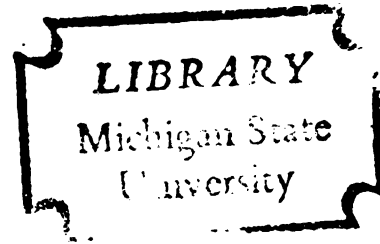


MARKET SEGMENTATION BY CONSUMER
PERCEPTION: A CASE STUDY

Dissertation for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
JORGE F. GONZALEZ - ARCE
1973



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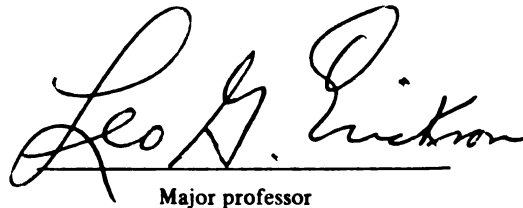
**MARKET SEGMENTATION BY CONSUMER
PERCEPTION: A CASE STUDY**

presented by

Jorge F. Gonzalez-Arce

has been accepted towards fulfillment
of the requirements for

Ph.D degree in Marketing


Major professor

Date

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ABSTRACT

MARKET SEGMENTATION BY CONSUMER PERCEPTION: A CASE STUDY

By

Jorge F. Gonzalez-Arce

The main objective of this research is to examine and validate the application of newer marketing research techniques in a developing country. The intent is to reinforce the hypothesis that technology does not recognize economic or national borders as long as it is correctly adapted to local environments.

The methodology which was selected for testing, although widely discussed in academic circles, has not been described step by step. Nor has it been used, at least in published materials, in large and probabilistic samples. It is thus our aim to present a practical business case in which a multicity (30 areas) survey was conducted by personally interviewing a large and probabilistic sample of respondents (14,309). A detailed description will be presented of each of the methods which were used and of the validating comparisons which

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were made in order to generate information about market segments integrated through consumer perception.

It is our hypothesis that other segmentation bases, although useful for some marketing purposes, are more descriptive and less problem oriented. Through the use of this, or similar methodology, for market segmentation, management could find out not only how the market is structured, but also how dissatisfied it is with current brands within a product line. Management also may learn which product attributes effectively can position a specific brand closer to a meaningful market cluster, an idea which seems much in consonance with the modern marketing concept.

After an exploratory survey was conducted to test the attributes to be scaled and to establish the questioning procedure, the sampling method, and the programs best adapted to our computer facilities, the field work was carried out. The market of a consumer product was segmented in every city according to consumers' perceptions of an ideal brand, and a geometrical space was structured through the consumers' perceptions of current brands in the market. Several analytical techniques were combined and adapted in this research: analysis of variance, factor analysis, multiple discriminant analysis, and cluster analysis.

Additional samples of 960 retailers were obtained from five cities, and an ex post facto survey was conducted

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in a city where the marketing mix of a brand had been modified. Likert type scales were integrated into the questionnaire, and respondents were selected statistically by a two-stage area sampling method.

Validity tests were attempted not only by contrasting the various individual city reports, but also by modifying the parsimony levels in the factor analytical routines and by introducing a third dimension for ideal brand locations. These later were to be clustered on the reduced geometrical space.

The conclusion of this research is that, at least for this particular product and in Mexico, the method employed seems superior to other currently used bases of market segmentation. Furthermore, although more research is necessary to complement the information thus obtained, management now possesses a very useful tool for determining marketing strategy, and a tool which can be tested partially in different areas since a separate estimate was obtained for each area.

In our opinion it also is valid to conclude that these techniques usefully can be adapted to other products and to other developing areas. Only when management is provided with this type of information will it begin to believe in marketing research and begin fully implementing the marketing concept.

MARKET SEGMENTATION BY CONSUMER

PERCEPTION: A CASE STUDY

By

Jorge F. Gonzalez-Arce

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Marketing and
Transportation Administration

1973

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To Yolanda

To Yolanda

... and our parents

... and for Jorge
Alejandro
Roberto
Yolanda
Adrian
Alberto

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The very last stage of this dissertation seems to be the most difficult to write, even in my own language. It is very difficult to find words to express my most sincere gratitude to all the people, and their organizations, who have believed in the author and have had the time and patience to sponsor, teach, assist, and encourage me to carry through. Repayment hardly can be achieved with words; it must be accomplished by deeds. It is my hope that throughout my life I will be able to do for other people what has been done for me.

My special gratitude goes to Dr. Leo G. Erickson, who never relinquished the idea that this dissertation would be finished. His encouragement and guidance made it possible. He and Professors Richard Lewis and Richard F. Gonzalez had the patience to listen to several of these ideas and provided me with the insight and theoretical framework with which to construct from them.

And Yolanda, GRACIAS.

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CHAPTER I

THE APPLICATION OF QUANTITATIVE TECHNIQUES
TO MEASURE CONSUMER PERCEPTION
AND BEHAVIOR

Introduction

This dissertation attempts to examine and validate newer research techniques for market segmentation in developing countries. It is our firm belief that technology has no economic or national borders and that it is possible to implement different and better methodologies if the analyst adapts them to the local socio-economic environment.

General Considerations

Marketing research, both as an academic discipline and as a pragmatic field has evolved very rapidly during the last ten years. It has borrowed heavily from the computer, quantitative and behavioral fields. Marketing research in the less developed countries has lagged behind that in more developed nations for several reasons. The most important one is the lack of experimentation with newer concepts of, and methods for, data analysis. The modern marketing philosophy theoretically has been adopted

by the largest business firms in these areas, but its implementation in real business situations has been hindered by the lack of sound market data that measure the impact of marketing decisions. Researchers in developing countries, instead of providing general descriptive market data, should provide management with more problem-oriented information which requires better and more sophisticated analytical tools.

It is our belief that once a decision maker understands and tries to implement the "marketing concept," he immediately discovers that his market is heterogeneous, and that his previous "shotgun" approaches to obtain larger sales volumes need to be transformed into specific actions directed to targeted market segments. His marketing plan comes to be the integration or the sum of the specific marketing mixes planned to cater to selected and profitable market segments.

An important problem for a company's management becomes that of knowing which groups of consumers are more apt to purchase its brand. To learn this, management requests market research with such a purpose. Studies of this type are called market segmentation surveys.

Cross classifying consumers into geographic, demographic, socio-economic, or psychographic groups has been attempted before. However, it has been our experience

that these bases for segmentation, although useful for some marketing purposes, show only partial pictures of a given situation; through this type of analysis management can find out who their customers are and an explanation for their divergent purchase behavior. A decision maker, for example, can learn through such an analysis that, in a given area, a specific age group from a certain socio-economic stratum prefers brand A x percent of the time. However, he must know what specific action he is to take and its probable impact on each group in order to improve sales and profits with current or new brands.

An alternative approach to market segmentation is that of structuring clusters through specific consumer behavior, or consumer perception. If it is possible for a decision maker to learn which sectors of a market are dissatisfied with his current market offerings within a product line, and, specifically, what it is that consumers expect a brand to have in terms of features in order to be better satisfied, then that information can be used to integrate market segments as a function of commonality of consumer pattern recognition, or in other terms, as a function of consumer wants.

This procedure for market segmentation can offer a marketer several distinct advantages: (1) Clusters are integrated by consumers who have homogeneously perceived

wants from a product, perceptions which might not be related to market classifications. By this knowledge a decision maker is able to prepare specific marketing mixes for each of those groups. (2) It can also be learned which product features or attributes are significant for each market segment, permitting ad hoc communications campaigns for each of them in terms of what they expect a brand to have. (3) It is also possible to become selective, when choosing among alternative market clusters or niches, to cater to them with current, modified, or even new brands.

In addition to these advantages, the measuring procedure can also be very useful in (1) learning the impact of a change in the marketing mix of a brand, either the company's or its competitor's, as the perception of current brands that has been obtained in time t_i can be comparable to results at time t_{i+1} . (2) In the same way, it is possible to compare perception among different areas since the same procedure was used to measure the same items in several places. (3) In contrast to its forerunner, motivation research, this approach is quantitatively measured, and the final results are less dependent on the researcher's subjectivity, and (4) it requires simpler field work. The task of measuring perception and assigning weights to variables or attributes is removed from interviewers and respondents and is passed on to the computers.

The Problem

The present researcher contacted a manufacturer of consumer products in Mexico who was seeking a national, city by city, study of consumer preferences. The firm also sought descriptive analysis of the market for its several brands within a product line. Having observed that, in the current marketing literature, heavy emphasis was being placed on market segmentation through the use of consumer perception, this researcher asked the company if he could experiment with such methodology in order to examine its validity in the country. The company, one of the leaders in its field, agreed to sponsor the experiment. When the final results were analyzed, the firm altered its plans for their previous research project and decided upon one conducted along these lines.

Research Objectives

The examining and validating of the newer techniques for market segmentation by consumer perception in a practical case in a developing country is to be considered the main objective of this dissertation. However, there are several more research objectives in this project: The methodology which was selected for testing, although widely discussed in academic circles, has not been described step by step, nor has it been used, at least in published materials, in large and probabilistic samples. Therefore,

it is our aim to (1) present a real life business case in which a multicity (30 urban areas) survey was conducted by personally interviewing a large and statistically selected sample of consumers (14,309); (2) to present a detailed description of each of the techniques which were combined and adapted in order to conduct the survey; and (3) to describe the validity of comparisons which were attempted to test the goodness of the methodology. This seems necessary in order to convince management and fellow scholars that this method for market segmentation, at least for this particular product and in this country, seems preferable to alternative ones which had been attempted before.

It is our belief that once research along these lines has been initiated in developing countries, and once it has been proven that computers, as small as they are in such countries, can be used for marketing research, practitioners will start contributing with additional research by testing alternative approaches and surveying different products in these areas. It is only through problem oriented surveys, more than through descriptive market analysis, that marketing research can contribute to the full implementation of the marketing concept.

Methodology

In this research of market segmentation by consumer perception several different techniques were used for data gathering and analysis. The purpose of each one can be briefly and nonmathematically explained in the following paragraphs.

First, in order to find out which attributes consumers recognized or perceived in the particular product under study, an exploratory survey was conducted that involved several stages: (1) Revision of previous descriptive and motivation research questionnaires and reports; (2) meetings with production control and marketing executives of the firm; (3) search in published materials; and (4) exploratory blindfold taste tests among a sample of consumers to learn about relevant product features and characteristics.

Second, in order to formulate the final questionnaire a decision was made to use Likert type scales. A phrase was formed with each of the selected attributes and the respondent was asked to rate on a four point scale each statement about a selected, but known by the respondent, brand within a product line. In each one of the interviews, ten different attributes or features were asked about three locally marketed brands, and the same attributes were used for an "ideal" brand, one if in existence would fully satisfy each consumer perceived want. During

the experimental test period, conducted by interviewing 648 consumers, it became clear that respondents were able to configurate an ideal brand and that the type of scale being used was adequate because it was differentiating among brands.

Third, in order to select respondents in each one of the 30 urban areas, a two stage area random sampling method was used. This procedure first involved the unrestricted sampling of city blocks from the city map, and in each of them, a systematic selection of respondents.

Fourth, three different methods were combined for data analysis: factor analysis, multiple discriminant analysis, and cluster analysis. Each of these is described below.

Factor analysis is a procedure for pattern recognition and it was intended to reduce redundancy in the original information from respondents. If two or more of the attributes which were rated for all brands seemed to be measuring the same quality, they could be grouped together into a factor. For example, let attribute one be speed, attribute two be velocity, and attribute three be slow. If we are measuring attributes for automobiles, the three seem to be redundant (although with a different mathematical sign). Through factor analysis, all of them would be grouped together in only one factor. This method can be

used for cases when the analyst is undecided about which of the n attributes or features he should include in the questioning process, and he is able either to eliminate redundant ones, or to question about all of them and the program would group them into a single factor.

The factoring routine begins by establishing the similarity or correlation among the original rated attributes for all brands. It sorts all the measurements into a number of groups or "factors" based on the extent to which they are measuring common ground. This is accomplished by examining each individual's pattern of answers for all attributes and identifying those which show commonality. In this way it is possible to reduce the original dimensionality of m attributes to a k dimensionality, where k is equal to or less than m , but where the original redundancy has been eliminated.

A set of factor loadings is generated and it indicates the extent to which an attribute is associated to a given factor; those close to +1 and -1 are heavy components of it. The principal component analysis, which is the method used in our factor analytical procedure, integrates those factors in such manner that they are mutually uncorrelated and each accounts maximally for a decreasing portion of the total variation among the original data. In this way, the factor chosen to be number one is the one that accounts for most of the original variation.

Factor two takes the larger proportion of the remaining variance, and so forth until the last factor has been dealt with. It thus is possible for the analyst to eliminate those factors which account for the least variation, and last ones to be extracted, without a serious loss of information. This action is called parsimony.

However, as some of the factors show high loadings for several of the original attributes, the analyst can have a difficult task in properly identifying them. To provide a meaning for all of the factors, a varimax routine was performed. It rotates, without any loss of information nor orthogonality, the previously extracted factors into a new matrix of rotated factors in which a given attribute has a high loading (near one), and the rest of them have lower ones (near zero). This permits the identification of each factor through naming it similarly to the original attributes with which it is correlated.

Most of the available computer programs for factor analysis would permit the researcher to perform these procedures. He must decide the type of rotation to be attempted as well as the extent of parsimony which is desired. In this manner, the analyst obtains a set of uncorrelated factors in which redundancy has been eliminated. The similitude of all the ratings provided by each individual respondent for every brand have been considered in the structuring of the factors.

Multiple discriminant analysis was the second technique used in our procedure. Its objective is to find out which factors account for most of the difference among brands. Furthermore, once a perceptual map has been developed by using factor correlations, this method locates each brand in either two- or three-dimensional reduced geometrical space.

This technique uses the ratings for each n brand provided by each respondent along the ten original attributes. First, attributes are transformed into factors by using the loadings obtained in the previous program. The discriminating power of each factor then is determined and brands are segregated according to those factor weights. A factor with the strongest weight is the one which differentiates most among existing brands. For example, if each brand of automobiles is perceived similarly along an availability scale, but differently on a quality of service scale, the availability attribute would not differentiate or discriminate among brands, but the latter attribute would. For advertising purposes, for example, the use of a theme related to availability would not produce as good results as using a theme of quality of service, as this last one is accounting for more of a differentiation among existing brands.

The matrix of factor correlations thus produced enables the analyst to locate each one of the dimensions

on a perceptual map which is to be drawn. The factor correlations represent the names that would be assigned to each of the axes on this reduced geometrical space.

For presentation purposes the analyst might choose either a two- or a three-dimensional space, but the computer works with the entire k dimensionality produced in the factor analytical procedures. An output from this program is the location for each n brand rated by respondents. A point along each one of the k dimensions is produced, and the research may position each brand in the perceptual map by using those points in the first two or three axes or dimensions.

Discriminant analysis thus finds a set of formulas. If these are applied to the original ratings for each brand, they will assist the analyst in learning the weight of each attribute in brand differentiation. They also will enable him to construct a perceptual map; through the correlation of each attribute to a given axis, brands can be positioned according to the relative brand means of those attributes. If an analysis of variance is performed, those attributes whose means differ the most will be those with a larger discriminating power; those in which the means are clustered together will not have a heavy discriminating weight among brands. The use of multiple discriminant analysis allows the researcher to observe

simultaneously the performance of all of the selected attributes in producing brand differentiation as perceived by the consumer.

Cluster analysis was the third procedure used in this study. In contrast to the methods explained above, this technique uses the ratings for the ideal brand, not the ratings for current brands. Its objective is to position each of the respondents on the perceptual map. Once this has been accomplished, respondents are grouped according to their proximity in that reduced geometrical space.

Ideal brand ratings are assumed to be what consumers desire from a particular product. When the regions of "desired characteristics" are established, the analyst can determine to what degree each of the current brands differs from each one of the ideal regions, or market segments. The objective of this clustering technique is to integrate market segments as a function of consumers' desires or wants from a given product. These clusters may or may not accord with geographic, demographic, socio-economic, or psychographic patterns of consumer grouping. However, such clustering would indicate which brand attribute should be emphasized in the campaign to reduce the distance between a specific brand and a target cluster.

The ratings of the attributes of the ideal brand given by each respondent are transformed into factors

by using the previously mentioned loadings. Through the use of discriminant weights, each ideal point then is positioned on the perceptual map drawn with the aid of the multiple discriminant analysis program.

A clustering routine next is used to place consumers in market clusters according to their proximity in that space. An alternative clustering technique was tested. Once each respondent had been placed on the perceptual map, the analyst would integrate the groups visually according to density. This later procedure, although allowing the analyst to stay close to his data, was not reliable; different eyes would produce differences in cluster integration.

Cross tabulations later were used to learn more about each one of the clusters and about the descriptive data surveyed. Reports were prepared for each individual city. In order to provide better basis for management's action, a national sample was obtained through a stratified sample, weighted by city consumption, of all respondents. Interurban and interregional comparisons then were possible.

Outline of the Dissertation

The objective of chapter 2 is to present a picture of marketing research in developing countries. First, an attempt is made to relate the role of marketing research

in the implementation of the marketing concept, and later, once that a description has been made of the several stages in the development of marketing research, some of the most important limitations that a researcher faces when conducting surveys in these areas are analyzed.

In chapter 3 an introduction to the theory of market segmentation is presented. Also discussed are a research methodology and the alternative bases that can be used to achieve this purpose.

Chapter 4 introduces the rationale for market segmentation by consumer perception as well as the techniques which were used in this study.

These techniques are more fully presented in chapter 5, where data gathering procedures also are described.

Chapter 6 outlines the data analysis, step by step, for a given city.

In chapter 7, a summary of the validity tests which were conducted to verify the reliability of the technique is presented.

Chapter 8 is devoted to an evaluation of, and conclusions to be drawn from, this study.

CHAPTER II

MARKETING PHILOSOPHY AND MARKETING RESEARCH IN DEVELOPING COUNTRIES

Introduction

Marketing as a business philosophy has found its basic foundation in the more economically advanced economies, where private enterprises struggle to gain and maintain consumer acceptance as their basis for continuous growth. The most advanced enterprises in these countries have not stayed within the borders of their respective nations, but have become international in their approach. When Jean Jacques Servan-Schreiber, in The American Challenge,¹ describes multinational business firms, he is implicitly contrasting a marketing philosophy to a production-oriented point of view.

Imbedded in this marketing orientation is the emergence of a marketing-oriented information system; consumer wants and desires must be detected in order to best serve them. During the last decade, marketing research has been directed toward extracting useful marketing information for decision making from market data.

¹Jean Jacques Servan-Schreiber, The American Challenge, trans. by Ronald Steel (New York: Atheneum House, Inc., 1968).

The "new" marketing concept would be only a good idea if management could not be provided with an intimate knowledge of the market and its dynamic change.

Although marketing research, as an academic subject, evolved very rapidly to cope with these new concepts, it was not until the late sixties that it began to analyze data systematically for better decision-making purposes. However, we shall observe that whereas in developed countries, where larger business firms began to demand more sophisticated data handling to obtain better information, in developing countries many limitations stood in the way of market researchers. Their ability was used less in data analysis than in descriptive research and the struggle with management to sell this information.

It is our thesis, and our firm belief, that as long as researchers in developing countries remain descriptive and narrative (treating broad and undefined problem areas), most business concerns will not have the basic marketing information, as a product of data analysis, necessary to really and fully adopt and adapt a marketing philosophy. Their view will remain product oriented, thus widening the gap between the home industries and the multinational giants, and between the less developed and the economically advanced countries.

It is also our firm belief that technologies do not have national borders, and we will test and validate

marketing techniques in a less developed economy. Obviously, when a method is adapted from industry to industry, there will be changes in its usage when crossing borders. Our corollary is that the basic marketing concept also will need adaption, but not in its basic philosophy, as much as in its relative impact within business structures. The newer marketing research, the more quantitatively oriented methodology which we will be validating, will accelerate the development of the marketing concept. In contrast to the more traditional research, oriented toward exploratory description, the newer methodology is directed toward obtaining conclusive evidence as to product and brand position in a market; it not only describes it, but also prescribes specific changes necessary to the achievement of market goals.

The Role of Marketing Research
in the Implementation of a
Marketing Philosophy

A marketing business philosophy implies four main elements.² First, the consumer is placed at the beginning and at the end of the enterprise cycle. Activity begins at a firm when it discovers an unsatisfied consumer, and it ends when the consumer is finally satisfied with the product or service acquired from the firm. The business firm

²Jorge F. Gonzalez-Arce, "Concepto Operacional de la Empresa," Administracion, ITESM, XIV, No. 79 (February, 1968) 1-3.

will survive and grow as long as it continuously repeats this cycle. Its operational goal is to serve a market, not to produce a given item.

Second, a market is not a geographical or demographical set of people; it is an aggregation of consumers with different wants and purchasing power abilities whose wants can be satisfied by patronizing different suppliers. The business firm is only one of those suppliers. Even in the rare case that the firm enjoys a monopoly, the consumer might not, in the long run, continue to demand its goods if he is not satisfied with the firm's performance.

Third, a marketing orientation encompasses the philosophy of the entire business organization, not simply the activities of the sales, advertising, and research departments. The market (sum of individual consumer decision makers) is, in the end, the sole judge of every decision made within the firm, as long as a change is produced, objective or subjective, in the final output of the company.

Fourth, a consumer orientation, although morally and socially accepted, should not be equated with profit reduction in the long run. Profits are the measure of effective and efficient marketing.

Having described the marketing orientation, our next task is to discuss its basic input, marketing

information, and to investigate the role that marketing research should play in providing that input in a manner useful for better marketing decisions.

Martin Bell has presented an explicative model:³

$$R = f (E, O, R) \quad (2-1)$$

Results (R) in a marketing-oriented firm are a function of E, the kind and degree of effort made by the firm, that is, how well decision makers play the controllable cards in the marketing game. Results also are a function of O, opportunities not only observed and measured by the firm, but also taken advantage of at the proper time. Such opportunities include innovation, efficiency, obtaining and conserving a market niche, and obtaining a differential advantage. Finally, results are a function of R, resistances found and overcome in the marketplace, among these technological, economic, and human factors.

Although from a descriptive point of view Bell's could be a useful model, a researcher must be more specific. A useful research model might be the following:⁴

$$R = f (ca, cb, \dots, cx, na, nb, \dots, nx) \quad (2-2)$$

³ Martin L. Bell, "Marketing: Concepts and Strategy," The Functional Concept of Marketing, Chapter 2. (Boston: Houghton Mifflin Company, 1966) pp. 26-54.

⁴ Gonzales-Arce, op.cit., p.8.

In this model it is stated that the results (R) of a marketing decision system are a function of two types of variables: controllable and noncontrollable. The first specific task of marketing research thus becomes to obtain information regarding which variables affect results, that is determining which of them are at least partly controllable.

Concerning this first task of marketing research, there usually are two extreme points of view.

The traditional manager usually is convinced that there are only a few variables which might affect results. He generally believes that sales, at most, will be a function of price, credit or promotion policies, competitive action, and governmental expenditures (GNP in the most developed countries). But as the only variables which can be affected are the first two, and since pricing frequently is not easy to change, he decides only on the credit and/or the promotion solution.

In contrast, the sophisticated scholar overemphasizes methodology and usually thinks of constructing a "complete model" which will consider all of the variables that might contribute to results. It is unfortunate that many of these scholars are not more realistic, which would help close the gap between their approach and the needs of decision makers. Very sophisticated and ex post facto

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normative models never will accomplish the task of turning a traditional decision maker into a more scientific manager.

The role of the marketing researcher thus becomes one of being the intermediary between managers and scholars. He must understand not only the problem on hand and the timing of the decision, but also that better methods, if properly adapted, will produce a better knowledge of the market and better information for decision making.

The second task of marketing research is to discover the contribution of each variable to the final result. Expressed another way, what is the elasticity of each controllable variable? This task involves the introduction of measurement methods. Many of these are borrowed from other sciences, and it is necessary to adapt them if consumer response is to be known and predicted.

Several theories of market response have been presented in the past,⁵ but a final measure of each controllable variable must be objectively or subjectively determined if executive action is to occur. To alter the level of any marketing variable, the decision maker must know, either from basic information produced by researchers,

⁵ See James F. Engel, Henry F. Fiorillo and Murray A. Cayley, Market Segmentation: Concepts and Applications (New York: Holt, Rinehart and Winston, Inc., 1972). See also Robert J. Holloway, Robert A. Mittelstaedt and M. Venkatesan, Consumer Behavior: Contemporary Research in Action (Boston: Houghton Mifflin Co., 1971) for summary readings on consumer behavior and measurement.

or from his own experience, what the expected return of his decision might be. Common sense indicates that resources first should be allocated to that factor that contributes the most toward increasing profits, either under ceteris paribus conditions or under the hypothesis of no inter-factor correlation.

From basic economic theory decision makers have learned that, when facing diminishing marginal returns, they should increase inputs until the marginal costs equal their marginal returns. In the case of a multivariable effect on profits, money should be allocated until

$$MP_1 = MP_2 = \dots MP_x = 0 \quad (2-3)$$

The equation means that, in order to maximize profits, resources should be assigned to marketing variables such that the marginal profit obtained by the movement of any variable should be equal to themselves and to zero.

For the marketing researcher, the foregoing means that his task is that of providing management with information regarding the expected returns of any outlay in any of the variables. In other words, his task is that of knowing the elasticity of each variable that may affect final results.

If the two tasks already assigned to marketing research do not seem easy, the matter is further complicated by the fact that changes in any one variable will

cause an effect not only on results but also on the weight of other variables. Stated in other terms, in a real life marketing situation, the ceteris paribus hypothesis never holds true; the market variables are autocorrelated, or, in economic language, they have cross elasticities.

The existence of cross correlations necessitates adoption of multivariate analysis in marketing research since unidimensional descriptions of markets are only partial views of the problem. The traditional technique of cross tabulation, although an advanced view, presents only roughly approximated schemes of the market reality. The multivariate revolution in marketing research seems here to stay.⁶ "One is pushed to a conclusion that unless a marketing problem is treated as a multivariate problem, it is treated superficially."⁷

The marketing research problem seems to be even more complicated when managers observe differences in consumer response in different groups. A decision maker realizes he is not facing one market, but a multitude of

⁶Jagdish N. Sheth, "The Multivariate Revolution in Marketing Research," Journal of Marketing, XXXV (January, 1971) 14.; John A. Howard and Jagdish N. Sheth, The Theory of Buyer Behavior. (New York: John Wiley & Sons, 1969).

⁷Sheth, op.cit., p. 17, quoting from Ronald Gatty, "Multivariate Analysis for Marketing Research: An Evaluation," Applied Statistics, XV (November, 1966) 158.

submarkets (segments). These not only are of a different size and importance for his firms, but also tend to behave differently as a result of a change in a marketing variable. His market is not a unit, but is the sum of several distinct units. Market segments exist when, for decision-making purposes, the entire market does not show constant elasticity for the most important marketing variables.

A segmented market multiplies the tasks for market researchers. First, they must determine which are the meaningful segments; second, they must gather information (similar to that previously described) for each segment.

A firm facing a segmented market, which is almost universally the case, needs information about each segment if it wants to develop a sound marketing strategy. That strategy is composed of the aggregate of decisions made concerning each segment. Market segmentation thus is not the division of a market to facilitate attack; rather, it is the integration of a strategy based on decisions made for individual segments of the market.⁸ Market segmentation, as theory and as applied research, will be the theme of the next chapter.

The last, but not the least important, task for marketing research as explained in our model of a business firm, is that of being attentive to change. Economic

⁸Ronald B. Frank and William F. Massy, "Marketing Segmentation and the Effectiveness of a Brand's Price and Dealing Policy," Journal of Business, XXXVIII (April, 1965).

development occurs within a dynamic market which seems to be changing faster all the time. Alvin Toffler, among others, has discussed how slowly human behavior changed in the past as compared to how rapidly it is changing in today's world.⁹

If marketing researchers are to provide information for decision makers on a continuing basis, their tasks acquire a different perspective. They should not concentrate merely on present structures but should present relevant information regarding actual market dynamics and expected future trends. When market response elasticity results, it must be tested to verify its consistency through time. Human wants, beliefs, and behavior, or the entire socio-psycho-economic structure is not, by any means, constant for a long period of time. More rapid changes are to be expected in the future; if a business firm is to survive and to grow, it first must comprehend that dynamic quickly and must adapt to it.

In summary, if marketing research is to become decision oriented rather than simply describe situations, it must do several things. It must provide meaningful information regarding which variables have an effect on results and must measure their relative importance for a given problem. Measurement should be made through the use

⁹Alvin Toffler, Future Shock (London: The Bodley Head, Ltd., 1970).

of multivariate analysis, applied not to the whole market, but to the most relevant segments. Finally, researchers should bear in mind that the dynamics of the market can alter significantly the information obtained about the previous items.

The Role of Marketing Research in Less Developed Countries

Introduction

Marketing research as a source of information for decision making purposes seems to be positively correlated to economic development and to the marketing orientation of businessmen. Business firms in less developed countries are smaller than those in developed countries, and many of them, even those dealing with consumer products, tend to be production oriented. In these circumstances marketing researchers hardly can expect a growing demand for their services.

In developing nations market research tends to be descriptive. In an effort to cover a large field, broad problem areas simultaneously are surveyed within one project, or "cooperative" studies are conducted in order to reduce costs. Unfortunately, these attempts have a greater probability of failure since the information thus produced only incidentally coincides with the needs of a decision maker.

In other instances market researchers are called upon only when the problem approaches utter failure, and too much is asked of them. The decision maker does not want information for the solution to his problem, but wants the entire problem of the firm to be solved by the researcher.

Growing government intervention, increased competition from international companies, and the emergence of business schools and management courses have had a positive effect on business firms. They have been forced to re-evaluate their role in society. The larger companies, managed by the new generation, have begun to look at more advanced managerial methods, and it is not unusual to find many of these firms using a technology as advanced as that of their counterparts in the developed countries. A democratic, or people-oriented, organization has been one end result of this new management philosophy, and it has been within these organizations that a marketing orientation has emerged and a decision-oriented brand of marketing research has found its application.

Stages in the Development of Marketing Research

When a decision maker must select among alternatives, he must have a way of acquiring marketing information. This function of a business firm always has existed, but it is only in the last fifteen years that we have witnessed

the emergence of marketing researchers. Only recently have business firms begun to feel the need for a more systematic, objective, and scientific method for obtaining better information in order to reduce uncertainty in their decisions.

The development of this information seeking activity has followed several stages. The steps have paralleled the growth of the business firms and their increased marketing orientation, both in developed and in developing countries.

Stage one of marketing research is conducted by a man with line or field experience who is capable of summarizing both his knowledge and current reports from the salesmen in the field. He acts as a secretary and adviser to the sales manager. Occasionally the firm will buy market information from outside specialized sources when they press hard enough to sell their services.

In stage two, sales analysis begins to be conducted by using the existing accounting data within the organization. The introduction of mechanical accounting processing equipment produces, as a by-product, data which, if properly classified, serves as a basis for comparing results obtained by different salesmen or about clients, products, or regions. Trends begin to be studied and used for market projections or quota assignments.

During stage three, a country continues to develop, both government agencies and private organizations begin to publish a larger amount of economic data. This the company begins to consider by relating it to its performance.

Stage four finds the company facing the "marketing shock." It discovers: that marketing and innovation are the key business functions;¹⁰ that there is a marketing concept and that the center of the whole industrial structure is not the product, but the consumer;¹¹ and that it is highly possible that it is experiencing a marketing myopia.¹² The business firm multiplies its efforts to "look outside," and its philosophy changes from a basic product to a basic marketing orientation. The formerly uncoordinated activities of sales, advertising, public relations, and distribution are gathered under a department of division head, and a marketing research organization enters the field, either organized within the firm or contracted through outside consultants.

¹⁰ Peter F. Drucker, The Practice of Management (New York: Harper and Row, 1954) pp. 37-41.

¹¹ J. B. McKitterick, What Is the Marketing Management Concept? Proc. American Marketing Association (Chicago: The Association, 1957) pp. 71-82.

¹² Theodore Levitt, Innovation in Marketing: New Perspectives for Profit and Growth (New York: McGraw Hill Book Co., 1962).

In this stage, the market researcher faces a huge descriptive task. His function becomes that of systematically beginning to construct a data bank of basic marketing information. His emphasis is on secondary sources of published data and on constructing an organization to systematically gather data from primary sources. Questionnaire construction, sampling procedures, and efficient field work are the basic concerns, as are middlemen, advertising content, the media, and the ultimate consumer. Needless to say, most of this information is not actually used by management, since it tends to be descriptive and not directed to problem solving. The researcher will have to ensure that correct data are provided if comparisons are to be made and if decision-oriented information is to result later.

In stage five the marketing research organization, after establishing effective and efficient data gathering procedures, now is in a position to integrate a marketing-oriented information system with the aid of the basic decision makers in the firm. The firm's research organization is in the position of feeding it more precise decision-oriented information. A group of models have been constructed which present not only a picture of the market, but also of its change through time and of its implicit behavior. Measured historical trends and basic correlation of the different market variables, in addition to

specific research, are used to predict, within an expected deviation, future market behavior as a response to changes in marketing inputs.

Attempts to arrive at this stage without first at least going through stage four, or introduction of stage five to a product-oriented firm will produce frustration both for the researcher and for the decision maker. External consultants or internal researchers, when overselling their services by promising too much from their projects (as did motivation researchers in the past), have been responsible for the "overcautious" attitudes of many decision makers regarding research, researchers, and their methodologies.

Finally, stage six is reached. Larger and faster electronic data processing equipment and basic hardware, including simpler computer languages and more advanced programs, enable market researchers to perform more sophisticated data analysis and thereby produce better information for decision makers.

Techniques imported from the behavioral sciences and the statistics fields rapidly have been adopted and adapted to analyze quantitative and qualitative market data. The researcher thus can perform multivariate analysis instead of using the former unidimensional approach. This information explosion, which has affected almost all large-scale organizations in developed

countries, soon will spread to their counterparts in the developing nations, thus changing the role of marketing researchers there. The increasing complexity of the home markets and the need to compete with manufactured (instead of raw materials) goods in international markets, will force organizations in developing countries to understand and validate this new information technology rapidly so as to be able to remain and grow in these markets.

Market research has played a minor role in developing countries, due to reasons which will be detailed later. It is our belief that at present it is at stage four, as most of the published material seems to be at the descriptive (exploratory or theoretical normative) level. If the gap between advanced and developing countries is not to be widened in the future, we believe it is necessary not only to introduce and implement a marketing-oriented philosophy in these areas, but also to change the role of marketing research so as to produce decision-oriented information.

Limitations to Marketing Research in Developing Countries

In an attempt to integrate the previous points with the present study's market research experience in a developing country, and to assist the reader in understanding some of the methodological steps used in the investigation of market segmentation in Mexico, a survey

of practical limitations facing an information seeker in a less developed country is presented below.

The first group of problems are technological in nature. There are three main types. The limited availability of researchers presents the first difficulty. Although the number of people who have received training in marketing research, both at universities and at research institutions, has grown, their basic understanding of the research problem is related to descriptive work. They suffer from the lack of analytical tools, being under-trained in statistics and in behavioral science methodology. In many cases these researchers do not have access to the current literature or they face language barriers. Their efforts thus are concentrated only on the methods they have learned to use.

The second problem concerns the availability of computers. Although computers were introduced early into some firms in developing countries, their time has been absorbed in accounting and administrative work. Only a few universities have large computer facilities, and these are small in comparison to those in the United States. Some international market research organizations are currently using computer time outside the country.

The third technological problem is that of government-produced secondary data. There is limited

access to these sources of information. Even when they are published their validity, consistency, and timing have to be considered before using them. When attempting to conduct a random consumer sample, for example, neither census tracts nor specialized publications of street-by-street telephone books are available. Only in the larger urban areas do fairly complete city maps exist.

The second group of problems are of the cultural type. There are four primary sorts.

Reticence on the part of interviewees is a serious drawback. Consumers are not accustomed to providing personal data to strangers. The problem is aggravated in rural areas, where it not only is difficult, but also dangerous to conduct surveys. Response rates within urban population concentrations, according to personal survey experience, are lower among upper and lower economic strata and among older people.

Obtaining business data from line executives also is a very difficult task. Most of the information is considered confidential. The strikingly small number of business case studies from less developed countries is due not only to the limited number of researchers, but also to the difficulty of obtaining sound data from business firms.

A second cultural problem is the great difficulty in recruiting and training part-time interviewers and in retaining them for extended periods of time. In contrast

to the most developed countries, women in general, and particularly housewives, in less developed areas have lower education (schooling) levels, thus limiting one ready source of interviewers.

Usually, research agencies providing this service do not exist. Even when available, a serious consideration is the relative quality of such service. These research organizations usually recruit college students as interviewers and obligations such as exams and papers and permanent part-time jobs limit their supply.

A third problem is the fact that in most cases, a researcher must conduct personal interviews. Telephone service is available only on a limited scale, thus reducing the extent of the universe to be sampled. The large proportion of illiterates (especially among older, rural, and lower economic strata) makes mail interviews impractical.

Finally, in some urban areas the advertising media, especially television and radio stations, have become quite competitive. They have tried to "buy" audiences by conducting house-to-house promotions, and they grant prizes for "correct" answers regarding broadcasting behavior. When interviews are conducted in such areas, respondents frequently try to outguess the sponsoring firm in order to receive a prize.

In addition, there are instances in which house-to-house salesmen or bill collectors introduce themselves as

interviewers to obtain the respondent's attention. Many consumers are so tired of this that they would not listen to any stranger with an interview "pitch." In many other cases, interviewers, in order to assure questionnaire completion, have offered to mail a present. Never having received the gift, many consumers refuse to respond to further interviewers.

Lower response and higher refusal rates can be attributed, in part, to the above-mentioned situations. But many of these circumstances are not consistent within cities since many have occurred only within the very recent past.

A third set of difficulties are the managerial ones. There are five of these.

First, some decision makers, even within larger and/or international organizations, do not believe in market research. They claim that respondents, due to some of the factors already described, will never be truthful in their answers.

Second, product-oriented decision makers would, by definition, pay very little or no attention to survey results, especially when product sales are increasing. These executives would resort to market research only when difficulties arise, expecting, in most of the cases, specific "decisions" from the research. Under these circumstances, marketing researchers either would use this

to alter organizational attitudes, although risking a failure, or definitively would stay out of managerial decision making. A researcher working under these conditions, rather than being a specialist, would be better equipped to fulfill this role if he were a generalist, but such people are rare in developing countries.

Third, market research outlays, even those related to the integration of data banks, tend to be considered as current operating costs, not as investments. This accounting logic penetrates into managerial thinking and short-run results are expected.

Fourth, many decision makers have had very limited training in statistics and in marketing research. They do not understand how, from a very small amount of interviews, representing a very low percentage of the population, valid generalizations can be obtained. Researchers, instead of increasing sample size and thus survey costs, would do better to find easier explanations for their approach.

Finally, vague problem descriptions are presented to researchers either because of poor communication with decision makers, or because management lack confidence in researchers or in their expected results. Thus a limited amount of time and interest (considered a waste in any case) is dedicated to problem description and even to

reading the results of surveys. Researchers must understand their market before attempting to sell their services.¹³

The next group of problems involved in research in less developed countries concern economic limitations. The three primary ones are noted below.

Survey costs tend to be higher since personal, rather than mail or telephone interviewing, is required. The lower response rates, even when using personal interviewing, also tends to increase costs.

As the impact of the decision is on "smaller" markets, the cost of research is higher per unit. Intermediate size organizations, with limited marketing budgets, are unwilling to allocate part of it to research, as the expected payoff is unknown.

Larger samples have to be obtained from a more heterogeneously composed market. In some cases these increase managerial confidence in the results. The increased cost of the project and the need for more extensive field work supervision are the consequences of using larger samples.

¹³ John E. Jeuck, "Marketing Research-Milestone or Millstone," Journal of Marketing, XVII (April, 1953) 381-387; and at a series of lectures at the International Center for the Advancement of Management Education, Stanford University, Winter, 1964. When writing in 1953 he advanced this role to be played by marketing researchers.

The final set of problems center around historical and organizational limitations. There are four major types.

Some of the earlier consulting firms, most of them now out of the market, when promoting their services, oversold the benefits of marketing research, thus killing the market when it was beginning to grow. Their good intentions were not backed by sound methodology and some of the older decision makers have long memories and do not tend to trust either research or consulting firms.

