991).

Problems associated with innovation overlap or lack of overlap are avoided by trait definitions of innovativeness, since it suggests that there is something more general underlying actual instances of innovative behavior. Yet the degree of overlap has been noted as being rather small. This suggests that "inherent innovativeness," if it exists at all, may be extremely rare.

Alternatives Conceptualizations of Innovativeness as a Trait

If innovativeness cannot be recognized as a trait by a single specific instance of early adoption, then how would one recognize an innovative person? What attitudes and behaviors would a person with an innovativeness trait have to manifest? Personality and behavioral characteristics of innovativeness as a trait has been conceptualized in several different forms which are reviewed below. None of these conceptualizations has been rigorously studied and tested.

Midgley and Dowling initially formulated a definition of an innovativeness trait in relation to communication processes. They defined innovativeness as the degree to which an individual makes adoption decisions "independent of the communicated experiences of others." This definition, centering upon independent judgement making, has not been fully operationalized and studied

in terms of a specific psychographic scale. In fact, this conceptualization may not be appropriate.

First, empirically separating the variable "independence in judgement" from the variable "communicated experiences of others" may be extremely problematic. In commenting on the Midgley and Dowling definition, Carlson and Grossbart (1984) cite research that indicates that early adopters seek more, not less, communicated experiences from others prior to the adoption decision. Various studies have found that innovators are likely to collect information from several sources, having high contact with information media sources. "Independence in judgement" may not be a particularly good basis to distinguish innovators and other adopter categories. Hirschman (1980b) and Carlson and Grossbart (1984) have presented evidence that distinguishes novelty seeking from independence in judgement.

Personality and cognitive dimensions related to innovativeness are discussed by Hirschman (1980a). Hirschman acknowledges the criticisms of Midgley and Dowling, but notes that the causes of innovativeness have been largely unexplored. Proposing that innovativeness is socially influenced rather than a genetic predisposition, she connects innovativeness to novelty seeking behavior. She argues that the desire to seek out the new and the different is conceptually indistinguishable from the willingness to adopt new products. In other words, a consumer expressing a willingness to adopt a new product is also expressing a desire for novel information.

Hirschman distinguishes several components of actualized innovativeness. "Adoptive innovativeness" refers to the actual adoption of new products, and "vicarious innovativeness" refers to the acquisition of information regarding a new product. The point is that through vicarious innovativeness, a person

can symbolically accept or adopt a product without purchasing the product itself.

Hirschman's conceptualization is not entirely new. Klonglan and Coward (1970) propose a similar model, arguing that a new product involves both an idea and an object, with corresponding symbolic and action forms of adoption. Individuals may symbolically adopt or accept the idea of a product but fail to proceed to trial and purchase for a wide variety of reasons.

Other research in this vein has been concerned with relating innovativeness to stimulus seeking. Mittelstaedt et al. (1976) used the Zuckerman Sensation Seeking Scale to establish underlying differences among innovators in seeking and dealing with information. They argue that high sensation seekers (HSS) used the act of consumption to gain information while low sensation seekers (LSS) rely upon cognitive evaluation before trial. The key difference is that while LSS tend to reject without trial, HSS tend to reject after trial. Mittelstaedt et al. proposed that while the "ultimate" adoption rates of the LSS and HSS groups may not differ, a disproportionate number of early triers are likely to be the HSS type.

This research is significant in that it begins to conceptually distinguish differences in the intrinsic or self-motivating rewards of innovative behavior from the extrinsic benefits of adopting an innovation. In other words, the motive to try a new product for the new experience it may provide is a different motive from evaluating the utility of the product. Symbolic and experiential dimensions of new products are more important to sensation or novelty seeking behavior than it may be to evaluation or repeat purchase behavior.

In a world supposedly driven by the pursuit of money, power, prestige, and pleasure, intrinsically rewarding behavior is often overlooked. Exploratory and novelty seeking behavior appear to contain rewards within themselves

that may not rely upon material incentives alone. Both cognitive and motivational factors are important in understanding this type of creative behavior.

Hirschman distinguishes a third type of actualized innovativeness based upon creativity in the usage of products. "Use innovativeness" is described as the act of consumers to solve a novel consumption problem by acting in an innovative fashion. "Use innovative" behavior as it is defined by Hirschman is essentially a type or subset of creative behavior.

Hirschman's contribution is conceptually explored but not empirically measured. Hirschman proposes that novelty-seeking and types of creativity are dimensions either underlying or closely connected to innovativeness. Furthermore, just as actualized innovativeness needs to be distinguished from inherent innovativeness, actualized novelty seeking must be distinguished from inherent novelty seeking. While the same could be said for creativity, the psychological literature on creativity suggests that the construct is extremely complex. In fact, various dimensions of creativity have been studied by psychologists since the 1950s.

While marketers have typically used concepts employed by psychologists to study behavior, the problem is that concepts may be too broadly defined to practically apply to the study of consumption. A number of researchers have connected innovativeness to such things as optimal stimulation levels or the internal need for stimulation (Raju, 1980), variety seeking (McAllister & Pessemier, 1979), and types of exploratory purchase behavior such as brand switching. The broad focus of these studies reflects the difficulties in precisely defining and isolating specific dimensions of innovative behavior.

Price and Ridgeway (1982, 1984) place innovativeness within the broad context of exploratory behaviors of consumers, developing a scale to measure the "use innovativeness" concept proposed by Hirschman. The Use

Innovativeness Scale consists of 44 items, interpreted by factor analysis to consist of five subscales. Subscales consist of the dimensions of creativity/curiosity, risk preference, voluntary simplicity, creative re-use, and multiple use potential.

The Use Innovativeness Scale was created to measure a more limited aspect of the innovativeness trait and was thought to apply to products with multiple use potential such as video recorders and home computers. Though validation of the scale is not complete, two subscales, creativity/curiosity and multiple use, have proven useful in distinguishing early adopters of in-home PCs by Anderson and Ortinau (1988). While the use innovativeness scale may be more applicable in measuring innovativeness in relation to certain technological innovations, the scale provides a further useful step in being able to analyze underlying dimensions of innovativeness as a multi-dimensional trait.

Other research related to this area has been that of Kirton (1976, 1980) who developed a scale to measure innovativeness as a cognitive component and employed this measure in the context of personnel decisions in organizations. Attempts to apply this scale to consumer contexts (Foxall, 1988; Foxall & Payne; 1989) have met with problems and needs to be examined more closely.

The Need to Explore Innovativeness as a Trait

The construct of innovativeness clearly needs to be broken down into distinct dimensions. The exploratory discussion of innovativeness above suggests that innovativeness is a multidimensional construct. There is clearly a need to further examine and explore types of innovativeness specifically on a product category basis.

Recently, Goldsmith and Hofacker (1991) have refined a psychographic instrument to measure "domain specific" consumer innovativeness which

could be applied in different product categories. Goldsmith and Hofacker created a music innovativeness scale which they validated for college students in "rock music" and other domains. This domain specific measure is consistent with the findings of the earlier operational measures of innovativeness as being limited among individuals to particular product categories. While this domain specific measure has been tested and validated, rules for defining specific domains are not examined. It is not clear how to define an appropriate domain, or how a domain is different from a product class or category.

While the Goldsmith and Hofacker domain specific measure of innovativeness has been reasonably validated as a psychographic instrument to measure innovativeness, the problem is that it fails to deal with the issues raised by Midgley and Dowling. Limiting innovativeness to the rather specific and limited domains which Goldsmith and Hofacker describe does not establish the case for innovativeness as an enduring or deeply-rooted trait. While innovativeness in specific product categories has been clearly established in the literature, the case for innovativeness as a trait has not been fully explored. Situational factors have not been fully ruled out as influences on innovative behavior.

In the rock music example cited above, it could be asked if music innovativeness is a rather short lived "phase of life" experience for particular college students who may temporarily be in a situation where they have a limited degree of interest in new rock music. No empirical evidence has been collected to establish or relate innovativeness in one category or domain to innovativeness as a trait which would be manifested across different product categories.

The issue of innovativeness clearly needs to be addressed in much greater depth. Innovativeness is simply too important an issue and too central to dif-

fusion theory to be ignored. There needs to be a comprehensive framework to address the issue of innovativeness. While research cited above has conceptually related innovativeness to information gathering, sensation seeking, and other types of creative behavior, these behaviors need to be further explored to establish more of a direct connection.

The Argument for Process Research

Many of the shortcomings and limitations of diffusion theory reviewed above have not escaped its major theorists. Rogers understood some of the theoretical limitations of diffusion theory when he noted (1976, 1983) that it lacks a process orientation. Process oriented research takes a dynamic view of the social system as it changes over time. Rogers (1983, p. 194) notes that research designed to answer the question of whether stages exist in the innovation-decision process is methodologically different from the study of independent variables associated with innovativeness. The former is process research and the latter is variance research. Variance research has predominated in the field, but it cannot probe backward into time to show what happened first, next, and so on, or how the first events influenced the later ones.

While diffusion theory has studied adoption as a decision-making process of the individual, it has not been focused upon how individuals change their behaviors as a result of adoption. Diffusion theory has not studied the creative adoption of innovations as an incentive to change behavior or as a commitment to values. Diffusion theory has been weak in the area of understanding the origins and motivations of innovative behavior and the growth of new social trends. The dominant theoretical approach of diffusion theory may have obscured alternative models of understanding innovation and consumption processes, such as the earlier cultural model initially proposed by Barnett

(1953). The analysis of innovations generally falls short of formulating models to understand larger macrocultural phenomenon such as historical or cultural trends and social cycles.

One of Rogers' proposed solutions to the shortcomings of diffusion theory is to develop a process orientation to the field. Various types of process-oriented studies of consumers are being recognized as important by marketers in recent years. These process studies are related to many issues in diffusion theory, but are not integrated within its traditional domain. Such studies include areas such as aesthetics (Holbrook and Schindler, 1989), variety seeking (McAllister & Pessemier, 1979), impulsive or compulsive consumption (Rook, 1987; O'Guinn & Faber, 1989), and many other studies of leisure-time pursuits. While certain researchers (Hirschman, 1986) find such studies as evidence of a paradigm shift in marketing and consumer studies, Rogers (1983) finds qualitative procedures to be a natural and necessary development of further progress in diffusion research.

A cultural process model can provide a broader framework to deal with certain aspects of diffusion theory. For example, while acceptance has been the primary focus of study in the diffusion literature, selection and taste formation processes demand equal attention as cultural processes. Processes of rejection and types of emotional response to innovations have been given little attention in the diffusion literature. Little discussion is given to the ramifications which innovations have for the rest of the society, how innovations may affect market structures and have further social and strategic marketing implications.

The lack of a process orientation is due to the focus on the individual adoption decision. As was noted above, individual adoption decisions are the primary focus of many marketing studies of adoption. The focus upon the indi-

vidual leads to explanations of individual blame (rather than system blame) for explanations of diffusion failures, according to Rogers. In other words, individual psychological reasons tends to be most frequently cited as the reason that innovations are accepted or rejected, even though social and communication processes are also posited as operating in the diffusion process. Rogers (1976) calls this the "psychological bias" of communication and diffusion research because it largely ignores the social-structural variables that affect communication.

The psychological bias is consistent with the behavioral emphasis of diffusion research. Since diffusion research in marketing has been heavily concerned with enhancing the acceptance of innovation and studying the spread of new products, the characteristics of the social process of innovation have been largely unexplored. While differences in the rate of adoption have been noted between such things as race and social class (Cancian, 1967; Martineau, 1958), innovative social groups have seldom been examined by marketers. Social groups are familiar to the profession of marketing. The market segmentation problem attempts to isolate particular consumer groups by defining their unique characteristics. The problem is that the groups studied by marketers are often too large and heterogeneous or otherwise ill-defined to be relevant to the issue of social processes.

The social conditions necessary for adoption are more frequently the study of sociological or anthropological studies of adoption. Social and anthropological diffusion research in developing countries have tended to confirm the point that innovations require a background of distinct and well-specified cultural expectations to be successfully adopted. The motivations and conditions which cause innovations to flourish has not been frequently studied.

New tools are needed to examine some of the social forces which affect the process of adoption.

The process-oriented view of consumers suggested by Rogers may necessarily lead to alternative research methodologies and different types of models. A process orientation of innovation which takes a dynamic view of change may need to use alternative cognitive models in dealing with the problem of novelty and creativity. Weisberg (1988) notes that examination of the modern psychological texts on problem-solving fail to deal with the issue of creative thinking.

The prevailing "problem solving" view of consumers sees decision-making processes as structured in terms of consumption goals, the satisfaction of needs and wants. While consumer decision-making has been widely seen in the context of a cognitive "problem solving" model, a "problem finding" (Getzels & Csikszentmihalyi, 1976) model of decision choice is more appropriate to understanding innovative behaviors of consumers. A creative "problem finding" approach may be more relevant in situations where consumers are reacting to novel stimuli and have not yet made a decision of whether they want, need, or desire a new thing. A problem finding approach is relevant to the study of intrinsically-rewarding stimulus-seeking behavior. Researchers are just beginning to face the problems of studying intrinsically motivated behaviors (Csikszentmihalyi & Csikszentmihalyi, 1988).

In summary, while diffusion theory is a rich interdisciplinary body of theory, there is a need for new approaches. This dissertation will examine the classification of innovations and propose research methods consistent with the effort to examine multiple processes.

CHAPTER 2:

THE DEFINITION AND CLASSIFICATION OF INNOVATIONS

Introduction

The above discussion has argued that a categorization scheme would augment the ability of diffusion theory to explain adoption and diffusion phenomenon. While diffusion theory has been engaged in studying diverse types of innovation, it has not clearly demonstrated that different types of innovation may reflect different and independent processes of adoption. A categorization scheme would be useful in the understanding of innovativeness, both in domain specific and trait dimensions. Categorization would clearly be of benefit to treating applied problems in marketing and assist the efforts of new product marketers to understand the process of innovation.

Newness as a Definition of Innovation

Thought innovations are commonly defined in terms of the new, the newness of a product cannot be taken for granted. Almost all firms continuously make their products "new" through changing their advertising, packaging, and design. Understanding the appeal of the new is a major problem for advertisers, designers, new product developers, and strategists.

Rogers' criteria for what constitutes an innovation is "perceived newness" expressed in terms of knowledge, persuasion, or a decision to adopt (1983, p. 11). This suggests that innovations are relative, being subject to individual interpretation. Using perception as the criteria for adoption creates the problem that what is perceived to be an innovation may be subject to the mental state of the person or the contextual situation of the adopting unit.

Rogers' definition raises an "interpretive problem" of the meaning of the innovation for an individual. Rogers' definition of innovation is, in essence, purely a psychological one, depending solely upon the attitudes and interpretations of the individual or adopting unit. This definition does not satisfy many researchers who seek to define innovations on an objective basis.

Marketers have struggled with relative definitions of newness. Newness has been defined (a) relative to existing products in a category, (b) relative to a product's introduction on the market, and (c) relative to a potential or projected market (Robertson, 1971, p. 4). These relative definitions cannot accurately be considered "objective" since they require the choice of arbitrary time periods. Since diffusion patterns vary considerably among product categories, from very short to very long time periods, the time periods which define the relative newness of a product may vary a great deal. Such operational definitions of newness do not, in themselves, aid in clarifying the significance of new products to consumers. Relative definitions of newness do not necessarily correspond to perceptions of consumers as to what is "new."

There are no absolute measures of newness. Newness can be defined in relative terms or as a perceptual attribute. Marketers have, as a rule, considered perceptions of newness to be an important factor affecting attitudes and behavior. Hart and Jacoby (1973) suggest three conceptually distinct dimensions of perceived newness: novelty, recency and scarcity. Based upon Berlyne's (1960) discussion, novelty was defined in terms of the quality and extent of differences between a product and its alternatives in a product category. The other dimensions, recency and scarcity, were said to generate "feelings of novelty" due primarily to limited contacts which consumers have with such products. The Hart and Jacoby study indicated that recency was the

most important factor to the subjective experience of newness, but this conclusion is based upon a highly limited study of the issue.

The perceived newness of a product is a complex component of experience. In the context of a study of advertising, Cox and Locander (1987) found that a novel product produced a significantly stronger affective reaction than a familiar product. The explanation hypothesized to account for this reaction is that a new stimulus cannot be readily categorized; difficulty in categorization (or schema incongruity) causes an increase in arousal or emotion.

The affective response to the new may provide more clarity to common practices of changing or updating the design and appearance of products and advertisements, but researchers agree that reactions to novel stimulus has many dimensions. Complex psychological and social factors underlie these perceptions. Marketers have yet to closely examine individual responses to the new in any depth.

Robertson's Behavioral Definition

Robertson (1967) defined three types of product innovations based upon the extent to which a new product is likely to disrupt established patterns of behavior. *Continuous innovations* are the least disruptive, *dynamically continuous innovations* are somewhat disruptive and *discontinuous innovations* are the most disruptive. Continuous innovations would include any product improvement, such as a new ingredient in a shampoo or a new flavor of toothpaste. A recent example of a dynamically continuous innovation could be a CD player. A computer may be a discontinuous innovation for a first-time user.

This classification scheme has been widely quoted, being perhaps the only conceptual means proposed to distinguish between different degrees of inno-

vativeness of a product. Wilkie (1986) has made an attempt to extend and clarify this behavioral interpretation of innovation categories.

Given this classification scheme, diffusion theory has undoubtedly emphasized major functional or discontinuous innovations which strongly impact traditional behavior. Minor or incremental product improvements which characterize many new product introductions are not likely to significantly disrupt behavior. Gatignon and Robertson (1985) note that little research attention has been given to continuous innovations. Given that the vast majority of new products are minor product improvements or variations in design, this essentially means that marketers have yet to study the impact and significance of the majority of product innovations.

Problems with Robertson's Behavioral Definition

While the Robertson method of classifying innovations has been shown to be useful in drawing certain distinctions among innovations, it is not precise enough to provide scientific criteria to classify innovations because it does not specify measurable factors. In fact, it does not avoid the "interpretive problem" of the Rogers definition; an innovation which is continuous for one person may be discontinuous for another person.

Types of innovation may be confused for different groups of consumers, depending upon when they begin to use an innovative product or service. Anderson and Ortinau (1988) have pointed out that marketers have in certain cases treated certain discontinuous innovations as continuous. The example they cite is the financial industries experience with automatic transferring machines (ATMs). They point out that while the ATM has been accepted by certain consumer segments and has been continuously improved, actual ATM usage remains low relative to the overall penetration potential of ATM card

holders. ATM machines remain either a dynamically continuous or a discontinuous innovation for a sizable segment of the population. Though products may continuously improve, education and subsequent learning on the part of the consumer may be crucial to the continuous use of many technologically-based innovations.

Robertson's behaviorally-based classification of innovations has several problems. It is necessary to more precisely delimit and define the extent to which an innovation is or could be "disruptive" on the behavior of consumers for Robertson's classifications to have precise meaning. It is difficult to define what "traditional behavior" means without well-defined social settings and social norms.

If an innovation originates within a marginal or deviant social group, then it may not disrupt social behavior within that group. An innovation could support a non-traditional pattern of behavior within a marginal social group. Consider, for example, the radical spiked haircuts which came into fashion among punks. This innovative fashion behavior verifies and supports punk norms by clearly differentiating an individual's social membership and commitment to punk values (Fox, 1989). To define the innovation of spiked hair as "disruptive" in this context would be misleading.

While Robertson's behaviorally-based classification of innovations has been provisionally useful and consistent with the behavioral emphasis of diffusion theory, it requires further conceptual clarification. Robertson's classification of innovations needs to be defined in reference to social settings and behavioral norms. Without being defined in relation to social norms and other social categories, this classification scheme can have no precision.

Strategic Definitions of Innovation

Booz, Allen, & Hamilton, Inc. (1982) defined six categories of new products in terms of their newness to the company and newness to the marketplace. In a world-wide survey of leading businesses, they identified the following mix of product introductions: new-to-the-world products which created an entirely new market (10%), new product lines which represent entries to existing markets (20%), additions to product lines (26%), improvements or revisions of existing products (26%), repositioning or targeting existing products to new market segment (7%), and cost-reduced products (11%). This classification scheme was created as a practical means of understanding the new product development activities of firms. Findings indicated that 30 percent of the new-to-the-world and new product line categories accounted for the 60 percent of new products that were viewed as the most successful.

With a similar schema but providing further conceptual discussion of the issues, Donald Heany (1983) proposes a spectrum of six product innovations to differentiate new products based upon the product's "functional impact" from the point of view of the firm (see Table 2-1). Heany's position is that the degree of innovativeness of a product has enormous impact on the firm; a style change implies much less risk and expenditure than a product improvement or even a product line extension.

Heany admits that the classification of innovations which he proposes is imprecise, has gray areas, and may be debatable in many cases. While others have noted a spectrum of features which define "new" products (Bobrow & Shafer, 1987), few have done so systematically. The value of this classification scheme, Heany asserts, is that decision-making for each type of innovation is likely to be different within the firm. Heany notes that the marketing and competitive implications of innovations need to be better distinguished.

Table 2-1

The Spectrum of Product Innovation

Is the market for the product established?	*Is the Business Already Serving Market?*	*Do Customers Know Functions & Features?*	*What is the Design Effort?*		*Then Innovation is a:*
			Product	*Process*	
Yes	Yes	Yes	Minor	Nil	**Style Change**
Yes	Yes	Yes	Minor	Minor	**Product Line Extension**
Yes	Yes	Yes	Significant	Minor	**Product Improvement**
Yes	Yes	Yes	Major	Major	**New Product**
Yes	No	Yes	Major	Major	**Start-up Business**
No	No	No	Major	Major	**Major Innovation**

Source: Heany, 1983.

Heany's classification system is an aid to understanding the marketing implications of firms' product development activities. Heany notes that even minor product improvements cannot necessarily be dismissed as trivial. Heany discusses the extent to which product improvements and style changes may require substantial promotional support, noting that minor product changes do not generally produce the shock waves within the firm because they are less disruptive to the marketing activities of firms than new products.

These steps at classification are basically managerial supply-side approaches to innovation. While these classifications may lack rigor and precision when applied to describing certain cases, they are useful aids to management. It is important to consider how a firm's ability to promote innovations and understand consumer reactions take an important part in the diffusion process. Understanding different types of innovations can be a critical effort in organizing an effective product development effort. While further clarification is needed, Heany provides the rudimentary basis to a supply side classification scheme.

Market-Oriented Classifications of Innovations

A less well-known but potentially valuable classification scheme was discussed by Robertson (1971), based on the idea that new products can be defined in relation to the effect they have on the market. The classification is based on the idea that new products frequently render existing products inferior or obsolete. Based upon this effect of making products obsolete, Robertson classifies innovations as (a) functional, (b) technical, or (c) stylistic. Functional innovations are products which perform either an unfulfilled function or an existing function in a new way. Technical innovations use new ingredients,

new materials, or new forms. Stylistic innovations are innovations based upon changes in exterior feature or design.

The problem is that innovations described in these terms may overlap categories. For example, the technical invention of velcro made possible certain stylistic innovation in fashion design. Contact lenses may be described as a technical innovation based upon new plastics technology, as a functional innovation to replace glasses, or as a stylistic innovation which made it possible for people to change their appearance.

This classification scheme is valuable in bringing attention to processes which drive the development of innovations and bring about changes in markets. Innovations can be described as economically valuable and significant to the extent that they improve products functionally, technically, or stylistically. New innovations may build upon past innovations.

This market-oriented classification scheme is an aid in understanding how new products may alter competitive factors in a market or create entirely new markets for products. In the more than twenty years since this classification scheme was proposed, however, it has not been utilized to study the underlying processes which alter markets. The possible reason for this is that it makes no mention of the consumer. Unlike Robertson's behavioral definition, market-oriented definitions make no reference to the problems of consumer acceptance and adoption.

Several issues are raised by this classification of innovations: (1) if these factors are important to consumers; and (2) how market-oriented factors are responsible for the generation of innovations. The basis of the classification scheme needs to be further clarified and developed so the basic differences between these types of innovation can be understood.

A substantive body of literature supports the distinction between innovations created as a result of technological and aesthetic change. However, there is less consistency in the literature dealing with functional innovations. Certain functional innovations may be a creative application of a technology or a stylistic variation. Functional innovations are often subsumed under discussions of technical or stylistic change.

While the Robertson market-oriented definition of innovations may have potential in providing the needed clarification to the classification of innovations, the basis for this scheme is not clearly defined. As a result, this classification scheme has been ignored in the marketing literature in favor of the Robertson behavioral scheme. Given the problems with both of these classification schemes, there is clearly a need to take a new approach.

Summary

There is no widely-accepted classification scheme which has been applied to innovations. While the above distinguishes behavioral, strategic, and market-oriented classifications of innovations, it should be noted that none of these classifications have been clearly examined and applied in relation to diffusion theory. These classes of innovations need to be further refined, explored, and tested.

CHAPTER 3:

TECHNICAL AND AESTHETIC FACTORS AS DRIVERS OF PRODUCT INNOVATION PROCESSES

Introduction to the Theoretical Model

As a proposed classification scheme to study product innovations, this chapter will limit discussion to a simple two factor classification of product innovations. These are referred to broadly as technology-based innovations and cultural or aesthetically-based innovations. This is not to be confused with the Robertson market-oriented definition of innovation which is based upon obsolescence. The basis for this classification scheme is motivational.

The argument is developed below that technical and aesthetic motivational factors appear to be the best basis upon which to distinguish between fundamentally different underlying processes which drive the development of new and innovative products. Technical and aesthetic motivational factors need to investigated as separate and distinct components which influence both supply and demand factors which affect change in product offerings within different markets.

This chapter first broadly reviews technological and aesthetic innovations as distinct and important types of innovation. This discussion establishes the basis for examining the differences in processes of innovation in terms of aesthetic and technical factors. A research model to investigate these motivational factors is then proposed.

Technical Innovations

A considerable amount of attention has been given to the importance of technological innovations both at the level of policy and at the level of theory. Historians and anthropologists have contributed to an interdisciplinary understanding of technical innovations and the role that technology has in social change. Many have written on the importance of technology to the firm, but opinions are diverse. Butler (1988) reviews the relationship between technology and strategy, finding that many factors play a role in the generation and diffusion of innovations, including the type of innovation, stage of development, interdependence between technologies, and other factors.

It is recognized that competition in certain industries may be driven by technology. The drug, tagamet, for example, was an important technical innovation which completely changed the market for ulcer medications. Shanklin and Ryans (1984, p. 166) argue that such high technology products have the potential to "create or revolutionize markets and demand."

The study of technology is clearly a central issue to the study of social change. To the early theorists and historians of technological innovation, it appeared that technology drove social change. They pointed in particular to then-new forms of communication and transportation. In the light of the recent sociology of technology, however, such examples appear rather dated. Technology is important, but social factors and consumer needs affect the development of technological innovation.

Jamison (1989, p. 505) argues that there has emerged in recent years a "broader notion of an *innovation process* as a wide ranging and multifaceted social activity." Looking at the historical development of theories technological innovation, Jamison argues that the understanding of technology as a driver of innovation has passed through several transformations where sev-

eral different factors have been stressed. These range from economic factors emphasized by Kondratieff and Schumpter, to social factors first emphasized by Veblen. As a result, different conceptualizations of science and technology currently compete in the academic marketplace, each with different types of political policies and agendas which they entail. The notion of science and technology as productive social forces have attracted considerable political attention.

Technology as a source of innovation is certainly an accepted and important strategic concept. Technological breakthroughs have certainly created many new opportunities for firms. The temporary monopoly which a new patent provides creates a profitable opportunity. However, though technology is given much of the credit for new product growth, technology is not the only source of change. Creative ideas are the source for many new products. Creative ideas can establish new standards and make other products obsolete or out of fashion. Both technology and creativity contribute to new product development.

Technical factors are cited as critical to growth in many industries, but the importance of technology is conditional. While technology is frequently given the credit for creating change, successful products may not require a new technology. For example, the game "Pictionary" is an innovation using existing and extremely simple technology (paper and pencils) creating a market for a game which had not existed previously. This innovation was introduced at a time when numerous technically-based innovations were appearing on the game market, namely computer games and the Nintendo craze of video games.

Clearly, certain innovations are due to factors other than technology. To say that all innovations derive from technological change is clearly specious.

For example, the development of Abstract Expressionism cannot be accounted for by the development of better paints. There are clearly drivers of innovation which are not based upon technical factors or scientific advance. Drivers of innovation which are broadly labeled "cultural" or "aesthetic" are considered in the next section.

Aesthetic Innovations and Hirsch's Model

Hirsch (1972) provides an important framework for understanding processes affecting the control and diffusion of new products in cultural industries. "Cultural industries" which Hirsch investigated, namely book publishing, records, and movie industries, are faced with the problem of continually introducing new products without being able to predict demand. In such aesthetic domains where innovations are generated and controlled within consumers settings, organizations are confronted with a highly uncertain consumer environment. Such cultural industries react by "sponsoring" several artists and exerting a degree of control over "gatekeepers" in the mass media who influence tastes. Feedback from consumers, in the form of sales figures and box-office receipts, provide cues to which products will likely be profitable and which should be dropped.

Hirsch's model suggests that there is a surplus of innovations in cultural industries, only some of which can make an adequate return on the massive promotional spending which is required to market them. While cultural industries satisfy demands for new fads and fashions, the abilities of these organizations to predict their reactions to their products is highly limited. Few films reach the break-even point and only a few books sell enough copies to make a profit. Such aesthetic products are created with highly uncertain de-

mand for these goods. Numerous product introductions are a consequence of this uncertainty.

Hirsch makes the important observation that cultural industries are different from other markets in that there is a surplus of innovation. This is a key aspect of innovation created as a result of varying the aesthetic properties of products. Aesthetic innovations can generate a period of change in certain products categories. Aesthetic differentiation of products can drive product development activities in certain product categories. Giorgio Armani is an example of a designer who has primarily been successful by creating stylistic innovations in men's fashion.

There is a consistent body of literature which has studied a subset of aesthetic innovations in the domain on fashion theory. Contributors to fashion theory have included anthropologist A. L. Kroeber (1919), sociologist George Simmel (1904), and in marketing, Paul Nystrom (1928), Dwight Robinson (1975), and others. In fact, the paradigm of diffusion theory stimulated new interdisciplinary research in these areas.

The issue of consumer aesthetics is just beginning to be treated by marketing and consumer theorists. A field of consumer aesthetics has been defined by Holbrook (1980, p. 114) as the study of "the cognitive, affective and behavioral responses of customers to products appreciated primarily for their own sake as objects-in-themselves." By the Holbrook definition, consumer aesthetics would encompass art objects and most performances of various types. Consumer aesthetics could also be extended to dealing with various collectables such as furniture and wristwatches. However, the issue of consumer aesthetics has also been applied to issues such as product design and packaging. To the extent that consumer objects can be appreciated "for their own sake as objects in themselves," all consumer products can be said to have an aesthetic

dimension. As items such as fountain pens, political buttons, decorative pins, and even old machinery has become collectable, the aesthetic dimension of these items has been discovered.

Aesthetics and innovation theory are clearly connected. Novelty is frequently seen as an aesthetic attribute and as a basis for judging the worth of new works. Aesthetic theory is applicable to innovation theory to the extent that it has been concerned with novelty and innovation in relation to the development of artistic movements and the emergence of new styles. Aesthetic theory is also applicable to marketing since it deals with the issue of understanding quality and taste. While classical aesthetic theories have been proposed to account for the development of new artistic works and styles, more recent aesthetic issues have been concerned with the consumption of popular artistic works and the reception of works by audiences.

The Importance of Understanding Developing Demand

The differences between technical and aesthetic innovations are important to examine because they require an understanding of fundamentally different processes. A simple model of the process of innovation in marketing is conceived to be one of developing products to fit needs. This is often described to be the result of "technology push," the technological ability of a firm to create and market new products, and "market pull," the explicit recognition of a need by consumers or buyers for a new product. This process is represented in Figure 3-1.

While technological development and consumer demand are a simple means of understanding the development of specific products, this process may be more accurately represented as a mixture of supply and demand factors. A more complex conceptualization of the process necessary to understand

Figure 3-1

Simple Model of the Process of Innovation

the factors which drive and inhibit the product development process is represented in Figure 3-2. In this figure, supply factors lie behind and drive the development of technology, but product development efforts may be limited by various technological barriers and limitations. Demand factors may drive product development as well, but product development efforts in this direction is limited by the resistance of consumers to develop a taste for new styles and the rate at which consumers are able to assimilate new fashions.

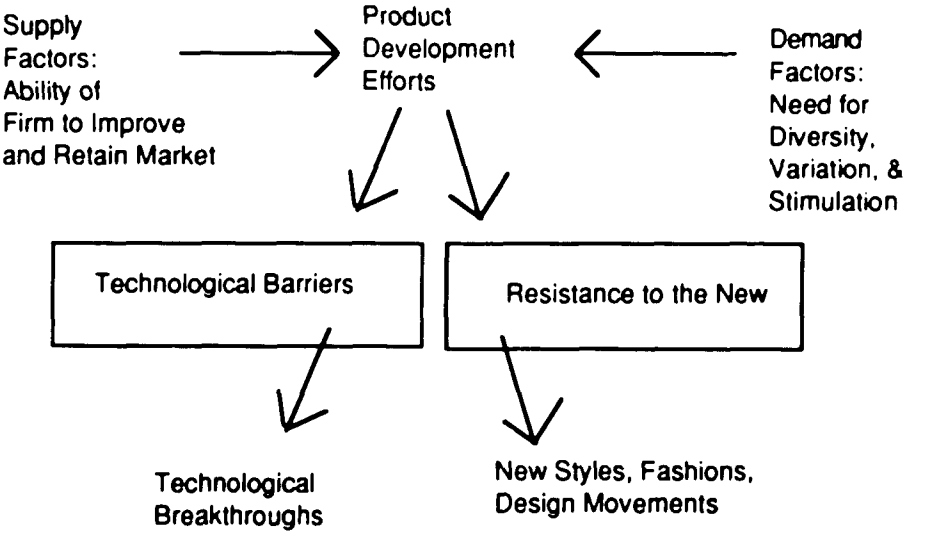
Most industries and most successful products are the result of a mixture of both of these supply and demand factors. For a new product to be successfully developed, there must be the matching of the ability of firms to develop new products with the firm's recognition of fulfilling a potential need or demand. This matching process is the key. Even if firms have the technical capability to develop new products, few (if any) products will be developed without the explicit recognition that a potential market exists for that new product. The costs of commercialization and roll-out of a new product are simply too high. Apart from the R&D capability of a firm, there must be an ability to understand new needs and potential markets in order for successful new products to reach the market. This capability to understand new needs and provide the guidance to developing products to fit these needs is a basic and important goal of marketing.

Firms clearly need to understand developing consumer demand to guide their product development efforts. Porter (1990) considers demand characteristics of markets to be a strategic factor. Porter argues that demanding buyers pressure companies to innovate faster which leads to a competitive advantage. However, Porter does not empirically support this proposition. Successful innovation is predicated upon firms being able to understand the demand for new products and develop products to meet those needs. The problem is that

Figure 3-2

The Process of Innovation

Drivers and Constrainers



new needs are not frequently articulated by consumers. It may take time for consumers to develop new needs. How firms understand developing consumer demand is not clearly articulated by Porter.

The concept of "need" may in many situations provide, at best, an anemic explanation why a product is bought and consumed. When dealing with new things, consumers may not have yet formulated specific needs. Hirsch's model is one of the few studies which have explicitly recognized that firms may sponsor, develop, and launch new products in situations where needs are not clearly understood and where demand is highly uncertain. The Hirsch model suggests that while it is difficult or impossible for firms to fully predict consumer reaction to new things such as new aesthetic or cultural products, product development efforts nevertheless occur along several dimensions.

The most apparent or distinguishing feature of aesthetic or cultural innovations is their lack of apparent need. Aesthetic innovations are adopted out of a social process of appreciation of their features or attributes, they are not "necessities." Aesthetic innovations may be generated without addressing a specific functional "need." The "need" they fulfill is entirely symbolic; it is a need related to social meaning.

The problem is that the concept of need is often understood as a lack or a deficiency of something. This definition of need may be unnecessarily constraining when it comes to aesthetic products. Maslow (1962) notes that certain needs, when they are gratified or fulfilled, breed increased rather than decreased motivation. Needs may be motivated out of growth rather than deficiency.

The drive for psychological growth as it is manifested in aesthetic variation provides a consistent stimulus for consumers to try new products. Even where growth in an industry may be limited by technological barriers, prod-

uct development efforts which offer consumers new aesthetic sensations and variations are always a potential option. Though firms may not be able to predict which new aesthetic variations will be successful, there are opportunities to develop new products out of the need for aesthetic variation.

The important issues from a product development perspective center around the conditions of developing demand. It is important for marketers to understand how consumers may develop and change their preferences over time in reaction to what is offered. Even if consumers are consistent and stable in their preferences, firms may introduce products which will alter demand characteristics in a product category.

It is interesting to note that even in relatively simple categories, diverse aesthetic preferences can develop. In the product category "water," for example, product offerings include tap water, mineral water, and carbonated water of various types, all in a diverse assortment of bottles obtained from a variety of water sources. Perrier created a market for carbonated water products by marketing a product which gave consumers a chance to develop a new type of preference.

While the development of aesthetic tastes for water products may be limited, the case of Perrier illustrates the ability of consumers to develop diverse preferences on the demand side. Cultural industries which Hirsch discusses aid in the development of a vast array of products which reflect extremely complex consumer preferences. Cultural industries are characterized by not only a surplus of innovation on the supply side but the gradual development of complex preferences and diverse tastes on the demand side.

Differences Between Technical and Aesthetic Dimensions in Innovation Processes

Certain innovations can be primarily aesthetic and others primarily technological. The problem is that the importance of aesthetic and technological factors may primarily depend upon the perception of the individual. Technological and aesthetic categories do not avoid the "interpretive problem" in the definition of innovations discussed above. Consumers are likely to have different views of the importance of technological and aesthetic factors in terms of their values.

Many products fall in the gray area between aesthetic and technological domains; technological factors and aesthetic factors may become mixed and compete in terms of the value which they offer the consumer. Automobiles can be evaluated in terms of their technological attributes (such as efficiency, safety, and reliability) or for their aesthetic attributes (such as body style, interior comfort, or symbolic features). These evaluations can change and become quite complicated over time; consumers who may initially buy a car for its technical features may develop a strong emotional response to the automobile.

An established corpus of marketing literature differentiates markets where either new aesthetic variations or technological development may dominate innovation within the product category. For example, while clothing may provide certain physical functions to provide covering, protection, and warmth, aesthetic properties dominate product category variation and innovation, especially in fashion clothing categories.

The many differences between technological and aesthetic innovation in their generation and diffusion need to be further defined and examined. As a better basis for theory and marketing practice, it is necessary to examine, dis-

tinguish and clarify certain fundamental differences between technological and aesthetic elements in processes of innovation. Using the conceptual framework provided by diffusion theory, the following brief summary suggests that aesthetic and technological differences are apparent in many aspects of the process of innovation. These include (a) diffusion patterns, (b) the meaning of the innovation, (c) the structure of the innovating firm, and (d) enculturation and other factors.

A.) Diffusion Patterns: Differences between technical and aesthetic innovations are twofold: in the way they are generated and in the way they diffuse. As technology has become increasingly sophisticated, discussions of technical innovation frequently focus on the supply side, the ability of firms to control technology through patents and research. Technological innovations clearly appear to be controlled by suppliers; they diffuse from firms to consumers and development costs are particularly important.

Discussions of aesthetic innovations, on the other hand, more often focus on conditions of demand. The "trickle down" theory of innovations in which innovations diffuse from higher to lower economic classes is not clearly applicable to aesthetic innovations. This theory is opposed in the domain of fashion innovations by King (1964) and Field (1970), who consider cases of fashions moving up and across social strata. Innovations in fashion may originate with consumers rather than firms; diffusion may be from lower to higher economic groups. In fact, designers in fashion and artists in other fields have noted that they get ideas from cues which they perceive in their everyday life and surroundings.

B.) Meaning: Past research has suggested and supported important distinctions between technological and aesthetic products. Hirschman (1981), for example, proposes that product innovations may result from two independent

sources, technology and symbolism. She notes that symbolic innovations may result when marketers and/or consumers attribute new social meanings to existing products. Symbolic innovations are due to intangible factors. She argues that a secondary diffusion effect is especially strong in cases in which symbolic associations are communicated through a particular reference group.

Hirschman's distinction between technical and symbolic factors is extended in a discussion of the difference between tangible and intangible qualities of these differences. While technical factors may be *tangible* factors which define an innovation, the efforts of consumers and marketers to define the *intangible* meaning and significance of products can be extremely important. In service sectors of the economy, for example, intangible factors are particularly significant.

Studies in advertising and related areas support this distinction. Hirschman and Solomon (1984) investigate advertisements along dimension of functional utility, aesthetic value, and familiarity. Golden and Johnson (1983) investigate differences in feeling and thinking appeals which has been modeled in advertising by Vaughn (1980) and others.

C.) Organizational Structure: On the supply side, technical and aesthetic innovations create different organizational demands and result in different organizational structures. Technical innovations are generally driven by research and development departments or independent research laboratories. Aesthetic innovations are driven by designers, creative staff, and artists who frequently work independently or freelance among firms.

Technological innovations have similarities to aesthetic or stylistic innovations since both may require creativity, a new use of materials, and depend upon a specialized group of people. It is recognized that certain industries are

primarily driven by aesthetic or stylistic factors and others driven by technology. In other cases, innovation may be driven by *both* aesthetic and technical factors to varying degrees. The focus of product development efforts may vary by company culture. Technology is thought of a being the engine of advancement and progress; fashion and style are considered to be temporary and cyclical.

Firms "manage" technology and culture to the extent that they make particular choices in their use of technology and design in the development of new products. Just as production is managed by the firm, innovation is managed by the choices which firms make to make changes in products due to technical and aesthetic input.

D.) Enculturation and Social Status: Many aesthetic innovations are peculiarly different from technical innovations in that they reflect a process of enculturation or training of a particular kind. The development of "good taste" in certain more or less purely aesthetic categories such as painting may involve the motivation to achieve a type of social status. Aesthetic products may require a good deal of time, money, and attention which may be a sign of wealth, "good breeding," education, and status.

The development of many types of aesthetic taste may imply social judgments. Stigler and Becker (1977, p. 88) argue that a new style is not achieved simply by any sort of change, "the newness must be of a special sort that requires a subtle prediction of what will be approved novelty, and a trained person can make better predictions than an untrained person." The development of aesthetic taste and preference requires a certain degree of effort and learning, a growing ability to distinguish between new types of products and greater selectivity between new product offerings.

The development of aesthetic taste may engage consumers in a culturally-based or social process of the learning. Aesthetic innovations such as paintings are created in reference to a particular body of existing products, a tradition of production. Innovative products may diverge from this tradition to varying degrees creating products appreciated for their new aesthetic values.

Not all products with aesthetic dimensions become indicators of taste or status or be subject to aesthetic refinement. The complexity of sensory attributes in the product category has something to do with the ability and motivation of consumers to develop complex preferences. Some consumers buy gourmet brands of coffee and develop an ability to distinguish between different blends, taking steps in the brewing process to preserve the fragile flavor. Other consumers are content with almost any brand of canned ground coffee which they brew with an automatic coffee maker and are indifferent to brewing processes.

Why do some consumers pay attention to developing and refining aesthetic taste and others do not? The underlying motivational reasons for this have not been investigated. The fact that certain consumers take steps to develop aesthetic appreciation while others do not is an important individual difference variable which may influence product development efforts in that product category. Certain complex categories such as painting may require considerable learning and experience. Many categories may be subject to fads and fashions where new and changing aesthetic elements periodically alter patterns of demand.

Research Framework and Approach

The above has reviewed some important differences between product classes which are dominated by aesthetic and technical factors and gathered

evidence to support the proposed categorization. There are clearly important behavioral differences in how innovations are generated, adopted, and diffused which are important to the process of product development. This dissertation attempts to separate and define this difference on the basis of empirically discernible motivational differences.

This dissertation investigates the categorization scheme of technical and aesthetic innovations by proposing that there are more or less "basic" motivational factors which drive consumer attraction to new products and bring about product development activities by firms. New products are attractive to consumers because they offer improved technological features or desirable aesthetic variations on what has gone before. Technical and aesthetic innovations satisfy two important classes of fundamentally different underlying motivations.

It follows that distinct types of innovativeness exist, namely aesthetic and technical innovativeness. The strength of aesthetic and technical motivational factors will correlate to the propensity to engage in innovative behaviors. Learning and involvement with product or categories of products will channel innovative behaviors toward specific goals. The understanding of developing new product demand requires an examination of the relationship of these distinct motivational components.

The Focus on Motivation

The recognition of motivation as important to consumer behavior is not new. The importance of motivational factors to the workings of the economy has been explored by Scitovsky (1976) among others. Scitovsky argues that there is something wrong with the facile assumption by economists that consumer preferences are revealed by their behavior. Scitovsky argues that it is

necessary to examine the underlying psychological motivations of consumers to understand the types of satisfaction which production in the economy supplies. Scitovsky argues that the underlying motivations are more complex and subtle than the typical rational economic model would lead one to suppose.

Marketers have been long concerned with understanding motivational factors behind purchase and product adoption. The problem, as motivational researchers such as Dichter (1964, 1978) have pointed out, is that many or most motivations are unconscious. Consumption is often strongly influenced by unconscious motives.

To say that a motive may be unconscious does not mean that it is irrational, mysterious, not subject to scientific examination, or less than real. Though reasons for adopting a product may be extremely complex, the influence of motivational factors can be subject to examination. Consumers have some idea of their own interests, passions, and desires which motivate search and choice processes for new products.

Research in motivation is not limited by the proposition that motivational factors are often unconscious. McClelland et al. (1953) advanced a theory of motivation and developed a measure of the achievement motive based upon Murray's Thematic Apperception Test and the examination of fantasy. Later studies in the 1960s examined such motives such as the drive for power and integrated motivational theory with decision theory (Vroom, 1964).

Unlike research in the early part of this century in which motivation was related to inner forces and drives, the more recent renewal of interest in motivation has been driven by a cognitive focus. Recent research in affect and cognition has brought specific motivational factors to attention. Cacioppo and Petty (1982) have identified a distinctly cognitive motivational factor among consumers to enjoying thinking, developing the Need for Cognition Scale to

investigate this individual difference factor. This scale has been utilized in various studies and has contributed to studies of persuasion.

The thesis of the existence of two different motivational components is paralleled and supported by Zajonc's proposition that there are two different systems of evaluation. Zajonc (1980) proposes the existence of a fast, crude, and quick-reacting affective system and the slower working cognitive system.

The recent cognitive focus on motivation has frequently obscured the distinction between values and motivation. Values and motives can both influence behavioral choices and represent what people regard as good or bad behaviors. The distinction which is usually made between values and motives is that values do not necessarily imply energy or lead to action. However, the issue of measurement is particularly important in making the distinction between values and motives clear.

McClelland, Koestner, and Weinberger (1989) have struggled with the distinction between values and motives and have related this problem to the necessity of keeping different types of measures separate. They distinguish between self-attributed measures of motives (scaled item measures) and "implicit" measures (fantasy measures), noting that these measures seldom correlate significantly with one another. McClelland (1980) summarizes the evidence that implicit motives predict "spontaneous behavioral trends over time" while self-attributed motives predict "immediate specific responses to specific situations or choice behavior."

This latter type of motivation, self-attributed motives related to specific situations, specifies the type of motivation which could be validly be explored in relation to product adoption situations and innovations. Self-attributed motives appear more valuable in examining the motives behind specific adoption decisions. It is necessary to explore self-attributed motivations in the context

of particular product classes in order to better understand developing demand in those product classes.

Research Goals

Based upon the discussion in the above chapters, an exploratory framework to empirically examine, isolate, and distinguish aesthetic and technical motivational factors is proposed below. The factors which drive innovation are the focus -- the factors which inhibit product innovation are not treated in this dissertation.

Given that motivational factors depend upon perception and interpretation, it is hypothesized that the influence or weight of motivational factors are both specific to the person and specific to the category. It is necessary to examine features of products as well as the weight given to motivational factors by individuals. The development of innovations in each product class may be affected by different factors, depending upon product features specific to that category. The first research goal is to examine and compare aesthetic and technical motivational factors as they vary in specific product classes.

Secondly, examining specific motivational factors in different product categories allows a new examination of the issue of innovativeness. As noted in Chapter 1, Midgley and Dowling (1978) raise the issue that innovativeness needs to be examined as a personality trait. The examination of motivational factors allows renewed consideration of this issue. The issue of motivation goes to the heart of the question of the extent to which innovativeness is a deeply rooted trait and an important individual difference variable.

The following discussion clarifies these points by establishing a framework to define aesthetic and technical factors and examine the characteristics of aesthetic and technical response. This discussion is necessary to being able to

frame the hypotheses in a way that can be empirically tested. The chapter concludes with the presentation of a research model and the formulation of specific testable hypotheses.

Features and Factors

The underlying motivational *factors* to own or adopt a new product is related to the product's perceived *features*. The term "factor" is used to refer an underlying motivational element as distinct from a perceived "feature" of a product. Features are frequently applied to defining attributes within a specific product category, for example, cars have engines, lights, and come in specific colors. Technological and the aesthetic *factors* are at a higher level of conceptual abstraction than product category *features*. Products have perceived *features* while motivational *factors* are unobservable or inferred.

To examine the underlying factors it is necessary to examine how technical and aesthetic features are perceived or weighted as important. Product features offer consumers different options in how they determine the value and quality of products. While aesthetic and technical motivational factors may influence choice unconsciously, these factors can only be present as a result of considerable cultural learning and experience. It takes processes of learning and experience for consumers to be able perceive various product features as desirably "new." This conceptualization is consistent with research traditions in motivational theory which has defined motivations as related to learning.

This issue is particularly important to study in case of many consumer products which have both aesthetic and technical features which influence motivational factors to different degrees. For example, color is a feature of a product which may or may not provide an underlying motive for adoption and

consumption. Color may, nevertheless, relate to technical and aesthetic factors. The redness of a strawberry may be an important technical sign of the ripeness of the fruit. It is also an important aesthetic component in the enjoyment of the product -- in this case, redness is a highly important feature which may affect subjective experiences and even taste perceptions which are important aesthetic factors.

On the other hand, the red color of a car does not affect the technical performance of a car. The color of a car may or may not be an important aesthetic component in the use and enjoyment of the product. The color of a car is a manipulable aesthetic feature which, in interaction with other aesthetic features, may affect motivations to own and use a particular car.

Manipulable Features

The manipulable features of a product are particularly important to the extent that they can be changed to affect underlying motivational factors to adopt and use them. The development of innovations in each product class is dependent upon manipulable product features and the involvement of producers and consumers specific to that category. Individuals may have different types of technical and aesthetic motivations and orientations, especially toward multi-attribute and high-involvement products.

Certain products appear to be more readily or frequently subject to aesthetic variation. As in the example of the product category "water," the development of diverse aesthetic tastes for water products may be limited by the small number of features in the product category. Meaningful aesthetic variations may occur in categories with simple perceptual features, but complex preferences are more likely to develop in categories with complex perceptual features. The more complex and subtle the features are in a product

category, the greater the potential for the development of complex consumer tastes. In product categories where consumers develop more complex tastes, producers have greater potential for new product offerings.

Features of a product which are manipulable are subject to product development efforts, either aesthetically or technologically. The problem is to understand the development of the underlying motivations. The redness of a strawberry might be subject to technological innovation through genetic manipulation or dyes, but the issue, nevertheless is an aesthetic one -- would consumers find yellow, green, purple, or blue strawberries aesthetically appealing? The answer would depend upon the strength of past learned behavior and the learning of new motivational preferences.

Learning and Experience Effects

Learning and experience appears to shape motivations, response characteristics, and reactions to product features. The weight of technical and aesthetic factors is relative or contingent upon various culturally established and learned predispositions of consumers. The weight or importance of underlying motivations to use or adopt new products may change as consumers alter their knowledge and experience.

The desire to own and use new technical products is frequently driven solely by technical features which depend upon the consumer's level of understanding and knowledge. For example, the development of a new industrial pesticide would depend upon such technical features as its environmental safety in manufacture and use, the cost of producing it, and how effective it was in killing specific types of bugs. In this case, as in the case of many industrial products, aesthetic factors are likely to have minimal influence.