Many researchers in less developed countries are undertrained in research. Some of them, when conducting surveys, merely have translated foreign questionnaires, especially those for foreign corporations. Furthermore, many of them, instead of adapting foreign technology to local market situations, merely copy what has been proven successful elsewhere. Product research and development is only accidentally being conducted by most international firms at the local level, and sometimes packages, brands, and even advertising copy is merely translated into the local language.

In some of these international organizations, even those engaged in consumer products, the "home office," somewhere outside the country, is in charge of all innovations and decisions for most of the controllable areas,

marketing included. This poses additional difficulties for the development of marketing researchers, since some of the larger potential clients are those international business firms.

In traditional organizations, local or international, with an autocratic or even a bureaucratic product orientation, it is extremely difficult, almost by definition, to find a problem area. Everything is "conceptually solved" either by the leader or by the written organizational law.

CHAPTER III

THE THEORY OF MARKET SEGMENTATION

Market Segmentation and Marketing Planning

Every firm operating in the field of Marketing, regardless of size (or location), should concern itself with the management of its marketing effort. . . , modern industry has reached the stage where production is not the major problem . . . , therefore, the emphasis of corporate management should be on how to market most efficiently the goods that can be produced.¹

Marketing planning thus has been defined as the method for efficiently managing controllable marketing variables.

On the other hand, the fact that markets and the consumers who comprise them are heterogenous, a fact which needs no proof, forces management to build a system for marketing planning constructed from the bottom up instead of from the top down.

Heterogeneity of consumers is to be viewed as an opportunity by the market-oriented firm, whereas it tends to be considered a nuisance by those concerned primarily with production efficiency.²

¹William J. E. Crissy and Robert M. Kaplan, "Matrix Models for Marketing Planning," MSU Business Topics (Summer, 1963) 48-67.

²Ronald E. Frank, William F. Massy and Yoram Wind, Market Segmentation (Englewood Cliffs: Prentice Hall, Inc., 1972) p.5.

There are three objectives of this chapter. It will present the foundations of a marketing strategy based on market segmentation, a description of alternative market segmentation methods, and the basis of the method that was used in our field work to segment the market of a consumer product in a developing country: consumer perception.

Evolution to a Market-Oriented Business Firm

As a business firm evolves from a product to a market orientation, most of the following changes can be observed in its behavior and in that of its decision makers.

1. A consumer consciousness is developed, and management begins to look for information regarding consumer wants and preferences.
2. The firm seeks to know how well satisfied the consumer is with current brands.
3. Ideas are sought as to how to introduce new products, or how to change current ones.
4. It is realized that in some market segments there is a good opportunity for market growth.
5. The firm comprehends that a different combination of variables (marketing mix) might be necessary to cater to each market segment.
6. Management, through research findings and sales analysis, begins being selective as to which segments are profitable to enter.
7. Either through specific research or through experimentation the effectiveness of marketing variables is tested.

8. Even more important, decision makers begin to formulate long-range plans, looking at expected changes in market and consumer behavior, and paying less attention to day-to-day problems.
9. Not only are desired goals stated, but also strategic steps as to how to achieve them are specified.

All of these changes pose heavier demands on marketing researchers whose task becomes that of providing information about present and expected behavior for each one of the relevant market segments and that of constructing a marketing-oriented information system.

The Product Differentiation Approach

Some firms, in an intermediate stage between a production- and marketing-oriented approach, follow the product differentiation route. Being basically a manufacturing concern, but observing differences in the way a product is demanded in the different sectors of its market, the firm decides to produce several alternatives for the various consumers. Changes are made in size, price, quantity, color, label, brand, package, and so forth, of the basic product with the expectation that it will produce larger sales and profit volumes.

It is an attempt, as Wendell Smith states, "to shift or to change the slope of the demand curve for the market offering of an individual supplier."³ The product

³Wendell R. Smith, "Product Differentiation and Market Segmentation as Alternative Marketing Strategies," Journal of Marketing, XXI (July, 1956) 5.

differentiation decision, although combined with changes in price, promotion, and distribution, is basically business- or production-oriented if it is not already based on a systematic market segmentation analysis.

The Market Segmentation Approach

An alternative method to increasing volume and profitability might be that of starting from the bottom up, that is, from learning where current brands stand in the consumers' estimation.

Segmentation is based upon developments on the demand side of the market and represents a rational and more precise adjustment of product and marketing effort to consumer and user requirements.⁴

The main barrier to market segmentation in recent years (and in developing countries) has been the difficulty of implementing the strategy, rather than the lack of recognition of its desirability . . . , some of these barriers are being overcome . . . and the marketing profession is beginning to deal effectively with the practice as well as the principles of segmentation.⁵

Market segmentation studies, although of several types, have the intention of fulfilling two goals: to provide management with some empathy (see the brand from the consumer point of view), and to develop a system for marketing planning.

⁴Ibid., p. 5.

⁵Frank, et al., op. cit., p.6.

Involving Market Segmentation in the
Marketing Planning Function

As shown in Figure 3.1, a traditionally managed firm will base its growth on product or brand differentiation, in new or in old markets, by moving to area C when

	Present Market	New Market
Present Brand	(a)	(b)
Differentiated Brand	(c)	(d)

Figure 3.1 Brand and Market Matrix.

demand for the present brand stops growing or because it finds it profitable for production or distribution reasons. Movements into other areas, first B and later D, usually are done when overcapacity is present, either for temporary or permanent reasons.

In contrast, a business firm whose marketing planning strategy is based on market segmentation would define its problem as shown in Figure 3.2.

	Present Products	New Products
Satisfied Consumer Wants	1	3
Unsatisfied Consumer Wants	2	4

Figure 3.2.--Want and Product Matrix.

If its present product is not adequate for satisfying consumer wants, adding a new or differentiated item to its line, that is, moving from area 2 to area 3 may solve the problem. Consumer analysis is conducted on area 4 when a new item is incorporated into the product line of the firm: It continuously surveys its market.

	Present Segments	Other Segments
Satisfied Consumer Wants	5	7
Unsatisfied Consumer Wants	6	8

Figure 3.3.--Want and Segment Matrix.

Figure 3.3 demonstrates that in its consumer research, the firm either might find unsatisfied wants in its market niche (area 6), that its product is catering to other segments (area 7), or that new market opportunities (area 8) exist.

If marketing planning is to be effective, there is need for current, accurate, and complete answers to the following interrelated questions: (1) Who are our customers? Whom do we wish as customers? (2) What needs and wants of theirs are we now satisfying? What needs and wants of theirs do we wish to satisfy? (3) What demand creating forces are we now using (in each segment)? What demand creating forces should we be using?⁶

A marketing plan, if constructed along these lines, comes to be the coordination of the marketing efforts performed on each market segment for each of the current or future company brands.

In conclusion we can say that market segmentation can lead to product development or differentiation, but that the inverse does not necessarily hold true; new or differentiated items do not create either new segments or new wants.

⁶Crissy and Kaplan, op. cit., p.48.

Methodology for Market Segmentation

The practical importance of Market Segmentation has led to much research, in both academic circles and business firms. Most of this research has been empirical in nature, aimed at pinning down what kind of segments and segmentation variables are important in various market situations. . . . Research on market segmentation can often be associated with one of two general schools of thought. These are (a) the behaviorally oriented school and (b) the decision oriented or normative school.⁷

The same authors also have drawn some conclusions about the differences between the two schools of thought. The first school has among its objectives the identification and documentation of group differences, the searching for predictors of such differences, and contributions to the theory of why such differences occur. The decision-oriented school assumes the existence of such differences and focuses on how meaningful segments can be identified among the heterogenous population, searches for predictors to aid in this process of identification, and develops procedures, or prescriptions as to how to allocate marketing resources to each segment.

The above comments on market segmentation methodology are extremely important for marketing research purposes. It is our contention that in the problem definition stage an explicit statement of the objective must be made as to which type of information is to be sought.

⁷Frank, et al., op. cit., pp. 11-15.

One can make a market survey which describes to what extent a brand or a product is being consumed or is preferred in every age group, socio-economic strata, or in every region of the country. An explanation even may be attempted as to why consumption or preference differences occur among each level. Most of the "advanced" market research conducted in less developed countries takes this approach. Although it might provide a good description of market reality, it is not very useful in helping decision makers to know what to do, or how to make more out of a given market. Much sophistication has been introduced into this type of market analysis, but such surveys cannot describe how to manipulate controllable variables.

In contrast, decision-oriented market segmentation research attempts not only to uncover meaningful market segments, but also to learn which controllable marketing variables can affect a given market segment and their relative weights. In this way, it provides a basis for the allocation of marketing resources to segments. It is highly probable that a meaningful market segment for a given product should not be one composed of a given age group, socio-economic strata, or geographical region, but one combining all of these, since segments could be formed by brand attitudes and perceptions. It is only by chance that a meaningful market segment for a given product

corresponds to a "natural" market group, by which is meant any of the classifications which will be described in the next section.

What management needs for decision-making purposes is information regarding the expected marginal profit when the marketing mix designed for a market segment is changed. Marketing strategy thus becomes the planning of all these changes and the continuous measurement of them to test their validity.

Alternative Bases for Market Segmentation

Any market can be segmented in an infinite number of ways, but for usable segments to be developed some criteria should be designed:

(1) the segment should be of sufficient size and market potential to warrant the expenditure of marketing funds, (2) it must be possible to reach the segment through available media and (3) the segment should show clear variation in market behavior in comparison with other segments.⁸

We might add that market segments should be mutually exclusive and that the variables used for segmenting the market should be measurable in order to test whether changes in the market structure occur through time.

It seems necessary to state at this stage that several ways of segmenting markets for analytical purposes might be useful to a company selling nationally different

⁸ Engel, et. al., op. cit., p. 7.

brands. For example, when analyzing sales trends, geographical and channel studies can be carried out simultaneously. The feminine market can be segmented differently than the youth, or the minority groups segments. In other words, we believe in a multistage approach to market segmentation rather than in the splitting of the total market into macro segments. A business firm should divide its market into macro segments, such as the masculine line market, and then study it for micro segments. This approach, which seems logical and acceptable in the case of multinational companies, which first divide their problem by nations, also should be used by local companies. These could divide their markets into "natural" (or general characteristics) groups and then study each one separately.

In segmenting the total market, two main approaches can be follows: Observe how the market is naturally structured, that is, observe the general consumer characteristics, or analyze what differences in consumption behavior are observed among present or potential consumers of a given product.

Segmentation by Market Characteristics

The most widely used bases for market segmentation have been geographical, demographical, and socio-economic strata. These are used because of the availability of

information, the ease of measurement, and the ease with which businessmen understand them.

Geographical segmentation.--The most logical market breakdown is along geographical divisions, of which there are three basic types.

Grouping by countries: A multinational business firm or an exporting concern usually finds it useful to classify its markets by nationalities. Each country can be studied separately, or some can be clustered together. This clustering can use as a common denominator the following: cultural or religious background; physical location or accessibility; economic development; political regime; language; economic alliance; or trade or legislative barriers.

Grouping by regions: Regional grouping within countries can be done by using factors such as those listed above and including climatic differentials. In many cases, political subunits, such as states, may not be the best clustering criterion since these are not really homogeneous strata.

Grouping by urban/rural development: Customer markets further can be clustered according to degree of urban/rural development. In developed nations, interurban, suburban, city, and rural populations are subjects of market analysis, but in developing nations it seems useful to

envision into five, although not mutually exclusive, types of markets: (1) Metropoli usually refer to a nation's capital and account for a larger percentage of the total population. (2) In industrialized urban areas, average consumer buying power is greater than in other areas. (3) Large non-industrialized urban concentrations usually are the center of agricultural, mining, or fishing activities. In these centers much of the consumer buying power comes from trading, and it usually depends heavily on weather conditions or on demand for the products. The spending behavior of consumers from these areas differs considerably from that of industrialized areas. (4) Semi-rural areas are the opposite of suburban markets in developed nations. They are small population concentrations, usually in very poor communication with the larger urban areas. There is very little personal discretionary income, and the population usually is subject to the rule of a landlord or a political or religious chief. (5) Rural areas, where the primary economic activities are performed, are, in contrast to those in developed nations, the poorest sectors of the less advanced areas. It is not uncommon that a large proportion of rural inhabitants will never leave the region and will not even speak the nation's official language. These regions, for most practical purposes, may not even be considered as a market for manufactured consumer goods.

Regarding the consumer behavior of these five areas, it is possible to generalize, assuming that in metropoli and industrialized urban areas consumers tend to behave similarly to those of like areas in developed nations. Although shopping alternatives are fewer, many of the products, tastes, and preferences tend to be, if not physically, at least psychologically imported from the developed countries. A world traveller might find little difference in these areas throughout the world excepting the obvious ones due to traditional or cultural backgrounds. It is not too rash to conclude that the main differences among the most economically advanced countries and those in the various stages of development are found in the semirural and rural areas. In the less advanced countries, larger proportions of the population live in those areas and receive their income from the less economically remunerated activities of agriculture, mining, and fishing. The total product of the less developed country as a whole and the average income of the population is smaller than that of its industrialized areas.

Demographic clustering.--Several bases can be considered for the demographic grouping of the population. Official census figures are available or descriptive surveys easily can be conducted. By analyzing marketing performance in each of these clusters, business firms usually

can obtain measures of their marketing effectiveness. Some of the most commonly used bases are noted below.

Consumers, purchasers, or users of products can be classified into age groups if a difference in marketing behavior is observed among them. There can be no universal age group classification since behavior toward a product, or within regions, differs. It is interesting to note that the age pyramid structure of developing regions differs from that of developed countries. In the latter, birth control measures have been used for a long time, but in the former a larger proportion of the population is under 21 years of age, thus making demands on education and new job positions in the present decade much greater.

Another bases for demographic grouping is sex. Psychological, physiological, social, and cultural factors contribute to significant differences between the sexes, which lead to different patterns of purchasing behavior. It is unarguable that the role of women is changing, particularly in developed societies, and that the role differs in the less developed nations. Some of the main differences are a smaller proportion of women in the labor force, a lower proportion of divorces, more dependence upon the "man of the house" for moral and economic support, less discretionary purchasing decisions made by women, less advanced schooling for women, and women's role in the raising of children and in household chores.

Occupation also is a useful explicative factor. It accounts not only for the size, type, and periodicity of income, but also for socially-oriented behavior. Business leaders, government officials, white- and blue-collar workers, farmers, construction workers, teachers and priests not only differ in income, but also in their attitude toward life and in their related spending behavior.

Most of the occupational differences described above also are observed in various education clusters. Their range is even larger in developing rather than developed nations. Few people attend universities, and many others are illiterate. For marketing and advertising purposes this fact represents an important problem. Some people at two given extremes might feel insulted if approached by the same communicator. What might seem naive for some may appear sophisticated for most, thus forcing the use of heterogeneously designed marketing mixes.

Racial or subcultural minorities within a market are a crucial problem for marketers. Very few countries are fortunate enough to have been spared the problems attendant upon this situation.

Religious differences historically have caused international and intranational warfare, and some of these differences persist today. For marketing purposes, religious groups and their related behavior are important for some products and in some regions.

Marital status and such correlated variables as stage in the life cycle, number and age of children, and number of people in the household are another source of market behavior differentials. Descriptive material on these variables is easily found in current marketing literature, along with an explanation as to how they should be considered for clustering purposes.

Physical mobility is another factor worth consideration. Although mobility is less in developing nations, such as exists is different from that in the United States. In America the decision to change jobs and locations is commonplace; in other nations, with other cultural backgrounds, this decision is unusual. However, and similar to the United States, the slums of industrialized areas are composed of people not born in the city, but who came there looking for jobs and opportunities not found in their birthplaces.

Some demographic factors have their origin in the marketplace. There are some cities where purchasing behavior is affected by the composition of the customers. For example, in a resort area like Acapulco, Mexico, there is the local consumer, the international jet-set group, the week-end tourist from neighboring Mexico City, the national and the international tourist. Each group has a different purchasing behavior, and marketers either

accept the fact and adapt their mixes or run the risk of failure. College towns, border cities, and travel stop-overs, among others, all present several of these clusters which should be considered in marketing planning.

Socioeconomic characteristics.--Having defined a market as a group of people having both the willingness to buy and the ability to do so, marketers and scholars also have segmented markets according to the style of living and income patterns of the population. They have constructed a composite socioeconomic levels structure which accounts for both variables.

Patterns of Living: Independent of the size, type, and periodicity of income, willingness to buy a given product seems to be related to the way that people live. Measurement of this variable has been attempted in various methods, ranging from quantitative and qualitative analysis of expenditure patterns to assessing attitudes toward education, government, religion, work, leisure, sports, socialism, and so forth. Each of these, if separately considered, might not be a good predictor for willingness to purchase. Therefore, a composite hierarchical social structure which originally was worked out by sociology and anthropology scholars has been adapted by marketing practitioners to be used as an aid for the understanding of marketing phenomena.

Income: The economic means for purchasing is income. For marketing analysis its relative size should not be the only criteria; its source and probability of continuance also should be considered. As an economy advances, more and more products are purchased by consumers who buy on credit, thus using part of their expected flow of future income. If persuading a customer to buy has been accomplished, persuading him to pay (collection) seems to become a major problem in developing countries. Clustering customers along the income and collection variables seems advisable for marketing purposes in many cases.

Socioeconomic Level Composite Index: Facing the need for a composite index for the socioeconomic structure, most researchers in Mexico, borrowing heavily from the Warner Scheme, implicitly have been using a five category hierarchical class system: Group A, upper; Group B, upper-middle; Group C, middle-middle; Group D, lower-middle and upper-lower; and Group E, lower-lower. Groups A and B tend to be clustered together when researching general consumer products, as group A accounts for less than five percent of the total, but taken separately if research is performed for expensive and exclusive items. Therefore, for practical purposes, there are four, not five, categories. Privately calculated estimates indicate that these four groups account for approximately 15 percent,

25 percent, 35 percent, and 25 percent of the population in the larger urban concentrations of Mexico. Elsewhere this writer has presented a description of this socio-economic structure.⁹

Personal Characteristics.--

Two products with very similar demographic profiles sometimes turn out to have usefully different psychographic profiles. . . a demographic bracket in itself means nothing unless one has a clear picture of its life-style implications.¹⁰

Psychographic, life-style, and attitude research focusing on consumer activities, interests, prejudices and opinions is beginning to appear; its aim is to draw recognizably human portraits of consumers.

Personal characteristics naturally play an important role in purchasing behavior, and there have been many attempts to measure them. Personality traits, sociability, life cycle and stage, and leadership are some of the factors which can be considered as forming someone's personal characteristics.

Unfortunately most attempts to use personality variables in the explanation and prediction of buying behavior have been made with no explicit attempt

⁹ Jorge F. Gonzalez-Arce, "Analysis de las Familias Lectoras de Periodicos en la Ciudad de Monterrey," (Unpublished Bachelor's Thesis presented at Instituto Tecnológico y de Estudios Superiores de Monterrey, September, 1959), Chapter 5.

¹⁰ William D. Wells and Douglass J. Tigert, "Activities, Interests and Opinions," originally in Journal of Advertising Research (1971), taken from Engel, et.al., op. cit., p. 261.

to verify any of the numerous personality theories and with no attempt to develop a specific buying-related personality theory.¹¹

The use of life style as a basis for segmentation is conceptually appealing. Yet the lack of a theory of life style that could guide the selection of life-style attributes to be included in any segmentation study detracts from the operational usefulness of the concept.¹²

Furthermore, it has been stated:

The absence of a satisfactory theory of individual behavior does not necessarily imply the absence of valid propositions about the groups' behavior. For marketing strategy, it is the behavior of groups, not persons, that is primarily important.¹³

Segmenting the Market for a Product Class

Having analyzed how the consumer market can be "naturally" clustered, that is, broken into its significant components, it is our intention in this section to describe useful or common methods for segmenting, both for analytical and decision-making purposes, the market of a given product. A product's market (actual or potential) can be studied by segmenting its buyers, by observing its flow through channels, by clustering consumers according to behavior patterns, or by measuring attitudes and preferences for brands within a product category.

¹¹ Frank, et.al., op.cit., p. 50.

¹² Ibid., p. 61.

¹³ Frank M. Bass, Douglas J. Tigert and Ronald T. Lonsdale, "Market Segmentation: Group Versus Individual Behavior," Journal of Marketing Research, V (August, 1968) 266.

Institutional Segmentation.--A consumer product is a good or a service that is bought in order to satisfy objective or subjective personal wants. However, between its production and its final consumption, the individual consumer is not the only person who handles it. Purchasers of consumer products may buy them for other reasons, and they also become a market for the product, thus forming institutional segments.

The market for consumer products can be institutionally structured or segmented along the following lines:

1. final consumers, those who buy the item for personal want satisfaction;
2. middlemen, who buy consumer products not for consumption, but for profit-making reasons. They act as intermediaries between producers and consumers, adding time and place utilities to the goods;
3. government and its decentralized agencies, which in some less developed countries become a major market, especially in socialized nations. For example, socialized medical services limit the market for pharmaceutical products;
4. service buyers use the consumer product as a means to provide a full service. Restaurants buy soft drinks to complete menus, and bars purchase beverages for on-premise consumption; and

5. industrial buyers who might use a consumer product either as a fringe benefit for their workers, as a part of their final product, or as a public relations item.

Segmenting the Intermediaries.--One of the common fallacies implicit in a product-oriented business firm is that marketing ends when a channel intermediary buys the product. The accounting records of the firm show that a sale has been made, and that is the end of the transaction. A marketing orientation, on the other hand, implies that inventory accumulation by middlemen is not an end in itself, but that a sale is made when the final consumer actually consumes the product. Nonetheless, the idea of segmenting the market, or at least of analyzing sales, by the channel of distribution utilized, is sound, and it usefully can be applied for decision-making purposes.

Intermediaries can be segmented in four ways.

(1) Type. Is the operation retail or wholesale? Does it provide full or limited service? Does it offer exclusive or competing lines of products? (2) Size. Larger intermediaries show different purchasing behavior than smaller ones. (3) Product significance. Importance of the product to any given intermediary usually will produce both a difference in attitude toward the product salesmen, and a difference in volume ordered from the firm. (4) Other factors. Intermediaries may be segmented according to

their distribution area, their availability of economic resources, their credit ratings, and so forth.

Consumer behavior and the product.--The final consumer of a product class can be segmented in three primary ways.

The first is current and potential market. A consumer is a person who has bought and consumed the product within "x" period of time. A potential consumer is one who currently lacks the will and the ability to purchase, but who is expected to have purchasing power in the future; it is possible for the firm to develop his willingness to purchase. A population without at least an expected purchasing power ability is not considered a market for consumer products. Peasants in underdeveloped countries are not, and will not in their lifetimes, be a market for automobiles.

The second is quantity purchased. Consumers of a product can be segmented along heavy, moderate, and light nominal scale. In 1967 Twedt advanced some propositions about the "Heavy-Half Theory."¹⁴ He maintained that:

(1) demographic characteristics generally are poor predictors of heavy usage; (2) heavy usage of different product categories is relatively independent; (3) there seems

¹⁴Dik Warren Twedt, "Some Practical Applications of 'Heavy-Half' Theory," originally in Johan Arndt, Word of Mouth Advertising and taken from Engel, et. al., op. cit., pp. 265-266.

to be less brand loyalty among heavy users; and (4) heavy users are not price buyers.

Among businessmen, there seems to be a tendency to overemphasize the importance of heavy users, thus often neglecting moderate and light users. Research can be helpful in this area in assessing market opportunities in each segment. Research might discover that most competitors are pursuing the heavy user segment, whereas in the light user segment there exists a larger proportion of unsatisfied demand, thus presenting a better market opportunity.

Third, by researching current customers several other bases for segmenting the products market by consumer behavior can be found. These include product uses; on-premise versus off-premise consumption; status consumption; timing of consumption after the purchase (purchasing for storing versus immediate consumption); occasions when the product is consumed; personal or accompanied consumption patterns; substitute and complementary products; and the importance of and reliance on influential agents in the purchasing decision.

Descriptive research along these lines can be usefully applied for marketing strategy purposes. Changes can be implemented in the product or in its physical appearance; its price can be adjusted to that of similar

products; promotion of the product, either in content or in the choice of media, can be altered; or the physical distribution of the product can be modified.

The Brand within the Industry.--The shift of the total product demand schedule toward the right will cause larger sales volumes for the industry, thus producing benefits for a given business firm marketing such a product. Although for strategic and long-range plans this is a desirable goal, decision makers also will be interested in obtaining a larger share of that market. Thus, marketing plans should include activities designed for demand increasing purposes, but much of managerial interest will be in how to increase sales of each brand within a product category.

In today's economy, each brand appears to sell effectively to only certain segments of any market and not on the whole market. . . Sound marketing objectives depend on knowledge of how segments which produce the most customers for a company's brands differ in requirements and susceptibilities from the segments which produce the largest numbers of customers for competitive brands. . . Traditional demographic methods of market segmentation do not provide this knowledge . . . and they are not likely to provide as much direction for marketing strategy as management requires.¹⁵

Several kinds of situation-specific market segmentation studies have been attempted by scholars and practitioners. They are designed to produce better predictors for

¹⁵ Daniel Yankelovich, "New Criteria for Market Segmentation," Harvard Business Review, XLII (March-April, 1964) 83.

brand performance in the market.¹⁶ Models analyzing brand choice processes (first and/or repeated purchases for new products) have been fully described in the current marketing literature.¹⁷ An alternative approach, segmenting the market by consumer perception, has been the subject of this field research. Its theory and basic methodology will be explained in the next section.

¹⁶ See Engel, et. al., op. cit., and Frank, et. al., op. cit.

¹⁷ Philip Kotler, Marketing Decision Making: A Model Building Approach (New York: Holt, Rinehart and Winston, Inc., 1971), pp. 469-565.

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CHAPTER IV

AN ALTERNATIVE APPROACH: SEGMENTING THE MARKET BY CONSUMER PERCEPTION

General Objective

Perception may be defined as the "complex process by which people select, organize, and interpret sensory stimulation into a meaningful and coherent picture of the world."¹ "Because the basic instruments of the marketing manager--product, promotion, pricing and place--are part of the consumer's sensory stimulation, many students of buyer behavior are interested in people's perception of various marketing offerings."²

Paul Green and Frank Carmone have suggested the following:

Suppose one could characterize a product class and its buyers as points in a space whose

¹ Bernard Barelson and G. A. Steiner, Human Behavior: An Inventory of Scientific Findings (New York: Harcourt, Brace and World, Inc., 1963) p. 88.

² R. H. Holloway, R. A. Mittelsteadt and M. Venkatesan, Consumer Behavior: Contemporary Research in Action (Boston: Houghton Mifflin Co., 1971) p. 32.

dimensions are perceived product characteristics. Each brand could be represented as a stimulus point and each buyer as an ideal point in the same attribute space. Actually, however, this would be a "superspace" in the sense that different buyers may perceive the same stimuli differently as well as occupy different ideal point positions in the space which is perceived. Conceptually, then, a market segment might be viewed as a subspace in which all members:

1. Perceive the stimuli similarly, and
2. Possess the "same" ideal point position and dimension saliencies.³

In the same vein, Green and Donald Tull have said:

Partitioning the superspace of ideal points and stimuli into reasonably homogeneous subspaces--and identifying the characteristics of consumers who exhibit commonality of perception and preference--appears to be in the spirit of market segmentation strategy. Perhaps such analysis would show "empty regions" where a high concentration of ideal points, but no "close" brands, are found. . . . From the manufacturer's point of view, the task is to modify his (marketing mix) product, package, advertising, etc., for the purposes of either (1) moving his brand in the space which has a high "concentration" of ideal points, or (b) attempting to move the ideal points themselves toward his brand.⁴

Implicit in the marketing concept is the assumption that the firm is serving the market with satisfiers--products and services--for its wants. The market of the firm

³Paul E. Green and Frank J. Carmone, Multidimensional Scaling and Related Techniques in Marketing Analysis (Boston: Allyn and Bacon, Inc., 1972) p. 15.

⁴Paul E. Green and Donald S. Tull, Research for Marketing Decisions, Second Edition, (Englewood Cliffs: Prentice Hall, Inc., 1970) p. 239. This same section appears in Green and Carmone, op. cit., p. 16.

is the sum of many consumers who have a relative freedom to chose (1) which perceived want they would satisfy, and in what order, and (2) with which product, and even with which brand.

Consumer wants, and their relative ranking, are not objectively fixed or set for all the population, except within the basic "Smith-Ricardo-Pareto" world, or, in a relative way, within a pure Socialistic structure, or in an autocratically directed group.

Modern theories of consumer behavior have shown that each consumer, or his market representative, subjectively--but not necessarily emotionally--makes continuous decisions as to what perceived need he will satisfy within a given time period. In the modern world the consumer finds a multitude of products, many of them substitutes for each other, competing for both his income and his will to purchase.

In terms of the satisfaction of a specific want, each individual consumer tends to perceive each product, and even each brand within a product category, differently from other consumers. Moreover, as consumers look at products from different perspectives (divergent attributes are assigned to each product), product and brand perception is not consistent within a market.

In this world of millions of consumers, thousands of products, and only a relatively small number of

brands within a product category, the following expectations might be logical.

1. Brands within a product category are perceived differently. If not, each one's market share would be equal to the total market divided by the number of brands being offered.

2. A given proportion of the total market will be relatively dissatisfied with current brands.

3. Perceived needs could be clustered into a manageable size.

4. Consumer perceived wants and brand perceptions are not constant. They change through time due to changes in communication received by the market from many sources.

5. The perception of communication--size, content and credibility--is not equal among all the members of the market.

6. The use of average measures (or descriptive segmentation bases) to describe perceived consumer wants, brand perception, and preference and perception of communication by the market might mislead managers in deciding among alternative marketing strategies.

7. There are several variables, which for each product category will not be the same, which have a combined effect on consumer perception. Therefore, it is logical to assume that: each variable will have a different weight; since they have a simultaneous effect on the market, they

should not be treated independently, or unidimensionally, because some of them might, in addition, be intercorrelated; market segments can be clustered considering the weight of each variable; and the importance--weight--of each variable might change through time, thus changing the market segments. It is therefore necessary to maintain a continuous tracking system.

Although a universal methodology has not been adopted by marketing, research which applies models and concepts imported from the behavioral sciences and mathematics, first experimentally and later pragmatically, has been applied to the problem of measurement of consumer perception.

In this connection Richard Johnson has commented:

In this discussion market segmentation analysis refers to examination of the structure of a market as perceived by consumers, preferably using a geometric space model, and to forecasting the intensity of demand for a potential product positioned anywhere in the space. The purpose of such study, as seen by a marketing manager, might be:

1. To learn how the brands or products in a class are perceived with respect to strengths, weaknesses, similarities, etc.

2. To learn about consumers' desires, and how these are satisfied or unsatisfied by the current market.

3. To integrate these findings strategically, determining the greatest opportunities for new brands or products and how a product or its image should be modified to produce the greatest sales gain.

From the position of a marketing research technician, each of these three goals translates into a separate problem:

1. To construct a product space, a geometric representation of consumers' perceptions of products or brands in a category.
2. To obtain a density distribution by positioning consumers' ideal points in the same space.
3. To construct a model which predicts preferences of groups of consumers toward new or modified products.⁵

Methodology

Ronald Frank and William Massy have said:

The strategy of market segmentation is defined as the development and pursuit of different marketing programs by the same firm and for essentially the same product but for different components of the over-all market. The choice of segmentation as a strategy is predicated on the assumption that the market for a particular product is composed of segments with somewhat different (perceived) needs and wants. If these segments can be identified, then it may be possible to develop a marketing program for each that corresponds to its requirements.⁶

A methodology to pursue these goals, which in the following three chapters will be analyzed stepwise, consists of several distinct stages.

⁵Richard M. Johnson, "Market Segmentation: A Strategic Management Tool," Journal of Marketing Research, VIII (February, 1971) 13.

⁶Ronald B. Frank and William F. Massy, "Market Segmentation and the Effectiveness of a Brand's Price and Dealing Policy," Journal of Business, XXXVIII (April, 1965) 185.

The first is problem setting. Management must be aware that it is facing a segmented market and that, although descriptive market segmentation--geographical, demographic, socio-economic, or personality based--could be useful, there might be another, and more problem- or brand-oriented way, to explain differences in consumer behavior.

The second stage involves the use of secondary sources of information. When researching in a new field, especially when in need of an interdisciplinary approach, one is forced to resort to the current literature to seek new ideas and to validate older ones. Previously conducted studies, mainly those classified as motivation research, seem very useful in the formulation of the first list of attributes, along which perception later will be measured.

A decision must be made as to which type of measurement scale will be used, as well as to the specific computer programs for data analysis. An additional set of problems arises if research is to be conducted in a developing country. These include the absence of literature, poorly conducted previous motivation research, the limited availability and capacity of existing computers, and the need to adapt the techniques to be utilized to the idiosyncracies of both management and consumer respondents.

Stage three is questionnaire construction. The questionnaire must be designed so as to provide at least

interval scaled perception ratings of respondents regarding two items: the "ideal brand," that which, if it existed, would satisfy consumer wants on each of the rated attributes, and at least one brand currently on the market and known by the respondent. Additional information about preferences, both present and past, about current objective buying behavior--what, when, where, how much, and so forth, about demographic and socio-economic characteristics, and about personality traits also could be included. Such items would provide descriptors of the clusters formed by consumer perception. The quantity of information to be gathered from respondents is limited by the type of field work conducted and by the type of respondents from whom the information is collected. The quality of responses, rather than their relative quantity, should guide the structuring of the questionnaire.

The fourth stage is sampling. Three basic problems arise regarding this stage of the methodology: determination of the unit to be sampled, the sample size, and selection of respondents. Obviously, if research is to be used for decision-making purposes, a probability sample must be drawn to assure valid generalizations about the universe. Most of the published research that follows a similar methodology has been conducted on an experimental basis, without using probability sampling, and on a very limited number of observations.

In order to determine the unit to be sampled, a decision must be made about whether a multistage segmentation approach is to be followed.⁷ Every consumer type can be included in the sample, or a pre-segmentation can be attempted, for example, rural areas, older people, women, and so forth, may be excluded.

In a segmentation study sample size must be larger than would be the case in descriptive projects since a sufficiently large sample must be obtained from each market segment. The sample size for smaller clusters should be at least 30 in order to provide statistical confidence. This minimum size will produce an error of 18.2 percent at a 95 percent confidence level which still is very high for comparison purposes.

The selection of respondents should be on a random basis since perception is not evenly distributed among demographic groups. The nonresponse and not-at-home rates must be kept under control since they could bias or influence total results from the sample.

Stage five is field work. Consistent procedures are to be followed to secure unbiased responses. Field supervision is recommended on a fairly large scale in order

⁷ For a detailed discussion on the multistage approach to market segmentation see Chapter III, "Alternative Bases for Market Segmentation."

to validate answers from respondents. Personal interviewing, rather than telephone or mail surveys, is recommended in order to assure lower nonresponse rates. Interviewers have to be selected and trained accordingly.

The sixth stage involves administrative work. Questionnaire coding should be made, taking into consideration the computer programs which will be used for data analysis. A separate and distinct code should be assigned for each attribute rating on each one of the different brands, as well as for the "ideal brand." The use of a computer data validating program is suggested in order to eliminate key punching errors.

Stage seven is data analysis. In this stage the main differences arise between a descriptive market survey and a market segmentation study. Various researchers have conducted data analysis by making different assumptions about their information, thereby using specific analysis techniques. A summary of our methodology is presented on Figure 4-1. The various kinds of data analysis discussed below are analysis of variance, factor analysis, multiple discriminant analysis, cluster analysis, testing for validation, and cross tabulation.

Analysis of variance tests respondent ratings on attributes of each brand for statistically significant differences. Unidimensional analysis is conducted for each

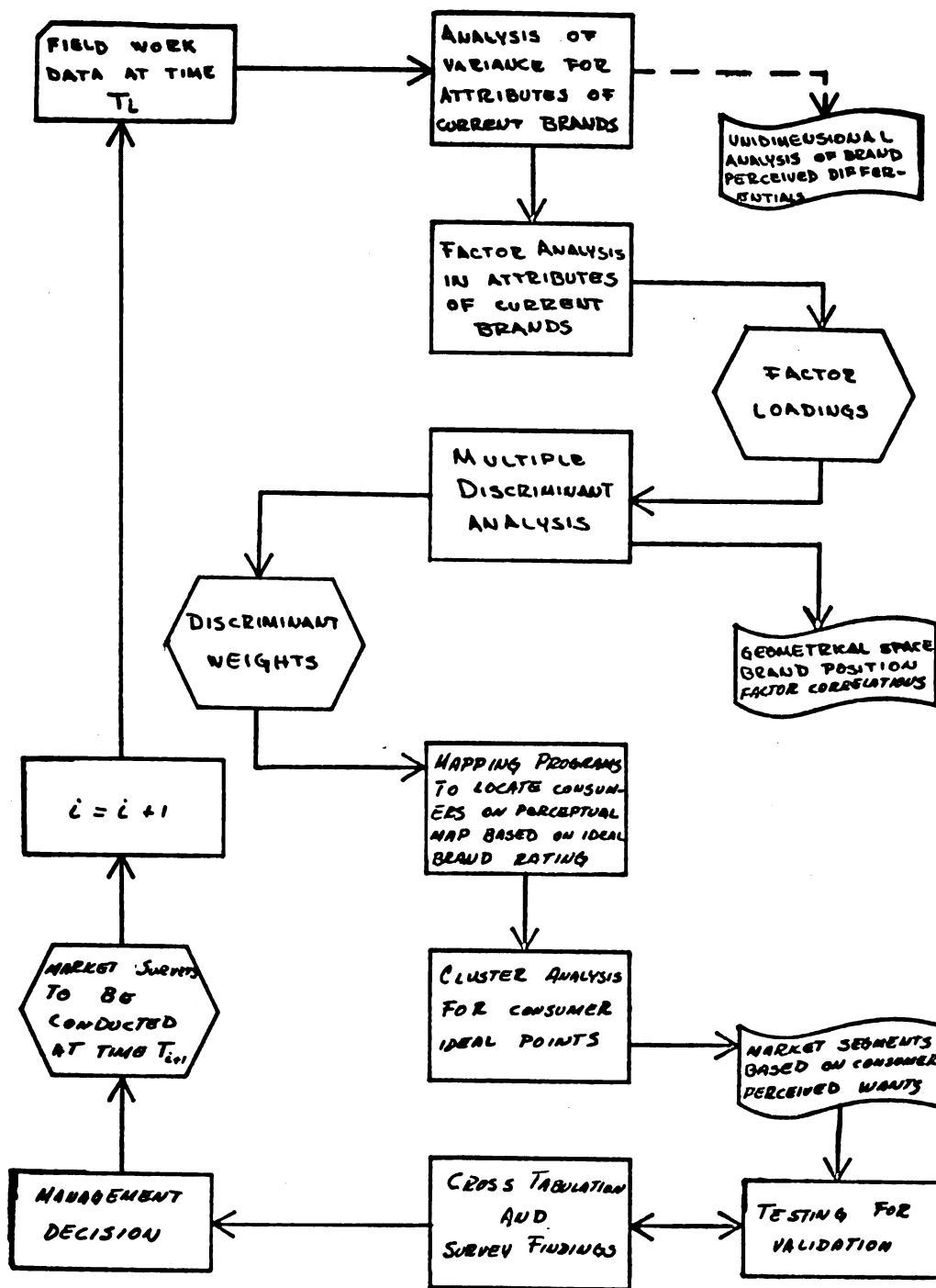


Figure 4-1.--Methodology for Data Analysis on Market Segmentation by Consumer Perception.

attribute on every rated brand in order to learn on what specific variable they are unevenly perceived. The weight of each attribute for brand discrimination can be derived by contrasting the means for each brand along every rated variable; a larger range will mean a more powerful discriminating variable. If the perceived mean values are clustered together, that attribute does not explain brand differentials.

In Figure 4-2 we observe that attribute B has a better discriminating power than either C or A when contrasting brands 1 to 5.

A	1	23	4	5		+	
B	3		2	1	5	4	+
C	4	1	3	2	5		+

Figure 4-2.--Consumer Brand Perception Along Specific Attributes

Analysis of variance is a very useful exploratory by-product of market segmentation research by consumer perception. If several of the rated attributes can be objectively measured in the market, for example, by price or availability, the researcher can be confident in the measurement system for the other attributes. Furthermore, the researcher can compare the results of this analysis

with those of more powerful techniques such as multiple discriminant analysis; the attribute ranking by weights should be consistent in both analytical methods.