Consumer choices, on the other hand, may entirely depend upon aesthetic factors where technical understanding is limited.

Consumer knowledge is frequently not extensive and technical features of products are not likely to be clearly understood in many consumer product categories. Consumers may prefer to rely upon "learning by experience" but this learning can provide ambiguous and uncertain information and be "managed" by firms (see Hoch and Deighton, 1989).

Consumer products, frequently being marketed in terms of easily manipulable aesthetic features such as styling and design, are likely to offer a "mixed value" to appeal to both aesthetic and technical factors. The importance or value of technical and aesthetic product features may become confused to the consumer. The red and black packaging of Raid, for example, is an aesthetic feature important in establishing an image of the product as a powerful bug spray. The consumer's technical perception of the spray as powerful and effective may depend upon such aesthetic features as the color and design of spray can. Consumers may not realize that their choice of a bug spray depends upon their use of these aesthetic features to infer technical quality.

Motivational researchers such as Dichter have argued many or most motivations to consume products are influenced by unconscious factors. In the above example, motivational researchers could argue that the motivation to choose a bug spray perceived to be powerful may express an underlying aggression. Consumers may feel a certain satisfaction and a sense of control in the use of a bug spray. The motivation is *interpreted* in the situation by examining the feeling and reactions of consumers.

The issue of the link between product attributes and consumer motives poses a hermeneutic problem. The importance of features in the use and consumption of products by consumers is explicable by interpreting the underly-

ing motivational factors, but these factors may not be clear to consumers themselves. Motivations may change through the use of products. The perception of the value of product features in a product category is affected by the strength of underlying motivations.

Are consumers attracted and motivated by design and other aesthetic features to pay attention to a product? Or are consumers motivated more by information search to pay attention to technical factors such as performance and reliability? Do people with trained backgrounds in aesthetic or technical skills have a different involvement, sensitivity, or understanding of technical and aesthetic product features? Individual differences in perception and innovativeness related to background, learning, and experience effects in aesthetic and technical product categories need to be explored.

Though motivational factors may be unconscious, they are subject to examination as a type of learned behavior. Aesthetic appreciation and technical competence both need to be learned. It takes experience to learn to interpret a feature as aesthetically pleasing and it takes learning to gain technical competence. The weight given in importance to aesthetic and technical factors in the perception of products may reveal important aspects of how products are consumed and evaluated and important predispositions of consumers. It is necessary to further define and isolate technical and aesthetic factors.

Definitions of Aesthetic and Technical Factors

One means of differentiating aesthetic and technical features is in terms of intrinsic and extrinsic properties or dimensions. Such characterizations of "intrinsic and extrinsic properties" have been widely applied to attributes in speaking about the cues to perceived product quality (Szybillo & Jacoby, 1974; Zeithaml,1988). Intrinsic and extrinsic dimensions have been studied as moti-

vations applied to job situations (Salancik, 1975), have been investigated by Holbrook (1986a) as personality factors, been applied to concepts such as "religiosity," and have been used to describe both products and motivations. Intrinsic and extrinsic dimensions are appropriate to distinguishing aesthetic and technical motivational factors. These factors are defined as follows:

> **Aesthetic factors** are learned predispositions or motivations to experience products or features of products as intrinsically rewarding, i.e., rewarding as ends in themselves.

> **Technical factors** are learned predispositions or motivations to experience products or features of products as extrinsically rewarding, i.e., rewarding as a means for the benefits which the product provides in the product use and consumption.

Characteristics of Aesthetic Response

Aesthetic factors are defined by the perceived presence of sensory attributes or features of products which consumers find to be pleasing, interesting, stimulating, or arousing about a product. Aesthetic evaluations are frequently expressed as affective responses. The motivation to acquire or experience aesthetic products is frequently characterized as hedonic. The majority of consumer research on aesthetic product categories such as music and art has noted the importance of hedonic and emotional content.

Holbrook (1980, 1982) has strongly argued the case that in aesthetic product categories, consumers show high levels of emotional and cognitive involvement in aesthetic experiences, accompanied by the ability to give meaningful

aesthetic responses to a broad spectrum of artistic offerings. While respondents may find it difficult to provide valid perceptual or preference judgements on more than one or two brands of toothpaste, consumers can easily provide meaningful evaluations of many musicians, performers, actors, or other types of artistic offerings.

This high level of emotional and cognitive involvement is an important aspect of aesthetic response. Individuals are highly selective in choosing specific aesthetic and ludic activities to pursue. Though aesthetic products and pursuits may be self-rewarding and hedonic, not all aesthetic products and activities are of interest to all individuals. Aesthetic response is a private, specialized, individual, subjective and unique reaction frequently not accessible to outside observation. The intensity with which certain aesthetic and sports-related activities is pursued suggests that these activities are connected to identity or personality. The high level of ego involvement suggests that the choices made are frequently part of a process of self-definition.

With high levels of self-definition and ego involvement, it is certainly understandable that the aesthetic features of products are experienced in emotion-laden terms. While emotions may be described and studied in terms of physiological response, these emotions have cognitive aspects and attractions which are measurable. Though largely under-researched (Holbrook, 1986b), emotion is important for understanding cognitive and motivational relationships and cannot be reduced to simple state or simple measure of "affective response."

Emotion is a state of activation which may be rewarding in itself. As Nelson Goodman (1976, p. 250) argues about art, aesthetic products may involve emotion because emotion is "a mode of sensitivity to the work." The underlying motivation for aesthetic experiences may be to create a mental and emotional

sensitivity to the aesthetic features of products. The sight, smell, hearing, and touch of aesthetic products may be rewarding only to those who are sensitive to particular sensory patterns of particular aesthetic products.

Related to emotion is the perception of pleasure. People may also desire to collect or repeatedly experience new aesthetic products because they are associated with positively experienced and pleasurable emotional states. Aesthetic products may provide pleasure due to the stimulation of the senses.

The aesthetic stimulation which new products can provide has been noted above as important in understanding adoption. Research discussed in Chapter 1 has related innovativeness to sensation seeking and arousal. Mittelstaedt et al. (1976) used the Zuckerman Sensation Seeking Scale to establish underlying differences among innovators. This research has stressed the importance of satisfying the need for stimulation and variety in the early trial of new products.

However, the pleasure connected to aesthetic stimulation has definite bounds. The relationship between stimulus patterns and arousal has been theoretically modeled and is known as the Wundt Curve. This model suggests that stimulus patterns which are too high or low will be experienced as unpleasant and be disliked whereas those stimulus patterns which are experienced as moderate levels of arousal will be more pleasurable (Anand & Holbrook, 1986; Scitovsky, 1976).

Aesthetic motivations can be conceptualized as factors affecting various kinds of behavior. These include the desire to acquire or possess a new aesthetic product, the desire for a new experience, the appreciation of sensory and design features of natural or man-made objects, the desire to stimulate the senses or arouse emotional states and moods. Within a specific class of behavior such as music appreciation, a wide variety of alternative behaviors and

choices affect the development of these motivations including the choice of the style of music, listening to the radio and the choice of a station, the desire to collect records, tapes or CDs, and attending concerts.

Perhaps due to the fact that individuals frequently return to products to re-experience the hedonic rewards of aesthetic products, repetition and the need for variety are important characteristics of many aesthetic categories. After experiencing a pleasurable aesthetic product, consumers desire to return to a similarly pleasurable state. However, aesthetic products which are re-experienced may "wear out" and consumers may then perceive a desire to explore new products. Consumers appear to have different tolerances for new products, but this may be affected by the strength of the motivation to pursue or cultivate aesthetic products and aesthetic experiences. As a consequence of further experience, aesthetic emotions and pleasures change over time in the process of learning, appreciation, and the development of taste.

In summary, the characteristics and features of products which consumer find aesthetic are quite complex and cannot be reduced to simple elements. New aesthetic products offer the stimulation of new experiential features which are self-rewarding or hedonic, but this is not a passive state -- it requires leaning and effort on the part of the consumer. Most important, the process of aesthetic appreciation leads to the pursuit of new products and experiences.

Characteristics of Technical Response

Rogers (1983, p. 138) notes that most innovations that have been examined in diffusion research have been technological innovations "so the term 'technology' is often used as a synonym for innovation." In fact, the most prominent and influential studies in the diffusion research tradition have

been concerned with major technological innovations. As Katz (1961, p. 71) notes about the classic hybrid corn study of Ryan and Gross (1943) and the medical diffusion study of Coleman, Katz, and Mendel (1966), both innovations "came highly recommended by competent scientific authorities... (were) of central importance to the groups for whom they were intended... (and) can be measured with a rational yardstick which enabled users to see for themselves, more or less, whether the innovation serves better than its predecessor."

Where the adoption of the innovation is decided upon clearly perceived technical or pragmatic criteria, technical factors may be relatively accurate predictors of adoption. The problem is that the more complex the technology, the harder it is for consumers to distinguish between the critical or important technical factors which will result in greater satisfaction. Adoption is often a function of what information and advice a consumer may receive before making a choice or gaining experience in a product category. Without adequate technological knowledge, it may be difficult to make an choice which will result in "optimal" satisfaction.

Technical factors are defined by the perceived presence of physical functions the product performs or the physical benefits the product provides. Technological evaluations are expressed as highly cognitive and rational responses. The majority of consumer research on technical product categories such as personal computers and audio equipment has stressed the rational search for information and evaluation of information sources. The information processing perspective in consumer research frequently chooses technical product categories to investigate such rational search processes. These studies frequently make little or no mention of the significance of emotional or affective reactions in these product categories.

The "technical motivation" to buy a new product may be driven by relatively pragmatic factors. The technical reasons for buying one car over another would be dominated by such things as its better motor, its suspension, its reliable breaks, etc. *The key point in examining preferences in new product categories where technical features are dominant is that trial and choice are affected more by information than by a sense of taste for variation.* More extensive information search, information processing, and a problem solving approach to product choice characterizes research these product categories. In fact, marketing studies of information search and product knowledge are almost exclusively dominated by studies of products with an important technological component.

Dickerson and Gentry (1983) investigated adopters and non-adopters of home computers which they defined as a technological innovation. The psychographic profile they tested indicated that computer adopters were "logical introverts," being rational, introverted, quantitatively oriented, and asocial. The adoption of a technological innovation was negatively correlated with activities which they categorized as "aesthetic enthusiasts" and "culinary enthusiasts." In a related study, Danko and MacLachlan (1983) also reported that early adopters of home computers were more likely to enjoy problem-solving and less likely to enjoy spectatorship at sporting event.

The above findings are consistent with the idea that aesthetic and technical motivational factors are distinctly different and that certain key traits are related to technical innovativeness. The group of adopters which Dickerson and Gentry investigated were drawn from a list of computer clubs. Considering that the time of the study was early in the diffusion of home computing, there is reason to believe that this group may be considered more technologically

innovative. These characteristics of technological innovators need to be explored and studied in other product categories.

Technical products are evaluated to what they can do or be used for and are often considered as "merely tools." Though the characteristics and features of products which consumer find technical can be quite complex and relate to utilitarian concerns, technical products can also be intrinsically motivating and involving. The pursuit of technical expertise can be thought to be challenging and ego-involving and therefore have a hedonic component. As Csikszentmihalyi and Rochberg-Halton (1981, p.1) suggest, although tools can be utilitarian, they can also "embody goals, make skills manifest, and shape the identity of the users."

Though involvement in technical product categories may often be highly situational and depend upon specific needs, they may also be related to deeply rooted cultural factors. Rudell (1991) notes that gender differences are apparent in the adoption process in high-tech product categories, and hypothesizes that such differences are related to socialization, involvement, values, problem-solving style and personal efficacy. The characteristics of technical innovativeness are complex and need further empirical examination.

The Role of Involvement

The above discussion has noted that certain response characteristics in aesthetic and technical product categories may be related to high levels of emotional, cognitive, and ego involvement. The concept of involvement has been useful to consumer researchers for a number of years; however, issues of the definition, meaning, and applicability of the concept have been widely debated. Currently there are several alternative conceptualizations and measures of involvement (Laurent & Kapferer, 1985; Slama & Tashchian, 1985; and

Zaichkowsky, 1985) and several types of involvement which need to be conceptually distinguished from one another. The empirical literature relating involvement to innovativeness is certainly not large or conclusive, but certain aspects of recent work on involvement is clearly related to issues raised here.

An especially important issue in this research area is the "enduring involvement" construct. Bloch and Bruce (1984) argue that forms of involvement labeled "product involvement" or "enduring involvement" are concerned with defining an abiding interest in a product class which is independent of situational factors. Extending the enduring involvement concept of Houston and Rothschild (1979), they propose the construct of "product enthusiasm" as a type of involvement which transcends the temporary purchase-process arousal investigated in most involvement research. Bloch and Bruce relate such forms of enduring involvement to leisure or recreational experience and the concept of "flow" (see Csikszentmihalyi & Csikszentmihalyi, 1988). They suggest that particularly high levels of involvement with products can lead users to considering those objects to be art forms.

Enduring involvement, distinguished as a relatively consistent and enduring on-going interest in a product class rather than with situational factors surrounding the purchase situation, is theoretically related to trait and personality measures. Involvement defined in this way could be related to trait-defined measures of innovativeness. In fact, it is reasonable to assume that trait-defined innovativeness should correlate to high levels of enduring involvement within a product class.

While "product enthusiasm" has not been empirically formulated as a testable scale, it is clearly important to examine innovative behavior in the context of high-involvement situations. This construct and other high in-

volvement measures have not been specifically related to innovativeness. The problem is that specific forms of product enthusiasm and enduring involvement may be relatively difficult to isolate. Enduring involvement is likely to be low for most products, though it is reasonable to hypothesize that many consumers exhibit relatively high involvement levels for at least one product category. Innovativeness as a relatively enduring learned trait and pattern of behavior would most likely be found among enduringly involved consumers in particular product categories which relate to strongly formulated aesthetic and technical motivations.

High-involvement measures which have been utilized so far have included items which have not always been conceptually distinct. Measures have included items measuring information acquisition as well as product use, product importance, and interest levels. Bloch (1981) formulates a 17-item scale to measure involvement with automobiles which was able to discriminate between students and members of a car club. In a later study, Richins and Bloch (1986) remove information acquisition items were from this scale and find with this measure that consumers "enduringly involved" with automobiles seek and share information.

Similarly, Bloch, Sherrel and Ridgeway (1986) find a positive relationship between this revised measure of enduring involvement and on-going information search in clothing and computer categories. These finding are important to establishing the relationship of information search to involvement. More interestingly, however, they note that information search has a hedonic component -- enjoyment was rated more important than informativeness in the search process.

Other measures of involvement, such as the Laurent and Kapferer (1985) measure, are noteworthy to the issues treated here in that one dimension of

their measure was factor analyzed and interpreted to refer to a hedonic component. Lastovicka and Gardner (1979) interpreted an MDS solution of the dimension of involvement to be related to change in fashion and technology.

The involvement construct, much like the innovativeness construct, has not been fully examined as a trait in the marketing literature. There has been limited attention to establishing the construct validity of the construct over time and relating it to other aspects of personality. Enduring involvement in a product category appears correlated to hedonic aspects of product usage, but this aspect has not be closely examined across categories.

Studies in the recreational and sports research context have explored these issues further. More recent studies have conceptualized ego involvement as a means of explaining the process by which recreators develop deep-seated attachments to leisure pursuits (Selin & Howard, 1988). Others have made reference to "personal meaning" as a means of better understanding recreational behavior or have further modified the "enduring involvement" construct (see McIntyre, 1989).

Certain findings in the high-involvement leisure research field are especially noteworthy. Bryan (1979) investigates high involvement leisure states of various kinds, finding that many high-involvement recreational activities can take alternative directions. For example, a photographer "can become a gadget manipulator or an artist" (p. 64). Bryan connects highly involved states to the cultivation of a strong aesthetic or technical response. In another example, Bryan notes that a hunter can become involved "in the equipment and technology of a sport" as "an end in itself" (p. 84).

Do the aesthetic/technical distinction apply toward consumer products in low-involvement categories? The research is limited on this question. Measuring involvement and information search with simple single item self-

report scales. Mittal (1989) found support for the thesis that information search is high only when the product is functional or utilitarian. Mittal found that consumers engaged in little information search for what he called "expressive" products. These findings are consistent with the hypotheses that information seeking concerning the extrinsic benefits of products is more characteristic of technical innovativeness than aesthetic innovativeness.

While both the issues and the scales need to be examined more closely, the key point is that some type of involvement appears to be related to innovativeness and innovative behavior. Various concepts of involvement have potential for further research but need further conceptual clarification. Though involvement has been viewed as a continuous variable, there is also reason to examine qualitatively different types of involvement. There may be a particular type of involvement which relates to involvement with new products. For examples, while consumers may be involved in collecting, some may favor new and avant-garde artworks over collecting antiques. Involvement is clearly an important factor that needs to be taken into consideration in the discussion of the development of category-specific innovativeness and models of innovativeness.

A Research Model to Examine Innovativeness

If products are weighted differently in terms of aesthetic and technical factors, then different types of innovativeness may be apparent. Aesthetic and technical innovativeness should correlate to different background and experience factors. However, not everyone with technical or aesthetic backgrounds becomes innovative. An individual may have learned an "orientation" toward products and be disposed to categorize products in certain ways, but innovativeness may not develop without some sort of enduring involve-

ment with a product class. Background and experience are necessary but not sufficient conditions to bring about product category innovativeness.

Innovativeness as a trait is conceptualized to require a certain degree and type of interest, caring, or involvement with a product category or group of products. Innovativeness should positively correlated to a particular types of high-involvement. Given that involvement is conceptualized to be a motivated state, there may be a hedonic aspect to becoming deeply involved in a product category. In other words, the pleasure of becoming involved may lead to increased involvement, much like an addiction. Consumers may have a sense, as Belk (1988) suggests, of "extending" the self by becoming deeply involved in a product or activities which involve the use and manipulation of products. Deeply involved consumers may affiliate in groups which may support and reinforce high levels involvement. Groups may be especially important to the extent that certain high-involvement activities may be considered deviant or peculiar to outsiders. Examples may include groups of collectors, people attending Star Trek conventions, motorcycle groups, computer clubs, and sports-related groups of various types.

It is important to consider how specific types or degrees of innovativeness may depend upon particular types of involvement. Low-involvement innovativeness needs to be considered separately from high-involvement innovativeness. Motivational factors and satisfactions are hypothesized to be qualitatively different in high and low involvement states.

In examining innovativeness as a relatively deeply-rooted trait, it may be first useful to examine and model innovativeness as it correlates to a relatively high level of involvement. These relationships are theoretically related in an exploratory model in Figure 3-3. Background and experience factors should correlate strongly among those who are highly technically or aesthetically

innovative, but it may depend upon specific learning requirements in a product category. Category-specific enduring involvement is modeled as a mediating factor related to the development of category-specific innovativeness. Enduring involvement may mediate technical and aesthetic innovativeness in different ways and to different degrees, depending upon the category and the individual. Enduring involvement is modeled to be affected by the same factors as innovativeness.

This model needs to be modified in the case of low-involvement products. Trait-defined innovativeness may not be reasonable to examine in low-involvement situations. Low involvement products are not likely to result in extensive information seeking and consumers are not likely to pursue these categories for extensive or involving emotional or hedonic responses. Learning is likely to be low and situational factors may have more powerful influences upon choice. However, aesthetic and technical factors may shape perceptions in the product category. Consumers will have predispositions and orientations to product categories based upon deeply-rooted traits related to innovativeness. They may be willing to try new low-involvement products if they offer some degree of sensory variety or stimulation or alternatively, relate to technical beliefs and information acquisition behaviors. Consumers will weigh low-involvement products differently based upon their own learned predispositions. These relationships are theoretically related in an exploratory model in Figure 3-4.

Figure 3-3

Inputs to Category-Specific Technical and Aesthetic Innovativeness in High-Involvement Product Categories

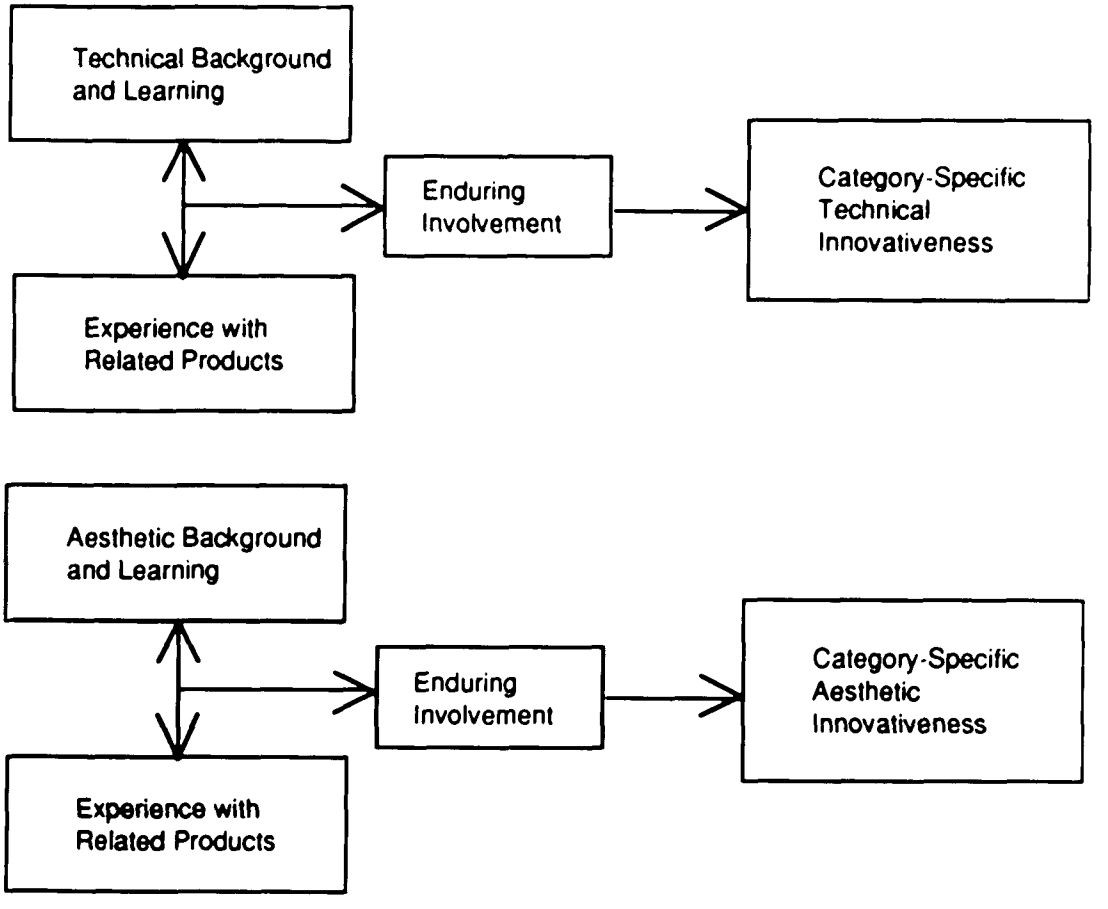
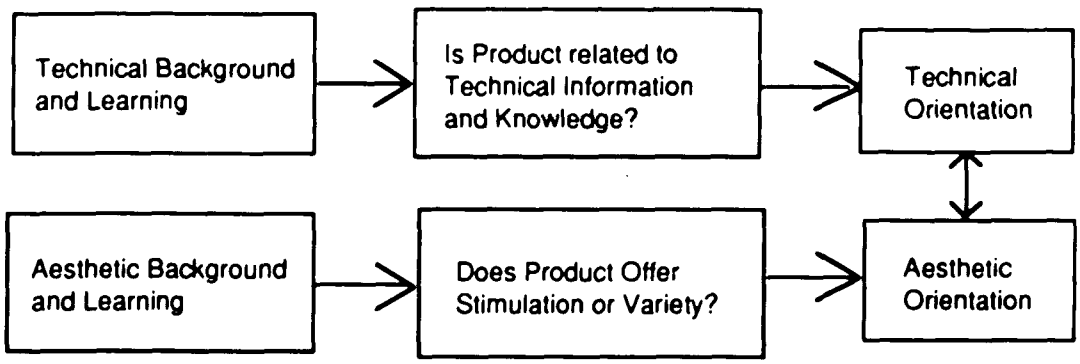


Figure 3-4

Technical and Aesthetic Orientation

in Low-Involvement Product Categories



Summary of Hypotheses

The above discussion provides an means to distinguish and address important differences in the motivation to adopt products and address problems in the study of innovativeness. The hypotheses below establish testable relationships about how consumers evaluate motivational factors in the adoption process.

The first issue is that motivational factors are category specific and independent. Technical motivations to adopt are distinguishable as a class from aesthetic motivations.

H1: Aesthetic and technical components are separate and distinct components of preference in each product category.

Besides the issue of the independence of factors, more important and interesting is the relationship of technical and aesthetic factors within the product category. Technical or aesthetic motivations may dominate some categories, but as it has been noted, technical and aesthetic motivations are likely to be mixed in many consumer product categories. Though the importance of technical and aesthetic factors are relative to the category, meaning that technical or aesthetic factors may dominate in that category, it is important to study the extent to which individual consumers weigh factors differently. Individual differences in the relative weights which consumers give to aesthetic and technical factors are likely to be influenced by experiences and learned preferences. The following hypothesis test these assertions:

H2: Individuals with strong aesthetic backgrounds give stronger weight to aesthetic components of products.

H3: Individuals with strong technical backgrounds give stronger weight to technical components of products.

Based upon the above discussion of technical and aesthetic factors related to innovativeness, the following hypothesis is proposed:

H4: Innovativeness in a product category is positively related to aesthetic and technical backgrounds, motivational factors, and product-category involvement.

Finally, the issue of aesthetic and technical types of innovativeness may add something to the debate about innovativeness as a trait and understanding why the generalized innovator is either scarce or non-existent. The categorization of innovativeness as motivated by aesthetic and technical factors may explain the correlation of greater innovativeness between related product categories. For example, consumers with aesthetic backgrounds would tend to be more innovative in aesthetic product categories. Likewise, consumers with technical backgrounds would tend to be more innovative in technical product categories. The following hypotheses test these relationships:

H5: Innovators will tend to overlap in product categories with strong technical factors, or overlap in product categories with strong aesthetic factors, depending upon background factors.

H6: Innovators in product categories with both strong technical and aesthetic backgrounds overlap more strongly in other product categories.

CHAPTER 4:

METHODOLOGY

Introduction

This chapter reviews methodological issues and measures and presents a research design for examining the above hypotheses. More generally, the purpose of the research design described in this chapter is to explore the theoretical model of aesthetic and technical motivational factors as fundamental to innovation. Exploratory support for this model can provide impetus for more comprehensive and detailed examinations of the these research areas in the future.

The chapter first reviews some specific problems which have been associated with past studies of adoption, namely the rational biases which have been implicit in past studies of technological innovations. Next, previously employed scales for innovativeness and involvement are examined. The new scale measures employed in the research are then presented. The chapter concludes with a discussion of the questionnaire employed in the final research design.

Biases in Examining the Motives for Adoption

As already noted, this dissertation examines factors driving the process of innovation on a product category basis. Not all factors affecting particular instances of actualized adoption are examined. Situational factors affecting actualized innovativeness rather than inherent innovativeness are not the concern. For this reason, the measurement of aesthetic and technical factors proposed must be considered as relative or subject to variance as situations

change. The issue of the importance or weight of aesthetic or technical factors depends upon the development of valid measurement tools.

Rational Biases

The emphasis in the diffusion research tradition has been on major technological innovations. Is this likely to produce a measurement bias toward rational explanations in the investigation of innovations? When asked to account for a preference in rational terms, it is likely that consumers will respond with rational reasons. In responding to a questionnaire or interviewer, it is likely that technical or practical factors may appear more important than aesthetic or emotional factors.

Marketers have largely been concerned with examining the attributes of innovations to explain the acceptance of new products in rational terms. Products which succeed are assumed to offer "less risk" and "greater relative advantage" to the consumer. These post-facto explanations for the acceptance of an innovation can be circular, however, since the products which succeed are defined to be "better" in some dimension.

The major limitation of the adoption decision model proposed by Rogers (1962) is that it fails to consider the role of affect, hedonic response, and emotional states in the adoption of innovations, giving greater attention to rational factors which determine the relative advantage of the innovation. Given the focus in the diffusion literature on discontinuous technological innovations (e.g., hybrid seed corn, tetracyline, etc.), this emphasis is not surprising. The Rogers model may be more relevant to technological products where rational reasons for adoption may dominate.

While the rational decision model of the adoption process has been prevalent, diffusion research does not necessarily entail or imply the use of a ratio-

nal decision model. In marketing, a hedonistic model (Holbrook & Hirschman, 1982) has been proposed to address the shortcomings of cognitive and rational models. It is certainly feasible to study and relate the diffusion process to hedonistic models of consumption, especially in the case of aesthetic and cultural products related to entertainment and leisure time.

The rational explanation for adopting a particular product may provide an inadequate explanation for adoption decisions. While the failure of rational reasons for adoption has been frequently noted in the diffusion literature in the case of traditional or less developed societies, the limitations of rational explanations are also apparent in modern societies. Rational explanations for adoption may be particularly inadequate in situations where (a) affect is important, and (b) consumers do not see the need or have not developed a desire for the new product. The failure of rational reasons for adoption is apparent in situations where individuals or groups are inhibited from developing an affective or emotional response to innovations which do not fit into their lifestyles or values.

Furthermore, rationalization of choice and cognitive dissonance may lead to biased technical explanations in explaining the reasons for adoption. A person who enjoys certain aesthetic features of his new Camaro may rationalize or justify these tastes in terms of perceived technical features such as "large powerful motor" and "good pick-up and handling" or through even more precise technical specifications. Reasons given by consumers for their behavior may simply represent consumers' justifications of their choice. As Zajonc and Markus (1982, p. 125) observe, "Assuming that individuals strive to supply consistent justifications for their choice behavior, weighted linear models in themselves might not be able to distinguish between the rating of attributes that justify the choice and the ratings that determine the choice." It

may be difficult to distinguish rationalization from the factors which determine choice.

The issue of the rational bias is particularly important in relation to considering the influence of emotion and pleasure in fashion and other aesthetic product categories. In the absence of clear and valid measures of affect, pleasure, and emotion, the acknowledgment of a pleasurable emotional response to a product may be considered some indication of the importance of an aesthetic factor. Since the connection of emotion to aesthetic response clearly needs closer scrutiny, the research presented below is exploratory.

Other Biases

The bias of rational explanations are not the only problems which may be encountered in examining the adoption of innovations. Compositional approaches which utilize multi-attribute ratings of products have been frequently used by marketers to differentiate brands and create perceptual product spaces to differentiate perceptions. Such perceptual measures of products are distorted by what is known as a "halo effect," the tendency to rank products which are liked higher on attributes thought to be favorable or positive. Dillon et al. (1984) note that the original usage of the term "halo" was described as "either as a general impression that seeps into respondents' ratings of scale item categories or as salient features affecting the respondents' ratings categories that the respondent believes are related to the salient features." It becomes particularly important to deal with such distortions in examining and interpreting product space analyses.

Holbrook and Huber (1979) develop a method of treating these distortions in terms of an "affect index" in their study of jazz recordings, partialing out what they call the "affective overtones" in the data. Dillon et al. (1984) note, how-

ever, that this method of partialing out what are thought to be distortions may not be appropriate in every case. In fact, the issue of affect needs to be re-examined, considering the issue that perceptual biases may be present in *any* individual reaction to a brand or a particular product. These biases, whether they are due to affect or other factors, need to be much more closely examined.

The problem with compositional approaches is that uncovered dimensions of product spaces may be more of a function of the attributes asked than of the product features that consumers view as important. While the research design described below must consider this issue, the design avoids certain of the problems of compositional approaches by developing and applying only aesthetic and technical attribute ratings across product categories. By examining the product category rather than the particular brand or reactions to a particular product, certain of the problems of the halo effect in response to particular products are avoided.

Marketers have examined brands and particular products without first examining the structure of the product category. If affective reactions and halo affects are to be examined and assessed, it is first necessary to examine how consumers are predisposed to react to branded products by their attitudes to the product category. Research into consumer reactions to the product category need to precede the examination of specific branded products. The research presented here addresses this important area.

Other problems of compositional approaches are avoided by limiting the research issue solely to aesthetic and technical motivational factors. Not all the specific attributes of a product are considered important to the research issue of examining aesthetic and technical motivational factors. While certain situational product attributes such as price and availability may determine instances of "actualized innovativeness," they are not considered relevant to ex-

amining the issue of motivation as it relates to "inherent innovativeness." Examining products as a category is a means of isolating product attitudes and perceptions apart from particular purchase situations. The product category is examined empirically within the bounds of a very specific framework.

Research Design

The research described in this paper can be considered exploratory. It is first necessary to establish a valid means of measuring and discriminating between aesthetic and technical motivations for adopting innovations before examining such motivations in greater depth. The problem can be posed in terms of a construct validity problem. The validation of measures of aesthetic and technical motivations provides support for the existence of these constructs as specific product dimensions.

The general problem is that development of valid measures, especially of innovativeness and involvement, have been subject to considerable debate. Given these problems, the research design employed needs to be examined within the context and tradition of previous work in this area. While findings must always be tempered with a recognition of the limitations inherent in the measures, the important goal of this dissertation is to support a framework for more comprehensive examinations of this topic in the future.

The research method used in this study are all self-report survey methods. It is important to recognize the problems in this method, particularly in inadequately measuring affect and considering the problems of choice rationalization. Though paper and pencil measures can go so far in examining motivations, they provide a valid exploratory measure which is useful in establishing fundamental differences between aesthetic and technical motivational factors. The following discussion considers previously employed measures in

these areas and discusses the development of the questionnaire out of previous research.

Measures of Innovativeness

As noted above, different measures of innovativeness have not been found to be consistent across studies. Most recently, a unidimensional domain specific measure of innovativeness has been developed by Goldsmith and Hofacker (1991) which consists of attitudinal and behavioral self-report items (see Table 4-1). This scale provides a category-specific self-report measure that was found to be stable and consistent in aesthetic product categories of rock music recordings, designer clothing, and scents (i.e., perfumes, colognes, and after-shave lotion). Data indicated that the scale is not affected by social desirability, response style, or agreeing response.

Goldsmith and Hofacker note that the self-report scale they developed is "most suitable for product areas where consumers purchase often and can thus report on their actual or anticipated behavior (1991, p. 219)." This poses problems in the application of the scale in low involvement and technical product categories. Many technical product categories such as automobiles, VCRs, and refrigerators are not categories in which consumers purchase often. Furthermore, (1) early purchase and (2) ownership of multiple items in a product category (note items one and two of the Goldsmith and Hofacker scale) may not provide good measures of inherent innovativeness in certain product categories. Holak et al. (1987) note that, for example, consumers purposefully delay purchase in the high-tech categories of computers and VCRs due to the expectation that products will become more technically advanced and prices will be reduced. These issues suggest that the Goldsmith and Hofacker scale has limited applicability.

Table 4-1

The Rock Music Innovativeness Scale

1. In general, I am among the last among the last in my circle of friends to buy a new rock album when it appears.*
2. Compared to my friends, I own few rock albums.*
3. I do not know the names of rock acts before other people do.*
4. I will buy a new rock album, even though I haven't heard it yet.
5. If I heard that a new rock album was available in the store, I would not be interested enough to buy it.*
6. In general, I am the last in my circle of friends to know the titles of the latest rock albums.*

Seven point agree/disagree scale

* reverse scaled

Source: Goldsmith and Hofacker (1991)

The Goldsmith and Hofacker scale may be more appropriate to aesthetically-oriented high-involvement product categories. In fact, the scale has only been used in what are largely aesthetically-oriented product categories. Items 1 and 5 in particular may be more appropriate for product categories in which consumers make frequent purchase choices. Since it is important that this research tests the validity of the scale in more technical product categories and less frequently-purchased product categories, the scale was rejected for use in this research. However, the format of utilizing a domain-specific measure of innovativeness was retained.

A relatively simple primary item measure of innovativeness was chosen to be employed. The simple primary measure employed consists of a seven-point agree/disagree item reading "I am generally interested in new and different [the product category] products." Two additional secondary items measure innovativeness along the dimensions of aesthetic and technical factors. These items are worded "I am interested in new types of [the product category] for their new technology," and "I am interested in new types of [the product category] for their more attractive designs and fashions." These three measures fit into a specific product category framework which is discussed below.

Measures of Involvement

As noted above, there are many alternative definitions of involvement which have been developed in recent years. Product involvement (rather than program or advertising involvement) has been conceptualized in terms of both cognition and affect and developed measures can be quite complex. A debate has developed over what attributes different scales actually measure. Product involvement have been measured by scales with both multidimen-

sional (Kapferer & Laurent, 1985) and unidimensional (Zaichkowsky, 1985) dimensions.

The major practical problem is that the scales developed for measuring involvement tend to be rather long. The Zaichkowsky scale is composed of 20 items in a semantic differential type format. The Bloch scale is composed of 17 items which includes measures of information acquisition which is also associated with innovativeness. The Kapferer and Laurent measure is composed of 19 items conceptualized on four dimensions.

Though a consensus has not emerged on the right scale to measure product involvement, the issue is clearly important. In related research in the psychological literature, Johnson and Eagly (1989) argue for a much more general concept of involvement defined as a motivational state induced by an association between an activated attitude and the self-concept. This conceptualization is clearly relevant to motivational issues examined here.

In the absence of a widely accepted involvement measure, the single item self-report scale developed by Mittal (1989) was adapted for this research. The item is a seven point category-specific scale which asks respondents to rank the extent to which they care about the product they buy. In the detergent category, for example, the item reads "When I buy a detergent:" and then asks for a seven point ranking between "I do not care at all about which detergent I buy" and "I care a great deal about which detergent I buy."

While this measure of involvement may appear simplistic, the evidence presented indicates it is a good exploratory measure of involvement. This measure correlates strongly with multi-item measures of involvement and has good face validity (Mittal, 1989). Mean involvement scores provide a good relative measure of category involvement. Mittal reported that mean score involvement (with standard deviations in parenthesis) for high involvement

product categories were: autos, 6.32 (1.23), perfume 5.89 (1.61), and music albums 5.70 (1.80). Relatively low involvement products reported were salt 3.55 (2.17), light bulb 3.47 (1.73), pen 3.28 (1.88), and dry milk 2.96 (2.08). These figures indicate that the scale is useful in discriminating between product involvement among product categories.

The Mittal measure was judged to be appropriate to the objective of examining multiple product categories while keeping the total number of items small. The measure employed is a seven-point agree/disagree item reading "I care very much about the type of [the product category] I buy."

In addition to this "caring-involvement" measure, additional secondary domain-specific measures of product involvement were developed in each product category. Involvement theoretically relates to the attitude that products in the category are not all the same. Perceived category discrimination is necessary for a certain degree of involvement in the product category. The reason for this, as Muncy (1990, p. 146) notes, is that it is only when the consumer perceives that real and significant differences exist that consumers carry out information search or discriminate between product offerings. Products must be perceived to be meaningfully different for there to exist some interest in choosing between different brands. The secondary item measure employed is a seven-point agree/disagree reverse coded item reading "[the product category] are all pretty much the same."

Product involvement should also correlate with willingness to spend time in the selection process. As a tertiary measure, a subjective measure of time spent in the selection process was employed as an additional measure of involvement. The measure employed is a seven-point agree/disagree reverse coded item reading " It is not worth it to me to spend much time in selecting a [the product category]."

These three measures of involvement are hypothesized to correlate highly with one another. These measures of involvement fit into a specific product category framework which is discussed below.

Measures of Motivation

The development of domain specific motivational scales to test for aesthetic and technical factors in particular product categories face similar problems to that of innovativeness and involvement. It is possible to examine an extremely large variety of items which may relate to aesthetic and technical responses to products. Even simple product categories may yield complex aesthetic and technical responses. Furthermore, different products have different aesthetic and technical features. In product categories with complex product features such as automobiles, the large number of technical and aesthetic features may make the problem of examining motivations and responses to products even more difficult.

Even if a variety of items can be reliably developed to examine aesthetic and technical factors in a particular product category, these may have to be altered and adapted to fit other product categories with other aesthetic and technical features. It is a problem to develop consistent motivational scales which can be applied across categories.

As an alternative to examining all aesthetic and technical factors in a product category based upon product features, the dominant aesthetic and technical factors can be examined as an aesthetic or technical attitude toward the product category. The extent to which products can be considered art forms or similar to art forms is a means of gauging an aesthetic attitude toward a product category. Rating the importance of the primary technical function

of a product is a means of measuring a dominant technical attitude toward a product category.

In the interest of keeping the measures reasonably short, three aesthetic measures and three technical measures were chosen. A hedonic-aesthetic measure was chosen as an additional aesthetic item and a technical information seeking was chosen as an additional technical item. Willingness to pay for aesthetic features and willingness to pay for technical features were chosen as additional aesthetic and technical items.

The Development of the Final Questionnaire: Category Specific Measures

The goal of the research was to examine (a) innovativeness, (b) involvement, (c) aesthetic motivational factors, and (d) technical motivational factors in several product categories to provide exploratory support for more comprehensive examinations of this topic in the future. The questionnaire instrument has two major parts, a section consisting of specific product category measures and a section consisting of technical and aesthetic background measures.

Product categories which were chosen for the study were products which (a) could be considered to offer a mixture of aesthetic and technical product attributes; (b) had low to moderate levels of feature complexity; and (c) would be relevant and familiar to the subject pool of the research. In the interest of keeping the questionnaire to a reasonable length, six product categories were included.

The categories chosen were wristwatches, jeans, toothpastes, sunglasses, telephones, and breakfast cereals. Besides the above mentioned reasons, these specific product categories were chosen to provide a reasonable degree of variety. Sunglasses, jeans, and wristwatches can clearly be considered fashion

categories. Wristwatches and telephones have a potential for technical complexity. Breakfast cereals and toothpastes have taste components but are also associated with functional benefits. A 12-item domain-specific scales were developed for each product category according to a framework proposed in Table 4-2. The 12-item scale measures employed in 6 categories results in 72 items which measure product category perceptions.

These measures are conceptualized as a structured set of items applicable across product categories. They are arranged as a "grid" in Table 4-3. The "primary" measure of involvement, the "primary" aesthetic factor, and the "primary" technical factor result in three primary measures for the constructs of involvement, an aesthetic orientation to the category, and a technical orientation to the category. Primary aesthetic and technical factors were developed according to a consistent format which could be applied across categories. The measures are adapted according to the dominant aesthetic or technical attribute in the category. For example for toothpaste, taste was considered the dominant aesthetic attribute and cavity-fighting ability is the dominant technical attribute. Secondary and tertiary measures were then developed in each of these categories.

An aesthetic/hedonic item was chosen for the secondary aesthetic factor which related to the aesthetic and pleasurable appreciation of the category. An information search component was chosen as a secondary technical factor. The tertiary factors all relate to cost or purchase. Category discrimination was the secondary involvement construct.

The measures of innovativeness which were developed are conceived to be overlapping with involvement, aesthetic factors and technical factors. The primary measure of innovativeness conceived of as "interest in new products" is conceptually overlapping with product involvement as it has been discussed

Table 4-2

Domain Specific Scale Item Categories

Measure	*Item Code*
Involvement-caring	I 1
Category discrimination	I 2
Involvement with selection	I 3
Aesthetic orientation alone	A 1
Technical orientation alone	T 1
Aesthetic-hedonic	A 2
Aesthetic-cost	A 3
Technical info-seeking	T 2
Technical-cost	T 3
Interest in the new	N
Aesthetic novelty	A N
Technical novelty	T N

Table 4-3

Grid Framework of Domain Specific Scale Item Measures

	Involvement	Aesthetic	Technical
Primary	I 1	A 1	T 1
Secondary	I 2	A 2	T 2
Cost/purchase	I 3	A 3	T 3
Novelty	N	A N	T N

Category Involvement = I1 + I2 + I3 + N

Category Aesthetic Factor = A1 + A2 + A3 + AN

Category Technical Factor = T1 + T2 + T3 + TN

Category Innovativeness = N + AN + TN

in the literature. As noted above, innovativeness is also measured as aesthetic novelty and technical novelty, which should overlap with aesthetic and technical motivational factors.

The arrangement of these items on the grid in Table 4-3 serves an additional function in suggesting correlations among items. It is predicted that correlations should be the highest between items arranged vertically on this table, the columns. The strongest correlations are predicted among the aesthetic items and among the technical items. There should also be a strong relationship in among the innovativeness measures, the novelty row across. This table provides a means of examining item structure. Table 4-4 includes all items from the wristwatch category. The other category items are listed in the appendix.

The Development of the Final Questionnaire: Background and Personality Items

The remaining measures employed are not category specific but measure various individual difference factors hypothesized to relate to aesthetic and technical backgrounds. The proposed item measures are designed to both replicate previous research and extend it. The correlation of individual difference factors to aesthetic and technical factors contributes to establishing the validity of the proposed motivational factors. For consistency, they were scaled on a seven point agree/disagree scale to match the rest of the survey.

Items were chosen from previous research in technical and aesthetic product categories. The Dickerson and Gentry (1983) study cited factors related to technical innovativeness which are included. As noted above, Mittelstaedt et al. (1976) used the Zuckerman sensation seeking scale to establish the connection of innovativeness to the desire for arousal. The items chosen are

Table 4-4

Wristwatch Category Scale Item Measures

I1. I care very much about the type of wristwatch I buy.
I2. Wristwatches are all pretty much the same.*
I3. It is not worth it to me to spend much time in selecting a wristwatch.*
A1. Wristwatches can be considered art forms or fashion statements.
T1. The most important thing about wristwatches is that they reliably and precisely keep time.
A2. I would enjoy looking at wristwatch designs in catalogues or books.
A3. I am willing to pay more for wristwatches with attractive designs.
T2. Before buying a particular wristwatch, I would like to read something or consult someone about its technical performance and reliability.
T3. I am willing to pay more for good technical performance in a wristwatch.
AN. I am interested in new types of wristwatches for their more attractive designs and fashions.
TN. I am interested in new types of wristwatches for their better technology.
N. I am generally interested in new and different wristwatch products.

Seven point agree/disagree scale
* Reverse Scaled

limited and have been adapted to keep the length of the questionnaire to a reasonable length.

General measures of rationality, technical information seeking, importance of technical factors of products, and confidence in technical knowledge are included in the measures proposed to correlate to technical innovativeness. General measures of aesthetic behavior, sensation seeking, appreciation of sensory and design features of products, and the desire for aesthetic stimulation are included in the measures proposed to correlate to aesthetic innovativeness. Subjective and normed background factors for both aesthetic and technical backgrounds are also included. Technical and aesthetic correlates used are listed in Table 4-5 and Table 4-6.

Table 4-5

Technical Motivational Background Measures

1. Technical information confuses me.*
2. I generally enjoy tackling difficult and complex problems.[a]
3. Technical discussions can be quite interesting to me.
4. I don't mind putting in some effort to finding out how products actually work.
5. I try to fully understand the practical benefits of nutrition and other information placed on packaging.
6. Information about complex products such as automobiles and electronics are better left to someone else.*
7. I have confidence in my ability to handle complex information when I need to understand it.
8. When I go on a trip I like to plan my route carefully rather than arrive with no definite route in mind. [c]
9. I prefer people who are reliable and predictable and generally knowledgeable about practical things. [c]
10. I examine information carefully before buying complex technical products.
11. My education has included many courses of a technical subject matter.
12. I am more prepared to understand technically subjects better than the average person.
13. I have no trouble in programming my video recorder or understanding the way to use cameras and other technical products.
14. My understanding of technology makes my life easier and more interesting.

Seven point agree/disagree scale

* reverse scaled

[a] from Danko and MacLachlan (1983)

[c] adapted from the Zuckerman Sensation Seeking Scale (Zuckerman,1964, 1971).

Table 4-6

Aesthetic Motivational Background Measures

1. I enjoy going through an art gallery.[b]
2. I enjoy going to concerts.[b]
3. I like ballet and other dance forms.[b]
4. I would like to take a trip around the world.[b]
5. I would like to spend a year in London or Paris.[b]
6. I am interested in spices and seasonings.[b]
7. I love to experience new foods and cuisines.[b]
8. I enjoy people who are excitingly unpredictable and willing to try new things.[c]
9. It is important to live life to the fullest and experience as much of it as you can. [c]
10. I would enjoy trying such things as water skiing, skydiving, or the experience of being hypnotized. [c]
11. My education has included several courses dealing with art appreciation or artistic design.
12. Compared to the average person, I have a much higher appreciation of art and design.
13. I enjoy many types of popular films and television programs.
14. My experience with different forms of art has made my life more interesting and enjoyable.
15. It is important to me to develop an appreciation of different art forms.

Seven point agree/disagree scale

* reverse scaled

[b] Items described as "aesthetic enthusiasm" by Wells and Tigert (1971) used by Dickerson and Gentry (1983) where the first five items loaded on one factor.

[c] adapted from the Zuckerman Sensation Seeking Scale (Zuckerman,1964, 1971).

CHAPTER 5:

ANALYSIS OF FINDINGS

Introduction

This chapter reports the empirical findings of the studies described in the research design. The first section profiles the subjects who participated in the survey. Next, the specific scale measures which were developed in Chapter 4 are discussed and analyzed. Tests of the hypotheses which were presented in Chapter 3 are then examined.

Since several measures are original to this research study, a considerable part of this chapter is devoted to validating these measures with the appropriate psychometric procedures. These scale measures are examined in two separate parts. First, the scales which measure aesthetic and technical backgrounds are examined with exploratory factor analysis, confirmatory factor analysis, and other procedures. Secondly, domain specific product category measures are discussed. These category measures are for product involvement, the aesthetic component, the technical component, and product category innovativeness for the six product categories which have been discussed. These measures are examined according to the concept of the "grid framework" shown in Table 4-3 above.

As noted in Chapter 3, the primary research goal is to examine and compare aesthetic and technical motivational factors as they vary in specific product classes. A series of multiple regression equations is used to examine motivational product factors in specific product categories. Several types of regression procedures are used to test the proposed hypotheses.

Profile of Respondents

Innovativeness has been shown to vary negatively with dogmatism (see studies cited in Rogers, 1983). Some evidence exists to show that moderately highly educated individuals (i.e., those with Bachelors or Masters Degrees) may exhibit lower dogmatism (Simonton, 1984). Given this, it follows that college students as a group may exhibit higher levels of innovativeness than the average level of the population.

Since this dissertation is concerned with examining individuals with high levels of innovativeness, graduate students were chosen as an appropriate target for data collection efforts. Product categories were chosen which were thought to be appropriate to the interests of graduate students, aged 22-35. Product categories utilized in the research were chosen so that subjects would have some interest, involvement, and past purchase experience in the categories. The goal of this research project is theory development; the data collected is not designed to study the distribution of innovativeness or aesthetic and technical motivational factors in the population as a whole.

Samples were taken of graduate students enrolled in two business schools on the east coast, one from an urban university and one from a suburban college. Subjects from these two schools comprised the majority (60%) of the total sample. Subjects were students taking a variety of classes in several different programs of business study. Subjects were found to be a diverse group, consisting of many working individuals pursuing M.B.A. degrees on a part-time basis, some aged in their thirties and forties. A small number of subjects consisted of foreign students. Since the questionnaire was administered in classroom settings and no one refused to respond to the survey, the issue of response rate is largely irrelevant.

In addition to this student sample, additional samples were sought of subjects which would definitely have the aesthetic and technical backgrounds which could test the hypotheses under study. Subjects were sought which would parallel the business school sample in offering a diversity of ages and specialized skills. Samples were collected at schools which taught technical/scientific or artistic specializations. To obtain an appropriate number of subjects with aesthetic backgrounds, a sample of graduate students were undertaken from classes at four schools of art and design, and two small design firms. To obtain an appropriate number of subjects with technical backgrounds, samples were undertaken of medical researchers, technical staff, and dental students from a large midwestern urban university.

Everyone exposed to the questionnaire was encouraged to complete it. In the process of data collection, a small number of university administration people and subjects older than 50 (about 7% of the total sample) were also included. There was no strong reason to removed this group from the survey; they were retained to allow for a degree of diversity among respondents.