Factor analysis, in this case an R-type factor analytical technique, was used for a dual purpose: to obtain a set of uncorrelated factors and to reduce the number of measured attributes to a smaller amount of factors for use in our computer without a serious loss of information. In other words, the aim was that of transforming our basis n (brands) by m (attributes) into a matrix formed by the same number of n but with fewer columns, since original attributes can be reduced to mf (factors). In other words, factor analysis transforms the original rated attributes into factors. A factor score is merely a linear combination of the original attribute scores:

$$F_1 = A_1 X_1 + A_2 X_2 = \dots + A_n X_n, \quad (4 - 1)$$

where A_j = the factor loadings or weights, and X_i = the original attribute scores.

The technique of principal components analysis was used for extracting factors, or, in terms of this method, components.

Unlike some of the less structured factor analytic procedures, principal components analysis leads to unique, reproducible results. The objective is to portray a set of associated variables in terms of a set of orthogonal (hence, mutually

uncorrelated in a linear way) linear combinations of those variables. The linear combinations are chosen so that each set of component scores accounts for a decreasing portion of the variance in the original variables, subject to being orthogonal with previously extracted components.⁸

The first factor will lead to a set of component scores which account for maximum variance. The second set of weights will lead to a set of component scores, orthogonal to the first set, which maximally account for residual variance in the original variables. In general, each successive component will account for a decreasing portion of total variance in the original set of data.

Parsimony thus can be obtained with little loss of information, as the factors which will be omitted will be those which account for the lowest proportion of total variance in the original set of data.

Concerning rotating the rotations, Green and Tull have said:

While principal-component analysis provides a useful tool from the standpoint of data reduction, it might not represent the best technique from an interpretative point of view.⁹

Factor loadings are not distributed in such a way as to permit neat and simple interpretations.

While the criteria of interpretable solutions differ among factor analysts, all seem to agree that it

⁸Green and Tull, op. cit., pp. 411-413. Also see Chapter I for a nonmathematical explanation of this methodology.

⁹Ibid., pp. 412-413.

would be desirable to have each variable load highly on one and only one component.¹⁰

The Varimax technique was chosen from among the many available because it "leads to a new set of orthogonal axes, keeping the sum of squared loadings for each row of the factor loading matrix intact. Moreover, the sum of products of loadings in any two rows of the rotated factor matrix equals the comparable quantity in the original factor matrix. As such, the new axes explain (in total) just as much of the common variance as explained by the unrotated loading matrix. The Varimax rotation merely breaks up this variance in a different way." ¹¹

Multiple discriminant analysis aided in the next problem, that of drawing a perceptual map. It should show the location of actual brands (brand position as perceived by consumers); and the relative importance (discriminant weight) of each factor (a transformed rated attribute), and, in addition serves as a tool for locating on the same map consumers' preferences as stated in their rating of the "ideal brand" along the same attributes.

Strictly speaking, in order to obtain the relative weight of each attribute a stepwise multiple regression analysis can be used as long as a dependent variable exists

¹⁰Ibid., pp. 412-413.

¹¹Ibid., pp. 418-421.

that at least is interval scaled. However, as the number of brands to be analyzed in this study is relatively small, although the resulting function might show a relatively high correlation coefficient, it also might have a high standard error due to sample size. Thus, the function might be used only to predict the leading brands in the market.

Green and Tull have noted that discriminant analysis is the appropriate method for:

(1) Testing whether significant differences exist among the average score profiles of two or more a-priori defined groups (brands). . . , (2) Determining which variables account most for such intergroup differences in an average profile; (3) finding linear combinations of predictor variables that enable the analyst to represent the groups by maximizing among-group relative to within-group separation; (4) establishing procedures for assigning new individuals whose profiles, but not group identity, are assumed to be from one of the a-priori defined groups.¹²

Johnson adds that the method is useful for "constructing a spatial model of the product category. . . as it finds a weighted combination which discriminates most among products. . . and then second and subsequent weighted combinations are also found which discriminate maximally among products, within the constraint that they are uncorrelated to one another."¹³

¹²Ibid., p. 369.

¹³Richard M. Johnson, (Market Facts, Inc., Chicago) "Relationships Between Product Attributes and Preferential Choice Behavior" (Paper delivered to the American Statistical Association, New York, August 19, 1969).

Several steps are involved in drawing a perceptual map. First, the percentage of total variance extracted by each dimension must be found. In ordinary cases, three dimensions will extract 90 percent to 95 percent of total variance. For simpler presentation a two-dimension map seems advisable; this would facilitate management's understanding of results.

Second, the axes must be labeled and the correlation of each variable must be learned. The computer program output will produce factor correlations for each dimension, the location of each factor in the spatial space thus formed, and a variable F ratio for each factor. Figure 4-3 summarizes these measures.

The following conclusions can be drawn from the analysis of Figure 4-3: (1) Axis I could be labelled according to the names for factors 3 and 1, for example, pricing and availability, whereas the label for axis II should be that of factor 4, say, quality; (2) Factors 4 and 3 are the most important in discriminating among brands in this fictitious example, factor 1 is the least important. (3) Factors 3 and 4 are uncorrelated, whereas factors 3 and 1 are positively correlated, and factors 1 and 2 show negative correlation.

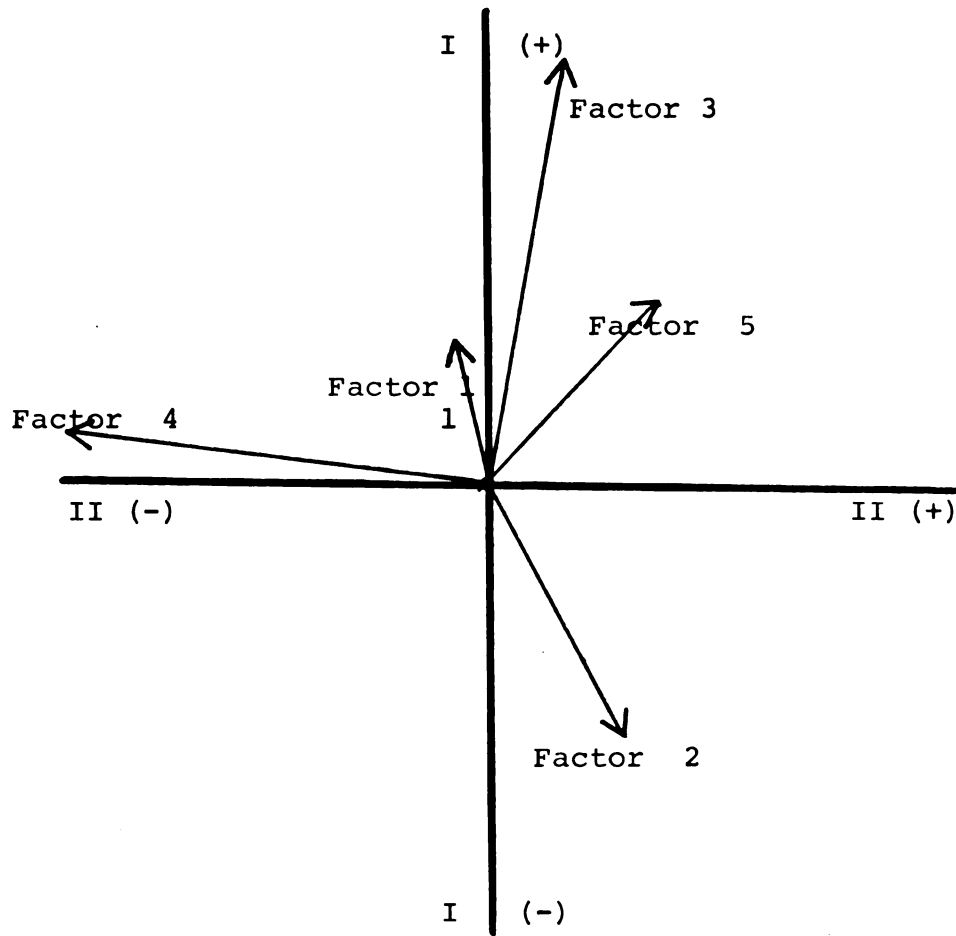


Figure 4-3.--Factor Correlations in the Perceptual Map.

The third step in drawing a perceptual map, brand positioning, is accomplished by plotting on the same map the location for each brand. This information is provided by the computer output. Figure 4-4 shows brand positioning.

Brands A and D are similarly perceived by consumers. Brands B and E are also close in consumer perception, but far from the former group. Brand C, in contrast, is the

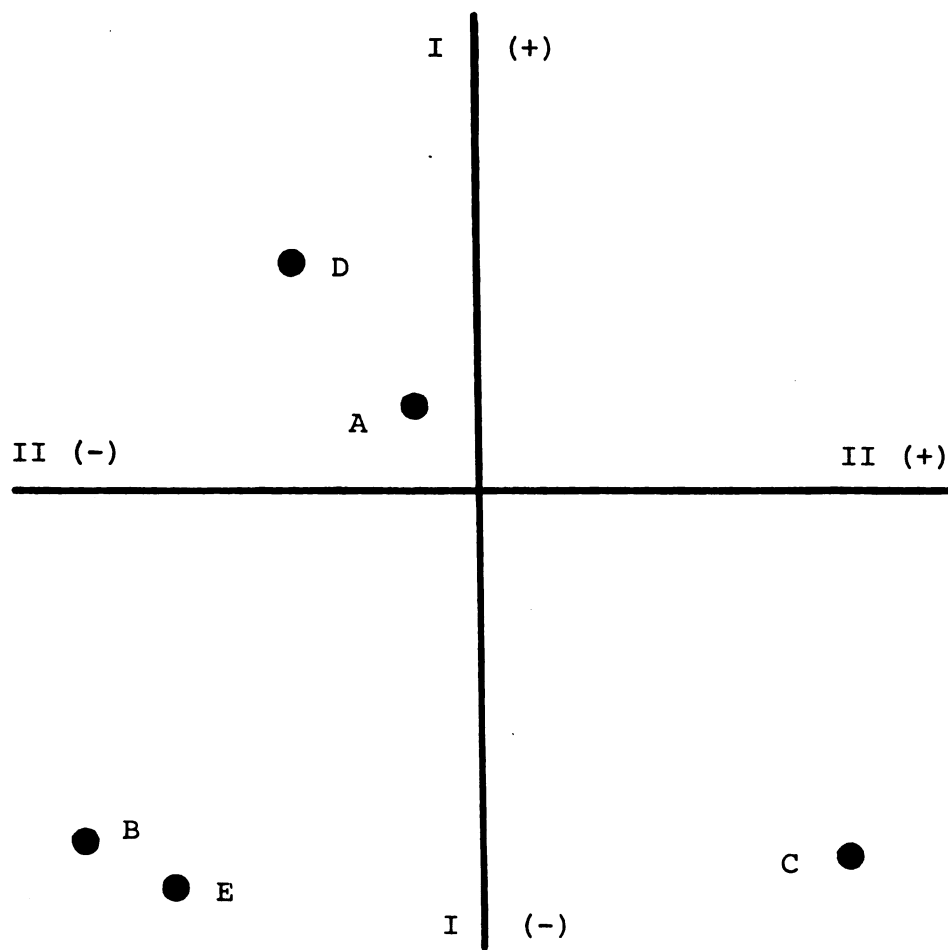


Figure 4-4.--Brand Positioning in the Perceptual Map.

"lonely" one in this market. This first analysis might prove useful for a multibrand company, if, as expected, the market is segmented, its various brands should not be clustered together in order to avoid useless marketing effort.

The fourth step involves making a meaningful interpretation of consumer brand perception. For example,

combining Figures 4-3 and 4-4 into figure 4-5 indicates that, in accordance with quality, brands B, D, E, and A

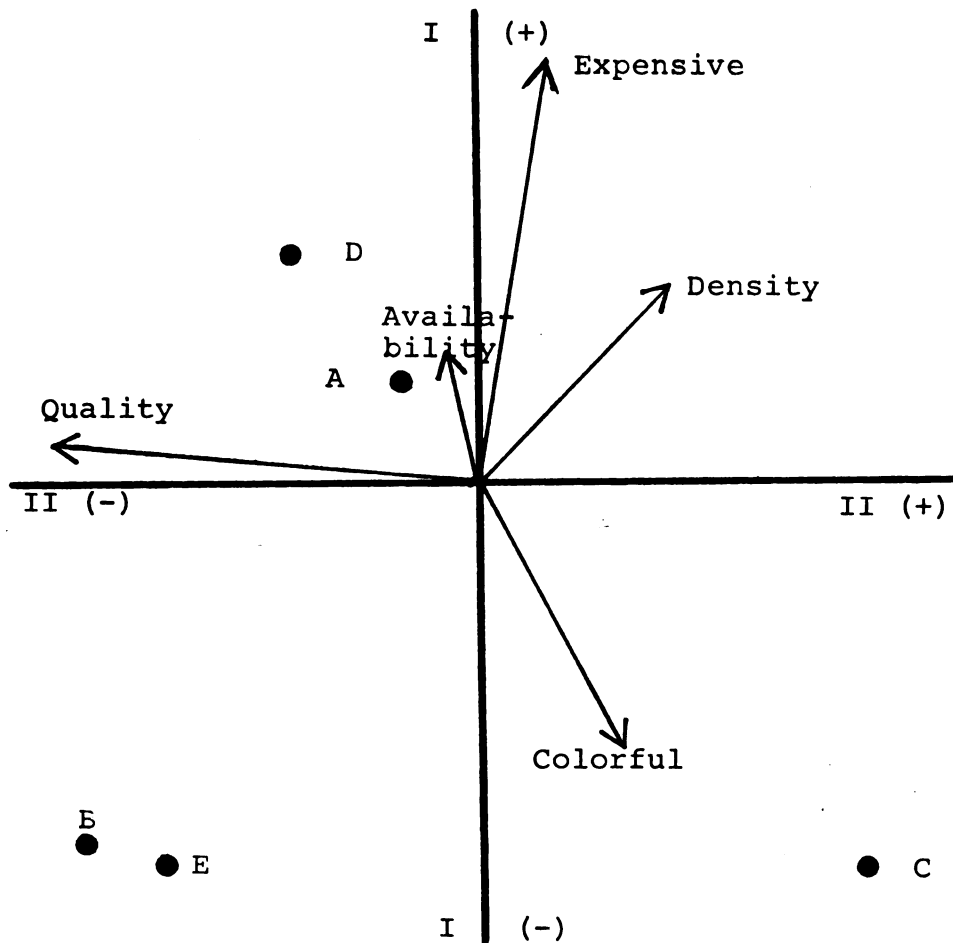


Figure 4-5.--Brand Positions and Factor Correlations in the Perceptual Map.

are similarly perceived, but brand C has a poor quality image. Brands are perpendicularly read against the line drawn for a factor correlation. In this same way, brands

D and A are perceived as more expensive, but easily available, in contrast to brands C, B, and E. Brand C is perceived as colorful, whereas the others run along a non-colorful scale. The marketing relevance of each attribute will acquire meaning when analyzing consumer preferences in the following sections. A factor-by-factor analysis such as the one just explained could be performed partially by variance analysis, as was presented earlier. Multiple discriminant analysis leads to a multivariate approach to the problem, as interfactor correlations have been considered.

The final step in drawing a perceptual map involves simulation of brand position changes, which can be achieved by altering the original attributed consumer ratings. For example, the position of brand A could be moved even closer to brand D if it were perceived to have a greater availability. This analysis suggests altering the consumer's perception by communicating to him where brand A can be bought, as he seems to have more difficulty in locating brand A than brand B. A posteriori measurement can be done to find out how much change was perceived by the consumer as a result of this campaign. Measurement of advertising effectiveness and other marketing variables can be accomplished with a similar methodology.

Cliff Holmes has described cluster analysis in the following way:

The analytical procedures designed for the purpose of simultaneously assessing respondents over many variables may be subsumed under the heading of "numerical taxonomy." The term "cluster analysis" strictly refers to part of the taxonomic procedure but has come into general usage to mean classification usually in a market segmentation context. Numerical taxonomy has, as its objective, the classification of persons, such that persons within a cluster or group are more like each other with respect to the measured variables than persons outside the cluster.¹⁴

In order to integrate such clusters, three basic measures of similarity are available: (1) similarity coefficients, which express the number of matching attributes respondents have in relation to the total number of comparisons; (2) distance coefficients, usually measured by Euclidean distances on a geometrical space configuration; and (3) correlation coefficients.

Cluster analysis is the group of techniques used to gather consumers into relatively homogeneous groups according to their relative "ideal brand" perception. Conceptually, every consumer is a cluster, that is, he is different from everyone else, but parsimony can be achieved without a serious loss of information if some

¹⁴ Robert M. Worcester, Editor in Chief, Consumer Market Research Handbook (London: McGraw-Hill Book Company Limited, 1972), pp. 323-324. Chapter 12 of this book: "Multivariate Analysis of Market Reserach Data," was written by Cliff Holmes. It presents a very good summary on Cluster Analysis methodology.

semi-homogeneous consumers are clustered together into market segments.

Several major questions must be answered before using this technique: What perceived attributes, or consumer characteristics, should be used for cluster integration? Should these selected attributes be equally weighted? What is the optimum set of subgroups to be formed?

In order to position clusters on the perceptual map, which was integrated by means of multiple discriminant analysis, the same measured attributes must be considered. In this case, however, the "ideal brand" ratings of respondents are used. Each consumer stated preference was considered as another brand. In order to be located in the perceptual map, each item had to be multiplied by factor loadings and discriminant weights, thus locating each "ideal brand" point in the same geometrical space. A mapping program was devised in order to achieve this aim.

Several programs for cluster integration have been developed.¹⁵ Among these are Q-type factor analysis, hierarchical methods such as the HGROUP program, N-way

¹⁵For a descriptive summary of Clustering Programs see: Green and Tull, op.cit., pp. 444-446. Notice that contrasted to factor and discriminant procedures which analyze ratings on current brands, clustering routines use ratings for the ideal brand.

discriminant analysis,¹⁶ and connective methods, which gather objects into clusters based on nearness. The grouping program used in our cluster analysis measures intersubject distances in order to integrate them into segments. The location of each respondent on the perceptual map is indicated to enable visual inspection of the data if the analyst so desires.

Clusters are plotted in the same geometrical space because a centroid measure is provided for each one. The size of every cluster on the perceptual map is its relative percentage of the total sample. Figure 4-6 presents the cluster configuration for our hypothetical example. The answer to the question regarding the optimum number of clusters to be formed will depend upon the specific product to be analyzed and upon the total size of the sample. A cluster whose value is 3 percent is meaningless if sample size is 100, or even 400. A casuistic analysis of the information must be done in order to determine the number of clusters to include in a segmentation study. Small clusters, when not close to current brand positions, can be either deleted or grouped with larger ones in nearby spatial regions.

Analysis of Figure 4-6 leads to several concluding remarks:

¹⁶William F. Massy, "Discriminant Analysis of Audience Characteristic," Journal of Advertising Research V (March, 1965) 39-48.

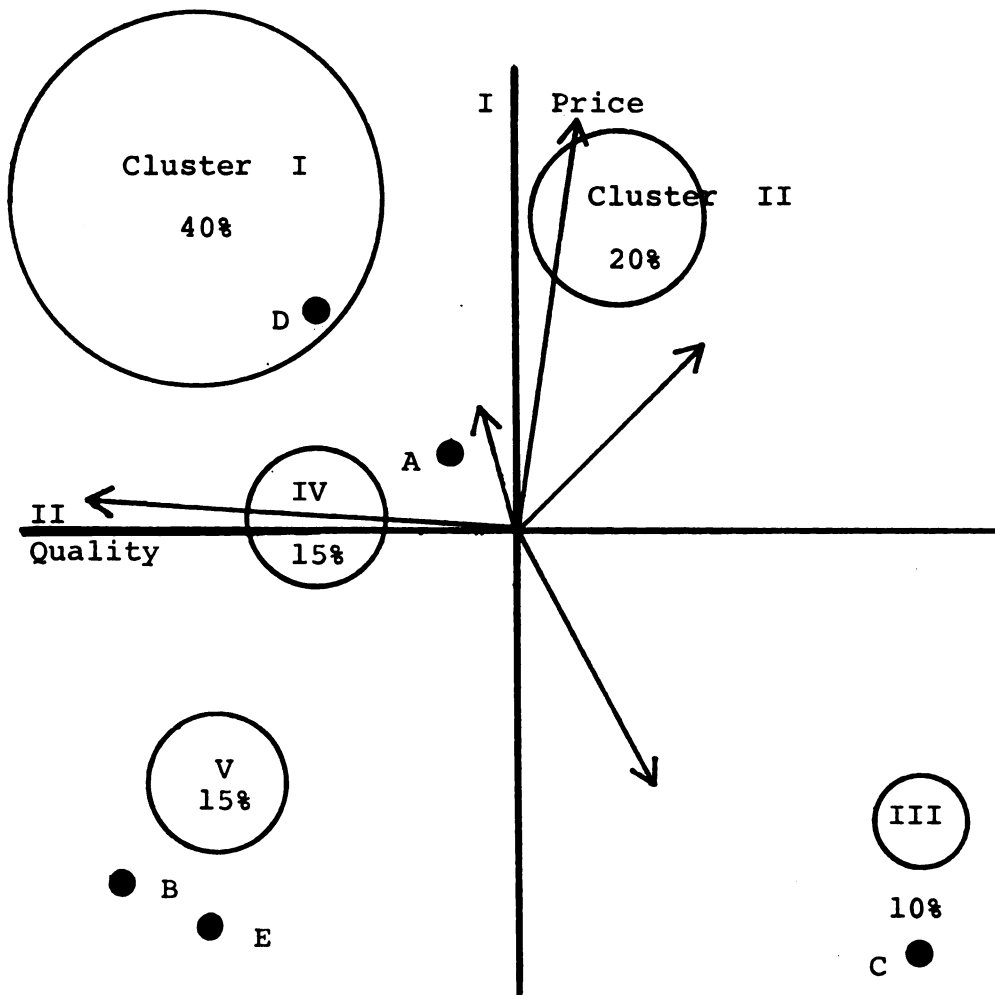


Figure 4-6.--Cluster and Brand Positioning in the Perceptual Map.

First, brand D enjoys the largest market share. It is perceived similarly to the ideal brand by 40 percent of the total market.

Second, consumers tend to value quality highly (70 percent) and are willing to pay higher prices (60 percent) for the item.

Third, assume for the moment that we are measuring hotel perceptions in Acapulco among upper class groups and that we are conducting this market segmentation survey for Hotel A. What can a manager do with these results? (1) He finds that cluster II is relatively unsatisfied by current hotels, but that cluster IV is being served by his offerings. He might attempt to cater to cluster II by building an expensive hotel or by being "production oriented," that is, by trying to convince members of cluster II through price consciousness. Another alternative might be to relocate to the northwest in order to share clusters I and II with Hotel D. (2) He has learned that communication based on colorfulness, or related hotel attributes, will not increase his demand. In many cases these non-market-oriented attributes included in advertising programs are the product of attempts to copy from other market situations or of introspective analysis of product attributes. Market segmentation research can be useful for providing consumers' viewpoints on the market offerings of the business firm.

Green and Tull have remarked about testing for validation:

Despite attempts made to construct various tests of the statistical reliability of clusters, no fully defensible procedures are currently available. The lack of appropriate tests stems from the difficulty of specifying realistic null



hypothesis. . . the analyst is usually assuming that "partial" heterogeneity exists in the first place--otherwise why bother to cluster? . . . the clusters are formed from the data and not on the basis of outside criteria. Thus one would be placed in the uncomfortable statistical position of testing the significance between groups formed on the basis of the data itself.¹⁷

Nonstastical but logically accepted validation procedures can be constructed. (1) The sample may be "sampled." That is, a partial sample may be randomly selected out of it in order to determine if similar cluster formations are found. (2) The same survey may be conducted in other similar markets. (3) The final proof is to cross tabulate market preferences against clusters; if nearness on the perceptual map is correlated to preferences, clusters can be said to be "correctly" structured. If market share estimates are available and if they can be measured by cluster, this would constitute a definitive test for validating this methodology.

The advantage of cross tabulations is that better information can be provided for managerial decision making if clusters are further identified. Demographic, socio-economic, and personality measures can be used for cluster description. If additional information is provided regarding attitudes and preferences of advertising media by clusters, an almost complete market scheme would be available for marketing strategy purposes. All such information

¹⁷Green and Tull, op. cit., p.447.

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usually cannot be collected through a single questionnaire. Collection can be attempted by some kind of sequential sampling, by split balloting, or by using panel information.

The eighth and final methodological stage concerns marketing management decision making based on market segmentation research. If research results are not incorporated into marketing strategy, market research will remain a scholarly rather than a pragmatic approach.

Several key questions have been raised regarding this particular problem.

(a) To what extent is the strategy of market segmentation explicitly built into the marketing program for new products prior to their introduction (as opposed to, for example, being used as a catch phrase to rationalize the failure or success of a product after it has been introduced)?

(b) How persuasive is the strategy of market segmentation in practice? Does it, for example, have an impact primarily on advertising policy? On pricing? On channels of distribution? On personal selling? Are there systematic differences in emphasis between new and established products?

(c) What factors determine the likelihood of a segmentation strategy being actively considered by line management? For example, is its consideration simply a function of the product's characteristics as perceived by consumers or does it also depend on the size of the firm, the organizational relationship between the research department and line management, and possibly the working relationship between the firm and its advertising agency?¹⁸

¹⁸Ronald E. Frank, William F. Massy and Yoram Wind, Market Segmentation (Englewood Cliffs: Prentice Hall, Inc., 1972) p. 248.

Questions such as these are asked when new technology begins to be adopted by business firms. A manager will not alter his decision-making behavior until he is confident about newer approaches. Therefore, a necessary task for market researchers is that of convincing management, on a step-by-step basis, or by experimentally controlled market tests, about the benefits of a market segmentation strategy.

Advantages of This Methodology over
Other Market Segmentation
Approaches

There are several advantages the methodology used in this study has over other approaches. In this section these will be summarized.

1. Our approach is a positivistic, pragmatic, and realistic one. It attempts to describe how the consumer behaves and what he wants from a product, rather than assuming normative criteria about what he should want or about how he should behave if positioned within a market segment.

2. Our method is directed to a given product or brand as opposed to adjusting a priori market classifications which might or might not be appropriate to the given marketing problem.

3. We do not assume preassigned weights for any of the variables under study.

4. We use a multidimensional approach to consumer attribute perception. In our view, several variables interact simultaneously, but heterogeneously, on consumer behavior.

5. In contrast to its forerunner, motivation research, our approach is quantitatively measured, and the final results are less dependent on the researcher's subjectivity.

6. The method used in this study is more "scientific." If the same procedure is used to analyze the same data, the same output will be obtained. Furthermore, the same methodology can be used to survey different markets, or the same market at a later date, and the results will be comparable.

7. Our approach requires simpler field work. Many different interviewers, if properly trained, can be used. The task of measuring perception and assigning weights to variables is removed from interviewers and respondents and is passed on to the computer.

8. Finally, a similar methodology, once understood, can be used to study related products or products from nonrelated industries. The approach chosen for this study has been used in developed countries to evaluate consumer perceptions on such different marketing situations as perceived attributes of business journals, graduate

programs, political candidates, the advertising media, and consumer products. It has helped to broaden the marketing concept, and it can help convey the generic concept of marketing¹⁹ as advanced by Philip Kotler, to other fields.

¹⁹On the idea of the "Generic Concept of Marketing," see Philip Kotler, Journal of Marketing, XXXVI (April, 1972) 46-54.

CHAPTER V

MARKET SEGMENTATION BY CONSUMER PERCEPTION:

A CASE STUDY IN MEXICO

Content and Method

It is the intention in the present chapter to refer to the method and content of the case study, that is, to the reason for and the strategy of inquiry. Therefore, the following sections include a description of the case, the development of research objectives, the testing the different methodologies for inquiry, questionnaire construction, sampling techniques, and field work procedures, all of which had to be adapted to the particularities of a developing country. The next two chapters, respectively, will be devoted to data analysis and validation of the results.

Description of the Case Study

Market segmentation research along the traditional lines of descriptive classification (geographic, demographic, and socio-economic) long has been conducted in Mexico by the larger local and international business firms engaged in marketing consumer products. Motivation research dates from the early 1950s, and since then it has

been used with partial success by some firms. Syndicated research data has been provided by INRA (International Research Associates) on television and radio audiences for more than a decade. Retail store panel surveys also have been made available by local companies, and the A. C. Nielsen, Company, joined the field about six years ago.

The advent of higher speed and larger computers and the development of quantitative research methodology for the measurement of consumer attitudes, perceptions, and preferences in the developed countries, induced us to try to validate these measures for consumer products in Mexico. If reports were correct, they would present better portraits of the market than traditional surveys conducted in the past. Limited usage for decision-making purposes was being made of available research information, and management eagerly was expecting better market information as a guide to marketing planning and strategy.

A consumer product manufacturing concern, whose name will be withheld, sponsored the research. The investigation passed through several stages; what began as exploratory methodological research later was transformed into a market segmentation experiment. This latter was conducted in the main urban areas of Mexico in order to learn about diversified regional consumer behavior. When completed, analysis of the study's results prompted a

change in the components of the current brand. A subsequent test was conducted to measure the extent of consumer perception of this transformation.

The particular company studied, hereafter, Company X, is engaged in the production and marketing, through wholesalers and retailers, on a national scale of several brands of a consumer product. It is one of the largest firms in its respective industry, and its main competitors, who are also national marketers, operate, as does this firm, several manufacturing units throughout the country. Several regional brands are marketed, but the sum of their relative market share is less than 10 percent of total demand.

In the early 1950s, Company X introduced mechanical equipment for accounting and statistical purposes. In the early 1960s, large and fast computers were added which process sales statistical data within three days after the closing of the accounting month. A "sales information revolution" took place in the later 1960s, and it might be added that Company X is one of the leaders in its field throughout Latin America.

Traditional descriptive consumer research had been conducted unsystematically in the past. In the early 1960s, management began its transformation into a marketing oriented and democratically led organization. Census based retail information had been systematically obtained

every year since 1960, and the firm's research organization had been advised to conduct consumer market research on a similar basis in order to obtain information to guide their planning, strategy, and decision-making effectiveness. Marketing costs were growing very rapidly and were expected to be even higher in the future. It was felt that retail promotional activities and advertising outlays needed to be rationalized, and a way had to be found to achieve this aim. Descriptive consumer research was part of the effort, and a national survey had been commissioned to be conducted systematically in order to obtain comparable results for interarea analysis.

Development of Research Objectives

While this national survey was being conducted, the researcher thought about the possibility of examining the validity and application of the newer concepts of quantitative consumer research methodology being described in the current literature in the advanced countries. An exploratory survey to test this approach was proposed in order to test four items: (1) the questioning and field procedure processes; (2) the possibility of adapting to our own computers some of the available programs for data analysis; (3) combination of several methods in order to arrive at meaningful market segments; and (4) the validity of the approach from the decision maker's point of view.

Several explicit potential objectives to be achieved through a market segmentation by consumer perception research were established.

The first objective was to learn and to quantitatively measure how the consumer market perceived each one of the brands within the product category.

Second, information was sought about which attributes consumers were considering when evaluating the available brands. The validity of previous motivation research findings were to be tested and, later, the weight of the attributes as assigned by the consumer market were to be determined.

Third, conclusive evidence, from management's point of view, was to be gathered regarding the consumer's ability to differentiate unbranded products in order to learn if brands were objectively discriminated against or if their relative market share was a product of subjectively perceived differences among them.

A fourth objective was to test the validity of the "average consumer" assumption as an adequate target market, or to learn if the existing and measured demographic and socio-economic segments tended to have homogeneous product and brand perceptions within each cluster. If the first assumption was true, mass advertising would be justified;

if the market was segmented according to perceptions, a specialized and targeted communications mix would be called for.

Fifth, it had to be determined to what extent current brands, both Company X's and its competitors', were satisfying consumer wants. This would help decide if new brand(s) were or were not necessary and, if so, what objective and subjective characteristics new brands should possess.

Sixth, in contrast, evidence had to be found regarding proposed changes in image (position) for existing brands in order to make them more competitive in the marketplace.

Seventh, the market had to be segmented according to perceived wants and tests made to determine whether this clustering procedure was in accordance with previous segmentation bases. If not, a more market-oriented decision tool would be available for marketing planning and strategy formulation.

Eighth, evidence had to be gathered regarding advertising themes as related to relevant product attributes. By knowing the weight of each attribute (and their intercorrelation) as perceived by each relevant market segment, alternative advertising themes, copy, and media could be used. If advisable, such material had to be

tested in selected experimental areas where "before" measures had been obtained.

The final objective was to discover whether significant differences existed between retailers' and consumers' brand perception and attitudes. Changes might be necessary in retailers' public relations and promotional strategies. Similar comparative research was proposed, but not carried out, to contrast salesmen's perception and attitudes toward Company X's brand and those of its competitors.

Exploratory Methodological Survey

An exploratory survey was sponsored in order to test the operational tools which originally were designed to segment the market by consumer perception. Several self-imposed limitations restricted the undertaking. Among these, the one which would become the most important was the fact that no additional field work would be carried out, although questionnaires might be changed to include necessary information without excluding previously authorized questions for demographic and socio-economic segmentation.

However, there were no limitations on the procedures to be utilized for data analysis, and there was no time pressure as long as the rest of the information was presented according to schedules previously approved. The

researcher was able to use field work to be conducted in the main urban concentrations of the country by adding a few relevant questions in the questionnaire which was going to be used.

Coincidentally the decision was made at the Instituto Tecnológico de Monterrey to replace its IBM 1620 with a CDC 3300. This provided a larger and faster unit for calculations, but, above all, made more computer time available. Two computer programs for data classification were developed by the Systems Department of the institute, "TAB-ENC" and "TAB-CRU." These reduced the burden of data tabulation to a minimum and opened the door for data analysis.

Prior to 1968, hand tabulation, Royal McBee pre-punched cards, and mechanical sorting of keypunched cards were the only methods for tabulating market research data. Although several larger companies had been using electronic computing facilities since the late 1950s, the machines' memory capacities were limited, and most of their available time was being used for administrative and accounting purposes. No general market research data tabulating programs, such as the ones developed at ITESM, had been used before, although some specialized data handling routines had been privately utilized by some researchers. The main limitation of specialized programs, as opposed to general

use ones, such as that mentioned above, is that for every new type of information desired from the original data, the program must be modified. It thus becomes a nonroutine (test) program for the computer departments, and these programs usually are run only once a day which would limit the time available for data analysis, simulation and experimentation.

At the same time, and serving as a basis for this study's approach to market segmentation, there was a growing amount of literature on multivariate analysis for market data appearing in marketing and business journals and even in specialized publications. Systems' salesmen of the competing computer firms also were instrumental in acquiring and implementing special programs for market data analysis.¹

Questionnaire Design

Jean Morton-Williams has remarked that

Every stage of a market research survey is of vital importance if valid conclusions are to be drawn from it. But the design of the questionnaire is certainly one of the most critical phases. If the required information is not covered or if the questions are posed in such a way that they make no sense to the

¹For a summary of the methodology for data analysis, see Figure 4-1 in the previous chapter.

to the informant, no amount of clever interviewing or ingenious analysis can produce useful results.²

Several steps had to be taken before arriving at the final questionnaire used in the exploratory test conducted in Mexico City in May, 1971. That survey was fully analyzed, and by the time the national sample was taken, the questionnaire had suffered more modifications. These will be explained later.

Preliminary Research on Attributes
to Be Measured by Consumer
Perception on Selected
and "Ideal" Brands

Noted below are the main areas researched before arriving at the attributes to be included in the questionnaire in order to rate consumer perception.

First, motivation research reports previously conducted in Mexico regarding the product class under investigation were probed for product attributes perceived by consumers.

Second, since some of the questions included in previous market descriptive surveys were "open" questions, an extensive reviewing of their respective answers was conducted for similar purposes.

² Robert M. Worcester, Editor in Chief, Consumer Market Research Handbook (London: McGraw-Hill Book Company, Limited, 1972) p. 69. Chapter 4, "Questionnaire Design" is written by Jean Morton-Williams.

Third, some of the published literature contained parts of questionnaires that had been used. Several of the rated attributes found on these were included in the first extensive list out of which the final attributes to be measured finally were produced.

Fourth, conferences were held with experts from the Product and Quality Control Departments of Company X in order to learn about the physical attributes of the product and about the differences among brands. They were asked what differences consumers objectively might be expected to perceive, both on branded and on unbranded items.

Fifth, an informal opinion survey was conducted among salesmen and marketing executives regarding product and brand attributes, including both their personal perception and what they had observed in consumers.

Finally, an exploratory consumer survey was considered in order to arrive at the final attributes to include in the questionnaire form.

Design: A nonprobability sample of 100 consumers was selected. One by one, and in different consumption situations, they were presented with four unbranded items of the product. They were asked to look at, feel, and taste each one for as long as they chose. They were told that questions regarding a new brand, which was included among the four, would be asked.

The four unbranded products actually were only two different, but existing and strongly locally demanded brands produced by companies X and Y. An open question was asked the consumers about which of the four they liked the best and the least. After the selection was completed, open "why" questions were asked, probing for, but not suggesting, differences in the attributes observed. When no more discriminating information was obtained, the consumer was questioned about which he considered the "best" brand in the market and which was his "most" preferred brand. Inquiries were made regarding reasons for his preferential choice as well as attributed advantages over other brands. Finally, each interviewee was asked to suggest to the producer and marketer of the new brand ways it could be better adapted to his wants.

Analysis: All of the interviews, which had been recorded by permission of the respondent, were tabulated according to perceived attributes. A final list, which will be disclosed later, was constructed to be included in the preliminary questionnaire.

Structuring the Questions for Attribute Measurement

Measurement of attributes, real or perceived, implies the construction of a measurement system. Such a system has been developed in the behavioral sciences, and

it has been widely applied and adapted by marketing researchers. This system is the scaling technique.³ Open questioning, although very useful in an exploratory search for attributes, will not provide adequate measures.

Types of Scales.--Green and Tull have stated that

Scales can be classified into the following major categories: (a) nominal, (b) ordinal, (c) interval, and (d) ratio. Each scale possesses its own underlying assumptions regarding the correspondence of numbers with real world entities and the meaningfulness of performing various mathematical operations on these numbers. It can be mentioned that the measurement of real-world entities can progress from scale to scale as our knowledge of the phenomena increases.⁴

Nominal scales are used for classifying items in different and mutually exclusive categories. Examples include male-female, age, socio-economic strata, and geographical region groupings.

Ordinal scales assign numbers to ordered elements to represent their relative rank. Examples are "the best liked brand" and "the least important attribute."

Interval scales, in contrast to the former, involve a constant but arbitrary unit of measurement. As no "natural" zero point is involved, and it is arbitrarily set; no

³See Russell L. Ackoff, Scientific Method (New York: John Wiley and Sons, Inc., 1962); Paul E. Green and Frank J. Carmone, Multidimensional Scaling and Related Techniques in Marketing Analysis (Boston: Allyn and Bacon, Inc., 1972); and Paul E. Green and Donald S. Tull, Research for Marketing Decisions, Second Edition (Englewood Cliffs: Prentice Hall, Inc., 1970).

⁴Green and Tull, op. cit., p. 177.

value on an interval scale is some multiple of another. However, it is possible to perform linear transformations, as the relative magnitude of the new values are the same as they were originally. This is an important and necessary characteristic for our study as it enables the numerical transformations explained in chapter 4 to be performed.

Ratio scales "represent the 'elite' of scales, in that all arithmetic operations are permissible. . . .they possess a unique zero point. . .and, as the name suggests, equal ratios among scale values correspond to equal ratios among the entities being measured. . . . We can move from one scale to another by merely applying an appropriate multiplicative constant."⁵

Types of Scale Techniques.--Several types of scaling techniques are available to a researcher. Their description and usefulness is found elsewhere,⁶ but a list containing the ones most commonly used is included in Table 5-1. In the next section the reasons for selecting a specific technique will be presented.

⁵Ibid., p. 180.

⁶Delbert C. Miller, Handbook for Research Design and Social Measurement, Second Edition (New York: David McKay Co., Inc., 1970).

TABLE 5-1.--Alternative Scaling Techniques

1.	Thurstone's Law of Comparative Judgement
2.	Thurstone Equal-Appearing Interval Scale
3.	Paired Comparisons Technique
4.	Guttman Scalogram Analysis
5.	Ranking Individual Products
6.	Ranking Pairs of Similar Items
7.	Differentiating the Most Alike and the Most Different Items
8.	Descriptive Rating Scales
9.	Semantic Differential Scaling
10.	Likert Type Scales

Selection of the Scaling Technique.--After analyzing the differences, advantages and limitations of the above-mentioned scaling techniques, the Likert scale method was chosen for the measurement of perceived brand attributes. The bases upon which this decision was made are presented below.

First, the researcher had used most of the methods for scale measurement except (1) Thurstone's Law of Comparative Judgement, (4) Guttman Scalogram Analysis, (6) Ranking Pairs of Similar Items, and (7) Differentiating the Most Alike and Most Different Items, but a partial application of this latter method was made in the exploratory stage of the project.

Second, techniques 1, 2, 3, and 4 have been designed as complete packages to measure consumer motivations regarding a given product and not for the measurement of individual perceived attributes.

Third, technique 5, Ranking of Individual Products, which previously had been used by this researcher, would only produce ordinal scales.

Fourth, methods 6 and 7 have been reported in the current literature as those used for products attribute perception, but their inclusion would involve a longer questioning time with each respondent and thus either higher costs or smaller samples. Let us remind the reader that one limitation was that only one set of questions could be added without altering the probability of obtaining answers in the remaining questions already approved in the survey.

Fifth, method 8, Descriptive Rating Scales, is very useful when the respondent is given the questionnaire form and himself selects an answer for each question. As a proportion of the sample to be selected was assumed to include a sector of the least educated market, and since comparable data had to be obtained, it was decided not to include two different sets of questionnaires, regardless of the advantages implicit in this scaling technique.

Sixth, a final decision had to be made between technique 9 and technique 10. Our criteria led us to

select the latter since it involves the use of only one descriptive adjective for the attribute that will be rated by the respondent on an "agreement-disagreement" scale. The semantic differential technique involves selecting a set of polar adjectives for each attribute, but it runs the risk of their being misinterpreted by the extreme sectors of the market. In any case, it seemed safer to ask respondents to understand only one, and not two, adjectives regarding each attribute, so the Likert Type Scale was chosen. In a privately conducted survey where both techniques were applied to the same individuals on relatively easy to rate items, such as colors, responses showed no statistically significant results.

Selecting the Number of Intervals to Use in the Likert Type Scale.--Having decided on the attributes to be measured and the scaling technique to be used, a decision had to be made as to how many scales to include, and whether the "undecided" level would be used. Privately conducted surveys in Mexico through the use of part-time interviewers, which did not probe for definite answers, had shown that a very large proportion of answers would fall in that interval. In contrast, in the "Investigacion del Consumidor Regiomontano" study,⁷ where Thurstone Equal

⁷ Jorge F. Gonzalez-Arce and Guillermo Marcos, Investigacion del Consumidor Regiomontano (Monterrey: Desarrollo Industrial y Comercial Mexicano, A.C., 1968).

Appearing Interval scales were used, thus forcing the respondent to either agree or disagree with the selected statements, a very small percentage of the population fell in the "undecided" interval.

Regarding the number of scales, a decision was made to use six different alternatives in the manner shown in Table 5-2.

TABLE 5-2.--Likert Scales Used in the Mexico City Study, 1971.

Scale	Value
In Complete Agreement	+ 3
Much in Agreement	+ 2
Agree	+ 1
(No Answer)	0
Disagree	- 1
Much in Disagreement	- 2
In Complete Disagreement	- 3

If the respondent provided no answer for one or two of the ten attributes, those variables were assigned a value of 0, equivalent to a "no answer," but if he did not respond to three or more questions regarding a specific brand, all responses related to a given brand were rejected.

After the Mexico City exploratory test was completed the extreme interval scales "in complete agreement" and "in complete disagreement" were deleted from the questionnaire. It was found that consumers, especially those from the less educated strata, did not understand the meaning between the levels "in complete. . ." and "much in. . .," and that consumer data tested by combining those two scales into one through analysis of variance resulted in very insignificant variations which did not justify the risk of receiving "garbage" data from the market.

As a result of the exploratory test, field work questioning was reduced to four scales: "SI-SI," "SI," "NO" and "NO-NO" intervals, but including the 0 level for "no answer" in the manner explained.

Final Draft of Questionnaire

After the first exploratory test in Mexico City during May, 1971, which included 648 personal interviews, several minor changes were made in the questionnaire forms. All through 1971, and as the national survey continued, eight more urban areas were researched, and 2982 personal interviews were conducted. During this period the entire methodology, including data analysis techniques, were tested, as well as management's receptiveness to this approach.

In January, 1972, a final questionnaire form was drafted for the national survey. Its content next will be described.

One part of the questionnaire constituted a product and brand descriptive survey.

1. "What brands have you purchased during the last two months?" If the respondent had not bought any brand during this period, the interview ended, since he would be considered a "non-consumer." The order in which the brands were mentioned was used as an indicator of brand awareness.

2. "What is the one that you purchase most often?" The answers to this question were considered indicators of brand preference. An alternative, "which is your most preferred brand?" might have produced answers such as "any one," "all of them," "the one that is available," and so forth. "Which is the one that you purchased last time in the market?" would have assumed no brand switching among consumers. Although we agree on not having a perfect indicator, this method of formulating the questions seemed superior to alternatives.

3. "What is the one that you used to purchase most often a year ago?" By contrasting answers to this question to those on the last one, an indicator of brand switching was obtained. For the particular product

studied this behavior is higher among the younger and heavy consumers than among the rest of the population. It also was observed that during the 1971 test period, when the price of all brands had been increased by 25 percent, consumers classified in the lower socio-economic strata had been changing from premium brands to lower priced brands. The opposite behavior was observed by analyzing data obtained during 1973, when the general economy of the country was growing, thus validating "elasticity" figures otherwise obtained for the brands of the company.

4. "How many units of this product do you buy per week? (assume a normal week period)" Answers to this question were taken as indicators (biased) of quantity purchased. However, the recorded figures were grouped into three wide categories to represent "light," "moderate," and "heavy" buyers. Contrasting these results to figures obtained otherwise, the total percentages were not very different.

5. "The product is sold in the market in packages of different sizes. Which is the one that you purchase the most often?" Answers to this question were very approximate to current sales figures in every city. While the question was used as an indicator of the validity of the survey's results, it provided an additional basis for classifying consumers. Much as expected, lower income

purchasers prefer larger size packages. It is interesting to note that in one of the cities, where this figure was not in accordance with real sales quantities, a cross tabulation was made by the interviewer, and it was found that three of them were biasing the results. A new survey was conducted in that area which showed "acceptable" results. After this "test," the remaining cities also were tabulated to discover this type of error, not only for this question, but also for the entire questionnaire.

6. The "image question" was: "As you know, there are several types of brands being sold of this product. Which is in your opinion the 'premium' brand? And the 'worst' of them? And a brand 'just in the middle'?" By weighting responses on a 3-1-2 scale an image rating was obtained. Three very interesting results were produced after cross tabulating by the most preferred brand. First, consumers buying a regular priced brand did not consider it the "best" on the market. Second, image thus measured, although ranking brands according to price for the extreme cases, ranked brands according to relative local market share. Third, when further classified by clusters, tabulation produced figures correlated to brand position on the perceptual map, but if tabulated along traditional clusters (demographic and socio-economic) brand preference for each of those groups was explained. Although additional research is necessary to arrive at "real image" ratings,

this questioning technique produces good and acceptable results which can be correlated against advertising and pricing strategies. "Effective" advertising for brands within the same price range undoubtedly will produce a higher image rating in the targeted clusters for the given brand.

7. "What brand do you purchase when yours is not available?" A second preference figure was the outcome of this question, and it can be usefully applied in order to measure brand "cannibalizing" in each of the market segments. Perceived attributes of second choice brands should be the most similar to the one most preferred.

8. "In what type of outlet do you purchase the product?" Results should be in accordance with sales figures for each brand. If so, answers usefully can be applied for segmented distribution strategies.

A second set of questions concerned the attributes of the "ideal" brand. In order to learn perceived satisfied and unsatisfied consumer wants the Coombsian approach to ideal brands was taken. Eleven different attributes were included for respondents' rating, out of which ten were selected for specific and current brand perception ratings. The selection of these attributes was explained above. Only ten were included in order to reduce the length of the questionnaire; questions were going to be

asked about three different brands in addition to the ideal, thus making 40 questions. The first attribute, type of package, which was included for the ideal brand, was deleted for the brands currently in the market, since the type of package is the specific characteristic of some of them.

TABLE 5-3.--Fictitious Name Assigned to Perceived Attributes.

Number	Name
1	Sweetness
2	Density
3	Higher-priced
4	Availability
5	Aftertaste
6	Mildness
7	Odor, smell
8	Strength
9	Flavor
10	Healthful

For obvious reasons, the specific attributes measured have been changed for publication purposes. In order to identify them, a given and fictitious name is

assigned to each one, but the reader should be aware that they would not describe the market and that specific marketing action developed from the results presented herein might produce undesirable marketing effects. Furthermore, as expected, the mathematical relation for some has been inverted to obscure "real market" pictures.

Each one of these attributes was rated on the "+2,-2" scale previously described, and these answers were fed into the cluster program as explained in chapter 4.

A third group of queries involved perceived attributes for the "most purchased" and two additional brands sold in the local market. The first part of this section contained a phrase in which the interviewer would reinforce the answer obtained for the "most purchased" brand. He would begin by saying: "Now, let's talk about brand x, the one you said you purchased the most often, OK?" If no correction was made by the respondent, the interview would continue. If a correction was made, an indication had to be included for supervision purposes.

A quota was set according to the local market share of each brand except in cases where more answers were desired for a given one. Brand names were randomly written on each questionnaire form before giving them to the interviewers, but before asking for a given brand, the interviewer would make sure that the respondent knew about

its existence, so that a perception rating could be obtained.

Phrases regarding each attribute as described in Table 5-2 were used in talking to the respondent in order to obtain his "agreement" response. In many cases complete interviews were rejected if repetitive ratings were found along the scales for a given respondent or when an interviewer's work showed equal responses for a certain phrase. In a particular city, interviewer biases along a given attribute would have been responsible for an incorrect decision regarding a product's attribute.

A fourth set of questions related to classification data from respondents. Several types of classificatory and identification data were obtained regarding observed socio-economic class, age or age group, sex, marital status, schooling, occupation, name and address.

A fifth group of inquiries produced advertising data. In order to have additional, but not conclusive, material for advertising purposes, questions were asked regarding in which media the respondent would like to see advertisements for the product and where he had actually seen or heard them. An additional question was asked as to the place where or occasion when this particular product would better fit into his way of life. This would serve as a guide to advertising media and themes.

Additional advertising research can be conducted as these described measures would not provide definitive answers for advertising strategy.

Final Questionnaire Form

The final questionnaire form, which for obvious reasons is not included, was printed on a single standard sheet (11" by 8.5") of paper of a different color for each city. As all the interviews were to be personally conducted, no more space was necessary, nor advisable. Previous experience had led to the conclusion that when a potential respondent is asked for 5 or 10 minutes of his time, and he sees many sheets of paper, he might be reluctant to believe such a statement and refuses to answer. As a matter of fact, the actual interviewing time is from 15 to 20 minutes. The final form also included coding guides to expedite final key work in the office.

Sampling Procedures and Field Work

Sampling Method

Obtaining a probability sample in developing countries is not an easy task. Much of the secondary information available in more developed countries is not obtainable nor purchaseable in those areas. No census tracts exist, and block or street telephone directories are not published.

However, if one is to attempt a market segmentation research for decision-making purposes, one must make sure that the selected sample is reliable and that generalizations made from it are unbiased estimates of the total population.

The only available probability sampling technique thus becomes area sampling. All that is needed is a fairly complete map for the whole area to be sampled. Unfortunately, in many cities an up-to-date map is unavailable, and the researcher must attempt to construct one for sampling purposes.

In our case, a two-stage area probability sampling method was used. The first step consisted of random selection of city blocks, the second, of systematic selection of households. These latter were used only if the man of the house was present, or the oldest son if over 18 years of age. No women were included in this sample as posterior segmentation would be attempted within that market sector.

In stage one, in order to select city blocks, each block was numbered on the city map. Through the use of tables of random numbers, the final sample was chosen. In order to find out the number of blocks to use, the desired total sample was divided by five. In previously conducted research in the various cities it was found that five was the average number of interviews obtained from every block,

whenever systematic sampling, with an interval of five is used for the second stage, which was going to be the case in our survey.

In order to select households within a given block, the interviewer was directed to go to the northwest corner of the first selected block on his program. He was to number as one the first house, and walking counterclockwise, he was to make the first call on the fifth house. If successful, he was to continue the same procedure, conducting an interview at every fifth house until he reached the end of the block. If the last house was assigned a number lower than five, he was to start the second block with that number until reaching five again. In this manner each house in every block had the same probability of being selected.

As no "call-backs" were to be attempted, if there was no response in the fifth house, the interviewer was to select the following house, and he would start his new count from it. This substitution was to be allowed for only two houses. If in three houses (the systematically selected one and two more alternatives), he had not achieved an interview, he was to begin counting again. If an apartment building was included within the sampled block, the interviewer was to start counting and interviewing systematically on the first floor, then the second, and so forth.

This sampling methodology assures an unbiased sample. As the number of interviews per block is a function of the block's size, those with more houses, basically in the lower economic strata, would receive more interviews. If the same number of cases were taken from every block, the probability of a house being sampled would depend on the density of its respective block, and those inhabited by higher socio-economic families usually would contain a lower number of houses per block.

Another method was attempted for the second stage selection. The sampled blocks were censused, and from that list an unrestricted sample was chosen. This method, although theoretically eliminating the systematic sampling bias (each combination of units does not have a probability of being chosen) increases the total cost and time of the survey. Furthermore, if houses, and in our case, product perceptions, are randomly distributed throughout the population and not according to house position within a given city block, we might assume that the systematic sampling bias is nil.

Sample Size

The minimum sample size to be obtained from every city was 300 interviews. This number could guarantee a maximum error of 5.7 percent with a probability of 95 percent, assuming, of course, a binomial distribution and unrestricted sampling. However, and in order to reduce

management's groundless uncertainty due to small samples, in most of the cities, but especially in the larger ones, the sample size was increased up to 1,000 interviews. The maximum error therefore was reduced to 3 percent, also within the 95 percent probability estimate.

As clusters were to be formed from the sample, and since 30 was the minimum accepted for each one, in the cities where the sample size was 300, a market segment had to be worth ten percent of the total sample in order to be included as such. In those cases, clusters of 18 or more people were chosen, but care has to be exercised when referring to them.

It is our firm belief that if management is to take action from a market segmentation research then the analyst should be very careful when selecting his sample. A probabilistic method must be used in order to be able to generalize findings about the total universe or population from which the sample was drawn. Although this particular paragraph seems obvious, in most of the published literature in this field, most of the data seem to have been obtained from nonprobabilistic or convenience samples.

Integrating a National Sample

It is always convenient to integrate total results from partial surveys into a national portrait of the market for a given product, but this task should be attempted

only when data from the entire nation is available. In our case, as only the 30 main urban concentrations were included in the sample, it would be fallacious to call the integration of the results a national sample. It is possible that product perception in smaller cities and rural areas might differ from that in the largest ones. Therefore, national sample should be understood as the area covered by this study.

A total national picture is desirable so that any deviations can be observed among the different regions of the country, but with a different weight given each rated attribute. For example, it is possible that in smaller cities availability may not play an important role, but relative price might. It is also possible that in northern cities a given attribute, such as healthfulness, might play an important role, whereas in costal cities thickness might be more important.

For analytical purposes, cities were grouped into nine different geographical regions within the country, and in such way they were further analyzed. The selection of these regions was in accordance with population and consumption parameters discussed herein, and a reference to them will be in accordance to nominal scales.

Two methods were used for the integration of the national sample. The first weighted the averages found

in every region by its relative consumption of the product class. Sales were not used because each firm holds a different market share in each region, and reference must be made to industry, not company, if market analysis is to be properly conducted.

The second method selected a systematic sample from the computer tape where all the questionnaires had been stored. As the sample for each city and region was not a function of industry sales, the same weighting procedure was utilized. By using the second method it was possible to obtain better results, and even comparable ones, as several samples can be obtained similarly and comparisons can be made. The burden of outside computations is reduced since the computer produces all the results. It is also possible to integrate other types of clusters. For example, the young market can be segmented, or the upper class, or the heavy user cluster, thus allowing further analysis, which can be beneficial for advertising purposes. A given segment can be further targeted through the use of specific media catering to those demographic clusters, which in this way are further segmented by consumer perception, both concerning product and existing brands.

Field Work Procedures

It is needless to elaborate on the idea that every step in the research procedure is important, but from the standpoint of the analyst, he must be provided with "good" consumer data if useful information is to result. Data gathering thus becomes a crucial point for the researcher, as upon it depends the "goodness" of the entire project. It is only in this particular stage that he must work through other people, and he must have a foolproof method for assuring collection of unbiased data. Most of the currently available marketing research textbooks provide good discussions of this particular point, and in this section we will only mention some of the highlights of, or differences in, procedures which were included in this study.

First, all of the interviews were conducted by part-time and locally hired college students. They were recruited from the fields of business, economics, psychology and sociology wherever available. In the smaller cities, where there are no universities, grammar school teachers, students from normal schools (teachers' colleges), or preparatory school students were hired.

Second, a different set of research supervisors was sent to every location. This was done to distribute more widely their personal methods of training and supervising field workers.

Third, forty percent of total interviews were supervised in every city by visiting the respondents again and asking him a diversified set of questions from the form previously filled in. When, in the supervisor's judgement, an interview was biased, either because of differences in answers or because of incorrect house counting, the form was rejected. If an interviewer had several rejections, he was automatically dismissed and all of this work removed from further analysis.

Fourth, training of interviewers included sample field tests, taped biased questionnaires for their analysis, and retraining sessions. In most cases several recruited people were not hired, and firing ranged from 5 to 10 percent.

Finally, as questionnaires were cross tabulated by interviewer, the entire work of some of them was rejected when systematic biases were found or when his results accorded too closely with his previously measured attitudes or preferences regarding brands. (Each interviewer, before being trained, was interviewed by the supervisor using the same questionnaire form. This was used as the basis for further rejection of the forms which he brought from the market if much similarity to his own opinions was encountered.)

It is our firm belief, and it has been our research experience, that attempted savings in this stage of the process will only increase the probability of defective data. If costs are to be reduced, steps should be taken in other stages of the methodology. If good data is to come from the market, interviewers must be the best available, fully supervised, and, most of all, paid accordingly. We have witnessed that in many cases some research agencies have attempted to increase their margins by reducing field work expenses, either through the hiring of lower paid interviewers or by low rates of supervisors' callbacks.

Defective field work cannot be saved with good questionnaires, sound sampling methods, or sophisticated analysis. A researcher always must remember one of the most important principles of electronic data processing, which undoubtedly can be applied to market research: "Garbage in, garbage out."

CHAPTER VI

MARKET SEGMENTATION BY CONSUMER

PERCEPTION: DATA ANALYSIS

Having described in the previous chapter the case content and the strategy of inquiry, it is the objective of this chapter to conduct a stepwise analysis of the different techniques which were utilized for constructing the geometrical space in which attributes, brands, and consumer wants were located.

Several techniques were used in conjunction for the achievement of this purpose.

Given the complex structure of most segmentation analyses, it would seem quite likely that 'multi-method' designs will become quite commonplace as familiarity with modern analytical techniques increases.¹

Figure 6-1, a replica of Figure 4-1, shows a summary of the "multimethod" strategy followed in this study in order to develop a market segmentation by consumer perception research.

It should be pointed out that a general methodology up to now has not been developed nor universally accepted

¹Frank, et al, op. cit., p. 169.

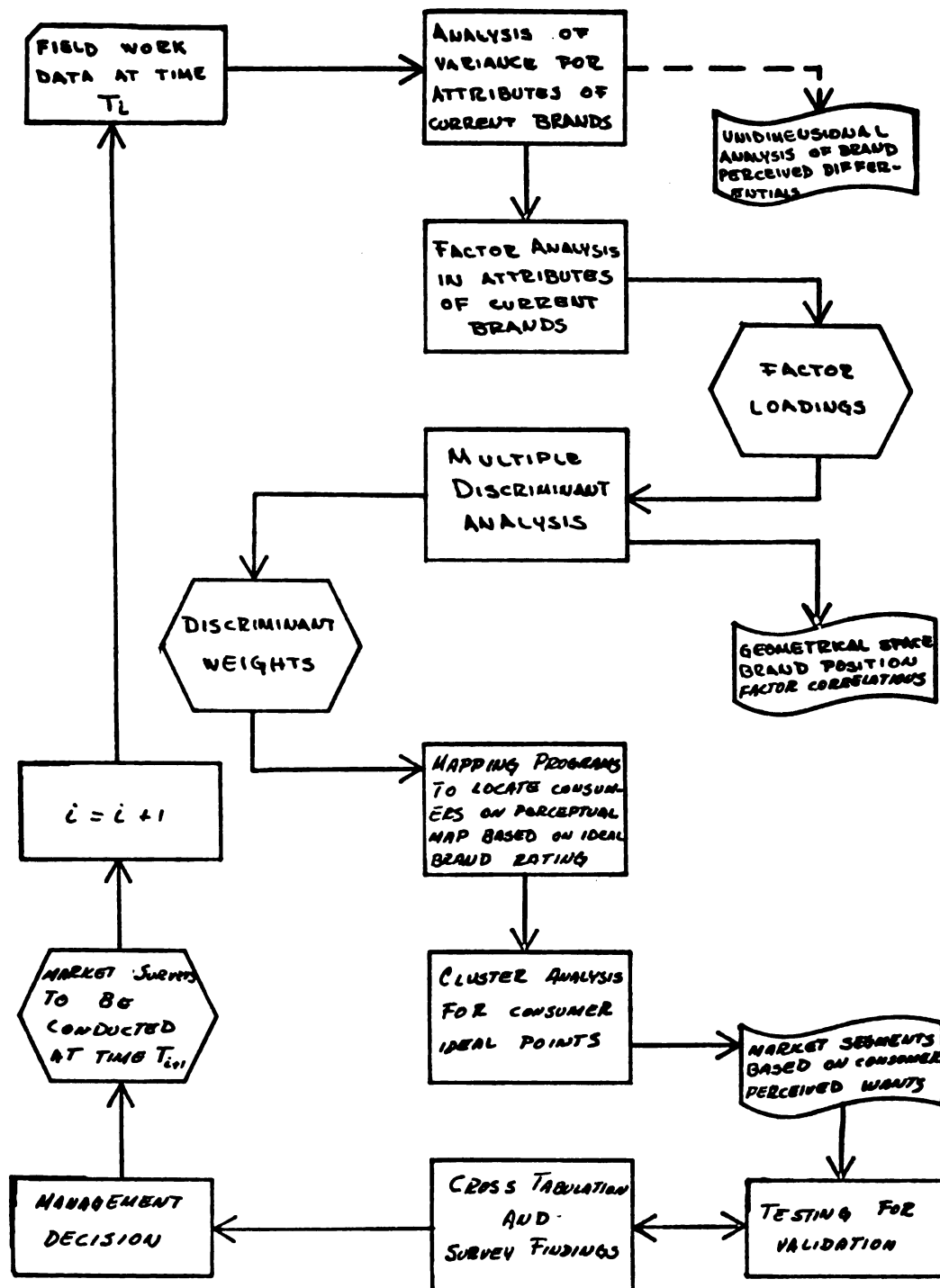


Figure 6-1.--Methodology for Data Analysis on Market Segmentation by Consumer Perception.

by marketing scholars or practitioners. The approach herein described, although taking most of its bases from similar ones described in current marketing literature, is an attempt to adapt some of those methods to a case study in a developing country; many changes had to be implemented and assumptions to be made in order to fully use these newer quantitative techniques in a large scale.

The following are two examples of those changes. First, questioning techniques had to be simplified, both in limiting the time involved in the interviewing process and in making questions comprehensible to all respondents. Second, computer programs had to be adapted to the equipment available in the country. Adaptations also had to be made to achieve better man-machine communication in relation to the level of analysis required and to enable several assumptions about the parametric structure of the input obtained in the market.²

The methodology described here should not be considered "the" one to be used; rather, it is "a" system which can fully use consumer perception data for the structuring of meaningful market segments for decision-making purposes. It has not been our intention to develop original methodology, and what is used here already has been

²"Metric methods provide good approximations to nonmetric techniques when the nonmetric function can be clearly approximated by a linear one." Ibid., footnote 8, p. 168.

combined in a similar fashion by other researchers.³ Our aim is to fully describe the methodology by presenting a sequential analysis of every step. The present survey, in contrast to those available in the current literature, was conducted in a developing country and in several cities using the same questionnaire. It thus validates the methodology, not only by its application to a developing economy, but also by contrasting the results obtained by its application on a multicity research study of the same product. The possibilities of its application, as well as the consistency of its results among different individual surveys thus is demonstrated.

The entire research project included 14,309 personal interviews conducted with individual consumers in 30 of the largest urban concentrations in Mexico. Work began in May, 1971, with the exploratory survey described in chapter 5, and this field work phase was concluded in February, 1973. In addition to this sample, information was obtained from 960 retailers in five of the areas by using the same questionnaire, that is, assuming they were ultimate consumers, in order to test differential product and brand perceptions. Finally, in June, 1973, as one of

³For instance: Richard M. Johnson, "Market Segmentation: A Strategic Management Tool," Journal of Marketing Research, VIII (February, 1971) 13-18, and Lester A. Neidell, "The Use of Nonmetric Multidimensional Scaling in Marketing Analysis," Journal of Marketing, XXXIII (October, 1969) 37-43.

the brand's marketing mix had been changed, an additional survey was conducted in one of the cities. In order to contrast changes in perceived behavior, both toward the product and the modified brand, 658 consumers were interviewed.

For the purpose of simplifying description of the multistage methodology, in this chapter the results obtained from one of the surveyed cities will be fully analyzed. In the next chapter, in the structuring of the national sample, results from this city will be contrasted to those in other areas. There were several reasons for selecting City X as the analytical example. First, it contains the largest single sample, 999 interviews. Second, it was here that the additional, the ex post facto consumer survey was taken. Third, it was one of the selected areas for measuring retailers' perception. Finally, as it was the city where the national survey started after the exploratory research was concluded, several alternative techniques were used to validate its results. These will be described in chapter 8. City X was surveyed originally in January, 1972, and the ex post facto test was made in June, 1973.

Analysis of Variance

Nine specific brands (A, B,.....I) were selected to be studied in City X along the ten attributes previously described. Table 6-1 presents their sample size and relative market preference.

TABLE 6-1.--Brand Preference Share and Sample Size in City X.

Brand Name	Sample Size	Market % Preference
A	225	6.5
B	345	7.2
C	347	10.9
D	126	1.8
E	584	39.2
F	94	2.9
G	355	18.4
H	213	6.5
I	198	4.1
Totals	2,487	97.5

The reason the sample size does not total the 2,997 possible ratings has three possible explanations. (1) Some respondents were undecided about three or more of the ten attributes of a given brand, thus invalidating the entire response for that brand. (2) Brands from J to Z also received consumer ratings. (3) Some consumers rated less than three brands per questionnaire.

Analysis of variance was used to test the brands' means for every attribute. The null hypothesis was that all brands had the same value or mean on each of the

measured characteristics. An F-value greater than two would mean that the difference among the means of any two given brands was statistically significant.

An n by n matrix was formed for every attribute showing the F-ratios in the interbrand comparison as well as each brand's mean. Table 6-2 shows the F-ratios for the attribute "higher-priced" in City X. Figure 6-2 represents the means of the nine brands included in the analysis according to the same attribute, using data from the last column of Table 6-2. In order to test the validity of this measure, Table 6-3 contains the relative prices of the different brands in City X.

By contrasting the value of the means (Figure 6-2 and Table 6-2) with the relative retail prices, it can be observed that this kind of measurement is a reasonably good portrait of the market, at least regarding this particular attribute, which could be contrasted with real market figures.

Figure 6-3 contains the means for all the brands along each of the ten attributes being measured in this survey.

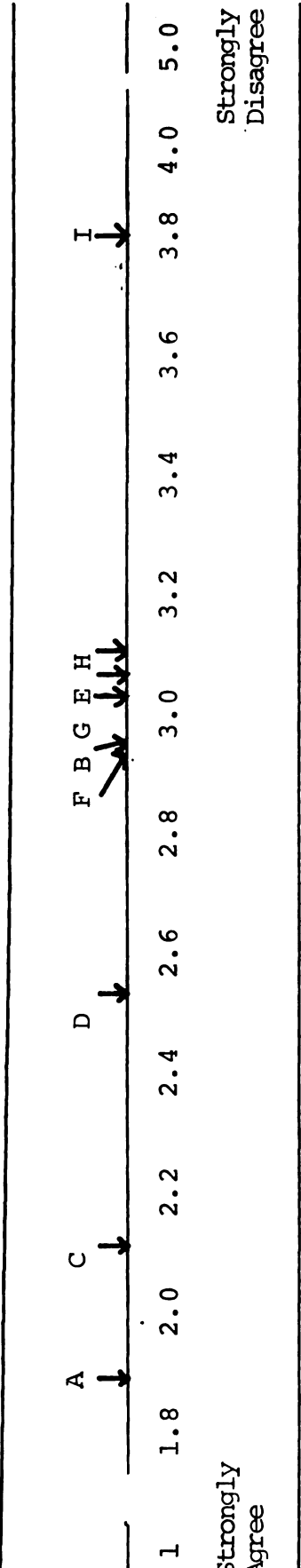


Figure 6-2.--Brand Ratings According to the Attribute "Higher-Priced."

TABLE 6-3.--Relative Retail Brand Prices.

A	-	150	F	-	100
B	-	100	G	-	100
C	-	130	H	-	100-110
D	-	110	I	-	80
E	-	100			

(1) Complete
Agreement

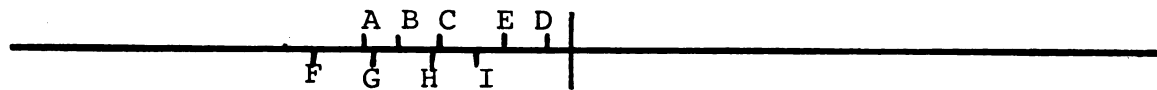
(2)

(3)

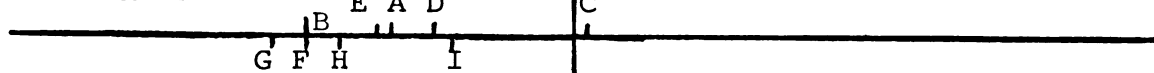
(4) Complete
Disagreement

(5)

"SWEETNESS"



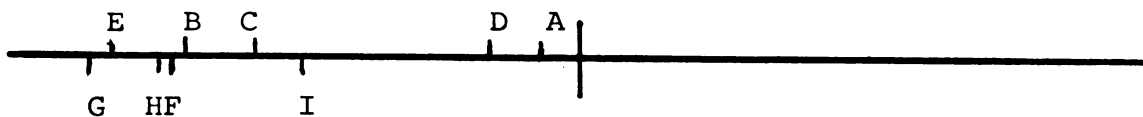
"MILDNESS"



"HIGHER-PRICED"



"AVAILABILITY"



"AFTERTASTE"

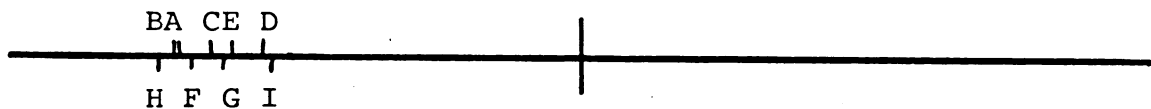


Figure 6-3.--Brand Means as Perceived by Consumers of City X.
(First Part)

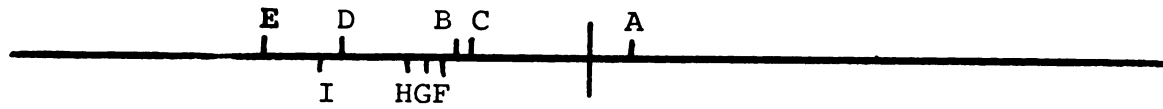
(1) Complete Agreement

(2)

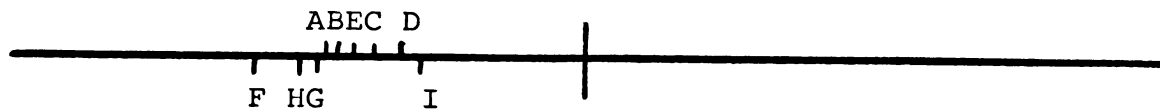
(3)

(4) Complete Disagreement (5)

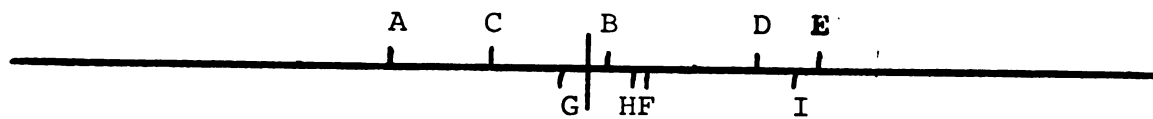
"DENSITY"



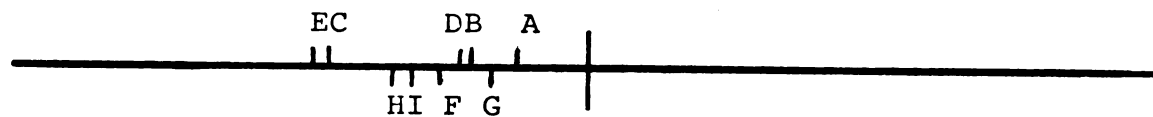
"ODOR"



"STRENGTH"



"FLAVOR"



"HEALTHFUL"

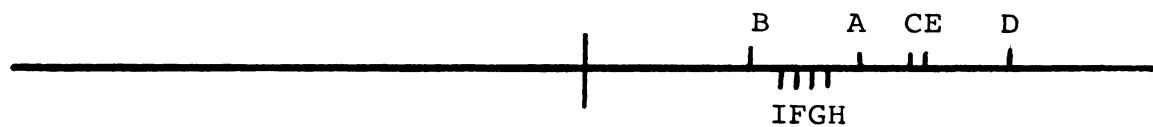


Figure 6-3.-- (Second Part)

As can be easily observed from this unidimensional analysis, in City X, among certain current brands, some attributes do not matter. (for example, "odor, smell" and "aftertaste.") Other attributes do make a difference (for example, "higher-priced," "availability," "mildness," and "density.") Correlating these important attributes against preference or market share would solve one of our main problems, namely: Which are the important variables that make a difference among brands? However, we would not have solved the remainder of our questions.

Following the same procedure, it might be possible to further cross tabulate by demographic clusters. A deeper unidimensional analysis could result but, although useful for decision-making purposes, it is incomplete. Still more information can be obtained from this market data on consumer perception.

Unidimensional analysis of variance is a good indicator for further methodological purposes. It is to be expected that the most dispersed attributes would account for the most discriminating weight among the brands, thus being the most important in determining brand positioning within the perceptual space. This program, which usually takes less than three minutes of computing time, was used to check the validity of the information, which later was to be processed in the remaining methodological phases.

It is simpler to find illogical answers by looking at the means of each brand in contrast to others, than by looking at the results of a factor analysis, where the original values would be rotated and transformed into factors.

In analyzing the n by n matrix for every attribute, one expects to find an F-ratio larger than one for every n_i - n_j combination of brands. If this value is zero, it automatically would mean that the original data was loaded into the computer improperly. If this were not the case, it would mean that every consumer rated brand n_i and n_j exactly the same along the entire sample, which is highly unlikely.

Several times during the process data was loaded improperly, due mainly to changes in card formats. As special local market data was asked for every city, and as regional brands also had to be rated, there were 13 different formats during the entire project. Validation routines in the program for analysis of variance were very helpful in saving computer time and in avoiding the risk of processing incorrect data.

Factor Analysis

As was mentioned in chapter 4, an R-type factor analysis was used for two purposes: to obtain a set of

uncorrelated factors from the original attribute ratings which could be loaded into the subsequent programs, and to make it possible to obtain a smaller number of factors which could explain most of the variation among perceived brand attributes.

The two main analytical techniques included in this factor analysis were a principal component method which is used to arrive at orthogonally derived factors, and a varimax routine for rotating the factors to make them interpretable for further analysis.

The two sets of data used for input in the factor analysis and subsequent programs were the original ten, scaled, current brand attributes and only eight of the original variables. It was our intention to simulate consumer brand perceptions without extrinsic and controllable factors such as market price and availability. We wanted to find out how the brands would be positioned if all were equally available in the market and if all were relatively similarly priced, an alternative marketing strategy being considered for one of the brands in that specific market. As an example of the methodology we will describe this second case, leaving for chapter 7 the presentation of the alternative results.

The following enumerates relevant output from the factor analysis program as demonstrated in the subsequent tables.

Mean and standard deviations for each one of the rated attributes is shown in Table 6-4.

TABLE 6-4.--Means and Standard Deviations of Rated Brand Attributes in City X.

Attribute	Mean	Standard Deviation
Sweetness	2.49698	1.41900
Mildness	2.30840	1.31463
Aftertaste	1.81825	1.11918
Density	2.31564	1.40354
Odor, smell	2.08926	1.27860
Strength	3.08766	1.54978
Flavor	2.24085	1.45193
Healthful	3.91074	1.44880

As the program takes all rated values for each brand, the mean is not the sum of the averages found in the tables derived from analysis of variance; rather, it is the weighted average of those means. That is, the mean of brand E (n=584) is more important than the mean of brand F (n=94) for the integration of the total mean for any attribute.

Comparison of numbers in Table 6-4 with those in Figure 6-3 will confirm that the mean of the attribute "healthful" should be larger than that of the attribute

"aftertaste," and that the latter should be only a little smaller than the mean for "odor, smell," thus confirming that data for both programs is the same. If a different picture appears, the original data and the computer loadings should be analyzed as there is an error which should be corrected before proceeding further in the analysis.

Correlation coefficients were arranged in an m by m matrix, where both in rows and columns the attributes are found in the original input order. Table 6-5 shows these correlation coefficients for City X. Observe that attribute 3, "aftertaste," is positively correlated with attribute 5, "odor, smell," which is to be expected. Also note that number 4, "density," is negatively correlated with 6, "strength," also to be expected. It is interesting that correlation coefficients are relatively small, thus showing little colinearity among the attributes if all brands are taken together, which factor analysis does. The reader should remember that the two exogenous product attributes, "higher-priced" and "availability," had been excluded from this analysis. Attribute 3 now becomes "aftertaste," and so forth, up to attribute 8, "healthful."

TABLE 6-5.--Correlation Coefficients of Rated Brands in City X.

Attributes	1	2	3	4	5	6	7	8
1	1.00000	0.19230	0.18152	-0.23229	0.09282	0.18834	-0.11025	0.10337
2	0.19239	1.00000	0.15239	-0.00765	0.10997	0.12473	-0.01765	0.09556
3	0.18152	0.15239	1.00000	-0.02185	0.28261	0.07969	0.02695	0.06045
4	-0.23229	-0.00765	-0.02185	1.00000	-0.00517	-0.23741	0.19264	-0.09711
5	0.09282	0.10997	0.28261	-0.00517	1.00000	0.07278	0.02308	0.06054
6	0.18834	0.12473	0.07969	-0.23741	0.07278	1.00000	-0.06445	0.22384
7	-0.11025	-0.01765	0.02695	0.19264	0.02308	-0.06445	1.00000	-0.03873
8	0.10337	0.09556	0.06045	-0.09711	0.06054	0.22384	-0.03873	1.00000

Where: Attributes:	1 - Sweetness	5 - Odor, smell
	2 - Mildness	6 - Strength
	3 - Aftertaste	7 - Flavor
	4 - Density	8 - Healthful

The third output of a factor analytical procedure is that related to eigenvalues and cumulative percentage of eigenvalues. An eigenvalue is the sum of the squared factor loadings, which have been rotated through a principal-component method, that is:

$$E_1 = \Sigma [(L_{11})^2 + (L_{12})^2 + \dots + (L_{18})^2] \quad (6-1)$$

These two vectors are included in Table 6-6.

TABLE 6-6.--Eigenvalues from Factor Matrix (City X).

Level	Eigenvalues	Cumulative Percentage of Eigenvalues
1	1.79849	0.22481
2	1.30107	0.38745
3	1.00732	0.51336
4	0.92256	0.62868
5	0.85643	0.73573
6	0.75628	0.83027
7	0.69381	0.91699
8	0.66404	1.00000

For operational purposes, several comments are important regarding eigenvalues. First, their sum is equal to the number of variables included, eight in this

particular case. Second, the contribution of each one to total variation is continuously decreasing: the first one accounts for 22.48 percent of the total, the second one for 14.26 percent, and the last one for only 8.3 percent of the total. Third, if parsimony is desired, let us say, to reduce to seven factors, a number between 0.69381 and 0.66404 should be set as a limit for this purpose. In the same way, if five is the total number of factors that are wanted for final analysis, a number between 0.85643 and 0.75628 should be set as a limit in the input of this program, thus retaining 83 percent of the original information.