Subjects were coded into one of three groups based upon their response to their indication of educational background. These groups are referred to as "the arts group," "the technical group," and "the general group." Respondents with educational backgrounds in the fine arts (e.g., painting, sculpture, printmaking) or applied arts (e.g., fashion design, graphic design) were coded into the arts group. Respondents with educational backgrounds in the physical and biological sciences or engineering were coded into the technical group. Respondents needed a minimum of a Bachelors degree in their specialization to be included in the arts or technical group. Several subjects had Masters degrees. Groups were determined solely by their response to educational backgrounds, not by the location where they completed the survey. As a

result, a few business students with advanced science and engineering degrees were included in the technical group.

The total sample consists of 338 respondents, 180 female and 158 male. The arts group number 53 respondents (16% of the total) and the technical group number 56 subjects (17% of the total). The remaining 229 respondents were placed in a general category referred to here as the "general group." These had college backgrounds in the humanities, business, or the social sciences and a very small number had not completed their college degrees. The mean age of the arts group is 32.35, the mean age of the technical group is 30.51, and the mean age of the general group is 31.08.

The major significant difference between groups, besides that of educational background, is gender. These difference are examined in the analysis in a later section. Table 5-1 presents the breakdown of groups of respondents by gender.

Aesthetic and Technical Background Measures

It was noted above that motivation is hypothesized to related to background and learning. To explain the development of aesthetic and technical motivations toward products, it is necessary to measure the extent to which individuals have developed a general background of aesthetic and/or technical education and experience. To measure the extent to which individuals perceive themselves to be technically or aesthetically oriented, a series of 29 items was proposed, the fifteen aesthetic background measures and the fourteen technical background item measures. This section will examine the construction of two scales from these proposed item measures, an aesthetic background scale and a technical background scale.

To provide support for the construct validity of these scales, a number of

Table 5-1

Respondent Groups by Gender

	Female	Male	Total	*Row Percent*
Arts	37	16	53	*15.7%*
Percent across	*70%*	*30%*	*100%*	
Technical	19	37	56	*16.6%*
Percent across	*34%*	*66%*	*100%*	
General	124	105	229	*67.8%*
Percent across	54%	*46%*	*100%*	
Total	180	158	338	
Column Percent	*53.3%*	*46.7%*	*100%*	*100.0%*

procedures were performed. One means of isolating aesthetic and technical backgrounds is to test items against populations where they are expected to exist. The arts group must score significantly higher on the aesthetic background scale and the technical group must score significantly higher on the technical background scale.

Both reliability analysis and factor analysis provide the basis to purify or reduce the 29 items to a smaller number and examine the dimensionality of the scales. Evidence of the reliability of the scales is examined through calculation of Cronbach's coefficient alpha. Convergent and discriminant validity is examined through the correlation of the scales.

Group Analysis

Can the arts and technical groups be differentiated on the basis of the 29 items? One means of testing this issue is through discriminant analysis. A discriminant analysis was performed on all subjects with the direct method in which all significant variables passing the tolerance test are entered to the discriminant equation. The discriminant equation created was for classifying the arts and the technical group. All variables were entered into the single discriminant equation.

Measured by (a) the absolute value of the canonical discriminant function coefficients, or by (b) the pooled within-group correlations between discriminating variables and canonical discriminant functions, the best discriminating variables are the subjective background measures and the normed background measures. Subjective background measures consist of the two items worded "My education has included courses dealing with..." and followed by either (a) technical subject matter or (b) artistic appreciation or artistic design. Normed measures consist of the items stating "Compared to the average

person, I have a much higher appreciation of art and design," and "I am prepared to understand technical subjects better than the average person." Classification results are presented in Table 5-2. The general group is included in the table, but are not part of the percentage of grouped cases correctly classified.

The discriminant analysis indicates that subjective and normed background items are clear indicators of differences between the arts and technical groups. These measure are clearly related to central dimensions of the constructs at issue. Since 29 items were used to measure aesthetic and technical background factors, all of these items could be used to examine the differences between aesthetic and technical groups. However, the purpose of this research is to examine aesthetic and technical background factors in these groups as a means of understanding these continuous measures and to apply them to examining these factors in the general population. The 29 item measures need to be reduced to a smaller number to facilitate future research. The dimensionality of these factors also needs to be examined.

One empirical test of the proposed hypotheses that there exist aesthetic and technical background factors is the formation of valid and reliable scales to measure these factors. The issue of the existence of aesthetic and technical backgrounds can be viewed as a scale development problem. If a scale can be developed to reliability measure these factors then this provides a degree of construct validity. The reliability of a scale is a necessary, but not sufficient condition for validation.

Factor analysis provides an additional means to refine and examine aesthetic and technical background scales. Not only can factor analysis establish dimensions within a data set and provide a statistical test of that structure, it can serve as a data reduction technique. A clear factor structure which dif

Table 5-2

Classification Results of Discriminant Analysis

Group	Cases	Predicted Arts	Predicted Technical
Arts	52	49 (94.2%)	3 (5.8%)
Technical	55	7 (12.7%)	48 (87.3%)
General	227	95 (41.9%)	132 (58.1%)

Percent of "Grouped" Arts and Technical Cases Correctly Classified: 90.65%

ferentiates measures of aesthetic and technical backgrounds provides additional empirical support for the separation of aesthetic and technical backgrounds. Tests of a two factor structure, examining the separate factor loadings of aesthetic and technical items, and measures of the fit of the models each provide tests of support for the proposed existence of aesthetic and technical backgrounds.

As a preliminary analysis, the structure of the correlations of the 29 items was examined with exploratory factor analysis. Four principle axis obliquely rotated factor solutions were examined: two factors, three factors, four factors, and seven factors. In all of these factor solutions, the two pairs of subjective and normed background factors loaded on one technical factor and one aesthetic factor and the correlations between these two factors was small (from .02 to .11).

Though it is sometimes difficult to know how many factors to extract or when to stop extracting factors, the correlation of scale items and the factor loadings of the items provide a means of analyzing the scales. The 29 items were examined in an iterative process as the basis for proceeding with the analysis to reduce number of items of the two scales. The final aesthetic background scale consists of five items. The final technical scale consists of seven items. The scales and factor loadings are included in the appendix (see Appendix B and Appendix C).

Cronbach's Coefficient Alpha

Coefficient alpha provides a measure of the reliability of a set of item measures of a construct only in the sense that it measures the internal consistency of the items. A large coefficient alpha indicates the measures are highly interrelated. Coefficient alpha is an especially appropriate measure for a unidi-

mensional construct. As Churchill (1979) notes, coefficient alpha is the first measure one calculates to assess the quality of a measurement instrument and is often the first procedure to purify a measurement instrument. A large alpha indicates that the test measure correlates well with the true score.

Coefficient alphas were calculated for several item measures for both the aesthetic and the technical scales. The highest coefficient alpha for the aesthetic background scale was obtained for a five item scale. Alpha was calculated at .8650 and standardized item alpha was calculated as .8766 for this scale. Five items may be considered a good number of items for use as a short scale. As Churchill (1979) notes, what is low for alpha depends upon the purpose of the research. These alpha values were considered good to excellent for the research purposes of this dissertation. Coefficient alpha is frequently a conservative measure of reliability.

The highest coefficient alpha for the technical background scale was obtained for a ten item scale. Alpha was calculated at .8554 and standardized item alpha was calculated as .8606 for this scale. Ten items is not considered the optimum number of items for future use as a short scale. Eliminating several items did not produce a large drop in alpha values. For a seven item scale, alpha was calculated at .8381 and standardized item alpha was calculated as .8499 The small drop in alpha values were considered acceptable for eliminating three items to shorten the scale, making it more attractive for further research needs. These alpha values were considered good to excellent for the research purposes of this dissertation.

Factor Analysis

In addition to coefficient alphas, exploratory factor analysis was used to examine the final aesthetic and technical background scales. Principle axis

obliquely rotated factor solutions for two and one factors were examined. Using either scree plots or eigen values greater than one as the cutoff, factor analysis of the aesthetic background scale indicates that a one factor solution is appropriate. Factor loadings on a one factor solution are greater than .71. This provides evidence that the scale is unidimensional.

The same methods applied to the technical background scale is less clear cut, but a one factor solution appears reasonable. Factor loadings on a one factor solution are all greater than .54. A two factor obliquely rotated factor solution produces two factors with the factor correlation at .63. Unrotated factor loadings on the first factor are all above .55 while only one item of the seven items loads above .60 on the second factor. This indicates that a one factor solution is more appropriate and the scale can be considered unidimensional for purposes of this study. Further research would be necessary to investigate the components of "technicality" as a background measure.

Confirmatory factor analysis supports these findings but provides additional measures of the fit of the one factor model. Confirmatory factor analysis was performed on the aesthetic and technical background scales with a one factor model indicated. Each item was set to load on one factor and were not allowed to correlate in the model. For the aesthetic background scale, chi-square with 5 degrees of freedom was calculated at 39.01 ($p = .000$). For the technical background scale, chi-square with 14 degrees of freedom was calculated at 130.53 ($p = .000$). The goodness of fit index was calculated to be .953 for the aesthetic background scale and .893 for the technical background scale Since goodness of fit indices above .90 are considered to be desirable (Hayduk, 1987), these figures provide support for the one factor model for these constructs.

An additional measure of fit, the normed fit index, was also calculated for these scales. The normed fit index used was calculated as the chi-square for the proposed model subtracted from the chi-square for the null model, divided by the chi-square for the null model. The normed fit index reflects the proportion of the chi-square eliminated by the competing model. Bentler and Bonnett (1980) suggest a minimum value of .90 is a good test when the competing model is compared to a fully-restricted null model. The normed fit index for the for the aesthetic background scale was calculated to be .9538. The normed fit index for the technical background scale was calculated to be .8637. These figures are also supportive of the proposed single factor models. In short, the scales were found to be unidimensional.

Mean Scores on the Resulting Scales

As expected, the arts group scored significantly higher on the aesthetic background scale and the technical group scored significantly higher on the technical background scale. This provides evidence that aesthetic and technical backgrounds exist and are measurable. Mean scores and standard deviations are presented in Table 5-3. It is interesting to note that the arts group and the technical group tended to score higher on the combined scale measure than the general group.

Convergent and Discriminant Validity

Correlations of the aesthetic and technical background measures with each other and with related items provide a degree of convergent and discriminant validity for the two scales. As explained in Chapter 4, items from the Zuckerman sensation seeking scale (Zuckerman, 1964, 1971), from Danko and MacLachlan (1983), and from Wells and Tigert (1971) were included. These

Table 5-3

Mean Scores by Group

(Standard Deviations in Parentheses)

	Arts Group	Technical Group	General Group
Aesthetic Scale	32.13 (3.52)	24.49 (6.45)	25.49 (6.58)
Technical Scale	33.81 (7.91)	39.35 (7.13)	33.06 (9.25)
Both Scales	65.94 (8.43)	63.84 (10.17)	58.65 (11.59)

were hypothesized to positively correlate to the proposed scales. Though these items were not used in constructing the unidimensional aesthetic and technical background scales, they provide convenient alternative measures of the proposed constructs. These measures are presented in terms of a multi-trait multi-method matrix of correlations to the aesthetic and technical background scales shown in Table 5-4. Coefficient alphas are included as a measure of reliability and appear on the diagonals of the table. Since coefficient alphas are simply a measure of internal consistency, these are not necessarily required to be high in the case of the alternative measures, especially given that the measures may be multidimensional.

Table 5-4 indicates that aesthetic and technical background scales are at a low level of correlation with each other. This provides an indicator of discriminant validity for the aesthetic and technical background scales. Secondly, the majority of items from the "aesthetic enthusiasm" scale are significantly correlated with the aesthetic background scale, providing convergent validity for the aesthetic background scale. Likewise, the alternative technical items are significantly correlated with the technical background scale, providing convergent validity for the technical background scale. Low correlations between the aesthetic enthusiasm items and the alternative technical measures, between the aesthetic enthusiasm items and the technical background scale, and between the alternative technical items and the aesthetic background scale provide additional evidence of discriminant validity. Finally, the low correlation of items from the Zuckerman sensation seeking scale with the background scales provide evidence of discriminant validity. In short, the MTMM matrix provides discriminant and convergent validity for the proposed scales.

Table 5-4

MTMM Matrix of Correlations of Aesthetic and Technical Background Scales with Alternative Scales

	1.	2.	3.	4.	5.
1.	(.8650)				
2.	.0186	(.8381)			
3.	.5629	.0005	(.5833)		
4.	.0854	.6296	.1012	(.5612)	
5.	.1966	.1784	.3763	.1658	(.5599)

1. Aesthetic Background Scale
2. Technical Background Scale
3. "Aesthetic enthusiasm" items from Wells and Tigert (1971)
4. Other Technical Items
5. Zuckerman Sensation Seeking Items (Zuckerman, 1964, 1971)

Domain-Specific Product Category Measures

This section will examine the construction of scales and measures in the six domain-specific product categories. The grid concept of item measures in the six product categories suggests that each of the items within the three item innovation measure is overlapping with the involvement measure, the aesthetic component measure, and the technical component measure. The calculation of coefficient alpha provides the means to test these assumptions and factor analysis provides a means of examining the dimensionality of the 12 items in each product category.

Coefficient alpha

Calculation of coefficient alpha is a means of testing the claim that innovation measures overlap with involvement, the aesthetic component measure and the technical component measure. Coefficient alphas were calculated for three and four item construct measures (as noted in Table 5-5). Data for each of the six categories is presented in Table 5-6.

Tables 5-6a to 5-6f show that in each of the six categories under study, the four item measures improved the internal consistency of the three item measure scales, raising the coefficient alpha in 14 out of 18 cases. The innovativeness measures either (a) substantially improves the internal consistency of the scale, raising the coefficient alpha by about .10, or (b) the coefficient alpha was extremely close to that of the three item scale, generally within about .02. In addition, the three item innovativeness measures showed a high degree of internal consistency, averaging about .7 in each of the six cases. This supports the proposed view that innovativeness measures overlap the involvement measures, the aesthetic component measures, and the technical component measures.

Table 5-5

3 and 4 Item Construct Measures

Category Involvement

3 items = I1 + I2 + I3

4 items = I1 + I2 + I3 + N

Category Aesthetic Factor

3 items = A1 + A2 + A3

4 items = A1 + A2 + A3 + AN

Category Technical Factor

3 items = T1 + T2 + T3

4 items = T1 + T2 + T3 + TN

Category Innovativeness

3 items = N + AN + TN

Table 5-6

Coefficient Alphas According to the Grid Framework

Table 5-6a: Wristwatch Category

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.1664
Secondary	I2	A2	T2	.5693
Cost/purchase	I3	A3	T3	.6081
Alpha Columns (3 item Alphas)	.6871	.6283	.6248	
Novelty	N	AN	TN	.7065
Alpha Columns (4 item Alphas)	.7167	.7497	.7189	

Table 5-6b: Jean Category

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.3667
Secondary	I2	A2	T2	.3042
Cost/purchase	I3	A3	T3	.6336
Alpha Columns (3 item Alphas)	.7315	.6181	.3581	
Novelty	N	AN	TN	.7190
Alpha Columns (4 item Alphas)	.7196	.7476	.5541	

Table 5-6c: Breakfast Cereal Category

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.4800
Secondary	I2	A2	T2	.5004
Cost/purchase	I3	A3	T3	.5259
Alpha Columns (3 item Alphas)	.7559	.6539	.8691	
Novelty	N	AN	TN	.6987
Alpha Columns (4 item Alphas)	.7423	.7184	.9010	

Table 5-6d: Category: Sunglasses

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.2659
Secondary	I2	A2	T2	.5361
Cost/purchase	I3	A3	T3	.5769
Alpha Columns (3 item Alphas)	.7571	.6696	.7175	
Novelty	N	AN	TN	.6913
Alpha Columns (4 item Alphas)	.7707	.7855	.8235	

Table 5-6e: Toothpaste Category

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.2359
Secondary	I2	A2	T2	.5202
Cost/purchase	I3	A3	T3	.5297
Alpha Columns (3 item Alphas)	.7807	.4876	.7151	
Novelty	N	AN	TN	.6968
Alpha Columns (4 item Alphas)	.7423	.6524	.8138	

Table 5-6f: Telephone Category

	Involvement	Aesthetic	Technical	*Alphas Across*
Primary	I1	A1	T1	.3191
Secondary	I2	A2	T2	.5576
Cost/purchase	I3	A3	T3	.5159
Alpha Columns (3 item Alphas)	.7730	.7416	.5887	
Novelty	N	AN	TN	.7215
Alpha Columns (4 item Alphas)	.7476	.8367	.7139	

Coefficient alphas across the primary, secondary, and cost/purchase measures have also been indicated in the tables. In all cases, the coefficient alphas for these measures are smaller than for the scaled items. These results are as expected, since it was not proposed that they would have anything in common. The highest alphas are found among the cost/purchase measures, which may reflect certain degrees of common or consistent attitudes toward shopping or cost factors among respondents.

Factor Analysis

A further means of studying the hypothesized underlying dimensions of the domain specific scales is through factor analysis. Factor analysis is concerned with the identification of a structure within a set of observed variables. The examination of factor loadings should give an additional indication of the structure among the set of 12 item measures. The utility of factor analysis specifically for examining variables related to products has been long established and has many precedents. Hauser and Kopelman (1979) argue that factor analysis is superior to either multiple discriminant analysis or non-metric multidimensional scaling in terms of predictive ability, managerial interpretability, and ease of use.

Principle axis exploratory factor analysis with obliquely rotated factor solutions were run on all six categories with no factor dimensions specified. In all categories, a three factor solution was indicated (the SPSS program uses eigen values greater than one as the default cutoff for deciding the number of factor solutions). In one case, the jeans category, the obliquely rotated factor solution failed to converge in the 25 iterations specified by the limits of the program. Additional factor analyses were run on all categories with the

maximum likelihood method and all converged on three factor solutions. Factor loadings are included in the appendix (see Appendix D).

The coefficient alphas and factor analyses provide data to support the conclusion that the measures are sufficiently reliable and valid to provide good indicators of the variables under study. Though further research would be needed to explore these variables, the item measures conform to the hypothesized product category structure. Product category measures can be used to provide tests of the proposed hypotheses.

In addition, the factor solutions provide important and interesting data on the relationship of the twelve product category measures. Since the three innovativeness measures were conceptualized to be overlapping with product involvement, the aesthetic component, and the technical component, the issue in question was if and how the innovativeness measures would load onto the specified factors, or if the factor solution would separate them out as a separate factor solution entirely. Factor solutions clearly indicated an aesthetic factor, a technical factor, and an involvement factor in every case. Loading for the aesthetic and technical factors are clear cut in that items loaded on primarily one factor, with factor loadings greater than or near .5 for almost all of the 72 items. The overlapping aesthetic innovativeness measure loaded primarily onto the aesthetic factor and the overlapping technical measure loaded primarily onto the technical factor in all of the six product categories.

The most interesting findings from factor analysis studies of the product category measures concern the loading of the primary innovativeness measures, the items reading "I am generally interested in new and different [the product category] products." In all cases, this measure did not load onto the involvement factor. Instead, the primary innovativeness measure loaded heavily in every case with an aesthetic factor. The loadings of this measure

with the involvement factors were low. This is interesting to the extent that it suggests that innovativeness in a category may be strongly correlated with an aesthetic component factor rather than simple involvement in a product category. The data for the primary factor loadings are presented in Table 5-7; for consistency, all are the pattern factor loadings for maximum likelihood method obliquely rotated factor solutions.

Tests of Hypotheses

This section will examine tests of the specific hypotheses presented in Chapter 3. Evidence has been presented above for the construct validity of the measures used. Regression analysis provides a means to test hypotheses and examine theoretical relationships among the variables under study.

Hypothesis One

H1: Aesthetic and technical components are separate and distinct components of preference in each product category.

The above discussion of coefficient alphas in the product category measures supports this hypothesis. High coefficient alpha support the internal consistency of aesthetic and technical component measures, while low coefficient alpha across the primary measures provides discriminant validity between the measures. In addition, the correlations between the primary aesthetic item measures and technical item measures in all product categories are non-significant. Also, the correlation between primary technical item measures and secondary aesthetic item measures are all non-significant. Finally, in all but two cases, cereals and telephones, where correlations are very small,

Table 5-7

Comparison of Loadings of the Primary Innovativeness Measures by Category

Product Category	Aesthetic Factor	Technical Factor	Involvement Factor
Wristwatches	.61	.23	.12
Jeans	.73	.06	.14
Breakfast Cereals	.74	.43	.37
Sunglasses	.58	-.29	.09
Toothpaste	.48	-.15	.15
Telephones	.50	.43	.01

correlations of the primary aesthetic item measures and secondary technical item measures are all non-significant.

The data supports the conclusion that aesthetic and technical factor motivations are distinct in each product category. The data also provides some indication of the relative importance of aesthetic and technical measures. Table 5-8 indicates that in each of the product categories, technical components were given higher importance weights than aesthetic components. There was also generally less variation in technical components scores.

Respondents were "rational" to the extent that they clearly and consistently recognized the importance of the primary technical component. Secondary and tertiary measures of technical component scores were correlated with the primary measures, but means scores were not as highly rated as the primary measure. To better examine component ratings, the relative rating of aesthetic to technical ratings must be examined.

An analysis was undertaken of the relative weights of aesthetic and technical component factors. Ratios were derived to examine the extent to which technical and aesthetic factors are considered important relative to one another for each respondent. First, the aesthetic component scores was divided by the technical component score for each individual (A/T ratio). Ratios greater than one indicate the extent to which aesthetic factors were considered more important and ratios less than one indicate the extent to which technical factors are considered more important. The problem with this simple ratio is it does not provide a uniform measure. The person who would rank aesthetic factors as maximally important and technical factors as minimally important would have a score of 21 over 3 or 7.0; on the other hand, the person who would rank technical factors as maximally important and aesthetic factors as minimally important would have a score of 3 over 21 or .143.

As a second measure, the technical component scores was divided by the aesthetic component score for each individual (T/A ratio). This produces a ratio which is the inverse of the A/T ratio. The T/A ratio is different from -- but comparable to -- the "perceived fashion content" measure, the ratio of single-item functionality over fashion ratings developed by Greenberg, Sherman and Shiffman (1983). These ratios appear to be most useful for purposes of comparison. Means and standard deviations of the A/T and T/A ratios are presented in Table 5-9.

The variation in aesthetic and technical importance is best examined by considering the variation in the individual ratio scores. Table 5-10 groups respondents according to A/T and T/A ratios. In general, it can be observed that the subjects are normally distributed with the combined ratio measures and there exists considerable variation across categories. Telephones, for example, are more strongly rated in the technical direction. On the other hand, there is wide variation in the breakfast cereal category with a significant percentage of respondents appearing at both technical and aesthetic extremes.

While the examination of *both* A/T and T/A ratios may not be necessary in every case, one of these ratios may be more important in categories which are dominated by either an aesthetic or a technical factor. These ratios are useful for purposes of comparison as aids to discriminate between product category structure. These and other ratios may need to be adapted differently in more complex categories.

Hypothesis Two and Three

H2: Individuals with strong aesthetic backgrounds give stronger weight to aesthetic components of products.

Table 5-8

Means of Aesthetic and Technical Component Scores by Product Category

(Standard Deviations in Parentheses)

Product Category	Mean for Aesthetic Component	Mean for Technical Component
Watches	15.41 (3.86)	16.00 (3.34)
Jeans	13.71(3.96)	15.21 (2.76)
Breakfast Cereals	13.59 (4.07)	15.98 (4.43)
Sunglasses	14.54 (4.02)	16.56 (3.60)
Toothpaste	13.92 (3.39)	17.00 (3.51)
Telephones	12.55 (4.46)	17.52 (2.99)

Table 5-9

Means Ratio of Aesthetic to Technical Components by Product Category

(Standard Deviations in Parentheses)

Product Category	Mean Ratio of Aesthetic Over Technical	Mean Ratio of Technical Over Aesthetic
Watches	1.01 (.39)	1.11 (.41)
Jeans	.93 (.36)	1.24 (.57)
Breakfast Cereals	.97 (.67)	1.32 (.75)
Sunglasses	.93 (.36)	1.27 (.74)
Toothpaste	.86 (.40)	1.31 (.56)
Telephones	.72 (.25)	1.68 (1.02)

Table 5-10

Distributions of A/T and T/A Ratios by Product Category

Product Category	A/T > 2	A/T 1.51 to 2	A/T 1.1 to 1.5	A/T ≤1.1 & T/A ≤1.1	T/A 1.1 to 1.5	T/A 1.51 to 2	T/A > 2
Watches	1.8%	5.0%	25.6%	30.3%	23.8%	9.8%	3.6%
Jeans	0.6%	3.0%	16.3%	44.1%	34.2%	8.7%	7.7%
Breakfast Cereals	5.3%	3.9%	13.1%	21.4%	34.7%	14.1%	9.1%
Sunglasses	1.8%	3.0%	16.2%	29.3%	31.7%	12.3%	5.7%
Toothpaste	1.2%	1.2%	6.3%	24.5%	48.5%	12.9%	5.4%
Telephones	0.0%	0.0%	5.1%	18.3%	38.5%	19.8%	18.3%

H3: Individuals with strong technical backgrounds give stronger weight to technical components of products.

To test the relationship between aesthetic and technical backgrounds and aesthetic and technical component ratings toward products, simple linear regressions were run. First, the 3-item category aesthetic component measures were run as the dependent variable and the aesthetic background measure was the independent measure; secondly, the 3-item category technical component measures were run as the dependent variable and the technical background measure as the independent measure. The aesthetic background measure was significant in the categories of watches, jeans, sunglasses, and telephones, but the value of r squared, the coefficient of determination, was an extremely small value, either .02 or .03. The technical background measure was significant in only the wristwatch and phone categories at the same values of r squared.

Though this statistical level of significance provides support for the two hypotheses, it must be concluded that aesthetic and technical background factors are extremely weak factors in predicting product category aesthetic or technical component responses. The low level of statistical significance may be simply the result of a reasonably large sample size and does not offer very powerful support of the hypothesis.

Hypothesis Four

H4: Innovativeness in a product category is positively related to aesthetic and technical backgrounds, motivational factors, and product-category involvement.

Just as aesthetic and technical background measures did not prove to be significant to any large degree to aesthetic and technical product component factors, aesthetic and technical background measures did not prove to be significant to any large degree to innovativeness. A small r squared of .02 or less was found for aesthetic background measures in the categories of jeans, breakfast cereals, sunglasses, and telephones. A small r squared of .02 was found for technical background measures in the category of sunglasses and r squared of .06 was found for telephones. Given that the coefficient of determination is so small for aesthetic and technical background factors, they were removed from further analyses.

To test the three other factors in the hypothesis, multiple regression equations were run in each product category. In the first case, the product category innovativeness measures were the dependent variables. The 3-item aesthetic component measures, technical component measures, and the product involvement measures were the independent variables. All independent variables were significant. Results for the regression equations are presented in Table 5-11; all B values are significant and none are standardized.

The results indicate that the aesthetic components are the stronger factors, having greater B values, and involvement the weakest. Since the three component measures are intercorrelated, the B values are not necessarily precise indicators of the weights of the measures in relation to innovativeness. Examination of the coefficient of determination for simple linear regressions equations (see Table 5-12) provide additional support for the strength of the aesthetic component in explaining variation in the product category innovativeness measures. Table 5-12 indicates that the aesthetic component explains the highest proportion of product category innovativeness. The r squared

Table 5-11

Multiple Regression Equations by Product Category

(Product Category Innovativeness as the Dependent Variable)

Product Category	Constant value	B for Aesthetic component	B for Technical component	B for Involve-ment	R^2
Watches	.09	.51	.25	.17	.47
Jeans	.47	.52	.24	.11	.42
Breakfast Cereals	2.84	.39	.37	.06	.50
Sunglasses	.43	.44	.35	.16	.58
Toothpaste	.35	.47	.37	.11	.53
Telephones	.38	.48	.39	.09	.61

Table 5-12

A Comparison of r^2 Values for Simple Linear Regression Equations by Product Category

(Product Category Innovativeness as the Dependent Variable)

Product Category	r^2 for Aesthetic Component	r^2 for Technical Component	r^2 for Involvement Component
Watches	.39	.14	.19
Jeans	.37	.11	.13
Breakfast Cereals	.29	.29	.19
Sunglasses	.40	.27	.30
Toothpaste	.37	.31	.18
Telephones	.49	.28	.21

value is always the largest for the aesthetic component (although it is equal to the technical component in the breakfast cereal category).

Finally, regressions were also run using the 9 individual item measures as the independent variables and the 3-item product category innovativeness measures as the dependent variables. This enables further examination of the utility of the measures to capture different aspects of the aesthetic component, the technical component, and the involvement component. The backward method of removing insignificant variables was employed. The results are presented in Table 5-13 with all insignificant variables removed from the equation.

The results indicate that coefficient of multiple determination is slightly higher, as would be expected. It is interesting to note that all secondary and tertiary measures for the aesthetic and technical components are significant while most of the involvement measures are insignificant. In fact, all involvement measures drop out of the equation in the case of toothpaste and breakfast cereals. This indicates that involvement measures may capture less important aspects of innovativeness than aesthetic and technical component measures in these product categories.

Hypotheses Five and Six

H5: Innovators will tend to overlap in product categories with strong technical factors, or overlap in product categories with strong aesthetic factors, depending upon background factors.

H6: Innovators in product categories with both strong technical and aesthetic backgrounds overlap more strongly in other product categories.

Table 5-13

Multiple Regression Equations with Individuals Item Measures by Product Category

(Product Category Innovativeness as the Dependent Variable)

Product Category	Con-stant	B for A1	B for A2	B for A3	B for T1	B for T2	B for T3	B for I1	B for I2	B for I3	R^2
Watches	1.62	.20	.47	.64		.26	.38	.52			.51
Jeans	3.08	.18	.70	.52	-.29	.37	.54			.27	.47
Breakfast Cereals	4.02	.24	.49	.43		.52	.57				.52
Sunglasses	3.16		.48	.62		.28	.55	.46			.61
Toothpaste	2.77		.46	.72		.42	.79				.58
Telephones	2.01		.18	.99		.20	.80	.38			.69

One indication of the overlap among innovators across categories is the matrix of cross-category correlations of the 3-item innovativeness scores. Cross-category correlations of innovativeness scores are presented in Table 5-14. These were all significant at a probability level greater than 1%.

Another measure of innovativeness is the single item primary innovativeness measure. Correlations among the single item measure is presented in Table 5-15. All were significant at a probability level greater than 1%, except for one case (breakfast cereals correlated to telephones were significant at a probability level of 5%).

The problem with these correlations is that they correlate all subjects over the full range of innovativeness scores. Normally in the study of innovators, however, it is only the most innovative individuals which are of interest. Innovators are commonly defined by a conative measure, they are normally taken to be the first two to ten percent to buy a new product. Instead, innovators are isolated here with self-designated interest measures, as those (a) scoring 19 to 21 on the three-item innovativeness measure, or (b) scoring 7 on the single item primary innovativeness measure. These definition of innovators results in the proportions of subjects presented in Table 5-16.

Using the 3-item definition of the innovator, 122 subjects or 39 percent of the sample, were innovators in at least one product category. More than half of these (52%) were innovators in more than one product category. This innovative overlap consisted of 64 subjects or 19 percent of the total sample.

Using the single item measure, 125 subjects or 37 percent of the sample were innovators in at least one product category. 49 of these (39%) were innovators in more than one product category. This innovative overlap consisted of 49 subjects or 14.5 percent of the total sample.

Table 5-14

Correlations of 3-Item Innovativeness Measures Across Category

Product Category	Watches	Jeans	Breakfast Cereals	Sunglasses	Toothpaste
Jeans	.49				
Breakfast Cereals	.30	.24			
Sunglasses	.44	.44	.39		
Toothpaste	.32	.39	.32	.45	
Telephones	.46	.39	.20	.45	.48

Table 5-15

Correlations of Primary Innovativeness Measure Across Category

Product Category	Watches	Jeans	Breakfast Cereals	Sunglasses	Toothpaste
Jeans	.39				
Breakfast Cereals	.32	.25			
Sunglasses	.38	.44	.41		
Toothpaste	.25	.31	.34	.45	
Telephones	.32	.31	.12	.39	.45

Table 5-16

Innovator Percentages Across Category

Product Category	3-Item Measure % of Total	3-Item Measure Number	Primary Measure % of Total	Primary Measure Number
Watches	9.2%	31	8.6%	29
Jeans	4.1%	14	5.3%	18
Breakfast Cereals	16.3%	55	12.7%	43
Sunglasses	16.9%	57	12.5%	42
Toothpaste	14.2%	48	9.2%	31
Telephones	11.5%	39	11.4%	38

Percentage of innovators by number of overlapping categories is shown for the two measures in Table 5-17. Greater overlap is shown for the 3-item measure. With both measures, the condition of being innovative in one category increases the likelihood that a respondent is innovative in other categories. The issue is if this overlap can be best explained by product category similarities or by individual background and learning factors.

To test the significance of innovativeness, percentages of overlap were cross tabulated and the chi-square statistic for the significance of probability of group membership was calculated. This overlap can be examined through a triangular matrix. Significance calculations of Pearson chi-square statistics are presented in Table 5-18. The first figure gives the significance for 3-item measures and the second figure gives the significance for single item measures. All categories of overlap are significant by at least one of the two measures and most are significant in both measures.

To attempt to explain this overlap, background measures were examined. Are innovators significantly different from non-innovators in terms of their technical and aesthetic background scores? To answer this question ANOVAs were run on the technical and aesthetic background scores of innovators, (innovators were defined by the 3-item measure in this case). Table 5-19 presents the F scores and significance of F for aesthetic background scores, technical background scores, and combined aesthetic/technical background scores.

ANOVA results indicate that innovators are significantly different in terms of background measures in some categories. Innovators in sunglasses have higher aesthetic background scores, innovator in watches and telephones have higher technical background scores, and innovators in watches, sunglasses, and telephones have higher combined scores.

Table 5-17

Innovators by Number of Categories

Categories in Which Respondent is an Innovator	Primary Measure Number	Primary Measure % of Total	3-Item Measure Number	3-Item Measure % of Total
0	213	63.0%	206	60.9%
1	76	22.5%	64	18.9%
2	32	9.5%	41	12.1%
3	7	2.1%	15	4.4%
4	10	3.0%	8	2.4%
5			3	0.9%
6			1	0.3%

Table 5-18

Chi-Square Significance Measures for Innovator Overlap Across Category

Product Category	Watches	Jeans	Breakfast Cereals	Sun-glasses	Tooth-paste	Tele-phones
Jeans	.010 .000					
Breakfast Cereals	.000 .178	.000 .048				
Sunglasses	.000 .000	.000 .000	.000 .021			
Toothpaste	.002 .818	.018 .769	.000 .021	.000 .017		
Telephones	.043 .003	.003 .454	.009 .001	.000 .000	.000 .000	

Table 5-19

ANOVA Results for Innovators Background Measures

Product Category	F for Aesthetic Bkgrd	Sig of F for Aesthetic	F for Technical Bkgrd	Sig of F for Technical	F for Combined Bkgrd	Sig of F for Combined Bkgrd
Watches	.936	.334	5.93	.015	6.34	.012
Jeans	2.28	.132	.073	.787	.451	.502
Breakfast Cereals	2.37	.124	.256	.613	1.71	.191
Sunglasses	10.55	.001	.337	.562	5.59	.019
Toothpaste	.536	.465	.000	.989	.176	.675
Telephones	.919	.339	6.38	.012	6.64	.010

This data suggests while there is significant overlap of innovators across categories, it is difficult to explain this overlap with either category factors or background measures. The best predictor of category overlap is the combined background measure score. This supports the claim that innovators tend to have higher educational backgrounds.

Finally, an additional analysis was carried out on those respondents who overlap in more than one product category. Are multi-category innovators significantly different in terms of background measures? The data confirms this. Multi-category innovators had significantly higher aesthetic background scores (significance of F is .013), significantly higher technical background scores (significance of F is .042), and significantly higher combined scores (significance of F is .002). The multi-category innovator is clearly different than single-category innovators in terms of both technical and aesthetic background measures.

Are individuals with higher technical and aesthetic backgrounds more likely to be innovative? An additional examination of those with particularly high aesthetic and technical was undertaken. Three groups were separated out. First, a "high aesthetic background" group was defined as those with aesthetic background scores with values greater than 32; these constituted 20 percent of the sample (n = 68). Likewise, a "high technical background" group was defined as those with technical background scores with values greater than 42; these constituted 20 percent of the sample (n = 68). Finally, a "high aesthetic and technical background" group was defined as those with aesthetic background scores with values greater than 28 and with technical background scores with values greater than 38; these constituted 16 percent of the sample (n = 55). Analysis of variance tests were then carried out on these

groups, comparing innovativeness of members to non-members of these groups. Results are presented in Table 5-20.

Results indicate that the high aesthetic background group is innovative in breakfast cereals, the high technical group is innovative in sunglasses, and the high aesthetic and technical group is innovative in wristwatches (significance of .06), sunglasses (significance of .001), telephones (significance of .000), and toothpaste (significance of .07). This supports the view that combined rather than single educational factors may bring about greater innovativeness. Combined background measures make it more likely that an individual is a multi-category innovator.

A Note on Gender Differences

Though gender differences are not the subject of this dissertation, certain issues need to be addressed which concern differences in group membership based upon gender. It was noted above, for example, that significant gender differences were apparent in the membership of the arts group and the technical group. This section will examine issues of differences in variables based upon gender.

Gender and educational background are correlated factors in this society. Women pursue educational opportunities in different areas than men. The question that can be raised is if significant differences is scores are apparent between the aesthetic and technical background scores and item measures.

Among the five aesthetic background measures, low level (below .18) though significant correlations occur in three variables in one direction (females slightly higher). Among the seven technical background measures, low level (below .25) though significant correlations occur in six variables in one direction (males slightly higher). In both cases, gender differences are

Table 5-20

Analysis of Variance Tests of Groups Defined by High Aesthetic and Technical Background Scores Across Category

	High Aesthetic Group		High Technical Group		High Aesthetic and Technical Group	
Product Category	F	Sig of F	F	Sig of F	F	Sig of F
Wristwatches	.56	.47	.21	.65	3.37	.06
Jeans	.43	.51	2.83	.09	2.16	.14
Breakfast Cereals	4.75	.03	.66	.42	1.36	.24
Sunglasses	2.25	.14	4.73	.03	12.35	.001
Toothpaste	.04	.85	.89	.34	3.26	.07
Telephones	.81	.37	2.8	.09	15.25	.000

not enough to explain the variation on these scales. The resulting correlation for the technical scale is .25 and is positive (in the male direction); the correlation for the aesthetic background scale is .17 and is negative (in the female direction); both are significant. The correlation for the combined scales is insignificant. Given that the aesthetic and technical measures explain little in the key variable under study, the low level differences noted here were not investigated further.

Among the innovativeness measures, low level correlations significant at a probability greater than 1% are noted in the case of jeans (-.29) and sunglasses (-.16), and at a probability of 5% for watches (-.12). [Females are coded as "1," males are coded as "2."] The low level of significance with gender was not apparent when you control for other factors. Regression equations by the backward method were run with innovativeness as the dependent variable, aesthetic components, technical components, innovativeness components, and gender as the independent variables. In all categories but sunglasses, sex was removed from the equation. In the sunglass category, increase in the coefficient of multiple determination provided by the gender variable was extremely low (about .01).

For aesthetic components, significant differences were found in the categories of wristwatches, jeans, sunglasses, and toothpaste. For technical factors, significant gender differences were found in the category of breakfast cereals. For involvement factors, significant gender differences were found in the categories of jeans and sunglasses. Low correlations were found in the direction of females in all these cases. Women were found more likely to be innovators in the case of jeans (significance of chi-square .05), breakfast cereals (significance of chi-square .05), and sunglasses (significance of chi-square .005).

In summary, gender appears to be an important factor in explaining some of the differences in component responses, but it is not the major factor. Multiple regression analysis shows that when you include other factors, gender differences do not significantly increase the amount of variance explained. The effects of gender are not unimportant, however. Gender differences are important to examine particularly on a product category basis, given the fact that products in these categories are different. There are male and female wristwatches, jeans, and sunglasses, and breakfast cereals are frequently targeted to diet-conscious females. Component measures were not designed to investigate gender differences. There may be more important aesthetic and technical response differences in males and females, but these are not the focus of this study.

An Additional Analysis of Involvement

Innovativeness has been examined as a function of aesthetic and technical component factors. An additional issue which could be examined is the issue of involvement. Are there aesthetic and technical components of involvement? Analysis of this issue may provide additional insights into product category structure. Findings of this analysis are valuable to applications discussed in the next chapter.

An additional analysis of involvement was carried out through regression analysis with involvement as the dependent variable, and aesthetic and technical components as the dependent variables. Dependent variables were significant in every case but one. R squared results of linear regressions of product category involvement with each factor and R squared results of multiple regressions of product category involvement with both factors are presented in Table 5-21.

Table 5-21

A Comparison of r^2 and R^2 Values for Linear and Multiple Regression Equations for Product Involvement

(Product Category Involvement as the Dependent Variable)

Product Category	r^2 for Aesthetic component	r^2 for Technical component	R^2 for Aesthetic and Technical component
Watches	.15	.07	.19
Jeans	.17	.03	.17*
Breakfast Cereals	.18	.17	.30
Sunglasses	.22	.14	.29
Toothpaste	.12	.13	.19
Telephones	.14	.22	.28

* Technical component was not significant.

The results indicate that aesthetic and technical factors are partially explainable by involvement. The important finding is that components of involvement differ by product category. In the category of jeans, involvement is better explained by the aesthetic component. In the category of telephones, involvement is better explained to the technical factor. In most categories, aesthetic and technical factors contribute to involvement, but these six product categories were chosen partially because of the mix of technical and aesthetic features. There may be particular types of aesthetic or technical involvement depending on the product category or depending upon the individual's response to products in a category. The issue of qualitatively different types of product involvement needs to be better examined. An examination of this issue may help to clarify the measures employed in different product involvement scales.

Summary of Findings and Conclusions

H1: Aesthetic and technical components are separate and distinct components of preference in each product category.

Hypothesis One was confirmed. In addition it was found that technical component were weighted more strongly than aesthetic components. Aesthetic components were more important than technical components in accounting for innovativeness.

H2: Individuals with strong aesthetic backgrounds give stronger weight to aesthetic components of products.

H3: Individuals with strong technical backgrounds give stronger weight to technical components of products.

Hypothesis Two and Three had weak support.

H4: Innovativeness in a product category is positively related to aesthetic and technical backgrounds, motivational factors, and product-category involvement.

Hypothesis Four can be restated and strongly supported as follows: Innovativeness is positively related to aesthetic component motivational factors, technical component motivational factors, and involvement component motivational factors, in order of their importance.

H5: Innovators will tend to overlap in product categories with strong technical factors, or overlap in product categories with strong aesthetic factors, depending upon background factors.

Hypothesis Five was not confirmed. While there was a significant overlap of innovators across categories, this overlap could not be obviously explained by product category or individual background factors.

H6: Innovators in product categories with both strong technical and aesthetic backgrounds overlap more strongly in other product categories.

Hypothesis Six could be more strongly stated with support as follows: The multi-category innovator is significantly different from the non-innovator or the single-category innovator in that the multi-category innovator has a stronger technical and aesthetic background. Those with stronger technical and aesthetic backgrounds are more likely to be multi-category innovators.

CHAPTER 6:

SUMMARY, CONCLUSIONS, AND DIRECTIONS FOR FURTHER RESEARCH

This chapter examines the findings from the contexts of both the tradition of research in the diffusion of innovations and contemporary theory in marketing. A brief summary of the major conclusions is followed by a detailed discussion. Next, an exploration of the applications of this research to applied marketing problems is undertaken. Methodological issues are then reviewed for the purpose of determining the direction of further theory development and future research studies. Finally, broad theoretical and empirical research needs are summarized.

Summary and Discussion

The research presented above provides clear support for aesthetic, technical, and involvement component factors to explain product category innovativeness. Proposed measures of aesthetic, technical, and involvement component factors exhibit a clearly defined pattern which was consistent across the six product categories studied. The measures were found to provide an important means to examine product category structure and provide impetus for more comprehensive and detailed examinations of the these topics in the future. More importantly, the examination of the relationship of technical and aesthetic motivational factors to innovativeness allows renewed consideration of the diffusion decision process model.

The findings indicate that respondents were "rational" to the extent that primary item measures of technical components were uniformly and consistently rated high in importance in every product category studied. Though

technical components were recognized by respondents as important, aesthetic product components were better in explaining innovativeness. The importance of aesthetic components to innovativeness breaks new ground in the diffusion research tradition. Key findings are discussed in depth by topic area below.

The Relevance of Technical and Aesthetic Background Factors

Global measures of aesthetic and technical background orientations were supported as valid and reliable unidimensional scales with psychometric procedures. Though the correlations of the proposed aesthetic and technical background factors to aesthetic and technical product category measures are weak, there is enough of a significant relationship to suggest that the development of aesthetic and technical product category responses may have some degree of grounding in education and personal consumption histories. Though this indicates that aesthetic and technical background factors are less relevant than product category factors in explaining innovativeness, the key variable of the study, this does not mean that aesthetic and technical backgrounds are irrelevant to the formation of product category responses. It simply means that the very general level at which background factors are measured does not appear to offer very powerful explanations of specific product category responses.

This low level correlation of background factors to any single product category measure is not entirely surprising. While background factors are measured at a very general level, aesthetic and technical product category component responses are much more specific. However, even improved and more extensive background and product category measures are not very likely to be highly correlated. An individual's general educational background is seldom

able to provide a good explanation for later specific behavior. An aesthetic or technical educational background does not predispose an individual to become aesthetically or technically involved with products.

The specific contributions of educational backgrounds and experience to the formation of product category responses calls for more than a simple explanation. The formation of product category responses is a complex process and may be very individualized. Measurement instruments to capture this response are limited. Product category measures were conceived for specific uses in this research and do not capture the full variation and complexity of an individual's reaction to the product category.

Technical and aesthetic background factors prove to have a stronger correlation to innovativeness when they occur in combination. These conclusions are supported in the examination of innovator groups. While technical and aesthetic background measures may together provide a better profile of the innovator, the profile of the innovator is, on the whole, very limited in the diffusion literature. Other issues need to be examined to better explain the development of the "ordinary consumer" into the "innovator."

Several issues raised in this research, particularly the issue of the cultivation of aesthetic and technical response, contribute a new means of understanding innovativeness. Further theoretical and empirical work is needed to explain the factors that affect the development of product category component responses. These issues are also related to the study of product involvement.

While product involvement correlates moderately to aesthetic and technical component factors, the literature on involvement has paid little attention to motivation and has not recognized the importance of aesthetic and technical motivational factors. The involvement literature would benefit from new methods of research, especially time series studies or product use studies that

are able to examine an individual's personal history and changing attitudes and involvement with specific product categories over time. There are very few studies which have examined product attitudes and perceptions over a reasonably long period. The issue of involvement with new products has potential as a research area to contribute to both the involvement and diffusion research fields.

The Importance of the Technical Component

High values for the technical component scores indicate that functional features and benefits are clearly recognized as important to the consumer. Consumers appear more definite in their ratings, for example, that telephones and wristwatches be technically reliable and that breakfast cereals should provide nutrition. However, the high values for technical component scores relative to other measures must be taken in perspective. It is not possible to conclude from high technical component scores that technical factors are necessarily the most important choice or purchase factors. High technical component scores may be an indication of a rational bias.

It is true that primary item measures of technical components were uniformly and consistently rated high in importance in every product category studied. The secondary and tertiary technical measures were not as high. The technical measure that is somewhat less consistent is the indication that subjects would like to read and check information about technical performance. Though this secondary measure does significantly and strongly correlate with the primary measure, the average rating values were not as high. The secondary measure was particularly low in the category of jeans, suggesting that technical product information is not valued on the average in this category.

In the other categories studied, this measure of technical information appeal was considered more important.

Similarly, the tertiary technical measures was also found to be less strong than the primary measures. Respondents on the average indicated that they were willing to pay more for products with higher technical merits, but not exceedingly so. However, respondents were also willing to pay more for products with higher aesthetic merits. Relative to one another, responses were higher on the average in regard to technical attributes than aesthetic ones. Superior technical performance clearly represent greater value to respondents on the average than aesthetic merit.

When you consider the consistency of multiple measures of technical components, there is no indication to suggest that high relative technical scores is simply method variance, an artifact of how the questions were asked. High significant correlations among the three indicators of technical component importance shows that respondents were generally quite consistent in their responses in indicating that technical factors are important.

This could suggest that consumers demand functional requirement of a product must be satisfied before considering aesthetic product attributes. Or alternately, it could suggest that technical components are given more weight over aesthetic factors in product category preferences. Further investigation of product category responses would have to be carried out to clarify the relationship of technical and aesthetic response structures. These may even have to be carried out for individual products and individual consumers. There are different types of technical and aesthetic product features and these features are valued to different degrees and in different ways by consumers.

It is also important to note that the data indicates respondents were found at the extremes of both aesthetic and technical responses. The distribution of

aesthetic to technical ratios (A/T and T/A ratios) illustrates that certain groups of consumers responded more strongly to aesthetic or technical components of the categories examined. There is a considerable degree of variability among technical and aesthetic product category response.

The issue of variance of these factors among individuals needs to be closely examined. The general indicator that technical factors are consistently given a higher relative value in product category responses than aesthetic factors clearly suggests that technical or functional performance must meet certain product category standards. However, different individuals may interpret cues to technical performance differently; technical performance standards are not always clearly understood by consumers. Technical performance also may interact with aesthetic features. Once certain basic technical factors are perceived to be met, aesthetic factors could become more important to the individual in the course of product use.

The Primacy of the Aesthetic Component

One of the most interesting aspects of the findings is the indication that innovativeness is strongly correlated with an aesthetic product component factor. This is supported most strongly by factor loading data presented in Table 5-7 and by the coefficient of determination values for linear regressions presented in Table 5-12. While technical or functional benefits are more frequently rated as higher in importance, they appear to have less importance in explaining innovativeness, being secondary to aesthetic components.

This strong association between innovativeness and the aesthetic component factor is not unexpected in some product categories. It was predictable that aesthetic factors are important to innovativeness at least in the case of sunglasses, jeans, and wristwatches, since these categories clearly have a

fashion component. More surprising, however, is the dominant association of innovativeness with aesthetic factors in categories with strong technical attributes. Though wristwatches and telephones have a potential for technical complexity, technical component factors are not the dominant components which account for innovativeness in these categories.

Aesthetic factors may be particularly important due to the need for variation. Breakfast cereals and toothpastes are products frequently associated with functional benefits, but taste components may be much more important in the case of new products in these categories because (a) many of their functional benefits may be counterbalancing or equivalent across product choices, and (b) being frequently consumed products, consumers may desire a certain degree of variation in taste.

The stronger association of innovativeness with aesthetic factors rather than technical factors was clear across categories, the only exception was in the category of breakfast cereals where technical and aesthetic component factors both yield an R^2 of .29 in accounting for innovativeness (see Table 5-12). Going by B values in multi-item multiple regression equations (see Table 5-11), aesthetic factors were twice the weight of technical factors in the case of wristwatches and jeans.

The strong relative association of innovativeness with aesthetic component factors undoubtedly is dependent upon the product category. The data indicates that in the types of consumer product categories examined, however, aesthetic components were consistently strong in accounting for innovativeness, even in the product categories which were considered relatively more technical. This has important implications for diffusion research.

While it has been noted that the diffusion research tradition has been dominated by major technical innovations, the importance of aesthetic factors

to consumer product innovation has been under-investigated if not totally ignored. The data indicates that aesthetic responses are clearly important across consumer product categories. Aesthetic components are clearly far more important than the diffusion research tradition has recognized.

Aesthetic factors may be much more important than realized, even in highly technical or industrial product categories. Aesthetic features including the sound of the company name and the look of the corporate logo are powerful design features due to the strong association of design factors with improved technology and organization. Design is centrally important for the distinctive placement of the product on the market and for the characterization that it gives to the organization that produces it. The considerable effort given to corporate logos and designs indicates the importance placed on visual design features and the power of aesthetic factors. As Strati (1992, p. 578) notes, "the characteristics of an organization's products are something of a metaphor for it."

Visual design factors are important with many products and may also be important with many services. For example, the design of the clothing of stewards, stewardesses, and airline ticketing agents provide an important component of the "service product" in the airline industry. Such things as the color coordination of uniforms and the design of waiting areas in airlines and other service industries are effective means of creating a company "style" which affects aesthetic response.