If no information is to be lost, then the analyst would have to use as many factors as original attributes that came into the program, in this case eight. A limit point lower than 0.66404, the eigenvalue of the last factor in this analysis would have to be used. For practical purposes, however, a value of zero will assure that no parsimony will be produced.

A factor matrix was produced (see Table 6-7) where every L_{ij} is a factor loading, such that in Equation 6-1 the eigenvalue 1 is:

$$(0.63047)^2 + (0.44641)^2 + . . . + (0.43611)^2$$

TABLE 6-7.--Factor Matrix (Principal Component) for City X.

Original Attri- butes	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Sweetness	0.63047	-0.06247	0.24732	-0.25226	0.31611	-0.41063	-0.19479	0.40904
Mildness	0.44641	0.28393	-0.07062	-0.74425	-0.15014	0.26419	-0.08276	-0.24903
Aftertaste	0.45950	0.56440	0.22723	0.18774	0.02869	-0.24900	0.51983	-0.22448
Density	-0.49303	0.51900	-0.19620	-0.22553	-0.30592	-0.07258	0.19959	0.50943
Odor	0.37985	0.56748	0.16596	0.42805	-0.19153	0.29158	-0.42999	0.12773
Strength	0.58860	-0.22702	-0.38134	0.12265	0.19303	0.45483	0.33510	0.29176
Flavor	-0.25803	0.49428	-0.48665	0.01298	0.64054	-0.05184	-0.15945	-0.11709
Healthful	0.43611	-0.10368	-0.66426	0.14305	-0.39411	-0.39500	-0.12784	-0.09829

Additionally a factor becomes

$$F_1 = (L_{11}) V_{1i} + (L_{12}) V_{2i} + \dots + (L_{18}) V_{8i} \quad (6-2)$$

where L_{1i} are the factor loadings for factor 1, and V_{ji} are the original attributes j as assigned by the consumer to brands i . For example,

$$F_1 = (0.63047) V_{1i} + (0.44641) V_{2i} + \dots + (0.43611) V_{8i}$$

That is, factor 1 for each brand will be the product of multiplying the factor 1 load vector by the original attribute scaled by the consumer for brand i on attributes 1, 2, . . . , 8. If consumer 432 had rated brand D as 5, 1, . . . , 3, those ratings would become the V_{ji} in Equation 6-2.

In addition to Table 6-7, an Eigenvector matrix was produced such that if the square root of an eigenvalue is multiplied by a column in this matrix, a column in the factor matrix is produced.

$$(L_{ij}) = (\sqrt{E_i}) W_{ij} \quad (6-3)$$

where W_{ij} is a number of row i , column j in the Eigenvector matrix

$$(0.63047) = (\sqrt{1.79849}) (0.47012) \\ \text{Table 6-7}_{11} = (\text{Table 6-6}_{11}) (\text{Table 6-8}_{11})$$

TABLE 6-8.--Selected Eigenvectors in City X.

Vector 1	Vector 2	Vector 3	Vector 4
0.47012	-0.05477	0.24642	-0.26264
0.33287	0.24892	-0.07036	-0.77486
0.34263	0.49481	0.22640	0.19546
-0.28324	0.49751	0.16535	0.44565

As it can be observed, and as was explained in chapter 4, although the matrix of factor loadings (Table 6-7) produces orthogonality for the new factors out of the original values, interpretation is very difficult. Factor one, for example, has high loadings in all the attributes, but especially in 1, 4, and 6, but factor 8 also has high loadings for the original values 1 and 4. In order to be able to name the new factors, a Varimax routine was performed, which produces the last significant output from this program.

Results from this rotating program are presented in Table 6-9. The advantage of this technique is that it produces high loadings (near one) for a few attributes (only one if no parsimony is obtained) and very low loadings for the rest of the original attributes, and without any loss of information. It thus permits better interpretation of the factors integrated by this method.

TABLE 6-9.--Rotated (Varimax) Factors for City X.

Original Attribute	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Sweetness	0.97949	0.03811	-0.04257	-0.09193	-0.05103	0.08224	0.08517	-0.11076
Mildness	0.08946	0.04771	-0.04217	-0.99007	-0.00699	0.05460	0.06814	0.00547
Aftertaste	0.08443	0.14041	-0.02416	-0.06926	-0.01626	0.03127	0.98311	-0.00537
Density	-0.11009	0.00122	0.04070	-0.00570	0.09473	-0.11279	-0.00496	0.98207
Odor	0.03697	0.98770	-0.02578	-0.04795	0.01224	0.03016	0.13805	0.00142
Strength	0.08179	0.03114	-0.10888	-0.05662	-0.02518	0.98125	0.03151	-0.11315
Flavor	-0.04893	0.01204	0.01550	0.00654	0.99397	-0.02433	0.01557	0.09146
Healthful	0.04129	0.02556	-0.99112	-0.04199	-0.01564	0.10574	0.02365	-0.03969
New Name	Sweetness ₊	Odor ₊	Healthful ₋	Mildness ₋	Flavor ₊	Strength ₊	Aftertaste ₊	Density ₊

CHECK ON COMMUNITIES

Variable	Original	Final	Difference		+	It shows positive factor loading
1	1.00000	1.00000	0.00000			
2	1.00000	1.00000	0.00000			
3	1.00000	1.00000	0.00000			
4	1.00000	1.00000	0.00000			
5	1.00000	1.00000	0.00000			
6	1.00000	1.00000	0.00000			
7	1.00000	1.00000	0.00000			
8	1.00000	1.00000	0.00000			
				-		It shows negative factor loading

Table 6-9 should be interpreted in the following manner. Factor 1 becomes "sweetness," as the loading for this attribute is 0.9795, and loadings are very low for the rest. Factor 2 becomes "odor," as its loading is 0.9877, and in this manner the entire table is interpreted in the last row by looking at the highest factor loading at the intersection with a given variable.

In this example, as no parsimony was desired, there are as many factors as original attributes. In the next chapter, where we will present parsimony for this same City X up to seven factors and up to five, we will find that a given factor acquired a double or triple meaning as it achieved high loadings for two or three original attributes and very low ones for the rest. The results of this rotated matrix thus became factor loadings to be used for the next computer program. By the use of these techniques we have transformed the consumers' original current brand perceptions into sets of uncorrelated (orthogonally constructed) factors without losing information. We also have retained a name for each one of them, which will be an important feature in interpreting results from the following procedures.

Multiple Discriminant Analysis

As was described in chapter 4, multiple discriminant analysis is the appropriate technique for finding

several items: the weight of each attribute in brand perception; the construction of a geometrical space through the use of those correlations; brand positioning within the map; and, finally, a basis for locating consumer "ideal" positions within the perceptual map. The first three objectives are achieved through the direct results of multiple discriminant analysis, whereas the locating of ideal points will be considered later through the employment of another set of computer programs, which make use of the space generated in this analysis.

The reader should be reminded that whereas in the factor analytical routines all the original attributes for all brands are taken together in order to transform them from an attribute space to a factor space (where every factor is a weighted combination of original ratings), in multiple discriminant analysis, through taking this factor space, brands are segregated by their differences, and the weight that each factor has in this discrimination is found. A new set of axes (discriminant weights) results as a linear combination of factors. This can be used in order to simulate desired changes in brand perception and, alternatively, will be used for locating consumer ideal brand ratings in this geometrical space. An explanation will be offered later in the cluster analysis section.

Input data for this program are the original current brand ratings on each attribute and factor loadings

and their mathematical sign, which will be used to transform the original ratings of every respondent for each brand into factors.

The procedure and output of the multiple discriminant analysis is described below.

First, the percentage of variance, which was extracted by each of the roots, describes how much explanation is found by using one axis (53.8 percent), and up to eight axes for a full multidimensional expression. Table 6-10 presents these numbers along with their relative chi-squares, degrees of freedom, and probability limits.

TABLE 6-10.--Percentage of Variation Extracted by Each Root in City X through Multiple Discriminant Analysis.

Root	% Variance	Chi-square	D.F.	P
1	53.78	271.230	15	0.000
2	33.06	170.244	13	0.000
3	6.93	36.671	11	0.001
4	3.34	17.732	9	0.039
5	2.06	10.968	7	0.141
6	0.57	3.062	5	0.693
7	0.25	1.318	3	0.729
8	0.01	0.039	1	0.838

D.F. = 64, and 14259

F-Ratio = 8,112 P = 0.000

In order to provide simpler explanations for management purposes, a two-axis space was chosen; it explained 86.8 percent of the total variation.

A second output of the multiple discriminant analysis is the table of factor correlations. These provide the basis for labeling the axes of the two dimensional space and for indicating the direction of each one of the factors (perceived attributes which were transformed into factors in the previous program). Table 6-11 presents the factor correlations for the first three axes of the dimensional space.

TABLE 6-11.--Factor Correlations for the Three Main Axes of the Perceptual Space, City X.

Name of the Factor	Dimension I	Dimension II	Dimension III
Sweetness	0.2820	-0.5783	0.3551
Odor	0.0426	-0.2642	-0.0030
Healthful (*)	-0.0592	0.4856	-0.7467
Mildness (*)	0.3790	0.8129	0.1265
Flavor	-0.1897	0.4610	0.0834
Strength	0.6472	-0.4681	0.1644
Aftertaste	0.1223	-0.3391	0.1207
Density	-0.6704	0.5750	0.1145

* Shows negative factor loading.

These factor correlations were plotted on the perceptual map in the following way. First, the mathematical signs of those with a positive factor loading sign were changed so that all factors fall along the same agreement scale. Remember that a one means a "SI-SI" answer, that is "in complete agreement," whereas a five would mean "in complete disagreement." Thus, a lower mean would represent more agreement, and a larger one, more disagreement, with the phrase containing a given attribute. Second, each factor was plotted in the geometrical space formed by dimensions I and II by assigning those numbers from Table 6-11 in Figure 6-4. Factor 1, sweetness, was plotted as -0.28 on the vertical scale and as 0.57 on the horizontal scale. The last factor, density, would be 0.67 on axis I and -0.58 on axis II.

The next step in the analysis of the multiple discriminant output was that of positioning each rated brand in the same geometrical space. Table 6-12 presents brands' locations along the main three dimensions.

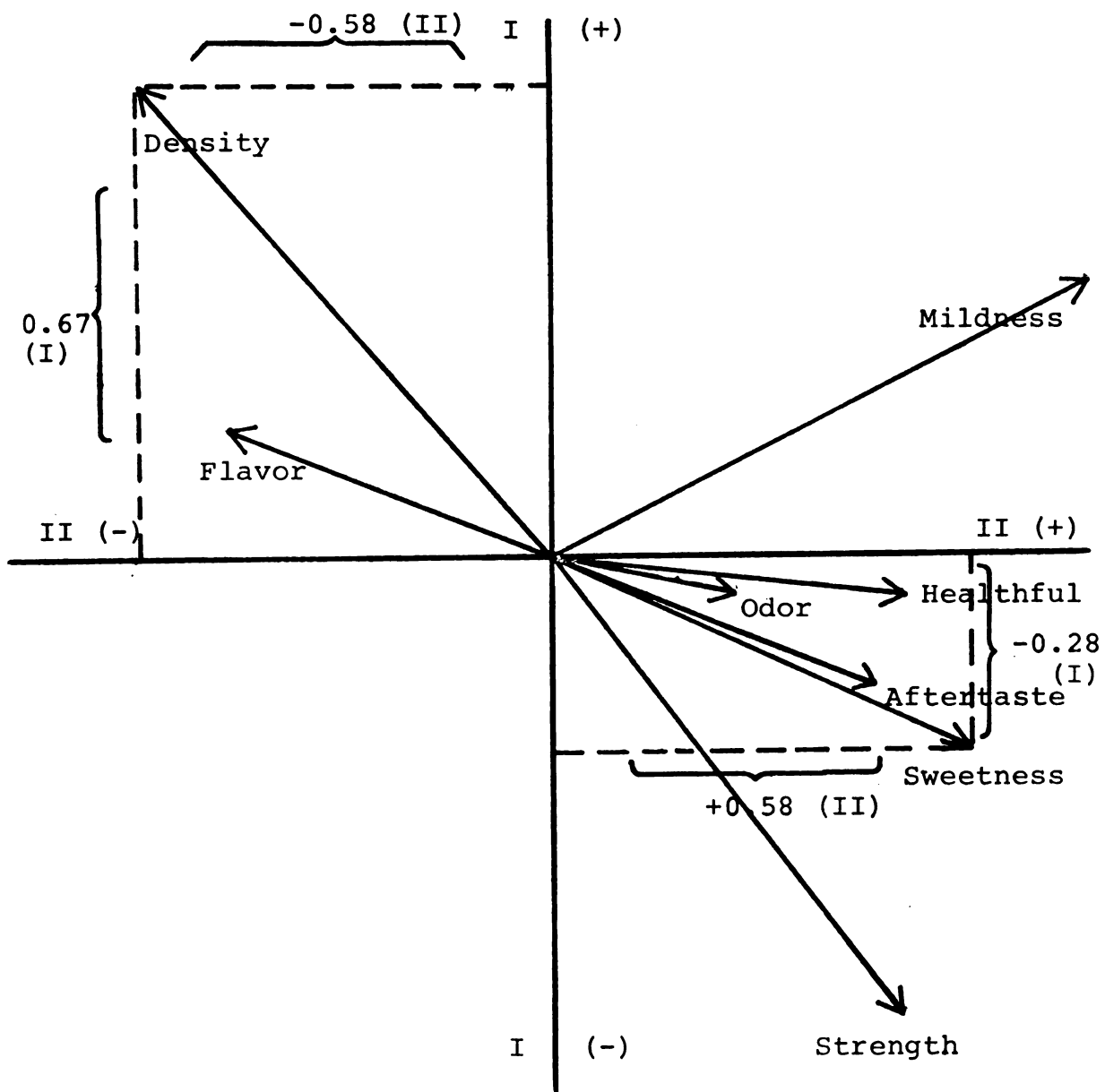


Figure 6-4.--Factor Correlations in City X.

TABLE 6-12.--Brand Location in Perceptual Map for City X.

Brand	Dimensions		
	1	2	3
A	-1.687	-1.722	3.865
B	-0.795	-1.758	3.338
C	-1.650	-2.805	3.365
D	-0.701	-2.559	3.788
E	-0.428	-2.557	3.541
F	-0.756	-1.802	3.365
G	-0.772	-1.771	3.450
H	-0.815	-2.007	3.455
I	-0.701	-2.453	3.230

Before plotting the brands in Figure 6-5, which already contains the factor correlations included in Figure 6-4, note that the range of values on dimension I is 1.25, the difference between brands A and E, whereas the ranges on dimensions II and III are 1.08 and 0.56, respectively. These facts confirm the idea that dimension I has more discriminating power among the rated brands than dimension II, and dimension II has more than dimension III.

In order to plot the brands in the perceptual space, the center had to be found, which is the weighted average of brand means along each axis. For City X,

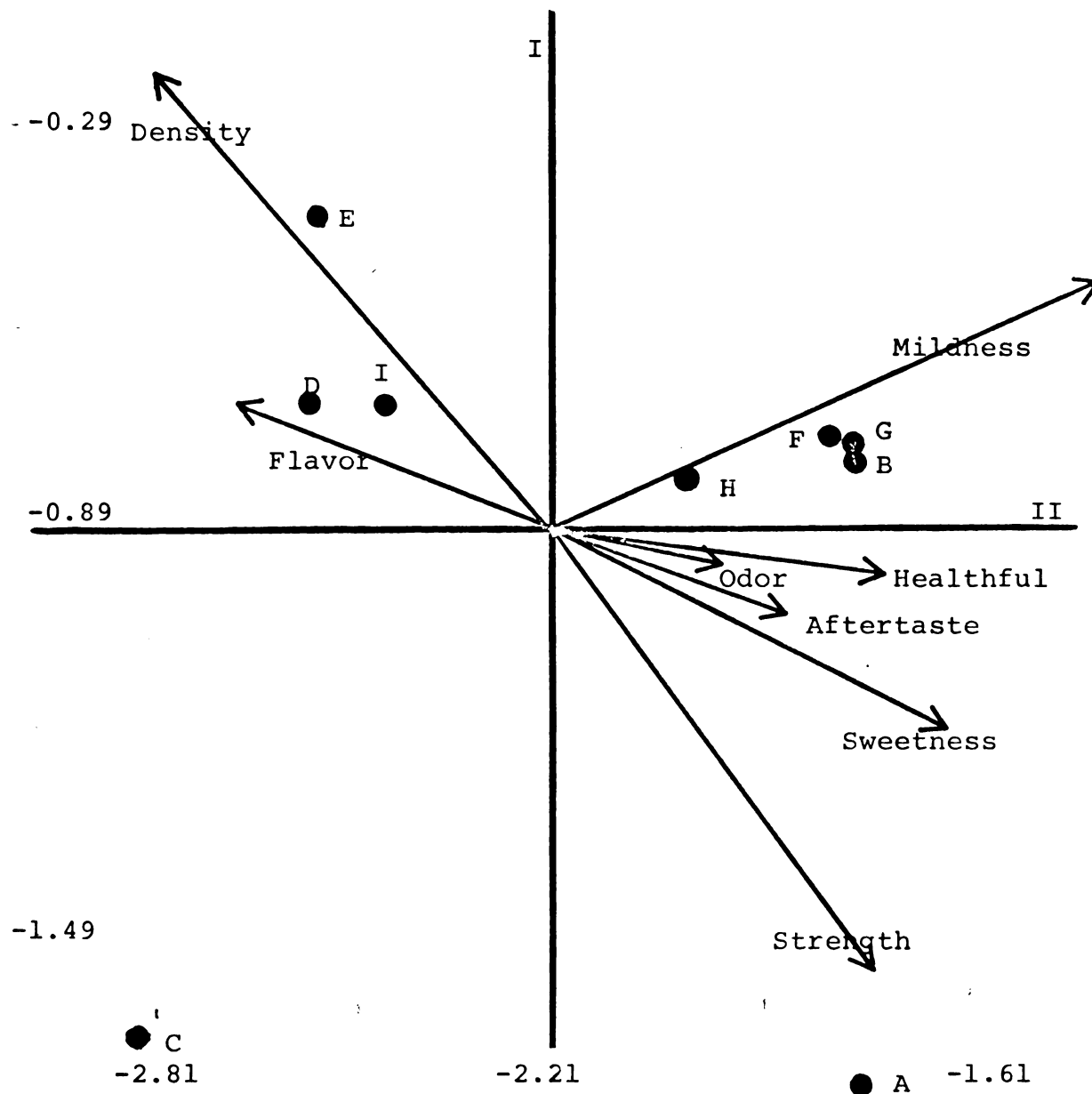


Figure 6-5.--Brand Position and Factor Correlations in City X.

centroids were on dimension I, -0.89 , and on dimension II, -2.209 , which became the center of the geometrical map, that is, the point from which all the factor correlations had to start. Next, the axes had to be numbered so that the numbers in Table 6-12 could be plotted in Figure 6-5. In this way, brand A was located at -1.69 on axis I, and at -1.72 on axis II, lower than the centroid, -0.89 and to the right of the same point, -2.21 . In contrast, the same points for brand E were -0.43 and -2.56 , which would place E in the upper left-hand section of the map. The reader must remember that the positive direction of axis I is toward the upper part of the map, and that of axis II is toward the right part.

Brand location and attribute weight in City X now could be interpreted. The interpretation should be similar to that achieved when the analysis of variance was performed. Bear in mind, however, that in this case a multidimensional (multicollinearity) meaning has been achieved rather than the unidimensional analysis used in the former case.

In Figure 6-5, the direction of the arrows, factor correlations, indicates agreement on that particular attribute, and brands are read perpendicularly to each line. In this way it can be seen that brand A is perceived as the strongest of the brands, whereas brand E is the weakest.

The reader can contrast this finding to that for analysis of variance output presented in Figure 6-3. There seems to be complete accord between the two technique. When a completely uncorrelated factor, healthfulness, is compared, brand C is perceived to have the least amount of this quality and brands G, F, and B have the most. These results also accord with those of the analysis of variance technique.

The discriminant weight of each factor is described by its F-ratio, shown in Table 6-13. As expected, factors such as mildness, density, and strength accounted for most of the difference, whereas odor and aftertaste had a low discriminating power. All of these results also accord with those found in the analysis of variance. The percentage of discrimination of each factor can be found.

$$\% \text{ D.W. } F_i = \frac{\text{F-Ratio Factor } j}{\sum_j \text{F-Ratio Factor } j}$$

$$\% \text{ D.W. of sweetness} = \frac{10.8613}{93.6113} = 11.6\% \quad (6-4)$$

TABLE 6-13.--F-Ratios and Percentage of Discriminating Power of Each Factor in City X.

Factor	F-Ratio	Disc. Power (%)
Sweetness	10.8613	11.6
Odor	2.4237	2.6
Healthful	7.8083	8.3
Mildness	19.6108	20.9
Flavor	6.6921	7.1
Strength	19.3587	20.7
Aftertaste	3.9130	4.2
Density	22.9434	24.6

All of the ratios described in Table 6-13 are significant at the 0.01 level, except number two, odor, which has a level of 0.0132.

Another output of multiple discriminant analysis is useful for simulating changes in brand perception (see chapter 7) and for positioning consumer ideal points. The program produces the discriminant weights of each factor along each of the selected axes of the geometrical space. As a two dimensional space was selected for our purpose, Table 6-14 contains such values for two axes, and Figure 6-6 presents their plotting in the geometrical space.

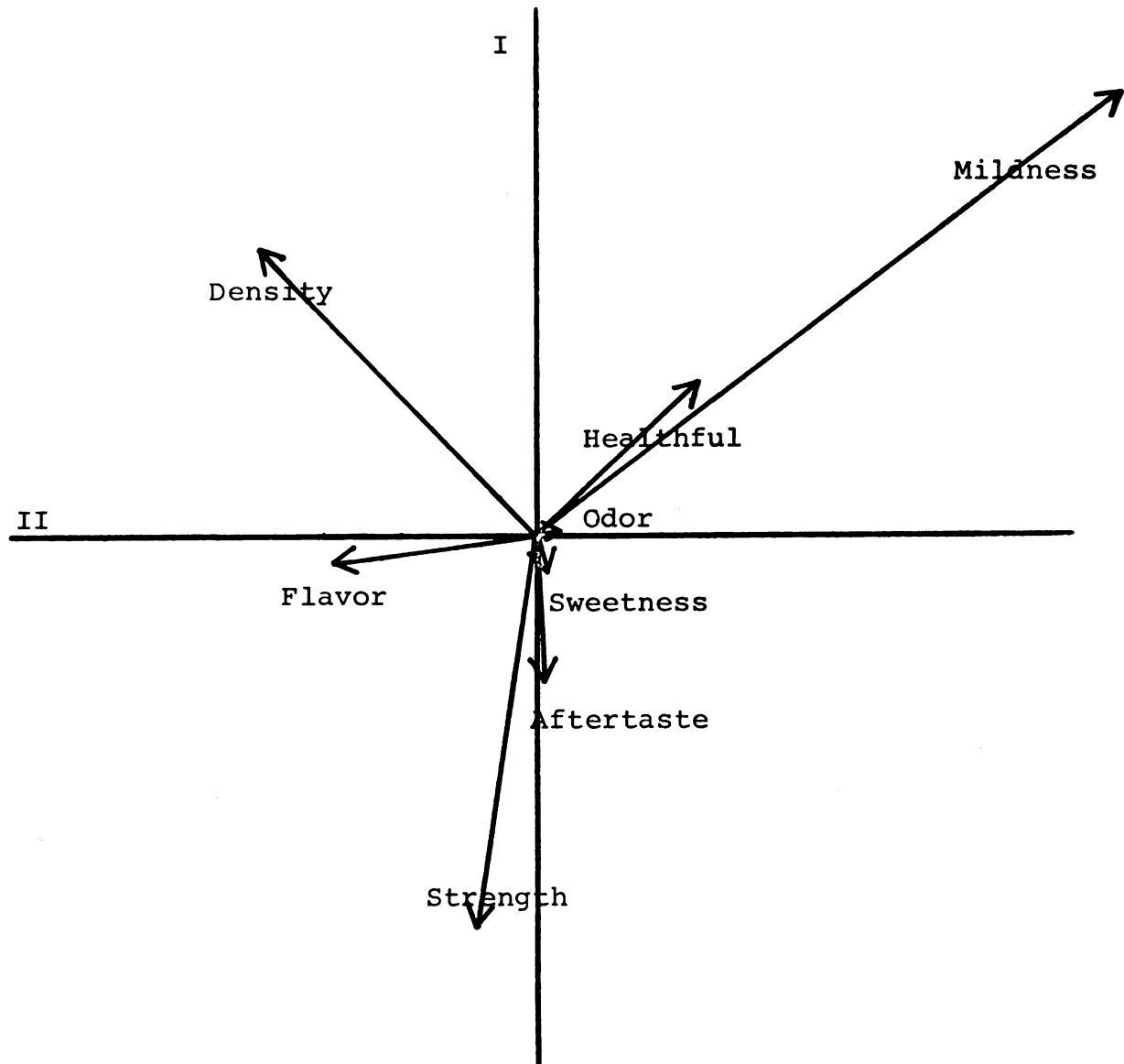


Figure 6-6.--Discriminant Weights in City X.

TABLE 6-14.--Factor Discriminant Weights in City X.

Factor	Dimensions	
	I	II
Sweetness	0.0499	-0.0163
Odor	-0.0075	0.0402
Healthful*	0.2285	0.2304
Mildness*	0.6436	0.8380
Flavor	0.0462	0.2803
Strength	0.5655	0.0720
Aftertaste	0.2018	-0.0076
Density	-0.4103	0.3987
* Factor has a negative loading.		

The points in Figure 6-6 were plotted in the same manner as those in Figure 6-4, factor correlations, and they are read similarly. In contrast to factor correlations, discriminant weights are used for simulating the expected position of a new brand if it showed selected brand perception ratings, or the location of a current brand if it were to change its perception along one or several of the rated attributes. For simplicity, Figure 6-6 can be compared with Figure 6-5, brand positioning. If the center of Figure 6-6 is located at a point along a given brand in Figure 6-5, the brand's position would move from its previous position in Figure 6-5 to a new one. The degree

of movement will equal the length of the arrow in Figure 6-6 if perception can be changed one point along the agreement scale of that specific attribute.

Table 6-15 is a matrix that shows the average rating of each brand on every factor. If the vector of brand *i* is multiplied by the matrix of discriminant weights, the two points on the axes of a given brand are obtained. For example, brand A's location on the perceptual map is -1.687 and -1.722.

$(2.5265)(0.0499) + (2.6609)(-0.0075) + \dots + (2.6145)(-0.4103)$, the result of which is -1.687, the value of brand A on axis 1.

$(2.5265)(-0.0163) + (2.6609)(-0.0402) + \dots + (2.6145)(0.3987)$ equals -1.722, the value of brand A on axis II. Notice that the first value, the brand mean for each factor, comes from Table 6-15, and the second, from Table 6-14, discriminant weights. If one were to assume that consumers changed their perception about the density of brand A, and, instead of being 2.6145, the highest disagreement for all the brands, it could be changed to 1.6145, the position of brand A would move 0.41 points to the left, as it has a negative sign, and 0.40 points upward. These figures can be observed in Figure 6-6 or computed from Tables 6-14 and 6-15.



TABLE 6-15.--Brand Average Rating on Each Factor in City X.

Attribute	A	B	C	D	E	F	G	H	I
Sweetness	2.5265	2.7298	2.9546	3.4534	3.2772	2.5169	2.6769	2.8716	3.0814
Odor	2.6609	2.6860	2.8093	2.9278	2.8202	2.4655	2.6582	2.6277	2.9711
Healthful	-4.3327	-4.0246	-4.5162	-4.8312	-4.6600	-4.2069	-4.2122	-4.2671	-4.2460
Mildness	-3.0348	-2.7667	-3.7704	-3.2612	-3.1152	-2.7508	-2.6998	-2.8825	-3.2823
Flavor	2.6422	2.3741	2.0722	2.2665	1.9283	2.3116	2.3879	2.1845	2.2478
Strength	2.8162	3.4309	3.2342	3.9633	4.1345	3.5475	3.3891	3.5471	3.8126
Aftertaste	2.5173	2.5140	2.6890	2.8878	2.7864	2.5010	2.6115	2.4760	2.8572
Density	2.6145	1.8726	1.9135	1.4080	1.1955	1.8260	1.8015	1.7422	1.4195

Multiple discriminant analysis should be considered as the key of the entire process. If no parsimony had been achieved through factor analysis, and if each factor had obtained a very high loading on each attribute, it might have been possible to construct a very similar perceptual map. However, factor analysis has produced orthogonal, uncorrelated factors from the original attributes, and in certain cases, like the ones found when testing the techniques, it could eliminate attributes which are very closely correlated. In addition, when many attributes are being scaled by the consumer, parsimony must be achieved if computer time is to be saved. In other cases computer capacity makes it impossible to use in a multiple discriminant analysis as many attributes as consumers were questioned about.

Cluster Analysis

Once a perceptual map has been constructed on the basis of consumer rating of current brands, the next step is that of locating on such a map the perception that consumers have about the "ideal" brand. This would determine how well current brands are satisfying the market, whether there is a need for a change in a given brand's perceived structure, or whether there is a need for a new brand in order to better cater to the market.

However, the mere location of consumer ideal points is not the end of the problem. Market segments can be constructed by gathering into homogeneous groups the points previously located. Such segmentation would permit market analysis since decisions can be made on the basis of cluster size.

The first step in cluster analysis is the location of consumer ideal points. This is achieved through transforming consumer rated values for ideal brand attributes into factors. They then are multiplied by the discriminant weights, and a location for each consumer is provided on the perceptual map. An example appears in Table 6-16 for the first ten respondents. All of these points eventually could be plotted on the perceptual map so that the analyst could cluster them together through visual inspection. This task was performed in the first surveys in order to contrast these groups of points against the results of the next program, whose aim was to cluster these points according to connective distance.

A further analysis of such a list as shown in Table 6-16 might be used to assess systematic interviewing bias. The data went into the computer in the order in which interviews were conducted by a given person. If two or more of these numbers were very similar, the entire data produced by that interviewer would have to be double checked.

TABLE 6-16.--Selected Consumer Ideal Points in City X.

Respondent	Axis I	Axis II
1	1.062	-1.975
2	-2.233	-0.216
3	-1.962	-3.318
4	-3.159	-4.021
5	-1.354	-2.102
6	-1.464	-4.039
7	-2.563	-3.574
8	-0.773	-4.656
9	-1.343	-0.295
10	0.288	-2.423

In the last computer program, "grouping," an Euclidian distance measure was used in order to interconnect these points on the perceptual map.

$$d(X, Y) = \sqrt{\sum (X_i - Y_i)^2}. \quad (6-5)$$

X and Y are consumers, and i indicates either axis I or axis II.

The computer performs the clustering procedure as follows. First, it calculates the distance between subject one and subject two; if it is less than a certain tolerance, both subjects are clustered together. If

greater than that tolerance, the computer continues sequentially to the next subject until it reaches the end of the file. This process is repeated until every subject has been assigned to a given cluster. Second, when all the clusters have been formed, the computer calculates the mean on each one of the axes for each cluster.

Table 6-17 shows the most important market segments formed by ideal brand perceptions in City X. It also contains their relative size as well as their

TABLE 6-17.--Market Segments in City X.

Segment	Size	Axis I	Axis II
I	251	0.779	-2.180
II	40	-2.103	-0.449
III	152	-1.816	-3.556
IV	44	-3.101	-4.352
V	143	-0.835	-1.907
VI	172	-0.729	-4.895
VII	73	-0.303	-0.660
VIII	50	0.318	-3.158
Centroids		-0.662	-2.948

location on both axes. These numbers have been plotted in Figure 6-7 for visual presentation. In order to achieve

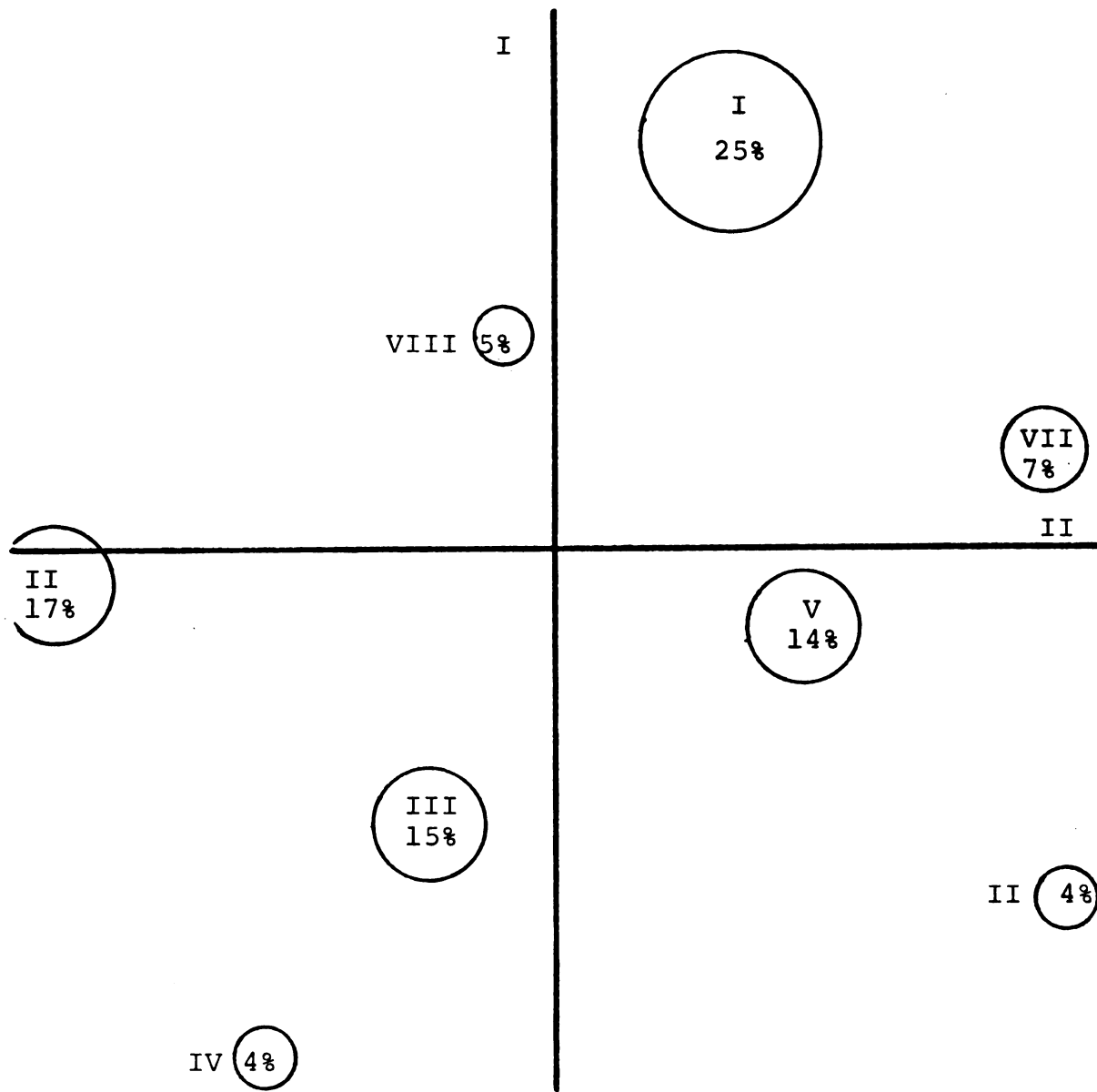


Figure 6-7.--Market Segments in City X.

better understanding, however, market segments, brand positions, and factor discriminant weights have been combined in Figure 6-8.

An analysis of this latter Figure shows that all the current brands are located within a limited portion of the total market. All of the brands seem to be far from the ideal brand ratings. A given brand can be shifted in its position, both in direction and relative size, toward a relevant cluster by moving it parallel to the arrow indicating a given factor. In this way meaningful market segments have been obtained by measuring just what the consumer perceives he wants to be from a given product. A firm producing such a product profitably can use this approach to learn how far it deviates from completely serving specific market clusters. It also has the knowledge about what to do, in perceptual terms, to alter its brand's perception by consumers.

Classifying Market Segments

The last step in the analysis of market data is that of learning the components of each one of the clusters. TAB-CRU (multivariate cross tabulation), which was described previously, was used to interpret the results. Every cluster was tabulated against each item of the questionnaire, and in this way the differences and similitudes among clusters could be detected.

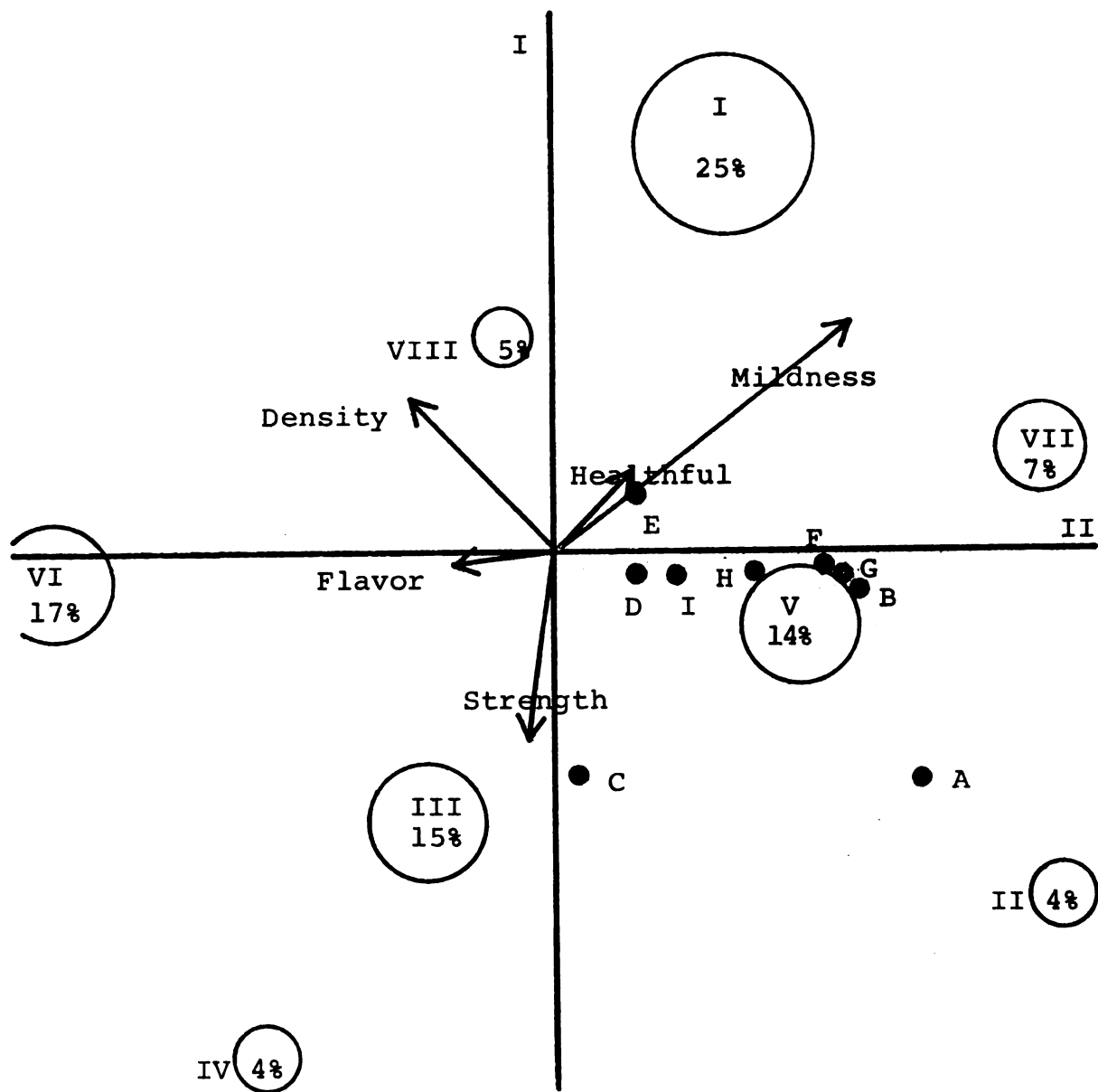


Figure 6-8.--Market Segments, Brand Locations and Discriminant Weights in Reduced Space.