Besides visual factors, auditory, smell, and taste factors are obviously important to understanding aesthetic response. The coordination of different aesthetic factors is particularly important. While consumers may want to appear "rational" in accounting for their preferences in categories such as soft drinks and beer with clear taste preferences, aesthetic factors other than taste

have been recognized as important to product preferences in these categories. Little research has been conducted as to the understanding the interactive effects which the combinations of taste and visual design have on the aesthetic response to these products.

While the understanding of aesthetic response to products has often been limited to "gourmet" categories, all products have aesthetic properties that affect their use. While the aesthetic properties of consumer goods are important components of their use, aesthetic features are not always recognized or appreciated as important attributes for their own sake. Some aesthetic products such as air fresheners may be described, promoted and evaluated in terms of secondary characteristics or functionality (to cure mildew or destroy bacteria).

A broader understanding of the types of aesthetic response to products requires a new conceptual and research focus. The understanding of aesthetic response to products bears a relationship to culture and ideology. Marcel Duchamp was one of the first of what are now called "postmodern" artists who showed that everyday objects can be placed in a context that will make them a work of art and call attention to their aesthetic properties. Artists have long demonstrated that calling attention to the aesthetic properties of everyday objects can aid in the improved appreciation of the social and natural environment. A richer appreciation of this environment is correlated to a greater sense of personal satisfaction and an improved perception of the quality of life.

In summary, aesthetic response factors are highly important to diffusion research and other research areas. There needs to be a broader recognition of the significance of aesthetic components. Aesthetic factors are important to product and service design decisions. The examination of the aesthetic prop-

erties of products may require a new conceptual focus of how the appreciation of aesthetic factors affects the quality of life.

The Importance of the Innovator

The research did not confirm the existence of either an aesthetic or technical "type" of innovator in the product categories studied. The data indicated that being innovative in one category makes one more likely to be innovative in the other categories under study. This finding is particularly noteworthy given the fact that the product categories studied are substantially different from one another.

While there is some debate about the existence of the "generalized innovator," the issue can be better put in perspective by the examination of the category of the "multi-category innovator." The presence of the multi-category innovator certainly provides further support for the idea that certain individuals may be predisposed to having a high degree of innovativeness in multiple product categories, even though they are not innovators in all product categories.

The multi-category innovator certainly deserves further research attention and may have something in common with the construct of the influential "market maven" who collects information about shopping environments (Feick & Price, 1987). The multi-category innovator and the market maven could have underlying aesthetic or technical motivations such as an interest in certain aesthetic or technical product groups. Little research has been conducted on multi-category involvement. Further research is needed to examine the motivational factors which innovators in multiple product categories have in common.

Motivational measures of the innovator are certainly more satisfactory in examining the construct of "inherent innovativeness" and avoid the problems of "time of adoption" measures. Motivational factors provide a more satisfactory means of examining the traits underlying innovativeness and provide more convincing evidence of innovativeness as a deeply rooted trait. This research confirms the importance of the innovator as an important research area.

Summary of Applications

Several issues have been addressed as to the utility of this research to examining marketing problems. Firms clearly need to consider the relationship of aesthetic and technical response structures to make promotional and product development decisions. Deciding which technical or aesthetic product features to promote or develop has an impact on strategic goals. Marketers need to recognize the opportunities created from the desire of consumers for technical improvement and aesthetic variation. Variability of response among consumers and changing product category perceptions continually provide opportunities for creating new product niches.

Variability of Response

The data illustrates that there is a great deal of variability of response to aesthetic and technical product components. While it was predictable that aesthetics is important in the case of sunglasses, jeans, and wristwatches, which are frequently considered fashion categories, consumer responses nevertheless showed a great deal of variability in these product categories. Though wristwatches and telephones have a potential for technical complex-

ity, the data indicates that technical aspects of these products are not necessarily dominant with all consumers.

Since component preferences are highly variable, the importance of particular aesthetic or technical component responses to consumers cannot be readily inferred. Though a product may be considered by advertising media as a "fashion product," the importance of technical and aesthetic product components are interpreted by individuals. Product component factors are interpreted through learned indicators.

Individuals have varying degrees of ability to read and interpret technical and aesthetic product cues and culturally communicated codes. What some consumers consider to be elegant in clothing may be considered gaudy or out of style by others. The process of learning to understand and formulate preference toward product cues is a process of taste formation. Recent studies by Belk (1988) in collecting and by Holbrook and Schindler (1989) in musical tastes are a few examples of contributions to understanding the complex process of taste formation.

This variability in response is related to the fact that cues and indicators which consumers use to infer technical and aesthetic value may be subject to change. For example the technical attributes of what constitutes superior nutrition in the breakfast cereal category has undergone transformation over time, from simple vitamins to fiber content. Products which have certain inferior technical components, such as flaws in blown glass dishes and vases, are sometimes considered superior when aesthetically categorized as "handcrafted."

While aesthetic preferences are frequently thought of as highly individualistic, technical preferences also may be distinctive and individualized. Taste components may develop among technical products when functional

products are appreciated and valued as objects for their own sake or for their reference to historical time periods. Taste is not an issue in all or perhaps even very many product categories. For many products, there is clearly a range of variation which is desired. The importance of taste may be provisional or not important in every case.

The instability of consumer aesthetic preferences certainly says something of how product categories are perceived by consumers. Research in marketing and social psychology (cognitive dissonance studies in particular) continually show that rational choice is easily dominated by other considerations. The "fickleness" of consumers, their variability of response over time, and their lack of loyalty in many product categories is a fact of life that is not frequently taken into consideration in consumer choice models. While changing tastes has been a prevalent factor in many consumer product categories, the aesthetic dimension of these tastes undergoes transformation as consumers accumulate new experiences. The demand for aesthetic variation, while not the dominant design component in the rush to be first to the market with an innovation, is much more important over time.

The Strategic Relationship of Aesthetic and Technical Factors

The relationship between aesthetic and technical factors has definite applications to several marketing problems. Aesthetic and technical responses to products may be related to customer satisfaction and customer loyalty. For example, repurchase of the Honda is high, indicating that customer satisfaction and loyalty are strong, but it may be particularly important to understand if the basis for customer satisfaction, loyalty, and product involvement is due to certain aesthetic or technical factors. While cars like the Honda have met standards of technical reliability and been promoted for technical perfor-

mance for several years, aesthetic factors may in fact become important to the loyal customer who has developed an affective reaction to product styling or other product features. If involvement in a product is solely due to technical features, aesthetic factors may become more important choice and preferences factors over time as other cars approach the Honda's technical standard or provide alternative technical merits such as air bags.

Customer loyalty may be due to either aesthetic or technical responses to the product or (what is more likely) the interaction of both. Customer loyalty which has developed in a product category as a result of technical or aesthetic factors may not change in categories such as automobiles where consumers aesthetically "fit" a product into their lifestyle. On the other hand, in categories where consumer continually accumulate experience, consumers may change their expectations, technical product standards, and aesthetic tastes over time.

In product categories such as computer peripherals, a new technology may be initially involving to the consumer but the newness of technical involvement may wear out. High technical involvement may require continual new challenges to be sustained over time. In product categories which offer both aesthetic and technical features, aesthetic components may gradually become more important as technical involvement fades. For example, the more aesthetically diverse Swatch watches are selling at higher volumes than technologically complex "gadget watches."

Furthermore, increased technical attributes may not always be desirable. For example, while increasing the technical recording capacities of VCRs may make them more involving and desirable to some consumers, such features may be confusing and less desirable to others. It is necessary to examine both

technical and aesthetic responses to product components. Consumers may desire only certain technical attributes in a product and not desire others.

There are other applications of these findings to promotion and product development decisions. Advertising itself has a functional purpose, but has been recognized as a commercial art form which is enjoyed for its aesthetic properties. Product development needs to consider the integration of new technology with the aesthetics of new design.

In summary, while the primary technical or functional attributes of a product are certainly important, firms which have satisfied consumers with superior technical standards may need to consider aesthetic factors to retain customer loyalty. Firms need to consider the relationship of aesthetic and technical response structures to a product category to make promotional and product development decisions as to which technical or aesthetic product features to promote or develop.

The Strategic Relevance of Aesthetic Variation

If innovativeness in a category is strongly correlated with an aesthetic component rather than simple involvement in a product category or the technical benefit the product category provides, there may be many more opportunities than previously realized for aesthetic differentiation of products. Marketers need to be more precisely focused and concerned with understanding acceptable variation in aesthetic product features to differentiate their products.

Aesthetic variation in a product category certainly depends upon the qualities apparent in the product category. However, many aesthetic features of products are overlooked or not recognized as aesthetic. Many product features, for example, brand names and brand marks, act as aesthetic product

components which designers use to decorate the exterior or visible features of products. Aesthetic features such as packaging undergo continual variation.

The more complex and subtle the features are in a product category, the greater the potential for the development of complex consumer tastes. The development of new tastes in a product category is not always predictable or controllable processes. Not every innovation will diffuse.

As indicated above, however, aesthetic features are often connected to culture and ideology. Many aesthetic innovations may be due to the creativity of consumers rather than the promotional efforts of firms. Firms need to recognize that aesthetic variation is a means to develop niches in a product category, but this may require considerable promotion and creativity. Certain aspects of the generation, diffusion, and acceptance of aesthetic innovations can be influenced by firms, but the process of taste formation is not well understood and is not strictly controllable.

The Managerial Relevance of Aesthetic and Technical Factors

The aesthetic and technical motivational framework developed in this dissertation can be used as a tool for dealing with specific managerial goals. However, the rules and values which have limited the focus of managers need to be challenged. Product development and design decisions need to be continually updated and informed to be consistent with the changing realities of consumers.

For the past few decades, the post-war era of prosperity produced an era of comfort, convenience, and conformity and production has been geared toward producing large quantities of goods to meet the rising population. Production of high quantities at low cost was thought to be the most important or critical objective. This orientation has been drastically changing with the growing

emphasis on quality. The recognition of the importance of quality now needs to be informed by a better understanding of the technical and aesthetic factors which determine precisely what quality is.

Improving the quality of life requires more than the availability of consumer goods at low prices. Scitovsky has long lamented the lack of recognition of the importance of the factors which can improve the quality of life in America. Scitovsky (1992, p. viii) comments that it is "our excessive demand for comfort... our Puritan tradition, work ethic, and educational system" which deprive us of "the skills and tastes necessary for the enjoyment of the more stimulating and creative leisure activities." Scitovsky calls attention to the some of the pervasive social attitudes and powerful cultural forces which influence motivations. These same factors influence the progress and direction of aesthetic and technical product development.

Until recently, firms have provided little help in aiding consumers to cultivate complex tastes for consumer products or teaching them the benefits and multiple uses of technology. The tacit assumption was that consumers lacked technical and aesthetic sophistication and had little hope of developing it. The understanding of aesthetic factors was particularly neglected by many American firms where product design has a strictly cosmetic or decorative function. Equally wrong was the assumption that technology can be developed without consideration of the changing technological focus and abilities of consumers. While the focus of design can be aesthetic, technological, or both, design is vitally important and cannot be given a secondary role in the firm.

The trend is clearly otherwise. Managers are faced with consumers with a need for stimulation and variation who are becoming increasingly complex in both their use of technology and in their aesthetic tastes. Firms must react accordingly.

The indicators of change are numerous and are most obvious in product categories of recent creation. The development of new computer technology, communication devices, and networking technology continues to change the way in which people relate to and use technology in work and home environments, affecting many aesthetic factors. Individuals have increasing numbers of alternatives to pursue aesthetic tastes and technical skills. These decisions are affected by changes in lifestyles, changes in urban and suburban environments, by changing ethnic groups, and other factors. Information is disseminated more rapidly and the demand for products can develop at a faster pace, bringing about more rapid diffusion and shorter product life cycles.

As consumer tastes grow in complexity, the demand for quality-oriented products has been increasing. These have benefited the growth of firms with a multinational perspective. Italian fashion, Swiss watches, French perfume, and sushi are a few of the imported product categories which require a cultivation of the senses and a discerning group of consumers. They each have inspired their share of fanatics or enthusiastic connoisseurs.

The spread of interest in new and foreign product types is apparent at the retail level in the growth of businesses with international product groups and international product images. Chain clothing stores such as Benetton and the Banana Republic cultivate foreign and international dimensions into product design and promotion strategies. New international retailing partnerships are developing, Barneys and Isetan, for example, which are formed to better capitalize on international fashion trends.

It is a serious mistake for American firms to ignore innovation from high-cost and foreign markets since new trends and styles frequently develop from these niches. Managers must be much more focused on *both* promotion and product development goals in order to cultivate and develop product niches.

Swatch watch, for example, has cultivated a market for watch collectors for its products by developing and promoting limited edition designs. Swatch promotes stylistic variation and educates consumers in multiple segments. Swatch has a product design strategy that is complimented with a product promotion strategy created to add value to their products.

Many product development strategies may require a long-term commitment of both technical development and promotional resources necessary to sustain them over time. These two complementary marketing tools, product development and promotion, require the use of considerable financial resources and is obviously a vitally important area of strategic planning. The failures are noteworthy. For example, the initial advances which American firms developed in videocassette recorders and fax machines were not sustained over time with further product development advances and the commitment of promotional effort. The fact that these markets were left to competitors is an indication of serious failures in strategy.

Aesthetic and technical product features in many consumer product categories undergo change and development which may be the result of haphazard and ill-informed decisionmaking. Numerous product failures testify to the fact that consumer trends are little understood. Aesthetic tastes and technological skills take time to develop and cultivate; the range of aesthetic variation and technological skills need to be better understood in the context of product development strategy. The framework of aesthetic and technical factors needs to be employed to dynamically integrate these factors into design and marketing decisions.

In an economy in which the scale of competition is becoming increasingly global, survival in complex and diverse consumer markets requires a new outlook. Managers need to recognize the importance of motivation and utilize

aesthetic and technical factors in the decisionmaking process. Managers need to change their attitudes to better understand the forces of competition and the technical and aesthetic factors which bring about change. Once the importance of aesthetic and technical factors to product development, promotion, and marketing strategy are better understood, the relevance of aesthetic and technical factors to managerial decisionmaking can be understood to be quite profound.

Methodological Issues and Directions for Future Research

While self-report measures such as those utilized in this study have definite limitations, they are relevant tools to the examination of the issues in question. When examining underlying motivations which are primarily mental phenomenon, it is necessary and appropriate to use such subjective measures to examine mental representations of subjects. Self-report scales are appropriate to the task of exploring the construct of the product category.

The research design is essentially correlational, no causal relationships are possible to infer from the data. The findings indicate the strength of component factors at a given point in time and need to be followed up with additional research and studies. More representative samples need to be taken to apply product category measures to the general population. More research needs to be conducted on the strength of aesthetic and technical component factors as they vary according to exposure to advertising and other sources of information. Further exploration of the consistency of motivation, the influence of motivational attitudes on behavior, and other related issues may require other research methods including the examination of behavior over time.

Only six product categories were investigated, chosen for their mixture of aesthetic and technical components. Given this, care must be taken as to what

can be validly generalized from the data to apply to other product categories. More research needs to be conducted on the strength of component factors in categories which have a greater tendency to be technical or aesthetic.

The relationships between aesthetic, technical, and involvement components did vary across categories, but the three component model was found to be significant in each category. Aesthetic factors are important in categories which have strong technical components, such as telephones. Technical factors are important in categories which have strong aesthetic or fashion components, such as jeans. While the strength of component factors may vary across categories, the data suggests that three component model could be appropriately and fruitfully applied to other consumer product categories.

The Product Category as the Unit of Analysis

The measurement unit is the product category, not the brand. Responses and preferences may be much more specific at the brand level than they are at the product category level. Brand level preferences may be likely to engender much more individualized responses.

The method of using the product category as the measurement unit is different from choosing the individual brand or the individual adoption decision as the means of investigating the adoption of new products. This method of investigating responses to products poses a theoretical problem of generalizability rather than that of reliability or validity. Can one infer anything about a specific instance of adoption from an understanding of product category preferences?

This question is not addressed in this research. The purpose of examining product category structure is not necessarily to be able to predict brand choice. Though it would seem reasonable to assume that one can make reason-

ably accurate preference predictions if you could specify a target group's product category responses, the issue of the predicting specific instances of the adoption of a branded product can only be addressed in a completely different sort of research design.

This does not mean that branding is irrelevant to understanding the product category. Consumer perception of the product category as is undoubtedly affected by brand promotions and brand images. Though the research did not specifically examine branded products, better understanding of product categories can contribute to isolating the effects of brand images and promotions. It is necessary to recognize that the product category is at a different level of abstraction from the individual branded product.

Besides branding, many specific influences on adoption decisions are not fully treated in this study. Cost factors which affect supply and marketing elements such as price and availability which affect demand are critically important diffusion factors, related to both the decision to adopt and the rate of adoption.

Motivational rating scales are not intended to measure product perception and adoption on all choice factors, just the relative weights of aesthetic and technical factors which were hypothesized to be important to the generation of innovations. The issue, for example, of inadequate choice information is not a problem since the study does not proposed to determine all the factors which would explain adoption.

There are many issues in need of further investigation. The issues are interdisciplinary and contributions are now coming from many fields. While some experimental work has been done in consumer tastes and preferences for complex artistic offerings, such fields as experimental aesthetics and leisure research which are in the early stage of development will certainly

provide new insights to the field. Psychologists have begun to study developmental issues of the origins of aesthetic preferences and abilities (Gardiner, 1983). Research in these areas is clearly overlapping with consumer issues.

The Process Approach

This research provides support for a process approach to diffusion theory useful to examining motivations which underlie the development of new products at the product class level. The research supports the categorization scheme to further the understanding of the motivational process view of innovation developed in Chapter 3.

Being exploratory in its purpose and design, not all motivations which could be described as technical or aesthetic are examined. The dimensions which underlie aesthetic and technical motivations are complex. Many important social and psychological issues are yet to be examined which would shed greater light on the complex issue of motivation. The issue of the interpretation of novel aesthetic and technical product features deserves greater research attention. The many situational factors which facilitate or lead to the development of new products would also be valuable to examine.

While this research is not focused on finding out if a particular new product will be successful, this research is nevertheless relevant to understanding processes which bring about innovation and result in adoption. Processes of taste formation, product category involvement, and novelty and stimulation seeking have a clear relationship to aesthetic and technical components. Research into these processes calls for new approaches and a broader focus on the social system. A process approach to understanding innovation are relevant and applicable to the direction of product development in many industries.

Processes of Motivation and Innovation

Diffusion theory posits that attributes of the innovation, including such things as the comparative advantage of an innovation, the trialability of the innovation, and other factors, affect the decision processes of early adopters of an innovation. This dissertation has ignored the features of the individual innovation and has turned attention instead to examining the motivations of individuals to want new things, either out of the desire for technical improvement or out of the desire for aesthetic variation. To the extent that these motivations are important to each new product on the market, these motivations need to be examined in understanding the adoption process.

Several theoretical areas have been examined which call for further theoretical and empirical research attention. This dissertation identifies several research areas important to the examination of innovation processes which has expanded the limits of diffusion theory and new product marketing. The process of innovation must also be examined on the basis of practical applications to change. Drucker (1985) describes innovation as a discipline which needs to be continually renewed and practiced. Further interdisciplinary research is needed to expand the understanding of the importance of aesthetic and technical motivational factors on the process of innovation.

APPENDICES

APPENDIX A:

Domain Specific Scale Items

JEANS

I1. I care very much about the type of jeans I buy.
I2. Jeans are all pretty much the same these days.*
I3. It is not worth it to me to spend much time in selecting a pair of jeans.*
A1. Jeans are definitely fashion design statements.
T1. The most important thing about jeans is that they last and fit well.
A2. I enjoy looking at different types of jean designs.
A3. I am willing to pay more for jeans that I find really attractive.
T2. Before buying a particular pair of jeans, I would like to read something or consult someone about their durability and workmanship.
T3. I would be willing to pay more for jeans that fit well and last.
AN. I am interested in new types of jeans for their better workmanship.
TN. I am interested in new types of jeans for their more attractive designs and fashions.
N. I am generally interested in new and different jean products.

BREAKFAST CEREALS

I1. I care very much about the type of breakfast cereals I buy.
I2. Breakfast cereals are all pretty much the same these days.*
I3. It is not worth it to me to spend much time in selecting a breakfast cereal.*
A1. Breakfast cereals are a tasty group of food products .
T2. The most important thing about breakfast cereals is that they provide nutrition.
A2. I enjoy examining a large variety of breakfast cereals products.
A3. I am willing to pay more for a breakfast cereals that I find really delicious.
T2. Before buying a particular breakfast cereal, I check about its nutritional value.
T3. I would be willing to pay more for breakfast cereals that provide superior nutrition.
AN. I am interested in new types of breakfast cereal for their better taste.
TN. I am interested in new types of breakfast cereal for their better nutrition.
N. I am generally interested in new breakfast cereal products.

SUNGLASSES

I1. I care very much about the type of sunglasses I buy.
I2. Sunglasses are all pretty much the same these days.*
I3. It is not worth it to me to spend much time in selecting a pair of sunglasses.*
A1. Sunglasses are definitely fashion design statements.

T1. The most important thing about sunglasses is that they protect my eyes from the sun.
A2. I could enjoy looking at sunglass designs in a book or catalogue of sunglasses.
A3. I am willing to pay more for a sunglasses with attractive designs.
T2. Before buying a particular pair of sunglasses, I would like to read something or consult someone about their protective properties.
T3. I am willing to pay more for sunglasses with better protection from the sun.
AN. I am interested in new types of sunglasses for their more attractive designs and fashions.
TN. I am interested in new types of sunglasses for better protection from the sun.
N. I am generally interested in new sunglass products.

TOOTHPASTE

I1. I care very much about the type of toothpastes I buy.
I2. Toothpastes are all pretty much the same.*
I3. It is not worth it to me to spend much time in selecting a toothpastes.*
A1. Toothpastes are pleasing and freshening products.
T1. The most important thing about toothpastes is that they help prevent cavities.
A2. I enjoy examining a variety of toothpaste products.
A3. I am willing to pay more for a toothpastes with better taste.
T2. Before buying a particular toothpaste, I check about its ability to prevent cavities.
T3. I would be willing to pay more for toothpastes that provide superior cavity prevention.
AN. I am interested in new types of toothpaste for their better taste.
TN. I am interested in new types of toothpaste for their better cavity prevention abilities.
N. I am generally interested in new and different toothpaste products.

TELEPHONES

I1. I care very much about the type of telphones I buy.
I2. Telephones are all pretty much the same.*
I3. It is not worth it to me to spend much time in selecting a telephone.*
A1. Telephone designs can be considered art forms or fashion statements.
T1. The most important thing about telephones is their reliable technical performance.
A2. I would enjoy looking at the designs in a catalogue or book of telephone products.
A3. I am willing to pay more for a telephones with attractive designs.
T1. Before buying a particular telephone, I would like to read something or consult someone about its technical performance and reliability.
T3. I am willing to pay more for good technical performance in a telephone.
AN. I am interested in new types of telephones for their more attractive designs and fashions.

TN. I am interested in new types of telephones for their better technology.
N. I am generally interested in new telephone products.

Seven point agree/disagree scales
* Reverse scaled

APPENDIX B:

Aesthetic Background Scale Items with Factor Loadings

Factor Loading	Item
.73	My experience with different forms of art has made my life more interesting and enjoyable.
.70	My education has included several courses dealing with art appreciation or artistic design.
.77	Compared to the average person, I have a much higher appreciation of art and design.
.78	I enjoy going through an art gallery.
.86	It is important to me to develop an appreciation of different art forms.

Factor loadings provided here are the lamda x estimates from the LISREL confirmatory factory analysis output.

APPENDIX C:

Technical Background Scale Items with Factor Loadings

Factor Loading	Item
.70	Technical information confuses me.*
.59.	I have no trouble in programming my video recorder or understanding the way to use cameras and other technical products.
.63	Information about complex products such as automobiles and electronics are better left to someone else.*
.60	My education has included many courses of a technical subject matter.
.78	I am more prepared to understand technically subjects better than the average person.
.70	My understanding of technology makes my life easier and more interesting.
.63	Technical discussions can be quite interesting to me.

* Reverse scaled

Factor loadings provided here are the lamda x estimates from the LISREL confirmatory factory analysis output.

APPENDIX D:

Factor Loadings for Category Measures

Factor loading provided are for exploratory factor analysis using the maximum likelihood method and are obliquely rotated factor solutions. Loading are indicated if absolute value is greater than .5. If no item loading value is greater than .5, all loadings greater than .2 in absolute value are indicated.

Category: Watches

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.37		
A2	.62		
A3	.75		
T1		.36	
T2		.64	
T3		.78	
I1			.59
I2			.58
I3			.80
N	.70		
AN	.84		
TN		.73	

Variance explained for 3 factors: 46%

Category: Jeans

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.28		.30
A2	.65		
A3	.46		.41
T1		.58	
T2		.41	
T3		.40	
I1			.62
I2			.77
I3			.65
N	.73		
AN	.84		
TN		.52	

Variance explained for 3 factors: 45%

Category: Breakfast Cereals

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.50		
A2	.61		
A3	.60		
T1		.75	
T2		.85	
T3		.88	
I1			.80
I2			.75
I3			.59
N	.74		
AN	.72		
TN		.85	

Variance explained for 3 factors: 56%

Category: Sunglasses

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.53		
A2	.54		
A3	.62		
T1		-.67	
T2		-.62	
T3		-.81	
I1			.72
I2			.74
I3			.70
N	.58		
AN	.91		
TN		-.92	

Variance explained for 3 factors: 55%

Category: Toothpaste

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.28		
A2	.31		.24
A3	.48		
T1		-.51	
T2		-.60	
T3		-.80	
I1			.62
I2			.80
I3			.76
N	.48		
AN	.90		
TN		-.78	

Variance explained for 3 factors: 51%

Category: Telephones

Item	Aesthetic factor	Technical factor	Involvement factor
A1	.46		
A2	.65		
A3	.91		
T1		.36	
T2		.43	
T3		.76	
I1			.73
I2			.73
I3			.74
N	.50		
AN	.87		
TN		.78	

Variance explained for 3 factors: 54%

BIBLIOGRAPHY

Anand, Punan and M. Holbrook, (1986), "Chasing the Wundt Curve: An Adventure in Consumer Aesthetics," *Advances in Consumer Research*, Association of Consumer Research, 13, 655-7.

Anderson, R. and D Ortinau (1988), "Exploring Consumers' Postadoption Attitudes and Use Behaviors in Monitoring the Diffusion of a Technology-Based Innovation," *Journal of Business Research*, 17, 283-298.

Arndt, Johan (1967), "The Role of Product-Related Conversation in the Diffusion of a New Product," *Journal of Marketing Research*, 4, 291-295.

Barnett, H. G. (1953), *Innovation: The Basis of Cultural Change*, New York: McGraw-Hill.

Bass, Frank (1969), " A New Product Growth Model for Consumer Durables," *Management Science*, 15, 5, 215-227.

_____ (1980), "The Relationship Between Diffusion Curves, Experience Curves, and Demand Elasticities for Consumer Durable Technological Innovations," *Journal of Business*, 53 (July), 551-557.

Belk, Russell (1988), "Possessions and the Extended Self," *Journal of Consumer Research*, 15 (September), 139-168.

Bentler, P. M. and D. G. Bonnett (1980), "Significance Tests and Goodness of Fit in the Analysis of Variance of Covariance Structures," *Psychological Bulletin*, 56, 588-606.

Berlyne, D.E. (1960), *Conflict, Arousal and Curiosity*, New York: McGraw-Hill.

Bernhardt, I. and K. Mackenzie (1972), "Some Problems in Using Diffusion Models for New Products, *Management Science*, 19 (October), 187-200.

Bloch, Peter (1981), "Involvement Beyond the Purchase Process: Conceptual Issues and Empirical Examination," *Advances in Consumer Research*, Association of Consumer Research, 9, 413-417.

_____ (1982), "An Exploration into the Scaling of Consumers' Involvement with a Product Class," *Advances in Consumer Research*, Association of Consumer Research, 8, 61-65.

_____ and Grady Bruce (1984), "Product Involvement as Leisure Behavior," *Advances in Consumer Research*, Association of Consumer Research, 11, 197-202.

_____ Daniel Sherrel and Nancy Ridgeway (1986), "Consumer Search: An Extended Framework," *Journal of Consumer Research*, 13 (June), 119-126.

Bobrow, E. and D. Shafer (1987), *Pioneering New Products: A Market Survival Guide*, Homewood, IL: Dow Jones-Irwin.

Booz, Allen, & Hamilton, Inc. (1982), *New Product Management for the 1980s*, New York: Booz, Allen, & Hamilton, Inc.

Brown, J. and P. Reingen (1987), "Social Ties and Word-of-Mouth Referral Behavior," *Journal of Consumer Research*, 14 (December), 350-362.

Brown, Lawrence (1981), *Innovation Diffusion: A New Perspective*, New York: Methuen.

Bryan, Hobson (1979), "Leisure Value System and Recreational Specialization," Journal of Leisure Research, 9, 3, 174-187.

Butler, John (1988), "Theories of Technological Innovation as Useful Tools for Corporate Strategy," *Strategic Management Journal*, 19, 15-29.

Cacioppo, John and Richard Petty (1982), "The Need for Cognition," *Journal of Personality and Social Psychology*, 42,1, 116-131.

Cancian, Frank (1967), "Stratification and Risk Taking," *American Sociological Review*, 32, 912-27.

Carlson, Les and S. Grossbart (1984), "Toward a Better Understanding of Inherent Innovativeness," *Advances in Consumer Research*, Association of Consumer Research, 19, 88-91.

Churchill, Gilbert (1979) "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research*, 16 (February), 64-73.

Coleman, J., E. Katz and H. Menzel (1957) "The Diffusion of an Innovation Among Physicians," *Sociometry*, 20 (December) 253-270.

Cox, D. and W. Locander (1987), "Product Novelty: Does it Moderate the Relationship Between Ad Attitudes and Brand Attitudes, *Journal of Advertising*, 16,3, 39-44.

Csikszentmihalyi, Mihalyi and I. S. Csikszentmihalyi, eds., (1988), *Optimal Experience: Psychological Studies of Flow in Consciousness*, New York: Cambridge University Press.

_____ and Eugene Rochberg-Halton (1981), *The Meaning of Things: Domestic Symbols and the Self*, Cambridge, MA: Cambridge University Press.

Cunningham, S. (1967), "The Major Dimensions of Perceived Risk," in D. Cox, ed., *Risk Taking and Information Handling in Consumer Behavior*, Boston: Division of Research, Harvard University, 82-108.

Danko, William and James MacLachlan (1983), "Research to Accelerate the Diffusion of a New Invention," *Journal of Advertising Research*, 23, 3, (June/July), 39-43.

Dickerson, Mary and James Gentry (1983), "Characteristics of Adopters and Non-Adopters of Home Computers," *Journal of Consumer Research*, 10 (September), 225-35.

Dichter, Ernest (1964), *Handbook of Consumer Motivations*, New York: McGraw Hill.

_____ (1978), "Interpretative Versus Descriptive Research," *Research in Marketing*, vol. 1, JAI press, 53-77.

Dillon, William R., N. Mulani and D. Frederick (1984), "Removing Perceptual Distortions in Product Space Analysis," *Journal of Marketing Research*, 21, (May), 184-93.

Downs, G. and L. Mohr (1976), "Conceptual Issues in the Study of Innovation," *Administrative Science Quarterly*, 21, December, 700-714.

Drucker, Peter (1985), "The Discipline of Innovation," *Harvard Business Review*, (May-June), 67-72.

Engel, J., D. Kollat, and R. Blackwell (1968), *Consumer Behavior*, New York: Dryden Press.

Feick, L. and L. Price (1987), "The Market Maven: the Diffusion of Marketplace Information," *Journal of Marketing*, 51 (January), 83-97.

Feldman, L. and G. Armstrong (1975), "Identifying Buyers of a Major Automotive Innovation, " *Journal of Marketing*, 39 (January), 47-53.

Field, George (1970), "The Status Float Phenomenon," *Business Horizons*, 13 (August), 45-52.

Frank, Ronald (1968), "Market Segmentation Research: Findings and Implications," in *Applications of the Sciences in Marketing Management*, F. Bass, C. King, and E. Pessemier, eds., New York: John Wiley and Sons.

Frank, R., W. Massy and D. Morrison (1964), "The Determinants of Innovative Behavior with Respect to a Branded, Frequently Purchased Food Product," *Proceedings*, L. Smith, ed., Chicago: American Marketing Association, 312-323.

Fox, Kathryn (1989), "Real Punks and Pretenders: The Social Organization of a Counterculture," *Journal of Contemporary Ethnography*, 16, (October), 344-370.

Foxall, G. (1988), "Consumer Innovativeness: Novelty Seeking, Creativity, and Cognitive Style," in *Research in Consumer Behavior*, E. Hirschman, ed., Greenwich, CT: JAI Press.

_____ and A. Payne (1989), "Adaptors and Innovators in Organizations: A Cross-Cultural Study of the Cognitive Styles of Managerial Functions and Subfunctions," *Human Relations*, 42, 7, 639-649.

Gatignon, H. and T. Robertson (1985), "A Propositional Inventory for Diffusion Research," *Journal of Consumer Research*, 11, (March), 849-867.

_____ (1986), "Integration of Consumer Diffusion Theory and Diffusion Models: New Research Directions," *Innovation Diffusion Models of New Product Acceptance*, V. Mahajan & Y. Wind, (eds.), Cambridge, MA: Ballinger.

Getzels, J. and M. Csikszentmihalyi (1976), *The Creative Vision: A Longitudinal Study of Problem Finding in Art*, New York: Wiley Interscience.

Glaser, B. G. and H. L. Strauss (1967), *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Chicago: Aldine.

Golden, Linda and K. Johnson (1983), "The Impact of Sensory Preference and Thinking Versus Feeling Appeals on Advertising Effectiveness," *Advances in Consumer Research*, 21, 203-5.

Goldsmith, Ronald (1986), "Personality and Adaptive-Innovative Problem Solving," *Journal of Social Behavior and Personality*, 1, 95-106.

_____ and Charles Hofacker, (1991) "Measuring Consumer Innovativeness," *Journal of the Academy of Marketing Science*, 19, 3, 209-221.

Goodman, Nelson (1976), *Languages of Art*, Hackett Publishing, Indianapolis.

Granovetter, Mark (1974), "The Strength of Weak Ties," *American Journal of Sociology*, 78, (May), 1360-1380.

_____ (1978), "Threshold Models of Collective Behavior," *American Journal of Sociology*, 83, 6, 1420-1443.

Greenberg, C. Jerome, Elaine Sherman, and Leon G. Schiffman (1983), "The Measurement of Fashion Image as a Determinant of Store Patronage," in *Patronage Behavior and Retail Management*, Darden and Lusch, eds., North Holland, New York.

Hart, E. and J. Jacoby (1973), "Novelty, Recency and Scarcity as Predictors of Perceived Newness," *Proceedings*, 81st Annual Convention, American Psychological Association, 839-840.

Hauser, John and Frank Kopelman (1979), "Alternative Perceptual Mapping Techniques: Relative Accuracy and Usefulness," *Journal of Marketing Research*, 16 (November), 495-506.

Hayduk, Leslie A. (1987), *Structural Equation Modeling with LISREL*, Baltimore: John Hopkins University Press.

Heany, Donald (1983), "Degrees of Product Innovation," *Journal of Business Strategy*, 3-14.

Hirsch, Paul (1972), "Processing Fads and Fashions: An Organization-Set Analysis of Cultural Industry Systems," *American Journal of Sociology*, 77,4, 639-659.

Hirschman, Elizabeth (1980a), "Innovativeness, Novelty Seeking, and Consumer Creativity," *Journal of Consumer Research*, 7 (December), 283-295.

_____ (1980b), ""Consumer Modernity, Cognitive Complexity, Creativity and Innovativeness," in *Marketing in the 80's: Changes and Challenges*, R. Bagozzi et al., eds., Chicago: American Marketing Association, 354-357.

_____ (1981), "Symbolism and Technology as Sources for the Generation of Innovations," *Advances in Consumer Research*, Association of Consumer Research, 19, 537-541.

_____ (1986), "Humanistic Inquiry in Marketing Research: Philosophy, Method and Criteria," *Journal of Marketing Research*, 23 (August), 237-249.

_____ and M. Solomon (1986), "Utilitarian, Aesthetic, and Familiarity Responses to Verbal Versus Visual Advertisements," *Advances in Consumer Research*, 22, 426-431.

Hoch, Stephen and John Deighton (1989), "Managing What Consumers Learn from Experience," *Journal of Marketing*, 53, 1-19.

Holak, Susan, Donald Lehmann, and Fareena Sultan (1987), "The Role of Expectations in the Adoption of Innovative Consumer Durables: Some Preliminary Evidence." *Journal of Retailing*, 63, 3, (Fall), 243-259.

Holbrook, Morris (1980) "Some Preliminary Notes on Research in Consumer Aesthetics," *Advances in Consumer Research*, 7, 104-108.

_____ (1982) "Mapping the Retail Market for Esthetic Products: The Case of Jazz Records," *Journal of Retailing*, 58, 1 (Spring), 114-129.

_____ (1986a), "Aims, Concepts, and Methods for the Representation of Individual Differences in Esthetic Responses to Design Features," *Journal of Consumer Research*, 13, (December), 337-47.

_____ (1986b), "Emotion in the Consumption Experience: Toward a New Model of the Human Consumer," in *The Role of Affect in Consumer Behavior*, Robert Peterson, Wayne Hoyer, and William Wilson, eds., Lexington, MA: Lexington Books.

_____ and E. Hirschman (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun, *Journal of Consumer Research*, 9 (September), 132-140.

_____ and Joel Huber (1979) "Separating Perceptual Dimensions from Affective Overtones," *Journal of Consumer Research*, 5 (March), 272-283.

_____ and R. Schindler (1989), "Some Exploratory Findings on the Development of Musical Tastes," *Journal of Consumer Research*, 16 (June), 119-124.

Houston, Michael and Michael Rothschild (1978), "Conceptual and Methodological Perspectives on Involvement," in S. Jain (ed.) *1978 Marketing Educators' Proceedings*, Chicago, American Marketing Association.

Howard, John A. and Jagdish Sheth (1969) *The Theory of Buyer Behavior*, New York: John Wiley & Sons.

Jacoby, Jacob (1971), "Multiple-Indicant Approach for Studying New Product Adopters," *Journal of Applied Psychology*, 55, 4, 384-388.

Jamison, Andrew (1989), "Technology's Theorists: Conceptions of Innovation in Relation to Science and Technology Policy," *Technology and Culture*, 30,3 (July), 505-533.

Johnson, Blair and Alice Eagly (1989), "Effects of Involvement on Persuasion: A Meta-Analysis," *Psychological Bulletin*, 106, 2, 290-314.

Kapferer, Jean-Noel and Laurent, Gilles (1985) "Consumer Involvement Profiles: A New Practical Approach to Consumer Involvement," *Journal of Advertising Research*, 25,6 (December), 48-56.

Kassarjian, Harold (1971), "Personality and Consumer Behavior: A Review," *Journal of Marketing Research*, 8 (November) 409-418.

Katz, Elihu (1961), "The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovation," *Human Organization*, 20, 70-82.

_____ (1987) "Communication Research Since Lazarfeld," *Public Opinion Quarterly*, 51, S25-S45.

_____ and P. Lazarfeld (1954), *Personal Influence*, Glencoe, Illinios: The Free Press.

King, Charles (1964) "Fashion Adoption: A Rebuttal to the Trickle Down Theory," *Toward Scientific Marketing*, S. Greyser (ed.), Proceedings of the American Marketing Association, 108-125.

Kirton, M. J. (1976), "Adaptors and Innovators: A Description and Measure," *Journal of Applied Psychology*, 61, 622-629.

_____ (1980), "Adaptors and Innovators in Organizations," *Human Relations*, 33, 4, 213-224.

Klonglan, G. E. and E. W. Coward (1970), "The Concept of Symbolic Adoption: A Suggested Interpretation," *Rural Sociology*, 35 (March), 77-83.

Kohn, C. and J. Jacoby (1973), "Operationally Defining the Consumer Innovator," *Proceedings*, 81st Annual Convention, American Psychological Association, 837-838.

Kroeber, A. L. (1919), "Illustration of Fashion Trends," *American Anthropologist*, July/Sept., 33-38.

Lastovicka, John and David Gardner (1979), "Components of Involvement," in *Attitude Research Plays for High Stakes*, eds. Maloney and Silverman, Chicago: American Marketing Association, 53-73.

Laurent, Gilles and Jean-Noel Kapferer (1985), Measuring Consumer Involvement Profiles," *Journal of Marketing Research*, 22 (February)/ 41-53.

Lazarfeld, Paul, Bernard Berelson and Hazel Gaudet (1944), *The People's Choice*, New York: Columbia University Press.

Liu, W. and R. Duff (1972), "The Strength in Weak Ties," *Public Opinion Quarterly*, 36 (Fall), 361-366.

Mahajan, Vijay and R. Peterson, (1985) *Models for Innovation Diffusion*, Beverly Hills, CA: Sage.

_____ and Y. Wind, eds., (1986) *Innovation Diffusion Models of New Product Acceptance*, Cambridge, MA: Ballinger.

_____ E. Muller and R. Srivastava (1991), "Determination of Adopter Categories by Using Innovation Diffusion Models," *Journal of Marketing Research*, 37 (February), 37-50.

Marcus, A. and R. Bauer (1964) "Yes: There are Generalized Opinion Leaders," Public Opinion Quarterly, 28 (Winter), 628-632.

Martineau, Pierre (1958) "Social Class and Spending Behavior," *Journal of Marketing*, 23, 2 (October), 23-28.

Maslow, Abraham (1962), *Toward a Psychology of Being*, New York: Van Nostrand.

McAllister, L. and E. Pessemier (1979), "Variety Seeking Behavior: An Interdisciplinary Review," *Journal of Consumer Research*, 9 (December), 311-321.

McIntyre, N. (1989), "The Personal Meaning of Participation: Enduring Involvement," *Journal of Leisure Research*, 21, 2, 167-179.

McClurg, J. and I. Andrews (1974), "A Consumer Profile Analysis of the Self Service Gasoline Customer," *Journal of Applied Psychology*, 59 (February), 119-121.

McClelland, David (1980), "Motive Dispositions: The Merits of Operant and Respondent Measures," In L. Wheeler (ed.), *Review of Psychology and Social Psychology* , (Vol. 1, pp. 10-41), Beverly Hills, CA: Sage.

_____ J. Atkinson, R. Clark, and E. Lowell (1953), *The Achievement Motive*, New York: Irvington Publishers.

_____ Richard Koestner, and Joel Weinberger (1989) "How Do Self-Attributed and Implicit Motives Differ?" *Psychological Review*, 96, 4, 690-702.

Merton, R. K. (1957), *Social Theory and Social Structure*, New York: The Free Press.

Mittal, Banwari (1989), "Must Consumer Involvement Always Imply More Information Search?" *Advances in Consumer Research*, 16, Association of Consumer Research, 167-172.

Mittelstaedt, R., S. Grossbart, W Curtis, and S. Devere (1976), "Optimal Stimulation Level and the Adoption Decision Process," *Journal of Consumer Research*, 3 (September), 84-94.

Midgley, David (1977), *Innovation and New Product Marketing*, New York: John Wiley & Sons.

_____ (1987), A Meta-Analysis of the Diffusion of Innovations Literature," *Advances in Consumer Research*, Association of Consumer Research, 204-207.

_____ and G. Dowling (1978), Innovativeness: The Concept and Its Measurement," *Journal of Consumer Research*, 4 (March), 229-242.

Muncy, James (1990), "Involvement and Perceived Brand Similarities/Differences," *Advances in Consumer Research*, 17, Association of Consumer Research, 144-8.

Nicosia, F. (1966), *Consumer Decision Processes*, Englewood Cliffs, New Jersey: Prentice Hall.

Norton, John and Frank Bass (1987), "A Diffusion Theory Model of Adoption and Substitution for Successive Generations of High Technology Products," *Management Science*, 33, 9, 1069-1086.

Nystrom, Paul (1928), *The Economics of Fashion*, New York: Ronald Press.

Nunnally, Jum (1978), *Psychometric Theory*, New York: McGraw Hill.

O'Guinn, Thomas and Ronald Faber (1989), "Compulsive Buying: A Phenomenological Explanation," *Journal of Consumer Research*, 16 (November), 272-282.

Ostlund, Lyman (1972), "A Study of Innovativeness Overlap," *Journal of Marketing Research*, 9 (August), 341-343.

_____ (1973) "A Further Caution: It's Innovativeness Overlap," *Journal of Marketing Research*, 9 (May), 225-6.

Painter, John and Max Pinegar (1971), "Post-High Teens and Fashion Innovators," *Journal of Marketing Research*, 8 (August), 368-369.

Pessemier, Edgar (1966), *New Product Decisions: An Analytical Approach*, New York: McGraw Hill.

Peterson, Robert (1973), "A Note on Optimal Adopter Category Determination," *Journal of Marketing Research*, 10 (August), 325-329.

Porter, Michael (1990), *The Competitive Advantage of Nations*, New York: The Free Press.

Price, L. and N. Ridgeway (1982) "Use Innovativeness, Vicarious Exploration and Purchase Exploration: Three Facets of Consumer Varied Behavior," *Advances in Consumer Research*, Association of Consumer Research, 56-60.

_____ (1984), "Development of a Scale to Measure Use Innovativeness," *Advances in Consumer Research*, Association of Consumer Research, 679-684.

Raju, P. (1980), "Optimum Stimulation Level: Its Relationship to Personality, Demographics, and Exploratory Behavior," *Journal of Consumer Research*, 7 (December), 272-282.

Reynolds, Fred and William Darden (1971), "Mutually Adaptive Effects of Interpersonal Communication," *Journal of Marketing Research*, 8 (November), 449-454.

Richins, Marsha and Peter Bloch (1986), "After the New Wears Off: The Temporal Context of Product Involvement," *Journal of Consumer Research*, 13, (September), 280-285.

Robertson, Thomas (1967), "The Process of Innovation and the Diffusion of Innovation," *Journal of Marketing*, 31, 14-19.

_____ (1968), "The Effect of the Informal Group Upon Member Innovative Behavior, *Proceedings*, American Marketing Association, 334-340.

_____ (1971), *Innovative Behavior and Communication*, New York: Holt, Rinehart and Winston.

_____ (1984), "Marketing's Potential Contribution to Consumer Behavior Research: The Case of Diffusion Theory," *Advances in Consumer Research*, Association of Consumer Research, 11, 484-489.

_____ and H. Gatignon (1986), "Competitive Effects on Technology Diffusion," *Journal of Marketing*, 50 (July), 1-12.

_____ and Myers (1969), "Personality Correlates of Opinion Leadership and Innovative Buying Behavior," *Journal of Marketing Research*, 6 (May), 164-168.

Robinson, Dwight (1975), "Style Changes: Cyclical, Inexorable and Foreseeable," *Harvard Business Review*, (Nov/Dec), 121-151.

Rogers, Everett M. (1962), *Diffusion of Innovations*, New York: Free Press.

_____ (1976), "New Product Adoption and Diffusion," *Journal of Consumer Research*, 2 (March) 290-301.

_____ (1983), *Diffusion of Innovations*, 3rd ed., New York: Free Press.

_____ and F. Shoemaker (1971), *Communication of Innovations*, 2nd ed., New York: Free Press.

_____ and D. L. Kincaid (1981), *Communication Networks*, New York: Free Press.

_____ and J. D. Stanfield (1968), Adoption and Diffusion of New Products: Emerging Generalizations and Hypotheses," in *Applications of the Sciences in Marketing Management*, F. Bass, C. King, and E. Pessemier, eds., New York: John Wiley and Sons.

Rook, D. (1987), "The Buying Impulse," *Journal of Consumer Research*, 14 (Sept.) 189-99.

Rosengren, Karl (1973), "News Diffusion: An Overview," *Journalism Quarterly*, 50, 83-91

Rudell, Fredrica (1991), "Boys' and Girls' Tools: An Exploration of the Gender Differences in Consumer Decision Making for High-tech Products," in *Gender and Consumer Behavior*, J. Costa (ed.), Salt Lake City, Utah: Univerisity of Utah Printing Service.

Ryan, B. and N. Gross (1943), "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," *Rural Sociology*, 8 (March), 15-24.

Schiffman, Leon G. (1972), "Perceived Risk in New Product Trial by Elderly Consumers," *Journal of Marketing Research*, 9 (February) 106-108.

_____ and Leslie Kanuk (1978), *Consumer Behavior*, Prentice Hall, Englewood Cliffs, N. J.

Scitovsky, Tibor (1976), *The Joyless Economy*, New York, Oxford University Press.

Scitovsky, Tibor (1992), *The Joyless Economy (revised edition)*, New York, Oxford University Press.

Selin, Steve and Dennis Howard (1988), "Ego Involvement and Leisure Behavior: A Conceptual Specification," *Journal of Leisure Research*, 20, 3, 237-244.

Selnes, Fred and Kjell Grønhaug (1986), "Subjective and Objective Measures of Product Knowledge Compared," *Advances in Consumer Research*, Association of Consumer Research, 67-71.

Shanklin, W. and J. Ryans (1984), "Organizing for High-Tech Marketing," *Harvard Business Review*, 84 (November-December), 164-171.

Sherry, John (1988), "Postmodern Alternatives: The Interpretive Turn in Consumer Research," to be including in the forthcoming *Handbook of*

Consumer Theory and Resea·ch, H. Kassarjian and T. Robertson, eds., Englewood Cliffs, NJ: Prentice Hall.

Sheth, J. (1971), "Word of Mouth in Low-Risk Innovations," *Journal of Advertising Research*, 11 (June), 15-18.

Simmel, George (1904), "Fashion," *American Journal of Sociology*, 62.

Simonton, Dean (1984), *Genius, Creativity and Leadership*, Cambridge, MA: Harvard University Press.

Slama, Mark and Armen Tashchian (1985), "Selected Socio-Economic and Demographic Characteristics Associated with Purchase Involvement," *Journal of Marketing*, 49 (Winter), 72-80.

Stewart, David (1981), "The Application and Misapplication of Factor Analysis in Marketing Research," *Journal of Marketing Research*, 18 (February) 51-62.

Stigler, and Gary Becker (1977), "De Gustibus Non Est Disputandum," *American Economic Review*, 67, 2 (March), 76-90.

Strati, Antonio (1992), "Aesthetic Understanding of Organization Life," *Academy of Management Review*, 17, 3, 568-581.

Summers, John (1971), "Generalized Change Agents and Innovativeness," *Journal of Marketing Research*, 8, (August), 313-316.

Szybillo, George and Jacob Jacoby (1974), "Intrinsic and Extrinsic Cues as Determinants of Perceived Product Quality," *Journal of Applied Psychology*, 59, 1, 74-78.

Tanny, S. M. and N. A. Derzko (1988), "Innovators and Imitators in Innovation Diffusion Modeling," *Journal of Forecasting*, 7, 225-234.

Vaughn, R (1980), "How Advertising Works: A Planning Model," *Journal of Advertising Research*, 20, (October), 27-33.

Vroom, V. (1964), *Work and Motivation*, New York: Wiley.

Weisberg, R. (1988), "Problem Solving and Creativity," in *The Nature of Creativity: Contemporary Psychological Perspectives*, R. Sternberg, ed., Cambridge University Press.

Wilkie, William, (1986), *Consumer Behavior*, New York: John Wiley and Sons.

Wind, Yoram, Thomas Robertson, and Cynthia Fraser (1982), "Industrial Diffusion by Market Segment," *Industrial Marketing Management*, 11, 1-8.

Zaichkowsky, Judith (1985), "Measuring the Involvement Construct," *Journal of Consumer Research*, 12, (December) 341-352.

Zajonc, Robert (1980), "Feeling and Thinking: Preferences Need No Inferences," *American Psychologist*, 35, 151-75.

_____ and Hazel Markus (1982), "Affective and Cognitive Factors in Preferences," *Journal of Consumer Research*, 9, (Sept.) 123-131.

Zeithaml, Valerie (1988), "Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence," *Journal of Marketing* , 52, (July), 2-22.