A good example of cluster description is found in cluster III: It is composed of upper class people, with college training. Many subjects are under 35 years of age, and there is a large percentage of single men. The members of the cluster tend to be light consumers. A further description of final results has no relevance for methodology.

Having described the techniques used for analyzing the market data in order to construct market segments, the next chapter will attempt to integrate those results into a national sample and to describe comparative intercity findings.

CHAPTER VII

MARKET SEGMENTATION BY CONSUMER PERCEPTION: NATIONAL SAMPLE, VALIDATION OF RESULTS

The objective of this chapter is to present the basis for structuring a national sample. Interregional and intercity comparisons will be made, and our results will be validated through the use of several alternative analytical techniques. Once confident about the information obtained through this study of market segmentation by consumer perception, it became possible to think about management's use of these results in decision making.

Structuring a National Sample (Weighted Averages Technique)

As noted earlier, 30 cities were surveyed and 14,309 persons were interviewed using similar questionnaires. The same analytical tools were applied in studying each particular city, and individual reports were prepared for each case. However, a national sample had to be developed in order to obtain an overall measure of the market. This sample was very useful in comparing regional results by contrasting their relative values to those of the entire nation.

The reader should be reminded that a full national sample was not taken; small cities and rural areas were not surveyed. However, for our purposes this sample can be considered a good measure of national product and brand consumer perception since urban areas account for 75 percent of total product consumption.

Two different procedures were used for structuring this national sample. The first consisted of obtaining a weighted mean for all the relevant measures of the survey; the total product (industry) consumption for each city was the basis for this total. The second procedure was that of obtaining from the total questionnaires, which had been stored on a computer tape, a probabilistic sample for each city; as in the previous case, relative weights were considered. The sample thus obtained was 1,476, the maximum number of cases which could be handled in the computer. The second procedure was very useful as it enabled several samples to be obtained and tested for statistical differences.

Surveyed cities were combined into regional groups following both procedures, and nine such groups were formed. In order to obtain similar information from among the different reports, the axis in each city was rotated. In every case, the factor "density" was placed on axis I, at 12 o'clock, and the rest of the factors were placed

accordingly. Factor strength, which in most cases was negatively correlated to density, was placed between five and seven o'clock, whereas mildness, which had almost no correlation with either of the former factors, was located between two and four o'clock. Figures 7-1, 7-3, and 7-5 show brand and cluster location for cities Y, W, and Z. Figures 7-2, 7-4, and 7-6 show their respective factor correlations.

An analysis of these cities will show how differently the brands are perceived in each market area. It also will show that the factor correlations tend to remain relatively constant regarding direction, weight, and correlation. This means that product wants are perceived similarly, but brands are not, and a different advertising strategy (themes, budgets, and possibly media) for each one of the regions is called for.

By contrasting each market area with the national picture (Figures 7-7 and 7-8 show brand and cluster location and factor correlations), a more meaningful comparison is possible. Specific brand location can be decided upon, and a total marketing strategy can be designed for each brand. (By marketing strategy is meant the relative factor mean that each brand is expected to have in order to arrive at a given position in the geometrical space.) Having decided upon these means for each

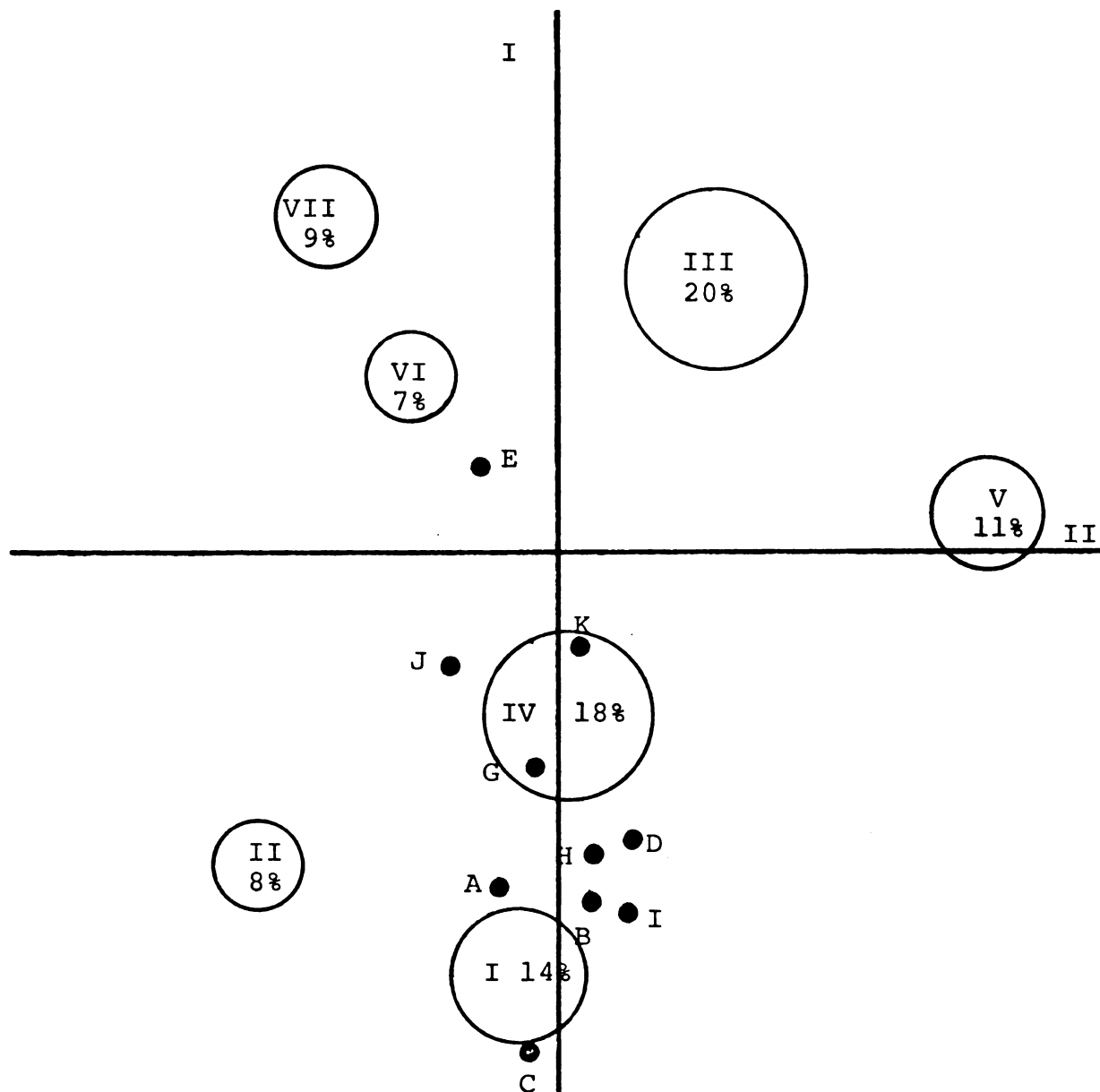


Figure 7-1.--Brand and Cluster Locations in City Y.

Note: J and K are regional brands.

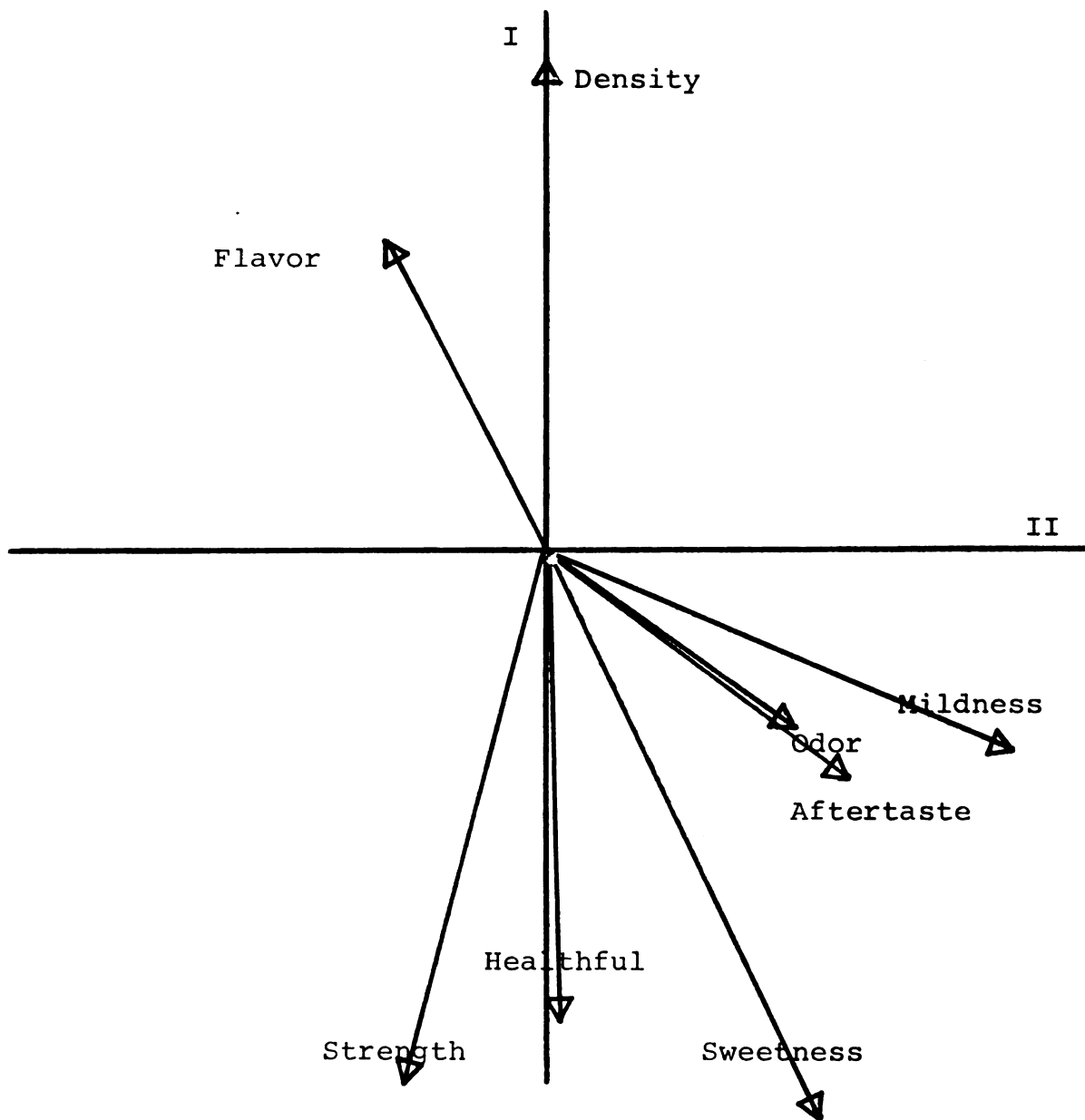


Figure 7-2.--Factor Correlations in City Y.

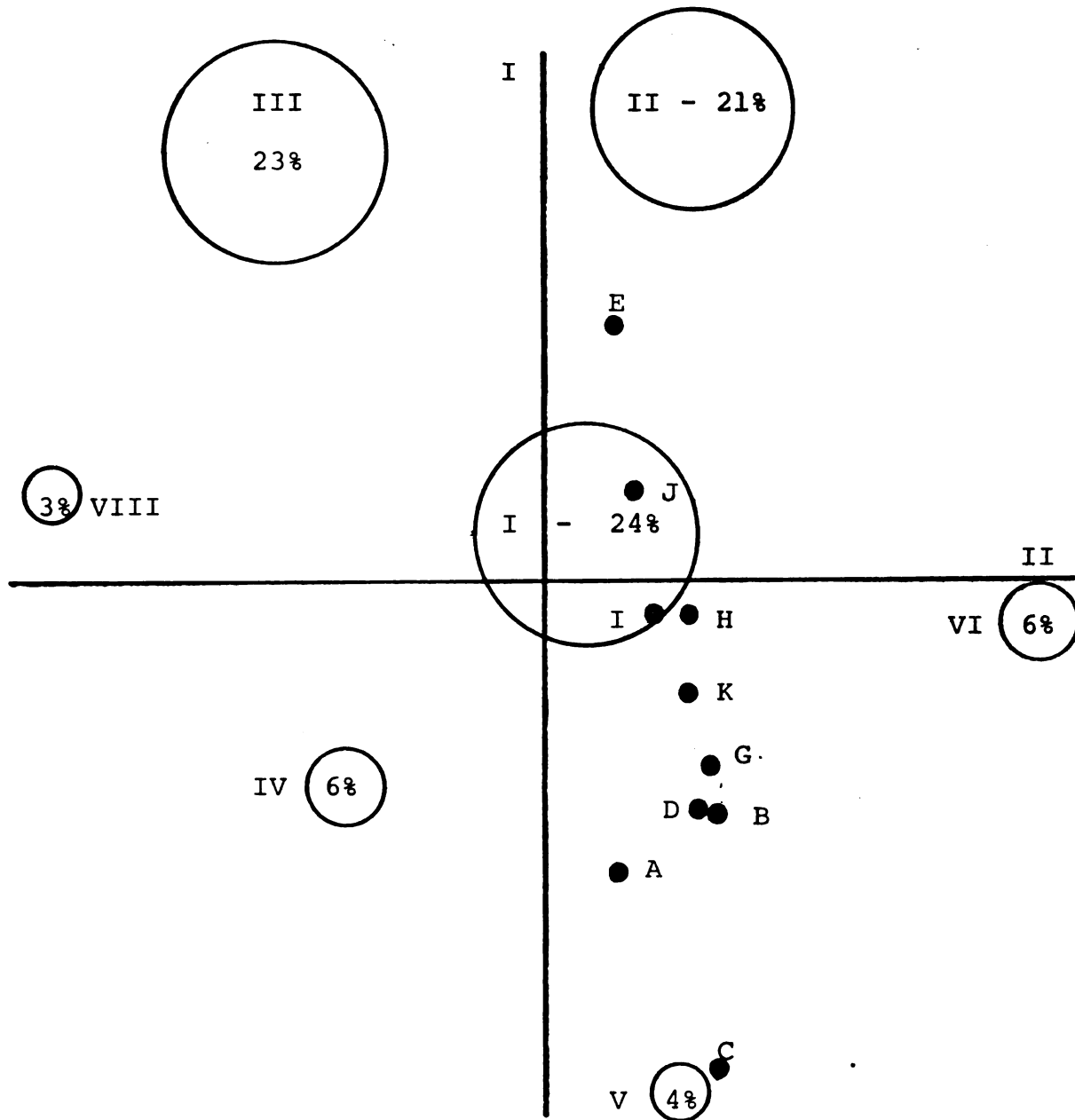


Figure 7-3.--Brand and Cluster Locations in City W.

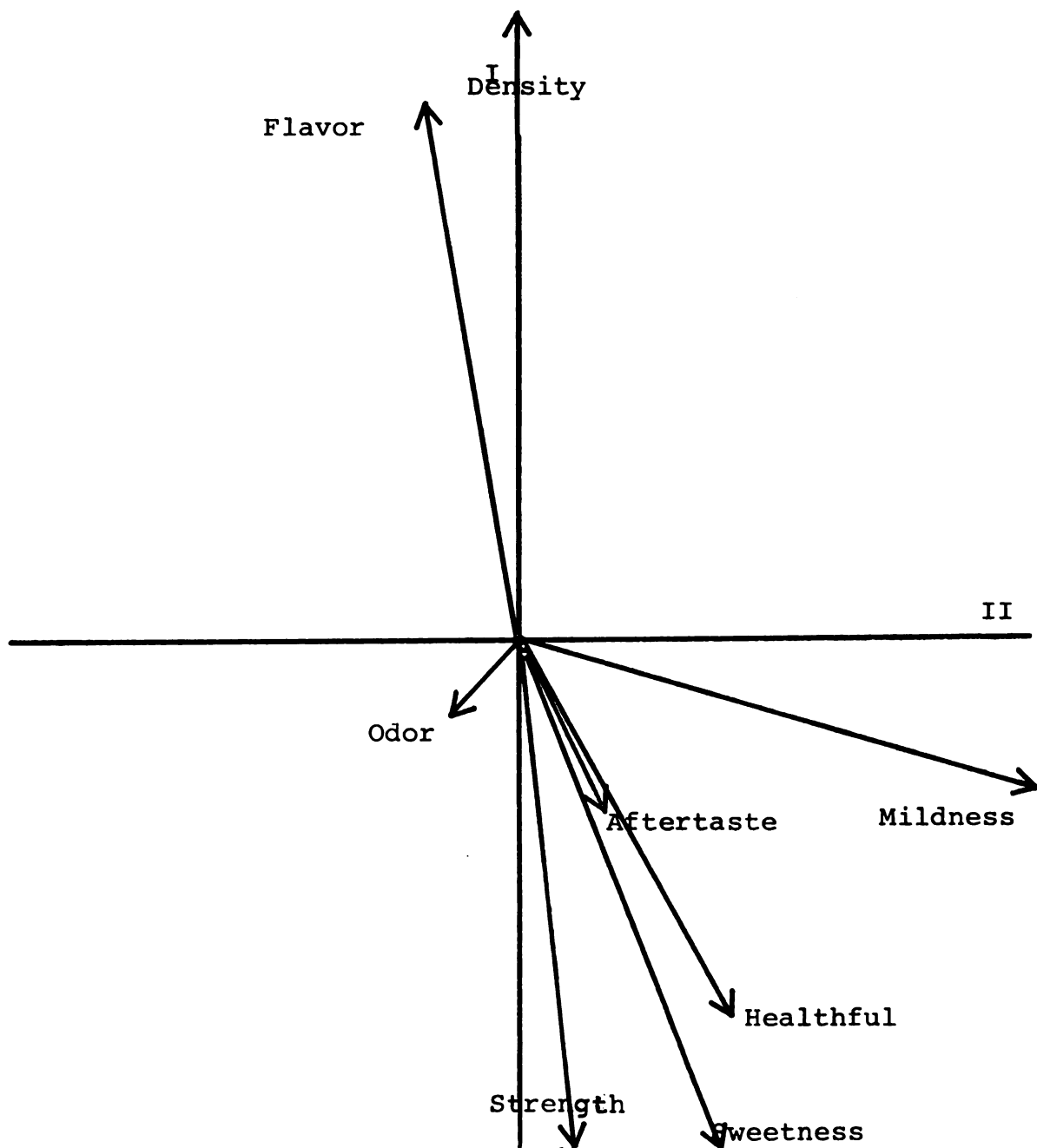


Figure 7-4.--Factor Correlations in City W.

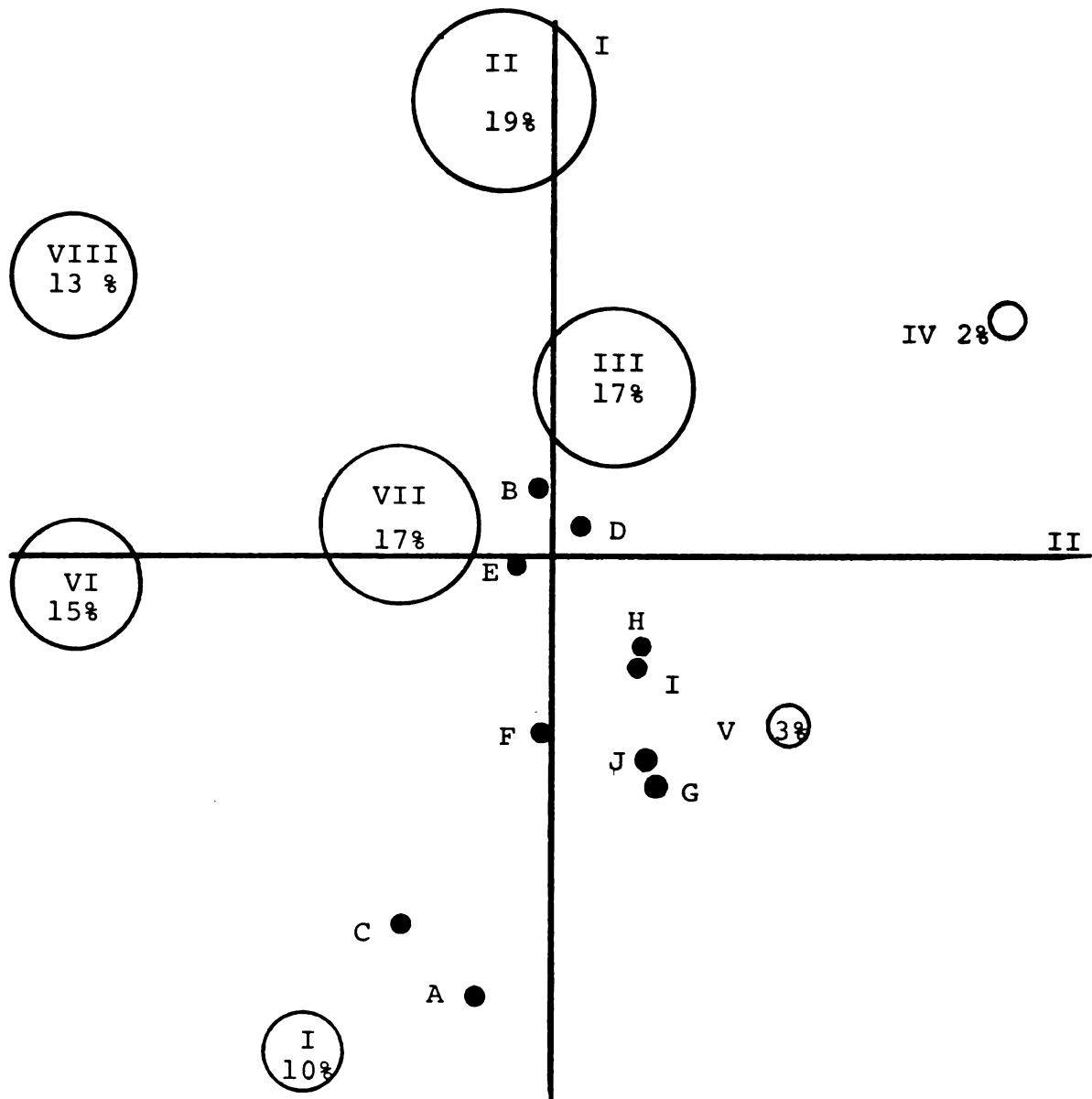
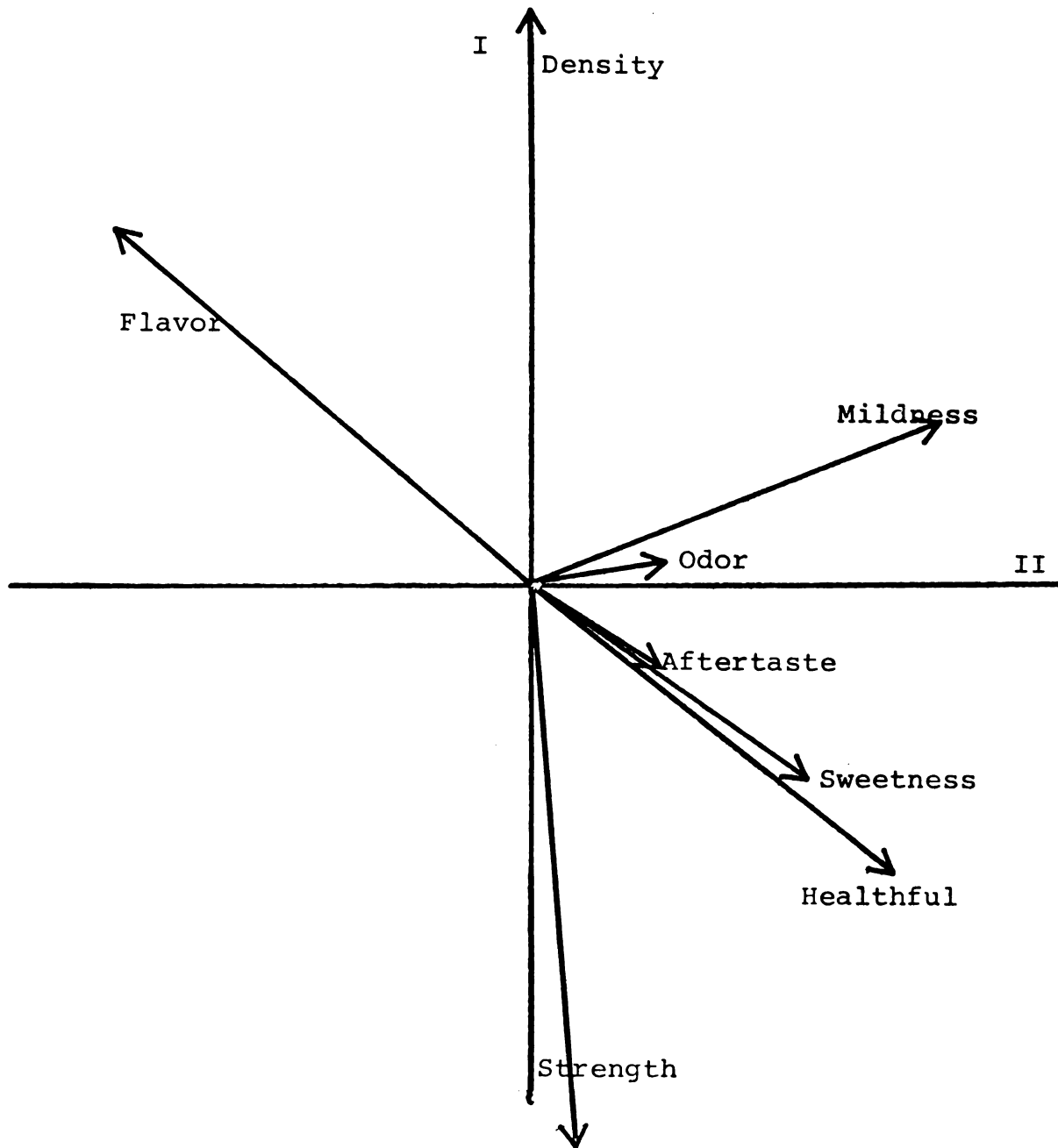


Figure 7-5.--Brand and Cluster Locations in City Z.



Factor 7-6.--Factor Correlations in City Z.

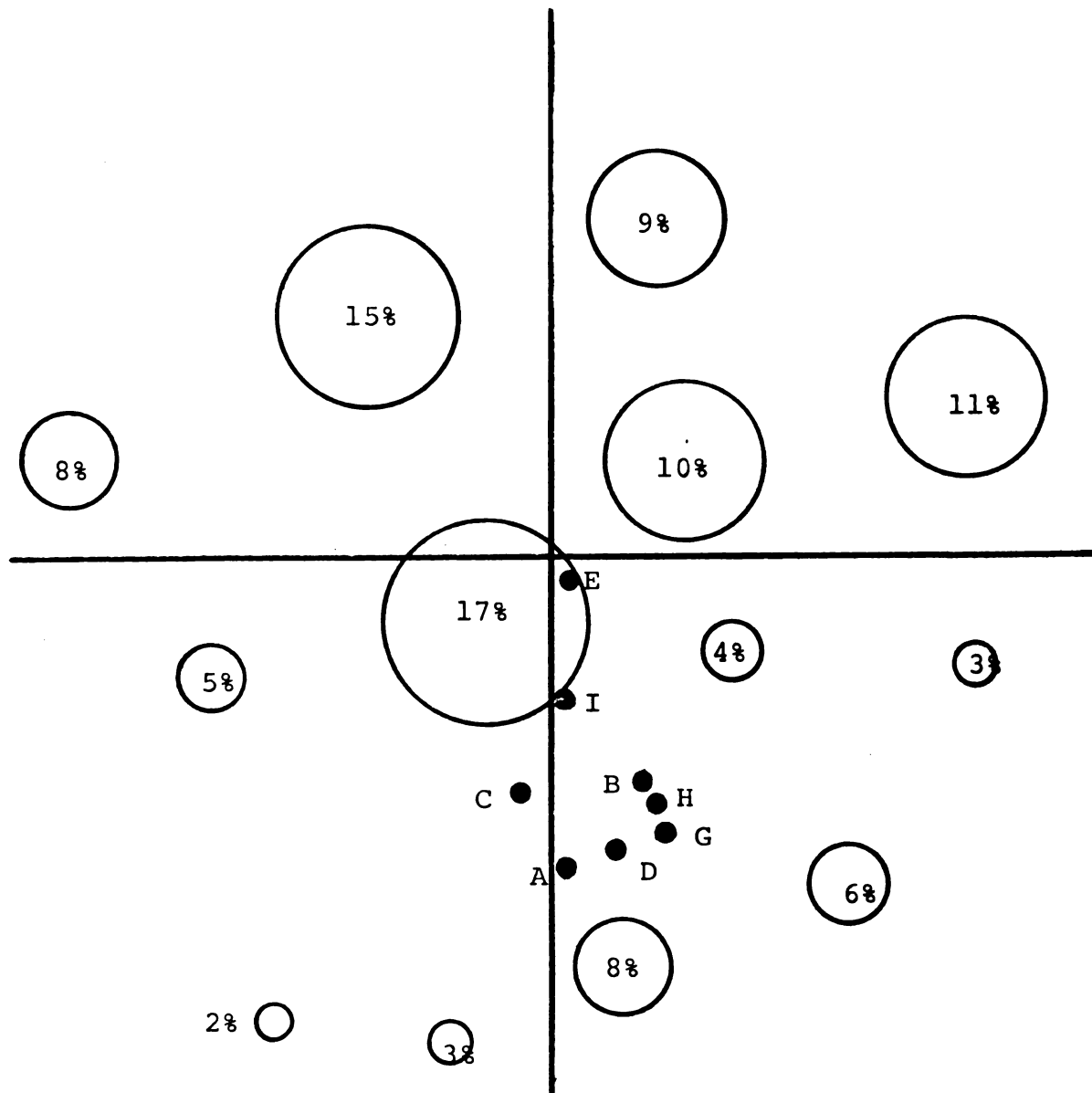


Figure 7-7.--Brand and Cluster Locations in National Sample.
(Weighted Averages Procedure)

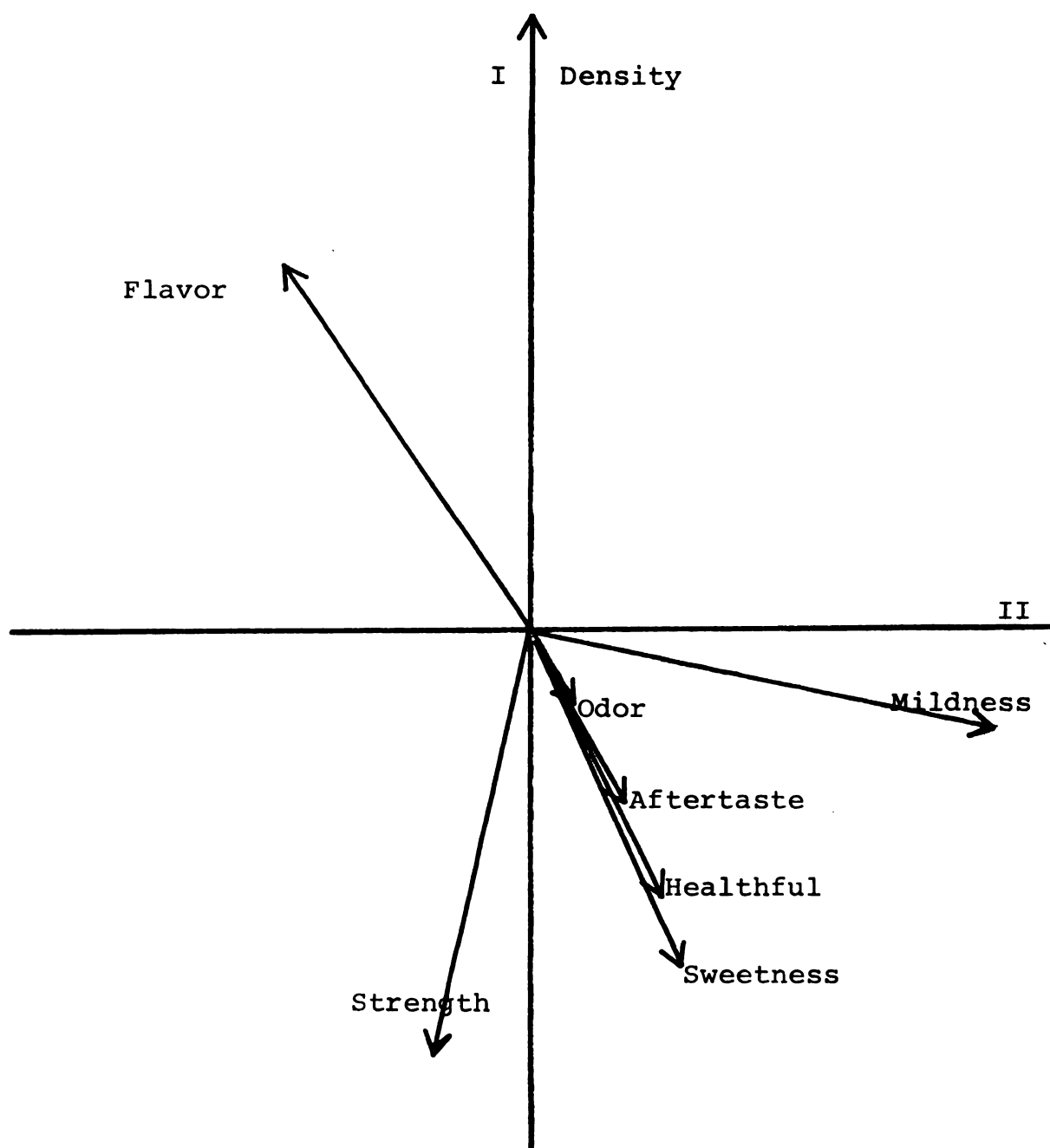


Figure 7-8.--Factor Correlations in National Sample.
(Weighted Averages Procedure)



attribute, in order to develop regional strategies, differences between actual and expected mean values can be obtained, and plans can be developed to change these means toward the desired values.

An advantage of this method is that it is not necessary to change the whole national communication campaign. If a change is made regionally, for example, for two alternative advertising campaigns, only those two regions will be affected. The two regions can be used to test the results, and the remaining regions can be used as control groups.

An analysis of the national perceptual map reveals the following: Brands are clustered together; an important sector of the market is relatively unsatisfied by current brand offerings, and some changes might seem necessary either in current or in new brands to cater to the market. The reader again should be reminded that the names and mathematical signs of the original variables have been changed; it would be incorrect to assume the results presented here portray the real market. Our emphasis is on the technique used to conduct market segmentation by consumer perception and on the potentialities of their usage, not on the specific results obtained in a given marketing situation. However, as these transformations were made systematically, it is quite possible to contrast

differentials among brands, either at a regional or at a national level.

Structuring a National Sample
(Stratified Random Sample)

The second procedure, as mentioned above and the results of which will be fully detailed in this section, was that of obtaining a national sample of 1,476 respondents from the computer tape. The tape was composed of the field questionnaires. A partial regional analysis had been performed in each case in order to check the data for possible errors along the entire process.

A different sample size was determined for every city based on its total product consumption, and the sample was selected systematically. A different interval was used in each case, since every sample size had been different and was not related to the city's relative product consumption. Factor analytical procedures similar to those used in the case explained in chapter 6, a principal component analysis, and a varimax routine were performed. The attribute weights for each factor which resulted are shown in Table 7-1.

As attributes were transformed into factors and then used as inputs in the multiple discriminant analysis, several data matrixes were produced. Among these were factor correlations, brand positions, and discriminant

TABLE 7-1.--Attribute Weights for Each Factor in National Sample.

Factor	Name	Attribute Weight
1	Odor	0.97600
2	Flavor	0.99395
3	Strength	-0.97799
4	Mildness	-0.98480
5	Healthfulness	0.98491
6	Sweetness	0.97798
7	Density	0.98466
8	Aftertaste	-0.97976

weights, which are presented in Tables 7-2, 7-3, and 7-4, and their results are plotted in Figures 7-9 and 7-10. The F-ratios and percentages of discriminant power of each factor are presented in Table 7-5.

An analysis of these tables and figures reveals several facts. First, the results are quite similar to those obtained through the weighted average procedure, as factor correlations once rotated show exactly the same length and direction in both cases. Second, brands are located at approximately the same distance and at the same position in both perceptual maps. Third, this second procedure enables us to know the factors relative means (Table 7-3). In order to find out exactly how much their

TABLE 7-2.--Factor Correlations for the Two Main Axes of the Perceptual Space, National Sample.¹

Name of Factor	Dimension I	Dimension II
Odor	-0.32	-0.28
Flavor	0.55	0.27
Strength*	0.78	-0.20
Mildness*	0.22	0.79
Healthful	-0.55	-0.20
Sweetness	-0.52	-0.44
Density	0.85	0.06
Aftertaste*	0.30	0.14

¹For an explanation see Figure 6-11.

*Shows negative factor loadings.

TABLE 7-3.--Brand Location in Perceptual Map, National Sample.

Brand	Dimension I	Dimension II
A	0.52	-0.99
B	-0.21	-0.69
C	0.06	-1.34
D	-0.13	-0.43
E	-1.06	-0.89
F	-0.09	-0.59
G	0.34	-0.58
H	-0.12	-0.52

*For an explanation see Figure 6-12.

TABLE 7-4.--Factor Discriminant Weights in National Sample.¹

Factor	Dimension I	Dimension II
Odor	-0.07	-0.09
Flavor	0.46	0.23
Strength*	0.58	-0.54
Mildness*	-0.14	0.75
Healthful	-0.09	-0.13
Sweetness	-0.08	-0.20
Density	0.64	0.05
Aftertaste*	0.09	-0.15

¹For an explanation see Figure 6-14.

*Shows negative factor loadings.

TABLE 7-5.--F-Ratios and Percentage of Discriminating Power of Each Factor in National Sample.*

Factor	F-Ratio	Disc. Power (%)
Odor	5.35	4.7
Flavor	12.54	11.0
Strength	22.94	20.1
Mildness	17.22	15.1
Healthful	12.21	10.7
Sweetness	14.77	12.9
Density	25.24	22.1
Aftertaste	3.84	3.4

*For an explanation see Figure 6-13.



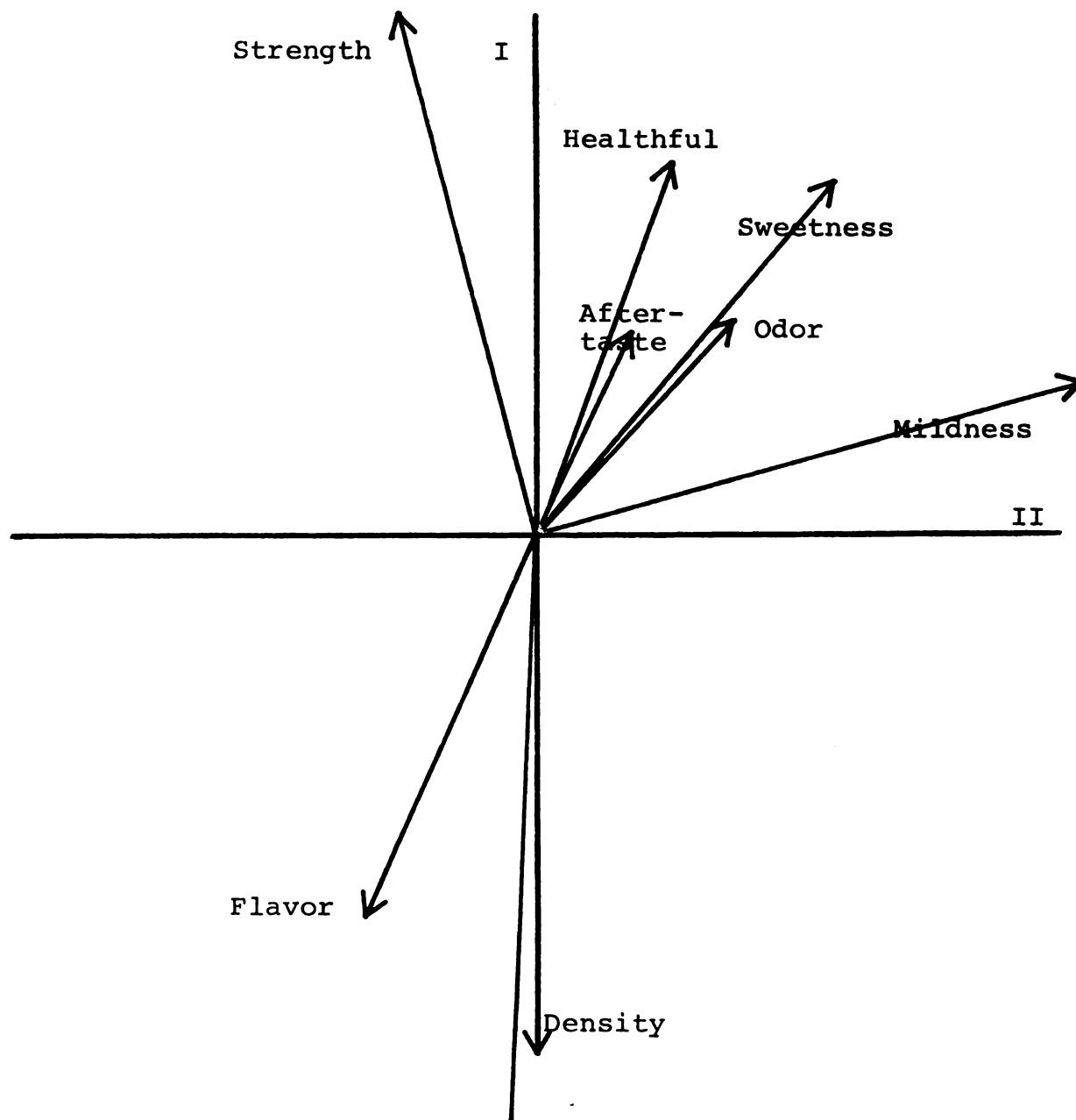


Figure 7-9.--Factor Correlations in National Sample.

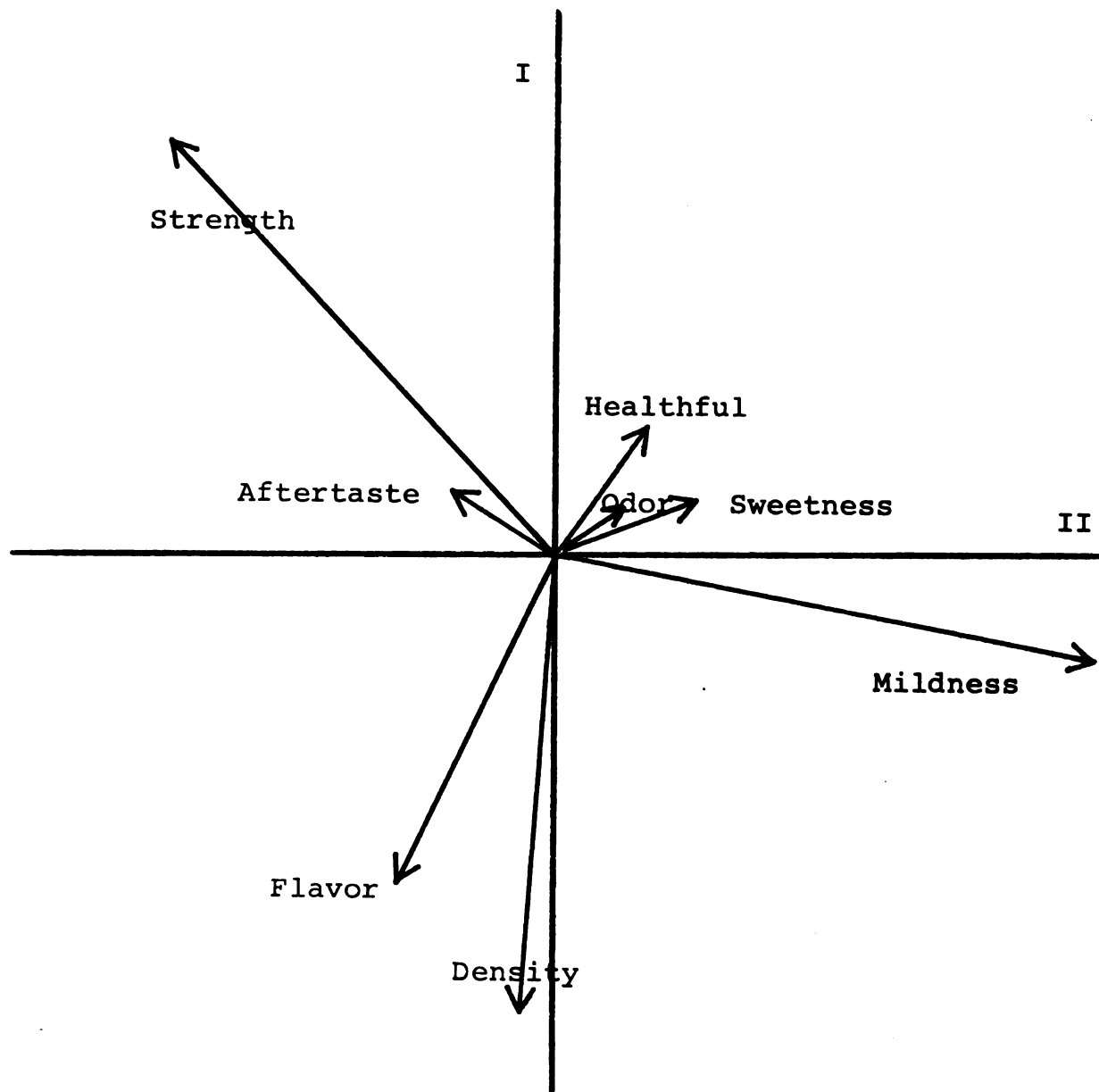


Figure 7-10.--Discriminant Weights in National Sample.

position would change if an attribute were moved, Table 7-4 indicates factor discriminant weights. In addition, as F-ratios are produced, we are able to find out that, similar to City X, in the national figures it is mildness, strength, and density that are the relevant product attributes, whereas aftertaste and odor contribute very little in discriminating among brands.

The integration of clusters is accomplished through the same programs. The total results are described in Table 7-6.

TABLE 7-6.--Market Segments in National Sample.*

Segment	Size	Percent	Axis I	Axis II
I	82	6.6	-3.30	0.42
II	84	6.8	-3.06	-1.64
III	229	16.6	0.13	-1.11
IV	267	18.6	-1.65	1.03
V	212	15.3	-1.73	-0.58
VI	59	4.3	-2.27	-2.79
VII	89	6.4	-1.36	-2.00
VIII	264	18.4	-0.19	0.28
IX	32	2.1	2.44	-0.45
X	42	3.1	1.17	-2.64
Centroids			-1.28	-0.51

*For an explanation see Table 6-17.

In Figure 7-11 these clusters have been plotted on the perceptual map. For simplicity, brand positions also have been included in such geometrical space. In this way a national picture was obtained, and the results could be presented to management for decision-making purposes.

Several additional analyses were performed on a national and regional scale through the use of the computer tape. First, consumers who preferred a given brand were taken as the universe and then the entire analysis was made. In this way the analyst could observe how specific targeted (brand) consumers perceive each competitive brand and their ideal. As a result, either offensive (if the analyzed brand is one of competition) or defensive decisions could be made. Second, consumers in a specific demographic market segment were taken as a sample, for example upper class members. The entire analysis then was conducted to achieve similar aims. A third alternative was to analyze responses of consumers who had selected the advertising media in which they would like to see advertisements for the product. Several other combinations were tested, but their results are not presented here since they seemed uninteresting for marketing purposes.

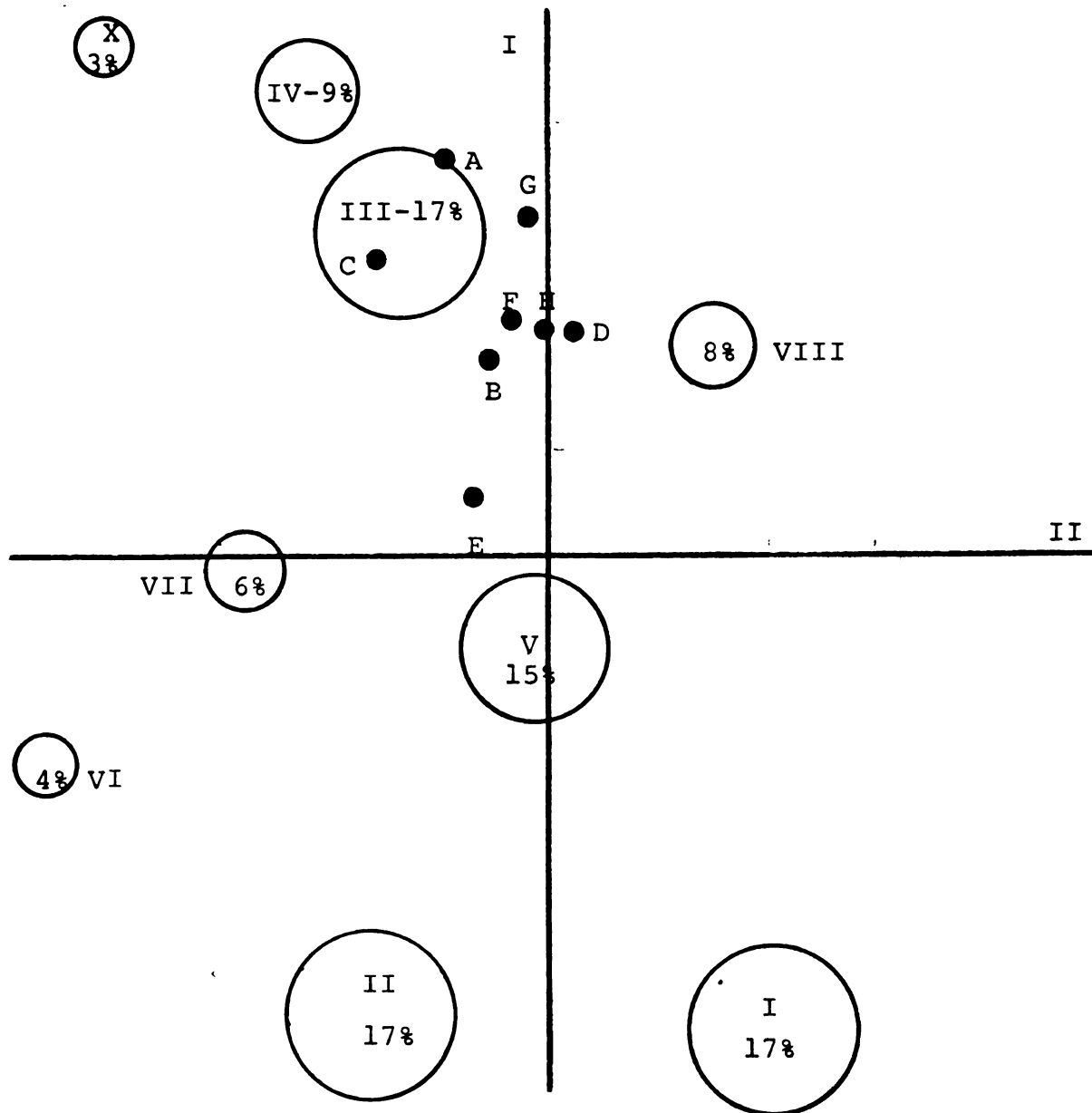


Figure 7-11.-- Brand and Cluster Locations
in National Sample.

Regional Validation

As one of our stated objectives was that of validating the use of various techniques not only on a single project but also horizontally, that is, by applying the same questionnaire and the same analytical tools to data from different cities, this section will present several such comparisons.

Table 7-7 contains the percentages of discriminating power of each factor in Cities X, Y, W, and Z, as well as those which resulted from the national sample. These numbers can be contrasted with those in Figures 6-4, 7-2, 7-4, 7-6, and 7-8, where factor correlations were plotted on the perceptual maps.

TABLE 7-7.--Percentages of Factors Discriminating Power for Cities X, Y, W, and Z and National Sample.

Factor	City X	City Y	City W	City Z	National
Sweetness	11.6	13.9	18.5	6.5	12.9
Odor	2.6	6.3	0.5	3.1	2.6
Healthful	8.3	11.9	9.8	11.5	10.7
Mildness	20.9	10.8	20.0	10.1	15.1
Flavor	7.1	9.0	3.0	14.4	11.1
Strength	20.7	16.6	17.9	25.3	20.1
Aftertaste	4.2	9.3	2.5	4.0	3.4
Density	24.6	22.2	27.8	25.2	22.1

In order to determine whether the discriminant power of each attribute was consistent, statistically speaking, among the different cities, a test of goodness was applied. A Table showing chi-squares for each of the factors is included as Table 7-8, where an example of this analysis is presented for Cities X, Y, W, and Z. A complete analysis was performed for the 30 cities surveyed, but for brevity we will include only the four mentioned. In this case the maximum expected value for χ^2 to be accepted at a level of significance of 0.05 is 5.991. If the value is greater than this number, it could be said that there is a significant difference for that attribute among cities.

TABLE 7-8.--Test of Goodness of Fit for Factor Discriminating Power in Cities X, Y, W, and Z.

Factor	Mean	Chi-square
Sweetness	12.6	5.04
Odor	3.1	5.57
Healthful	10.4	0.79
Mildness	15.5	<u>6.49</u>
Flavor	8.4	5.62
Strength	20.1	2.21
Aftertaste	5.0	5.28
Density	24.9	0.64

As can be observed in Table 7-8, mildness does not show a consistent discriminating power. Although important nationally, it is much more important for specific cities. In contrast, density has a consistent and important discriminating power among brands, and it lends itself to a national advertising campaign.

In Figures 7-12, 7-13, and 7-14, brand means for three original attributes are contrasted for brands D, E, and B. It is possible to verify consistency on relative perception. In every case, for example brand E is considered more dense than brands B and D, but at the same time it is seen as the one with the least healthfulness. By the same token, brand D seems to be very similar to brand E in some regions and to brand B in others.

A complete analysis, very similar to the one used in discriminant weights, was performed for all brands along all their attributes. This was done to contrast their respective means as perceived in each of the cities. Table 7-9 includes, for comparative purposes, the ideal brand perception for all the attributes in cities X, Y, W, and Z.

As it can be observed in Table 7-9, desired attributes are not the same in each of the regions, but they are consistently perceived. That is, their direction and sign are the same in all cases, although their relative

TABLE 7-9.--Ideal Brand Perception in Cities X, Y, W, and Z.

Attribute	City X	City Y	City W	City Z
Sweetness	0.56	0.76	0.32	0.48
Mildness	0.30	0.27	0.14	0.49
Higher-priced	-0.97	-0.90	-0.84	-0.73
Availability	1.56	1.08	1.40	1.35
Aftertaste	0.71	0.82	0.72	0.62
Density	0.78	1.04	1.19	0.73
Odor	0.44	0.83	0.90	0.60
Strength	-0.88	-0.56	-0.75	-0.74
Flavor	1.01	0.93	0.86	0.81
Healthful	1.62	1.13	1.48	1.41
Sample Size	999	810	1,200	814

mean differs. The way each brand is perceived in the different areas is exemplified in Tables 7-10 and 7-11 for the attributes sweetness and density, respectively. The reader is to be reminded that the analysis that was performed on data from Table 7-7 also can be used to test goodness of fit in Tables 7-9, 7-10, and 7-11.

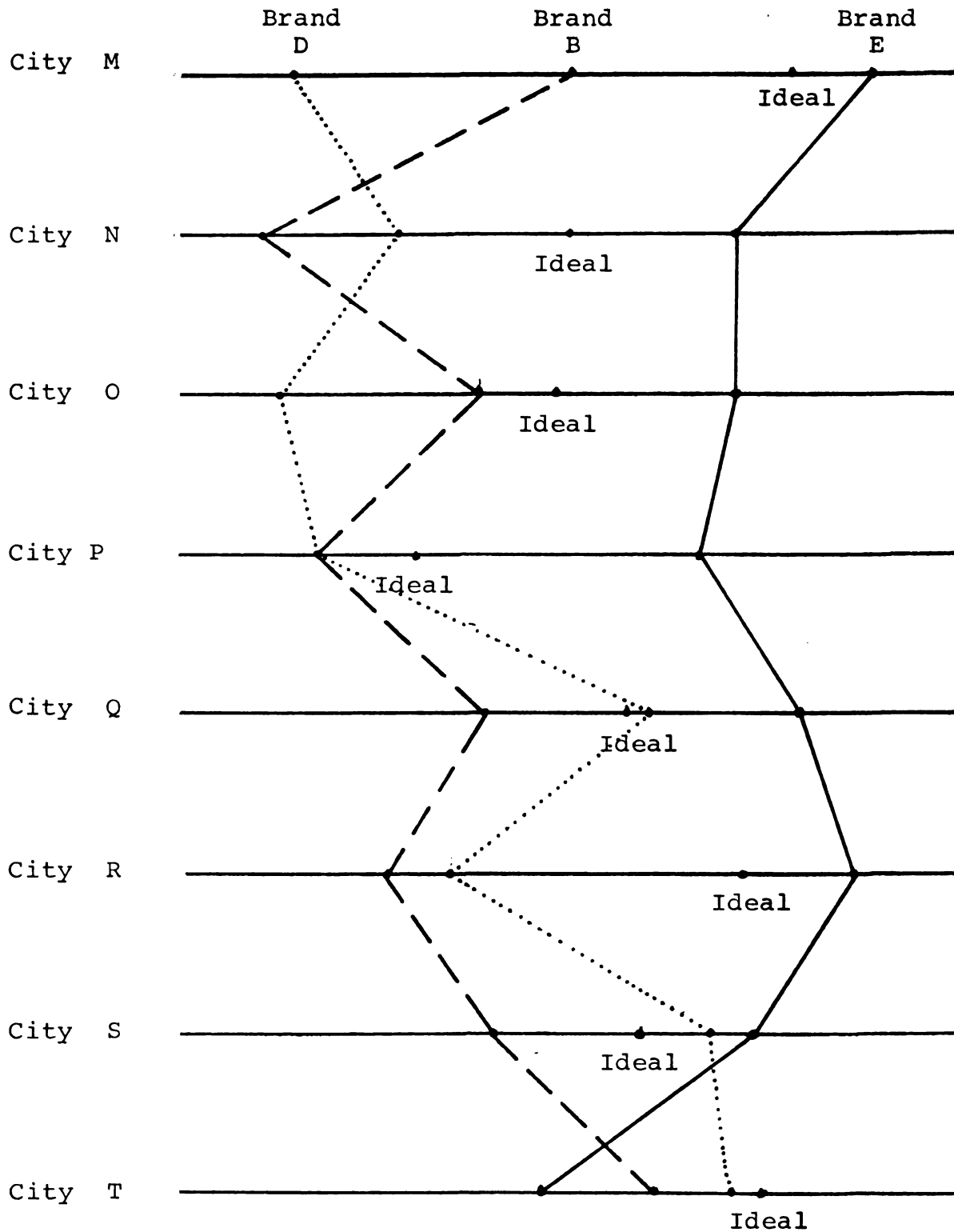
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Figure 7-12.--Selected Brand Means for the Attribute Density.

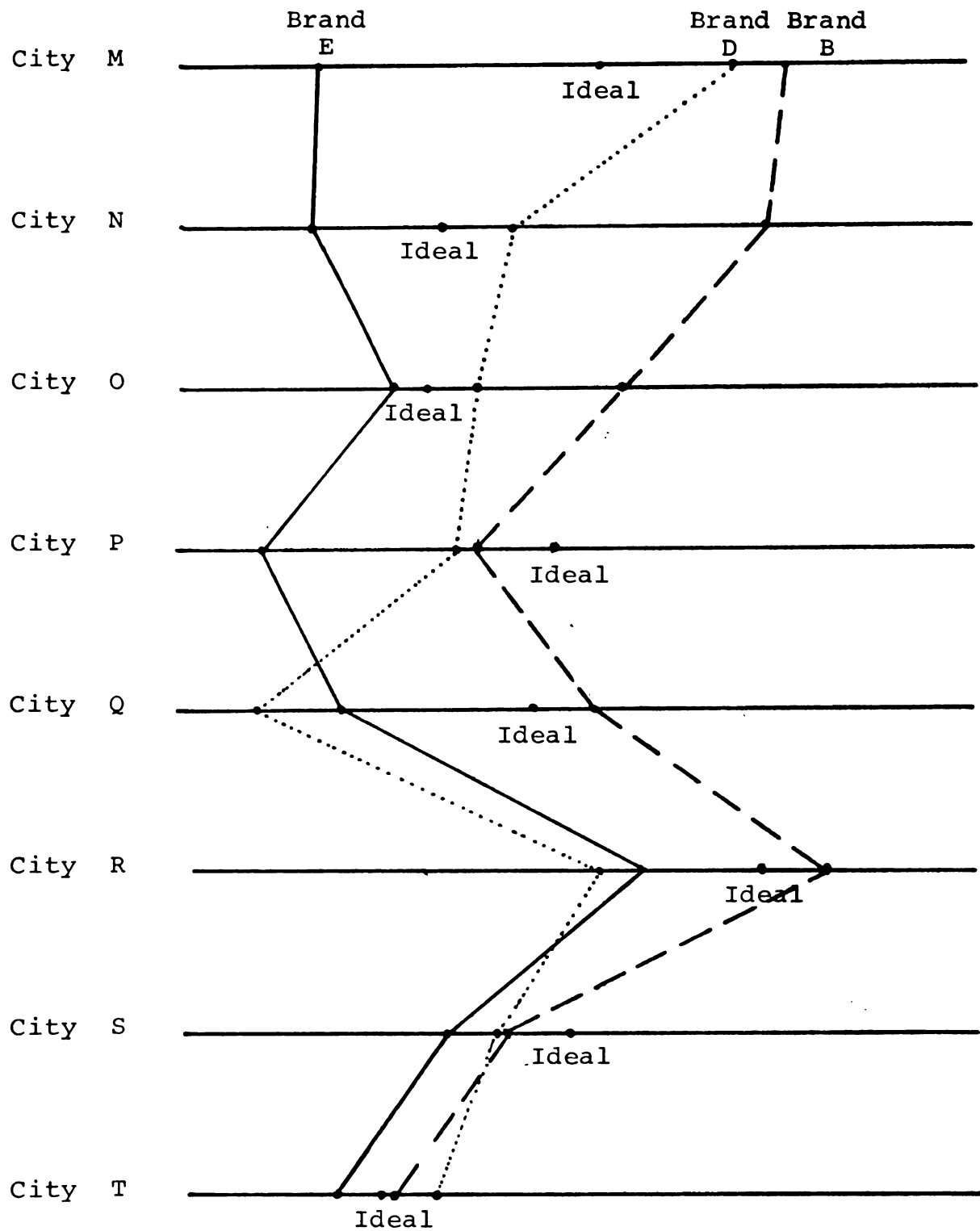
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Figure 7-13.--Selected Brand Means for the Attribute Healthfulness.

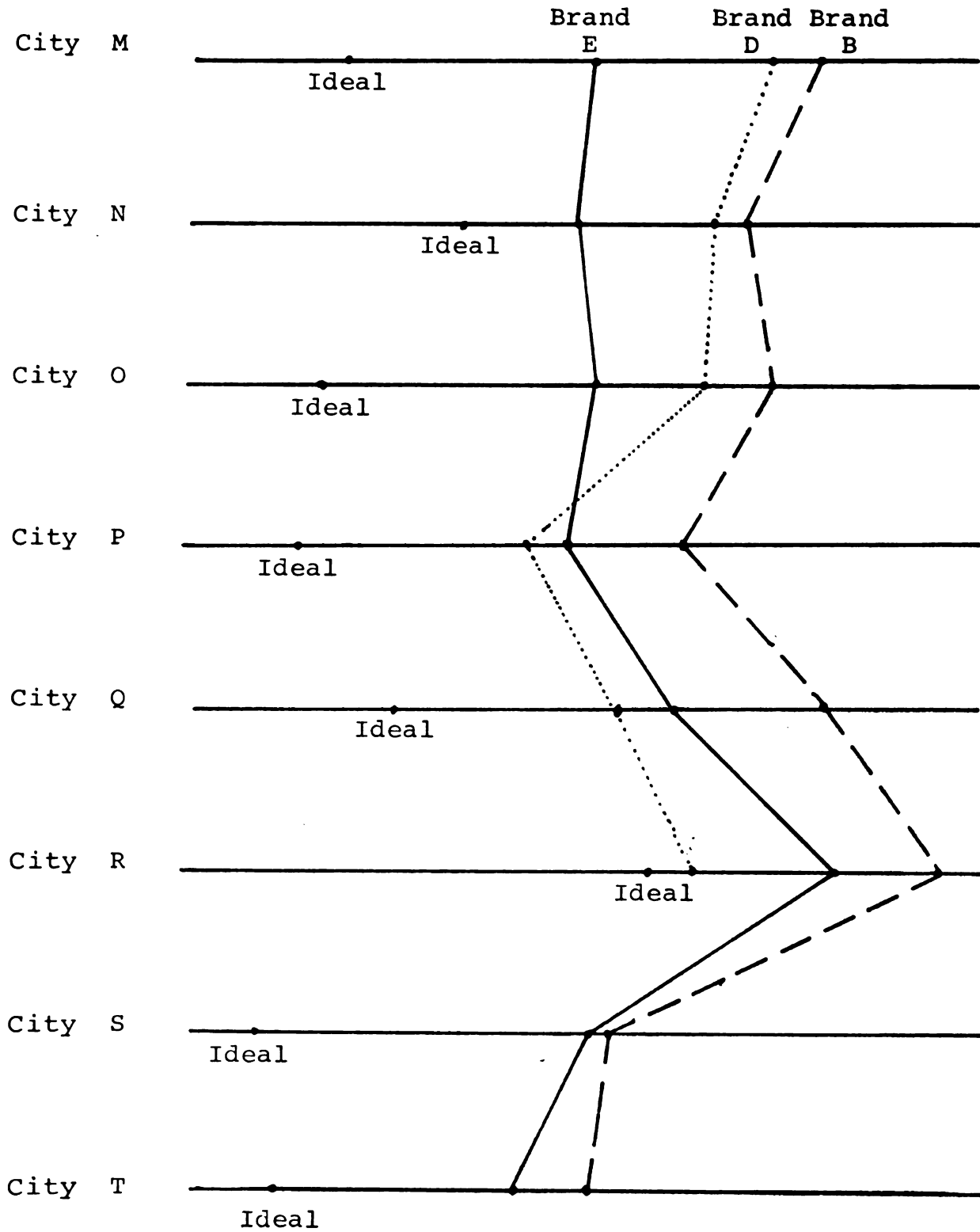
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Figure 7-14.--Selected Brand Means for the Attribute Mildness.

TABLE 7-10.--Brand Perception in Cities X, Y, W, and Z for the Attribute Sweetness.

Brand	City X	City Y	City W	City Z
A	0.75	0.83	0.67	0.51
B	0.63	1.17	0.86	0.51
C	0.51	1.33	1.33	0.44
D	0.05	1.02	0.59	0.25
E	0.26	0.03	-0.08	0.28
F	0.75	n.a.	n.a.	0.60
G	0.70	0.61	0.72	0.87
H	0.51	0.96	0.37	0.51
I	0.41	1.08	0.49	0.82

TABLE 7-11.--Brand Perception in Cities X, Y, W, and Z for the Attribute Density.

Brand	City X	City Y	City W	City Z
A	-0.12	0.64	0.23	-0.17
B	0.56	0.70	0.54	0.97
C	0.50	0.19	-0.41	0.13
D	0.90	0.75	0.33	0.94
E	1.09	1.30	1.34	0.96
F	0.35	n.a.	n.a.	0.26
G	0.64	0.58	0.48	0.35
H	0.65	0.85	0.82	0.64
I	0.95	0.34	0.89	0.34

As can be observed, brand perception for each attribute is distinctly different in each of the cities. If measured through the same scales, however, these differences can be displayed, and differential budgets and themes could be assigned to attempt to change the way that consumers see those brands in each city.

Alternative Analytical Steps Used
for Validating Results

In order to obtain a better grasp of the results of this market segmentation research, several methods for analyzing data were attempted. One of these was the intercity comparison referred to previously, which indicates that the technique is providing consistent results. Another methodological change was that of obtaining parsimony in the factor analysis stage, where reductions were made to seven and then to five factors. A third modification was attempted when a three-dimensional structure was employed in the multiple discriminant analysis step. Data from the first three axes were used to obtain factor correlations and brands positions. Later, the same three were utilized for mapping consumer ideal ratings in the clustering procedure. A fourth step was that of including for analytical purposes the ten variables which had been measured. That is, the two attributes, "higher-priced" and "availability," which had been omitted

because they were considered exogenous factors which could be modified when management so desired, were included. A fifth and more conclusive step was conducted when management decided to make a marketing change in one of the current brands. An ex post facto survey was conducted in City X to measure the results of this change, and a second measure was available for the same city through the use of the same technique but at different time. Finally, as was mentioned previously, a sample of 960 retailers was taken in five cities to find out differential perception between this group and ultimate consumers.

In order to reinforce the results on brand and product attributes, several additional tests were conducted. In one of these a sample of 250 persons was taken in four cities. Four unbranded and different items of the same product were tested in order to learn whether consumers could tell the correct name of brands and, through open questions, to learn the attributes they were assigning to each brand. Another test was made through group interviewing. A trained psychologist conducted a conversation about the product, probing for a more universal meaning of the phrases which had been used for attribute or variable measurement.

A summary of the findings on each of the different steps is given in this section.

Parsimony to Seven Factors

Consumer data from City X were factor analyzed through the reduction of the original eight attributes to seven factors; the loss of information was equivalent to 8.3 percent. When the varimax routine was performed, it was found that the attribute density received high loadings in several factors, but it appeared mainly correlated to sweetness (-0.67) and to strength (-0.45). In other words, those two factors would become "dense but not sweet" and "strong but not dense." In the multiple discriminant routine the first two axes obtained 88.6 percent of the trace, against 88.8 percent, which had been extracted without parsimony, and the discriminating weight of density, associated with sweetness and strength, the weight increased to 63.8 percent, whereas in the previous case the weight had been 56.9 percent among the three of them.

Figure 7-15 presents the geometrical space which was formed through this parsimony, including factor correlations, brands, and cluster locations. It is interesting that this figure is very similar to that obtained without parsimony, but that it is inverted. If rotated (see Figure 7-16), it would appear that the original perceptual map and the one obtained through these methods would be the same. In Table 7-2 a cross tabulation

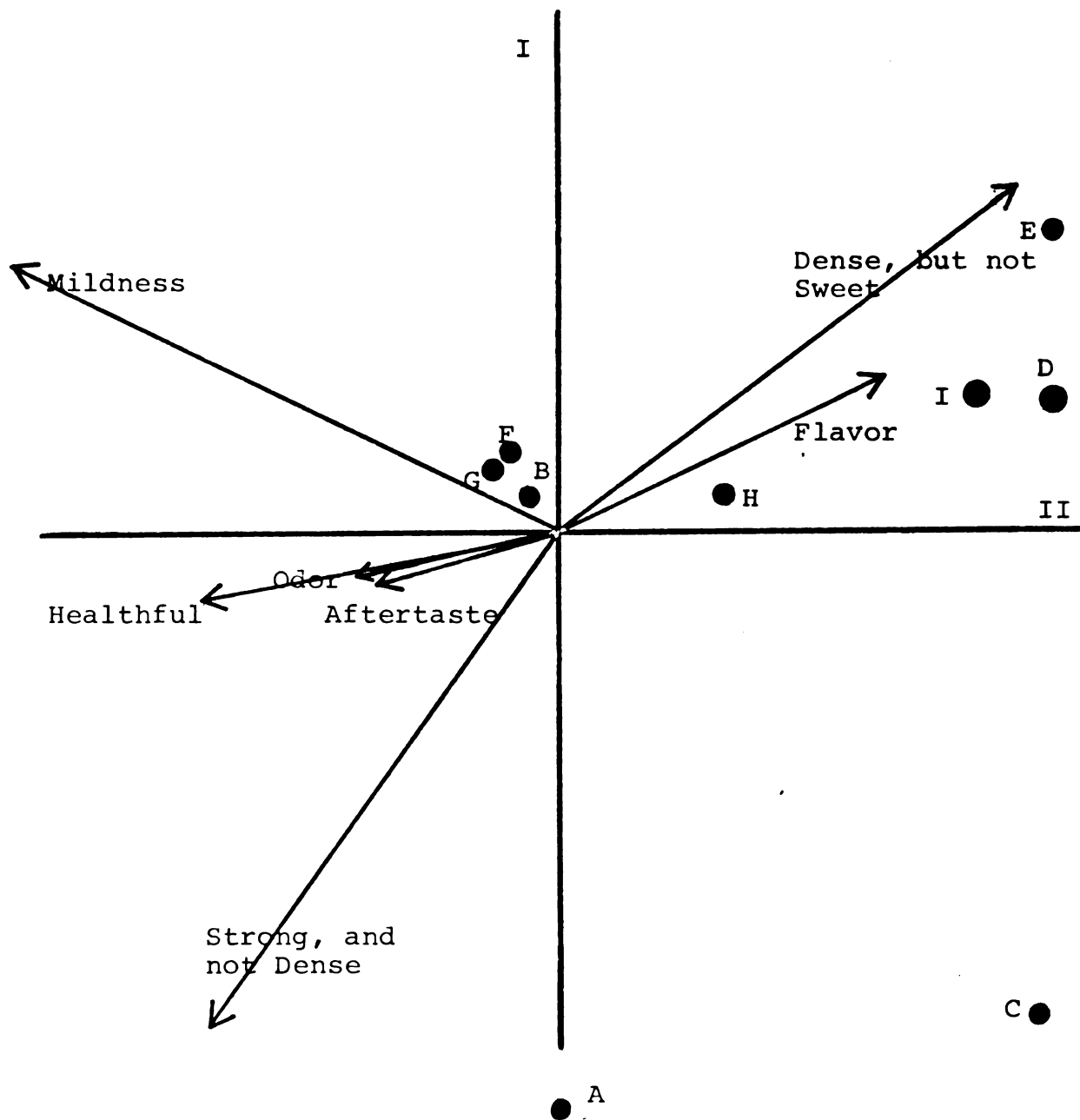


Figure 7-15.--Brand Position and Factor Correlations in City X. (Parsimony to Seven Factors).

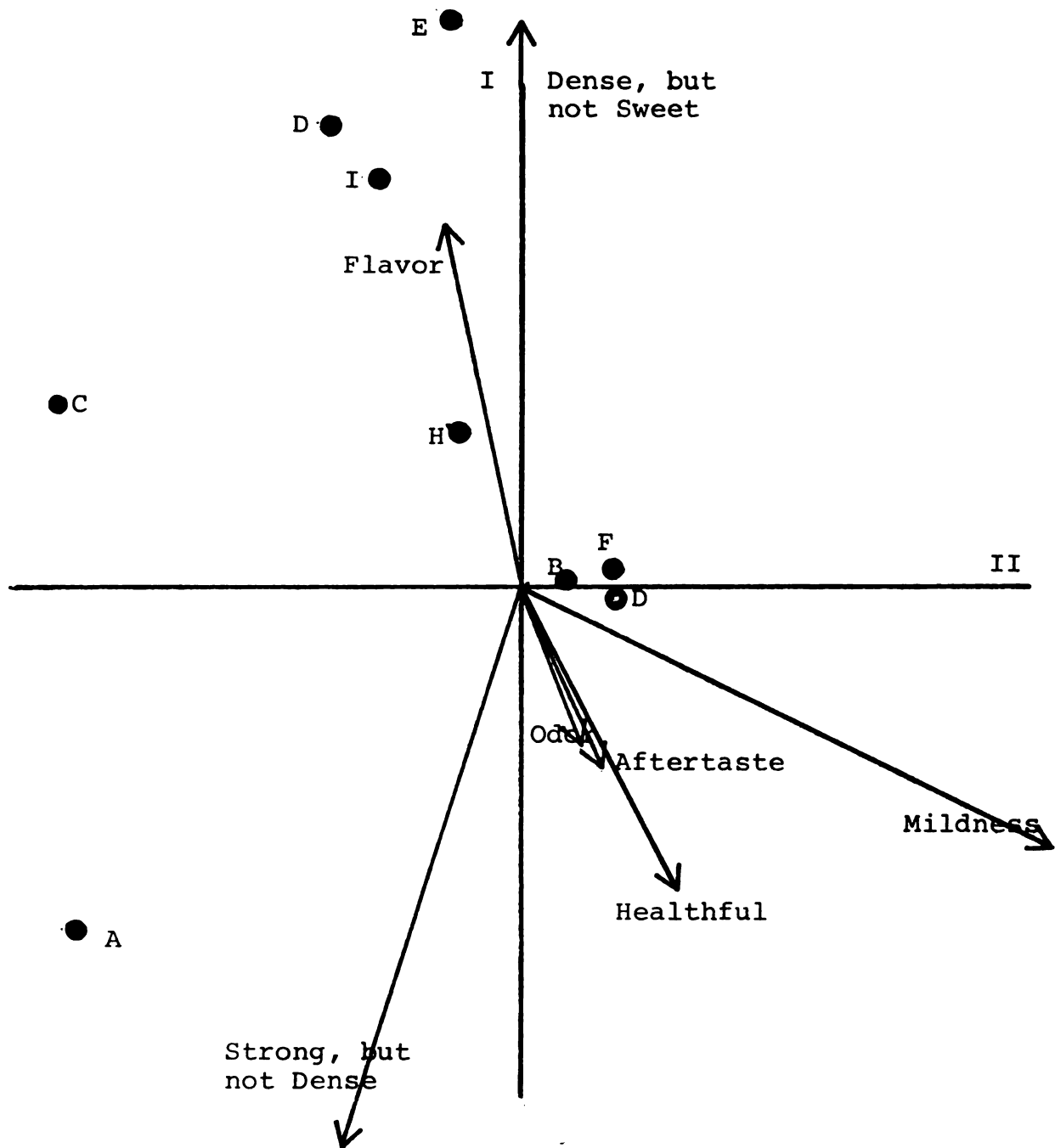


Figure 7-16.--Brand Position and Factor Correlations in City X. (Parsimony to Seven Factors). (Rotated Dimensions).

TABLE 7-12.--Comparison of Cluster Integration by Using Parsimony.

	Cluster Integrated with Parsimony to Seven Factors								Other	Total
	1	2	3	4	5	6	7	8		
1	207	0	0	0	0	16	0	0	28	251
2	0	32	1	0	0	1	0	0	6	40
3	0	4	119	14	6	4	0	0	5	152
4	0	0	5	31	0	0	0	0	8	44
5	0	5	33	0	1	76	28	0	0	143
6	6	0	2	0	141	0	2	11	10	172
7	3	0	0	0	0	63	2	0	5	73
8	25	0	0	0	13	1	6	0	5	50
Other	2	5	3	8	3	1	1	18	33	74
Total	243	46	163	53	164	162	39	29	100	999

is made contrasting cluster formation through the use of eight variables and through parsimony up to seven factors. The difference found between the two procedures is minimal.

Parsimony to Five Factors

In order to test the effect of obtaining parsimony in factor analysis, the same data which had been transformed into seven factors later was transformed into five factors. In this case 73.6 percent of the original variation of the data was retained through the principal component method; as in the previous case, some of the factors received high loadings for several attributes. Table 7-13 presents such loadings. As already known, factor one becomes "dense but not sweet" and "dense and not strong"; factor two is aftertaste and odor; factor three, healthfulness and strength; factor four, mildness; and factor five, flavor. As can be observed, it is difficult to interpret the factor when conducting parsimony, even after the varimax routine is performed.

In the multiple discriminant analysis, the first two axes traced climbed to 92.8 percent as contrasted to 88.6 percent in the previous case. The discriminant power of density remained the most important, 43 percent. In Figure 7-17, factor correlations, brand positions, and cluster locations are included for the purposes of

TABLE 7-13.--Rotated (Varimax) Factors for City X*. (Parsimony to Five Factors.)

Original Attribute	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Sweetness	-0.645	0.159	0.075	-0.422	-0.029
Mildness	0.008	0.072	-0.108	-0.919	-0.022
Aftertaste	-0.123	0.752	0.037	-0.171	0.073
Density	0.789	0.029	0.076	-0.173	0.190
Odor	0.047	0.835	-0.102	0.047	-0.043
Strength	-0.524	0.028	-0.549	-0.055	0.129
Flavor	0.125	0.025	0.022	0.028	0.970
Healthful	0.024	0.049	-0.897	-0.069	-0.076
Factor Name:	"Dense but neither sweet nor strong"	"Odor and aftertaste"	"Healthful and strong" ***	"Mildness" ***	"Flavor"

*For an explanation see Figure 6-9.

***Indicates negative factor loading.

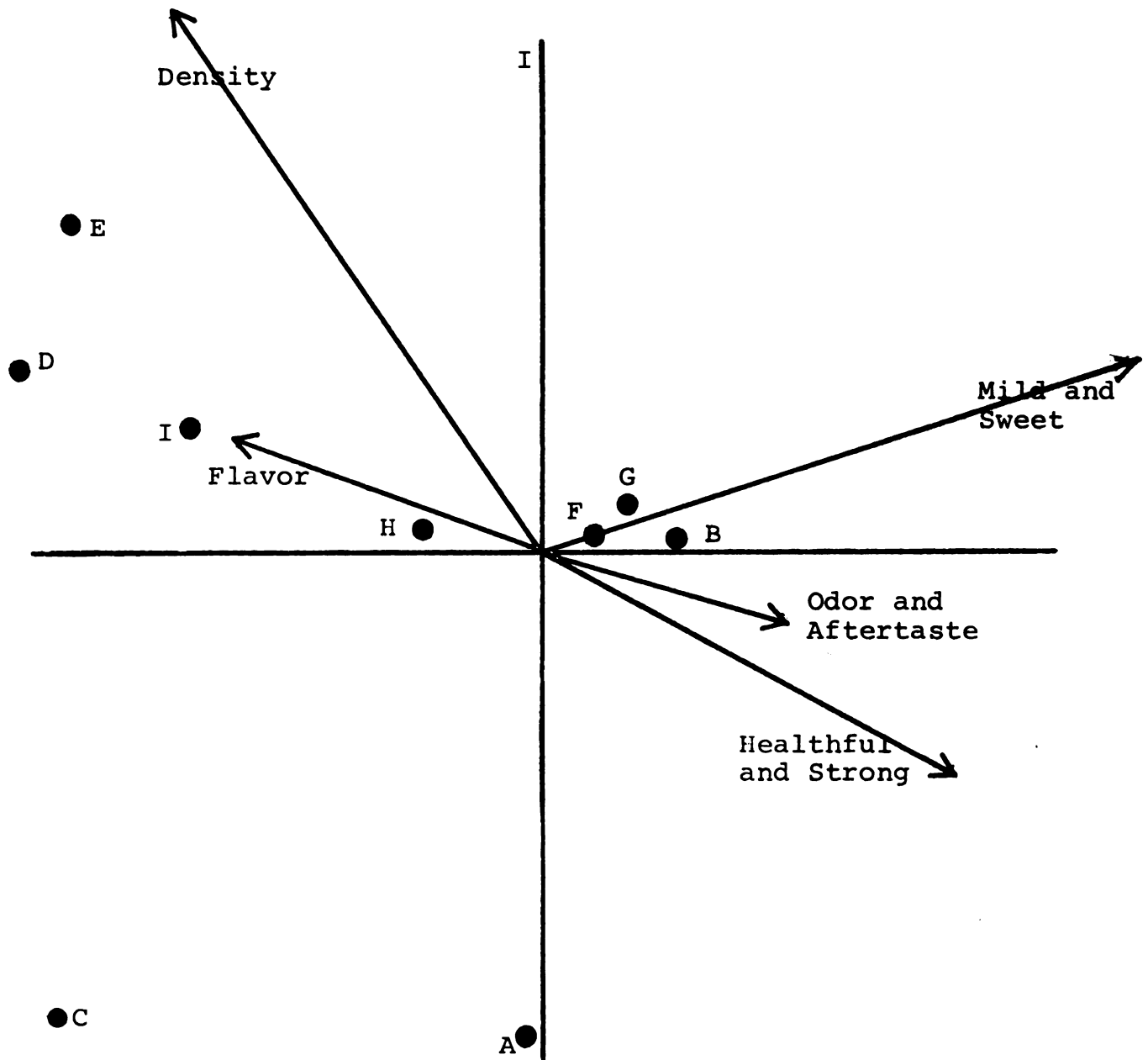


Figure 7-17.--Brand Position and Factor Correlations in City X. (Parsimony to Five Factors.)

contrast with Figures 7-16 and 6-8, which show similar numbers for the case of parsimony to seven factors and for no parsimony, respectively.

As can be seen, there is no significant difference in either of the three cases. Thus parsimony can be achieved in order to reduce the number of original attributes to a smaller number of factors, reducing in this manner the computation time for the rest of the programs without loss of significant information. Although in our case we included only eight attributes and parsimony would not reduce computer time significantly, in the case when more than ten original variables are used, this factor analysis technique was extremely important. It would be very time consuming, even with larger computer equipment, to handle in discriminant analysis, let us say, 100 original attributes. Furthermore, the routines performed with this technique are very helpful in eliminating redundancy among the original variables; those which are heavily intercorrelated will reduce to one factor. Through this approach it might be possible not only to shorten computer time, but also, and most important, to reduce questionnaire length and interviewing time; several of these attributes can be deleted without significantly affecting results and without increasing the probability of obtaining biased information due to more complicated field work.

Analyzing the Ten Original Product
and Brand Attributes

As was mentioned previously, for analytical purposes, two of the original ten attributes were not included. In this section, some of the relevant results obtained from the inclusion of these two variables, higher-priced and availability, will be summarized. inclusion of these two variables, higher-priced and availability, will be summarized.

It is obvious that the matrix of correlation coefficients will not vary in content, except for the new rows and columns derived from these two new variables. They were not closely associated with any of the previous attributes, as the largest coefficient was 0.18.

In order to have comparable results, no parsimony was requested. The results of the factor analytical routines were ten rotated factors, each one associated with only one original attribute. In the multiple discriminant analysis the first two axes explain only 75.8 percent of the discrimination among brands in contrast to the case of eight attributes, where 88.6 percent was accounted for in the first two axes. In this case, axis III includes an additional 14.6 percent of the discrimination. As more factors enter in a multiple discriminant analysis, the percentage explained by the first two axes decreases, thus

creating another reason for achieving parsimony in the factor analytical procedures.

By adding the higher-priced and availability variables, the discriminating power of each factor was modified, as is shown in Table 7-14. Similar to Table 6-13,

TABLE 7-14.--F-Ratios and Percentage of Discriminating Power of Each Factor in City X, Ten Attributes.*

Factor	F-Ratio	Disc. Power (%)
Flavor	7.32	3.4
Odor	2.47	1.2
Higher-Priced	54.47	25.6
Healthful	7.84	3.7
Mildness	19.99	9.4
Availability	55.67	26.2
Strength	22.81	10.7
Aftertaste	4.13	1.9
Sweetness	11.33	5.3
Density	26.67	12.6

*For an explanation see Figure 6-13.

Table 7-14 presents the F-ratios and percentage of discriminating power of each factor for the same city in which all analyses were performed, City X. It is very interesting

to notice that the two new factors account for 25.6 and 26.2 percent of the discriminating power among brands, thus becoming the most important. However, the rest of the factors remain in the same order as they had been in the previous analysis, that is, density, strength, and mildness are important, and odor and aftertaste are almost irrelevant for discriminating purposes.

Factor correlations, brand positions, and cluster locations, as derived from this analysis are plotted in Figure 7-18. For comparative purposes, the reader is advised to refer to Figure 6-8, which was obtained through the use of only eight factors.

We think that both analyses are necessary for arriving at correct information for decision-making purposes. The first analysis, of eight variables, will inform management about perceived intrinsic and/or subjective product characteristics; the second, using the ten original variables, will more nearly accord with actual market preference and share. As it was explained, the two "new" factors account for 51.8 percent of total discrimination among brands. In addition, simulating new brand positions in the perceptual space would produce results similar to those obtained before if price and availability also are changed. If not done, and if only one of the other attributes is modified, an analysis of the ten

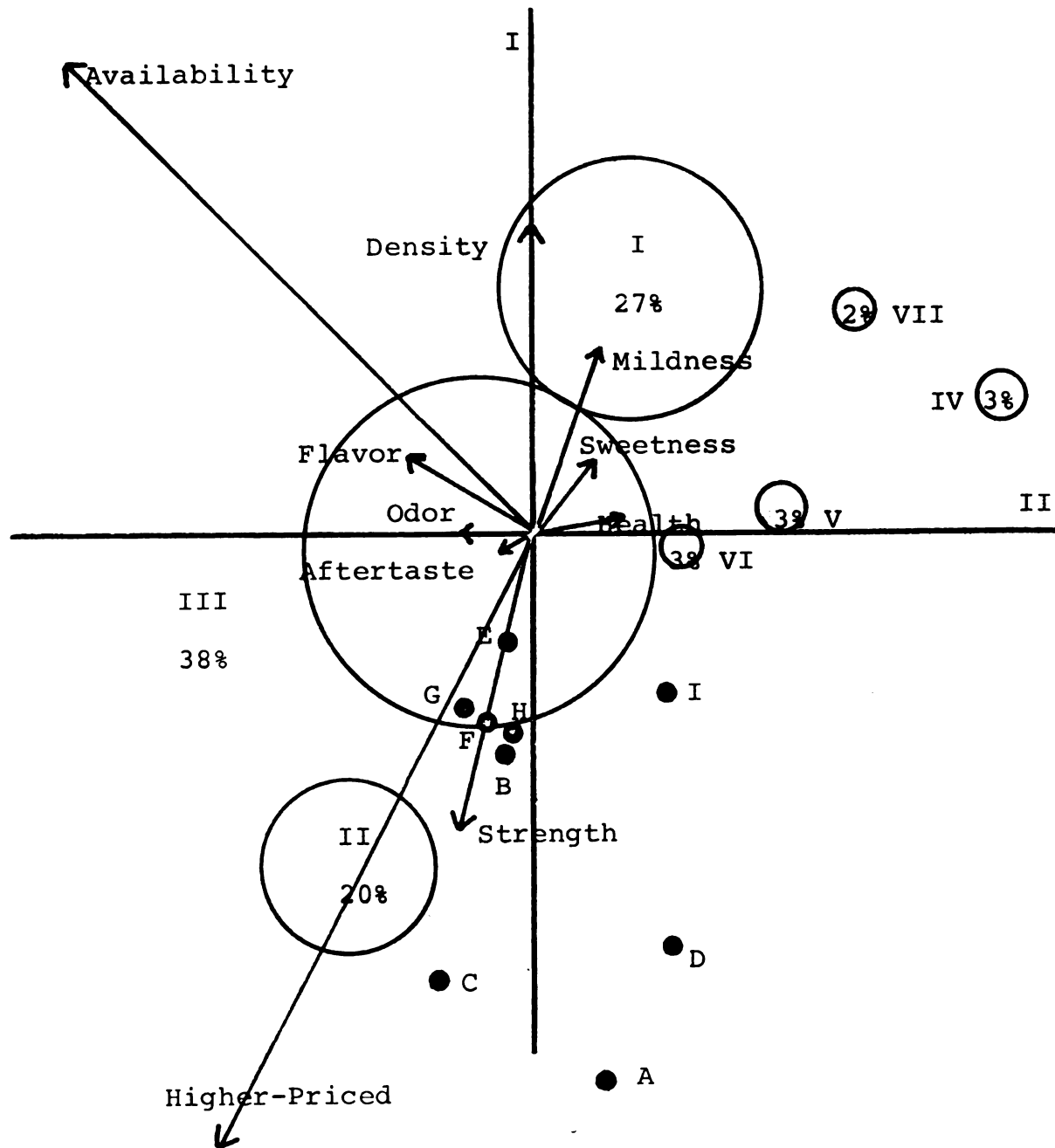


Figure 7-18.--Perceptual Map in City X by the Use of the Ten Original Attributes. (Rotated Dimensions.)

relevant variables would indicate not only the new and changed position of a brand, but also an estimate of its new brand preference or market share.

Comparative Results from a Three-Dimensional Analysis

In some cases it was found that the third axis explained an important part of the total discrimination among brands. Therefore, it was decided to test whether its addition significantly would modify the previous results. For this purpose, the multiple discriminant analysis output was altered to include this third dimension for brand positioning and factor correlation. Later, as the cluster routines also were modified, the third dimension was used in cluster location on the perceptual map. Since third-dimension presentation is not easily performed, all the results, using that dimension, were reduced to two axes.

In Figure 7-19, a composite picture of these results is presented along the geometrical space developed through the use of two dimensions. As can be observed from the dotted circles representing clusters for the two-dimension formation, there is not much difference in the results. It might be concluded, therefore, that two- or three-dimensionality can be used since final decisions would not differ significantly in either case;

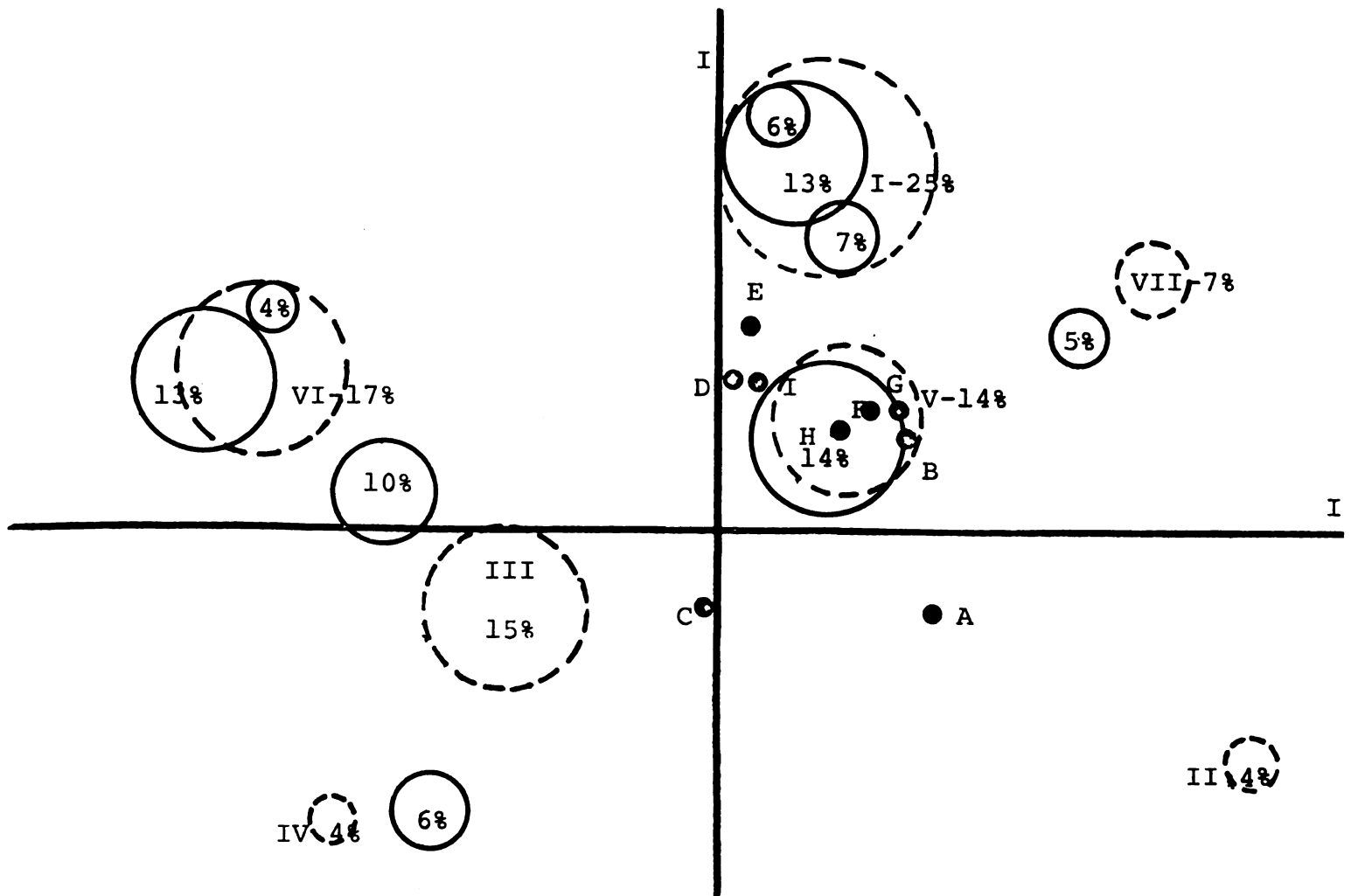


Figure 7-19.--Comparison between Cluster Integration by Use of a Two- and Three-Dimension Procedure.

in this instance two dimensions explain an important portion of the discrimination (over 75 percent). When the proportion is lower than this number, it might be advisable to include a third dimension. However, data should be presented in a two-axis geometrical space in order to gain discriminating power when integrating clusters by the use of this additional information.

Ex Post Facto Test in City X

When management analyzed the results of the project of market segmentation by consumer perception, the firm's decision makers introduced a change in the marketing attributes of their brand. An ex post facto survey was conducted, and 658 respondents were interviewed with the same questionnaire. The same analytical techniques were used in processing the data. Some of the most important comparative results are included here in order to present an additional validation of this measurement system.

Table 7-15 contrasts consumer perceived attributes of the ideal brand resulting from the January, 1972, study and the one made 18 months later.

A goodness of fit test through chi-square analysis shows that χ^2 equals 0.186, which is lower than the number of the χ^2 table. This means that there is no statistically significant difference between the two tests conducted 18

TABLE 7-15.--Ideal Brand Perception in City X. A
Comparison of Two Different Survey
Dates.

Attribute	First Test	Second Test
Sweetness	0.58	0.37
Mildness	0.35	0.19
Higher-Priced	-0.95	-0.93
Availability	1.46	1.62
Aftertaste	0.71	0.56
Density	0.77	0.87
Odor	0.46	0.30
Strength	-0.80	-0.96
Flavor	0.99	0.99
Healthful	1.51	1.60

months apart. However, as can be observed in Table 7-15, there are very small changes among the rated attributes. The larger changes in the variables that show lower discriminating power among brands are shown in Table 7-16 for the ex post facto test in City X.

By contrasting these figures with those shown in Table 6-13, it is interesting to note that the same factors remain the most important ones (mildness, density, and strength), and the least important remain the same (odor and aftertaste). Figure 7-2.0 shows the perceptual map of

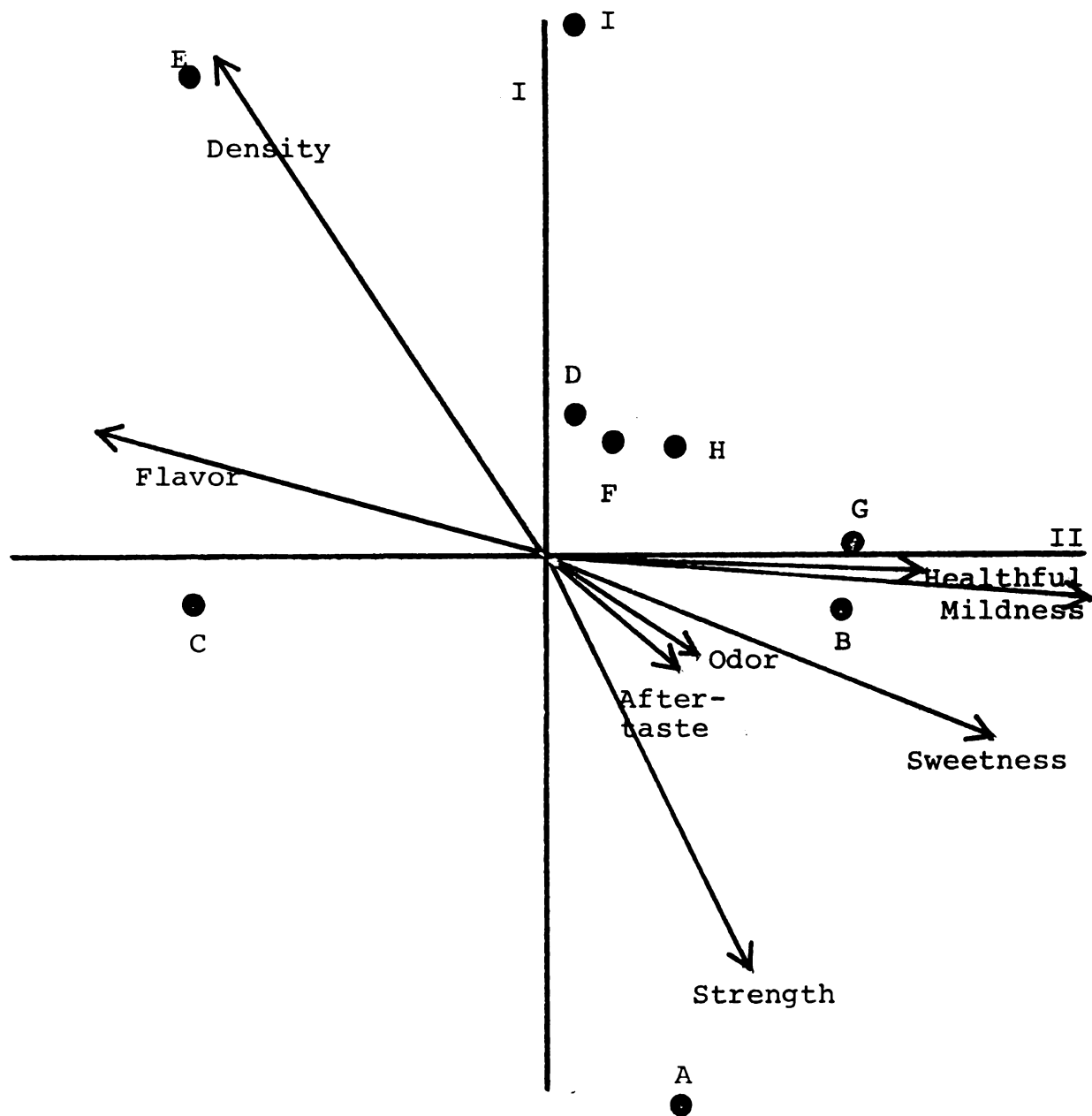


Figure 7-20.--Brand Position and Factor Correlation in City X. (Ex Post Facto Sample).

TABLE 7-17.--Percentage of Discriminating Power of Each
Factor in the Ex Post Facto Test
in City X.

Factor	Discriminating Power (%)
Flavor	12.8
Odor	2.7
Healthful	8.4
Mildness	17.1
Density	26.4
Aftertaste	4.2
Sweetness	13.9
Strength	14.5

City X in the ex post facto survey. If contrasted to Figure 6-8, comparison would reinforce the conclusion that there was no difference in perception over the 18-month period. Some of the brands, due to changes in their communication strategy, did change their position in this geometrical space, which is to be expected. The important point is that consumers did not change their preferences, only their perceptions about brands in this market.

Retailers' Perception

As noted previously, a study was conducted in five cities, among 960 retailers, who were considered as

ultimate consumers. Results were used to conduct public relations campaigns among them in order to increase positively their perception toward specific brands. These results also were very useful for validating consumers' responses, and X^2 analyses were conducted for every type of retailer against specific market segments. This was done in order to learn which differences in perception it was most important to change for specific brands.

Contrasting Segmentation Approaches

One of the aims of this study was to contrast traditional segmentation analysis with the structuring of market clusters through consumer perception. Therefore, cross tabulation analysis was performed among these clusters, and groupings were made according to ideal brand and existing brand attributes.

For presentation purposes, Figure 7-21 presents a univariate comparison to show how the different demographic market segments perceived attributes M_1 and M_2 in relation to how much discriminating power is achieved if clusters are integrated through our approach. As can be observed, the three selected demographic segments-- socio-economic strata, age groups, and consumption levels-- perceive these two attributes very similarly in contrast to the differential perception achieved through the nondemographic clusters. This type of analysis was extended to

In Complete
Disagreement

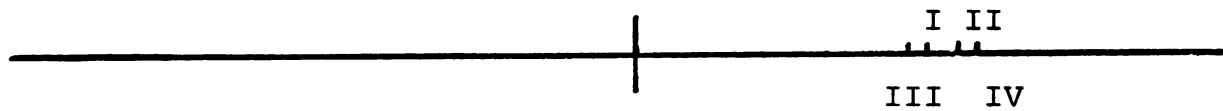
Indifferent

In Complete
Agreement

"Socio-Economic Strata"



"Age Groups"



"Consumption Levels"



"Clusters Formed by
Consumer Perception"

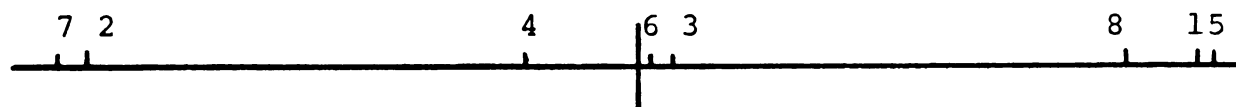


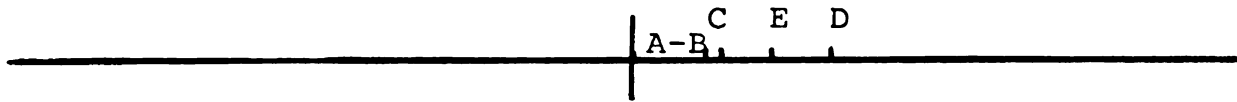
Figure 7-21.--Perception of Attribute M_1 Along the
Different Market Segments¹ in City X.

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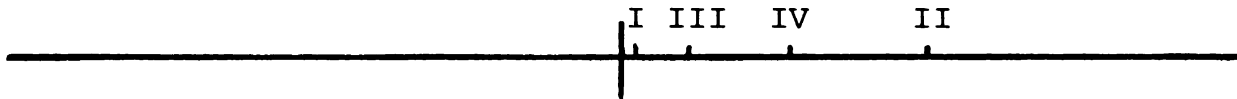
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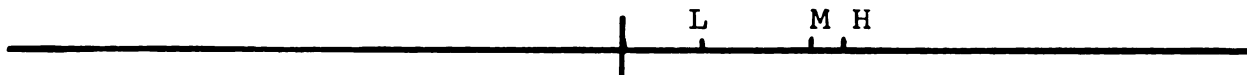
"Socio-Economic Strata"



"Age Groups"



"Consumption Levels"



"Clusters Formed by
Consumer Perception"



Figure 7-22.--Perception of Attribute M_2 Along the
Different Market Segments in City X.

every city. The conclusion was reached that, for brand positioning purposes, it seems advisable not to rely on demographics, at least for this type of product. Consumer perception does not run according to traditional segments. However, if consumer perception is measured, better information for marketing planning and strategy can be obtained.

CHAPTER VIII

EVALUATIONS AND CONCLUSIONS

Marketing as a business philosophy and as an academic field has found its basic foundation in the more economically advanced countries. There enterprises struggle to gain and maintain consumer acceptance as their basis for continuous growth. In the so-called developing nations, where the economic and socio-political environment permits the development of a free enterprise system, marketing has rapidly begun to develop among the larger local business firms and multinational corporations.

Marketing research, both as an academic subject and as an applied methodology, has evolved very quickly during the last six years. It has introduced techniques from the behavioral and quantitative fields, thus providing management with more decision-oriented information for marketing, planning, and strategy. A specific set of these newer techniques was used for this study, whose purpose was to develop research on market segmentation by consumer perception. The survey's findings positively can be described as decision oriented since management can gain more precise information from them to guide their marketing actions.

Among the several objectives that led to this particular research project, the main aim was that of examining the validity and application of newer technologies and concepts in a developing country, Mexico, and in a practical business case. The intent was to test the techniques in an environment where very few such efforts had been made before and where there are obstacles for the researcher. Furthermore, the testing was to occur in a situation where additional validations could be performed on the information received from the market.

Many conclusions have been described at each step of this study, and they will be summarized in this chapter. First, some general conclusions regarding marketing research and marketing philosophy in developing nations will be presented. A few thoughts related to the transfer and adaptation of technological advances also will be offered. Second, conclusions related to marketing segmentation by consumer perception will be noted. Third, the general findings of this study and a description of potential marketing activities as a product of those findings will be given. Finally, some of the main limitations of these techniques and a proposal for further research to overcome these will be suggested.

General Conclusions

Technology is not limited by national borders. It is transferable if it is adapted to local situations

and if it is designed to overcome practical limitations. If a country is to obtain a more rapid economic development, it must examine and validate newer technologies which become available through the current literature. When proven superior to actual practices, these must be implemented in an effort to reduce the economic gap between more and less advanced countries. Management myopia in the less developed regions will only contribute to keeping those countries in an underdeveloped state.

Newer technology in marketing research has become available. In contrast to that used a decade ago, which emphasized descriptive market surveys, it has become decision oriented. It has begun to measure consumer behavior quantitatively. The emergence of larger and faster computers and an interdisciplinary approach which has borrowed heavily from the behavioral and mathematical sciences has had two significant effects. It is possible to learn more about the ultimate consumer and to process larger amounts of data rapidly in order to generate useful information for strategic marketing planning.

The development and implementation of newer technologies is only possible when the business firm has acquired a consumer orientation, or a marketing conscience. That is, management must be interested in

how these human beings, the product's consumers, perceive the marketing actions of the business firm. The acquisition of this marketing philosophy by companies in less developed nations can be accelerated if marketing researchers place more emphasis on decision-oriented rather than descriptive projects.

It is the obligation of any researcher worthy of the name to survey available technology before searching for data through accustomed procedures. Better tools become available periodically which can generate information of a better quality for decision-making purposes. The assertion that "it cannot be applied here" is part of the management myopia that the researcher must eliminate through experimenting with new technology.

The implementation of the marketing concept, a task which can be facilitated by sound marketing information, will help business firms in less developed countries become more competitive, not only within the national borders, but also internationally, in the export market. Action in this latter area could serve to reverse an unfavorable balance of trade.

A model which considers multivariate effects on marketing results has been described in this study. Researchers should provide not only the data to feed it, but also the methodology for its effective use. Although

many limitations apparently stand in the way of researchers who desire to adopt these newer quantitative technologies for the measurement of market and consumer behavior in the developing countries, the researcher must understand that most of these are human limitations. Rather than as limitations, these conditions should be visualized by the researcher as opportunities for using his knowledge, innovativeness, and initiative.

If searched for, computers and computer programs are available almost everywhere. Programs even can be rewritten and adapted to the special characteristics of small computing units. If no secondary data can be obtained for a given project, there are methods which do not rely heavily on such information for obtaining and validating research results. If stratified random sampling, for example, cannot possibly be used to select respondents, random area samples can achieve similar results. If in some cases respondents would not provide all the desired data, unnecessary questions should be deleted. Sound questionnaires should be prepared and fully tested. Several questionnaires could be used in the same universe to obtain complete data. However, it has been our experience that sound practices in recruiting, selecting, training, and supervising interviewers pays off in terms of better field work

data. Researchers should understand that outlays for these activities should not be regarded as money wasted; these expenses are investments which will produce better results. The common practice of underpaying field workers as a means of cost reduction will only increase the probability of generating data of dubious quality.

Perhaps the most important limitation for the implementation of newer technologies in marketing research in developing countries is management's perception of such surveys. In this case the researcher must know his customer. If the researcher is marketing oriented, his position would be that of stressing the potential uses of his product, information, rather than one of "selling" methodology.

Care should be taken to avoid "overselling." Even the "overbuying" of potential results by business managers should be discouraged in order to reduce the risk of conducting "last" surveys for every client. The researcher must understand the limitations of his methodology and the basic assumptions about the data he is handling. Care should be exercised in interpreting them when providing information for decision-making purposes. New methodology should be experimented with before conducting full surveys. Tentative marketing decisions based on this information should be tested in areas other than the national market or with brands

other than the leading brand of a company until satisfactory results are obtained. Although more time consuming, this "scientific" methodology will help the researcher overcome management's apparent lack of receptivity.

Market Segmentation by Consumer Perception

Concurrent with the adoption of the marketing concept by a business firm should be management's awareness of market segmentation. Once the decision maker has observed his market, he discovers that some brands seem to sell well in several markets, but not in others. The several types of market segmentation studies are intended to provide management with empathy, that is, he should look at his brand from the consumer's point of view. The studies also are meant to develop a basis for building up a marketing strategy.

Most of the traditional bases for market segmentation--geographical, demographic, socio-economic or psychographic--although very useful for describing market behavior, fail to provide management with useful information regarding differential consumer perception. Through traditional methods, consumer behavior--past, present or expected--can be analyzed, but no indication is given as to what actions the firm must engage in to promote their product.

In contrast, if the market is segmented through the use of a methodology similar to the one presented in this study, the decision maker learns which are the relevant variables, or brand attributes, that need to be modified, physically or perceptually. He also learns what power they have in altering present brand position in the important market clusters formed by combining consumers' perceived product wants. Each segment is characterized by a common desire for specific product attributes, and members of each cluster have provided information as to how well they perceive each brand satisfies those wants. The decision maker thus knows what he must do in order to cater to selected market segments. He may alter the marketing mix of one or several of his brands within that product category.

Segmenting markets by consumer perceptions is a positivistic, pragmatic, and realistic approach. It attempts to describe how the consumer behaves and what he wants from a product. It does not assume normative criteria about what he should want or about how he should behave if positioned within a given market segment. This method is oriented toward a specific product or brand as opposed to adjusting a priori market classifications which might or might not be appropriate to the given marketing problem. Furthermore, it does not assume preassigned weights for any of the variables

under study. It is a multidimensional approach to consumer attribute perception; several variables interact simultaneously, but heterogeneously, on consumer behavior.

In contrast to its forerunner, motivation research, the new approach is quantitative, and its results are less dependent on the researcher's subjectivity. If the same procedure is used to analyze the same data, the same output will be obtained. In addition, the same approach can be used to survey different markets, or the same market at a later date, as was done in this study, and comparable results will be obtained. Finally, simpler field work is required. The task of assigning weights to attributes is removed from the field work stage and is passed on to the computer. Several of the techniques used in this study are noted below. Two stage area sampling was used in order to obtain a random sampling of the population to ensure generalization. Likert type scaling techniques were employed instead of semantic differential ones since the former simplified field work. Field work was conducted through personal interviewing. Blindfold product testing was adopted in order to arrive at some of the relevant product attributes to be measured. Group interviews sought to obtain common usage correlates for the measured attributes. Analysis of variance was

applied in order to determine significant differences among brands in their perceived attributes.

In the data analysis stage factor analysis was used to reduce dimensionality of attributes by transforming them into orthogonal and uncorrelated factors. Multiple discriminant analysis was employed to learn the discriminating power of each factor and to construct a geometrical space or perceptual map. This latter, defined by factor correlations, was used to position brands as they were distinctly perceived by consumers. Later, cluster analysis grouped consumers together from the perceptual map on the basis of which attributes they had perceived as positive in the ideal brand. Chi-square analysis also was used to determine differences among cities on product or brand perception. Chi-square analysis was useful later when attempting to obtain clusters of cities on the basis of common perception in order to determine representative areas for market experimentation.

Similar surveys conducted in 30 cities using a sample of retailers and in a given city after the brand's physical contents had been modified produced comparable and reliable results. Furthermore, alternative assumptions about the data were made, and the final results were similar. All of these steps led us to conclude that this technology is relevant, valid,

and adaptable for measuring consumer perception in developing countries, not only in the product category, in which it has been tested, but also in many others if adequate research is conducted.

Potential Uses of These Research Findings

Although the purpose of this study was to validate the technique of market segmentation by consumer perception, it may be useful to present some ideas as to what marketing decision makers can do with the findings of this type of research.

First, let us consider the idea of brand positioning. A multi-brand company can learn the perceived position of its brands. If all are clustered together, the firm may change its marketing mix to separate and guide products to the most important market clusters.

Second, knowledge of what the consumer in a given market cluster expects from products enables development of a program for new brand(s) aimed at unsatisfied wants.

Third, management must learn the weight of each attribute before attempting to modify brand positioning. Through market segmentation of the type shown herein the firm knows which product characteristics it should attempt to change in a given brand in order to cater to a specific market segment.

Fourth, an alternative route for increasing sales could be to attempt to alter consumer perceptions. Through the research we describe, management knows how the brand is perceived in the market clusters, and it also knows what each segment wants from this product line. A firm's advertising campaign might be designed to change desired product characteristics, or, in other words, to educate the consumer by telling him what he should be looking for in a product. Although this seems to be a more product-oriented tactic, and although it might be harder to achieve than those previously described, in some cases it is an advisable course to follow.

Fifth, results from studies of this type can be used as a basis for advertising experiments, related either to themes, copy, or even budgeting. With a before market measurement available for a given city, changes in advertising strategy can be attempted there. An after measurement could tell how product or brand perception or position had been affected. If advertising costs are introduced into the experiment, it might be possible to learn how much a unit change in perception of an attribute costs, and how it affects other variables (since we are dealing with a multivariate technique of market measurement).

Sixth, a measure of competitive market advancement can be achieved in the same way that a brand is measured. Competitive brands' advertising themes can be researched as to the effects they are producing in consumer perception.

Seventh, as a measurement is available for every city, each one of the strategies described above can be conducted experimentally in one of them. The rest can be used as control groups. Furthermore, an ²X analysis can be conducted to learn which cities exhibit common perception in order to select one of them for experimentation purposes. Cities showing common product perception could be clustered for strategic marketing planning purposes. Efforts need not be limited to differential advertising strategies, but could include radical differences in marketing mix, distribution methods, sales organization, pricing and even special brands for those clustered cities which might or might not follow geographical patterns.

Finally, a continuous panel type study has been suggested in this type of research. Such an effort might determine how the market is changing for a given product category, either in intercity comparisons or through time.

Additional Research to be Conducted
in the Future

It can be said that through this study a more complete knowledge of the consumer has been gained, that management has been provided with useful tools for decision making, and that several validating steps have confirmed the results obtained. Nevertheless, it is our belief that more research along these same lines is necessary not only to increase our knowledge of consumers, but also to provide even better marketing information.

There were several important limitations to the methodology which was chosen; through research, several of these could be overcome. First, consumers were rating attributes on a priori selected variables and were questioned with specific phrases. This procedure might produce biased answers if respondents' personal interpretations differ. More depthful questioning procedures, conducted on a limited scale among some of the respondents, might aid in verifying the truth of this possibility. Furthermore, through a similar group interviewing technique, such as the one implemented at the end of this study, greater confirmation could be obtained.

Second, if care is not taken in selecting the attributes to be measured, some significant

ones in discriminating among current brands might be omitted. If this type of extrinsic testing is not included in the methodology, it might well happen that several years later some of the attributes would lose their importance, whereas others, not included in the process, might gain importance in brand discrimination. An example of this point is the use of color in advertising. If a brand is the first to use a given color, let us say red, it might capture the attention of the viewers, but when more products began to use the same color, it might lose its importance.

Third, respondents might not have the same knowledge of all brands. If asked about some of them, their answers might be simply guesses. The interviewer must make sure that the respondent, although he may not have tried it, knows about a specific brand and has opinions about it. Furthermore, one of the important methodological assumptions is that respondents are able to imagine an ideal brand and that it can be rated along the selected attributes. In this respect, extrinsic group interviewing is very helpful; consumers openly say which product attributes that they would like to see modified to produce a product better suited to their specific wants.

Fourth, research is necessary in the analytical stage to test data through some of the available and

newer computer programs, mainly the fully nonmetric procedures. This would confirm our previous ideas that the ones we used provided a close approximation to reality. In the factor analysis step, a varimax routine was used, but alternative rotating procedures are available; quartimax, equimax, or oblique rotation each would make different assumptions about the data. In the clustering stage it might be advisable to use alternative clustering techniques in larger computers in order to test if the one selected for this study provides acceptable market segments.

Fifth, it is our belief that, in order to improve the communication necessary to modify consumer perceptions, advertising media research in the various segments should be conducted. This would reduce the risk of ineffective and inefficient advertising campaigns. At any rate, as was previously suggested, management always could use the results of this procedure to conduct experimental campaigns and to pretest advertising in selected cities and among target clusters.

Finally, it seems pertinent to point out that unidimensional attitudes or roles in the research procedure, such as overspecialization of researchers and analysts, might be very strong limitations to furthering the implementation of multivariate analysis in marketing. It is difficult for a line executive to

fully understand the methodology involved. As a result, he might underestimate findings if contrary to his previous market belief, thus fostering the use of more traditional, or easy to understand and evaluate, methods of research.

As the younger generation of researchers is the one that can apply this newer methodology most readily, the older generation, which usually heads research organizations, might undervalue the methodology for strictly nontechnical reasons.

However, the use of quantitative methodology and computers will not automatically produce better information. Quantitative-oriented researchers, especially those with little experience in data gathering and who are overspecialized in methodology, might be asking too much from what, in their eyes, seems very easy to obtain--consumer data. When analyzing a problem from one's own desk, it is very easy to forget the basic principle of electronic data processing, which can be applied usefully to marketing research: "Garbage in--Garbage out."

The use of newer techniques and methodologies, it is our belief, will foster the role of marketing researchers within business firms. Its implementation in companies in the developing countries will assist them in reducing the gap between themselves and the more economically advanced nations.

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