
Market segmentation

A search for the Holy Grail?

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Introduction

Since Smith's (1956) introduction of market segmentation, marketing practitioners and academics have adopted the concept enthusiastically, and standard marketing texts now include at least a chapter describing segmentation and the benefits it will bring to marketers who adopt the technique. These benefits seem appealing: a full understanding of a market; the ability to predict behaviour accurately; and an increased likelihood of detecting and exploiting new market opportunities (Kotler, 1988).

Claims such as this have led to a widespread endorsement of segmentation as an important marketing tool, but they have not been accompanied by critical scrutiny of either the techniques used to segment data sets, or the problems of interpreting the solutions. Even when actions based on segmentation have failed, marketers often do not acknowledge that the underlying research may be wanting, but instead attribute the lack of success to other factors. For example, Andrew (1986) states:

Barclays' "Getting Married Scheme" was a clear case of a bank identifying a specific segment and attempting to match product benefits to consumer needs. The product that was finally developed was perhaps not sufficiently innovative to succeed, but clearly demonstrated a segmented approach to the market (p. 2).

While it is sometimes logically obvious to direct marketing activities to particular groups (for example, vendors of yacht fittings would appear to increase their chances of making sales if they target yacht owners rather than teenage females), many segmentation studies go beyond these clearly rational judgements. By segmentation, we refer to the process by which marketers "understand" a market, having collected and then analysed several variables using sophisticated multi-variate techniques. Using this understanding, they divide a market into distinct groups in the belief that developing different offerings for some or all of these groups will increase profitability.

However, segmentation can only be useful to marketers if it enables them to choose between different options; for example, if it allows them to determine which actions would attract or retain customers, or if it enables them to decide which additional products or services they could introduce profitably. Given that marketers aim to change, reinforce or initiate behaviour patterns (Bass *et al.*, 1968; Nord and Peter, 1980), segmentation must help them identify different

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response groups which have uniform and stable responses to a particular set of marketing variables, and which are capable of specific targeting through available promotional media and distribution outlets.

In this article we question the belief that segmentation leads inevitably to better decision making, and suggest that segmentation research is more arbitrary than robust, and rarely, if ever, results in an objective outcome. Although some authors (Wind, 1978; Young *et al.*, 1978; Yuspeh and Fein, 1982) have criticized aspects of segmentation, detailed synthesis of the problems does not exist. In this article we discuss the decisions researchers must make during segmentation analysis and the problems of interpreting the outcome, before drawing conclusions.

Data analysis

Base variables

The bases analysts use to segment markets have all received detailed attention in the marketing literature. These bases include: demographics (Blattberg *et al.*, 1976); psychographics (Alpert, 1972; Frank *et al.*, 1972; Pessemier *et al.*, 1967; Wells, 1975; Ziff, 1971; Zotti, 1985); benefits (Haley, 1968; Myers, 1976); usage (Twedt, 1964; Young *et al.*, 1978); lifestyle (Lazer, 1963; Plummer, 1974; Yankelovich, 1964); loyalty (Grover and Srinivasan, 1989); image (Evans, 1959; Sirgy, 1982); situation (Dickson, 1982); and socio-style (Cathelat and Wyss, 1989).

However, despite the varying popularity of these bases, and the ongoing generation of new variables, few guidelines as to the most appropriate base to use in a given marketing context exist. Thus, managers and researchers have no clear evidence available to them documenting empirically why one base should produce a superior outcome to another. The existence of inconclusive segmentation studies and the fact that managers have made poor decisions based on segmentation outcomes (Martin, 1986; Wind, 1978) suggest that important decisions ought to be guided by something more substantial than intuition or the vested interests of market research suppliers.

Although selection of a priori bases can guarantee within-segment similarity by ensuring, for example, that all segment members have similar ages or incomes, it does not necessarily mean segment members will respond uniformly to marketing stimuli. That is, consumers in the same age range may respond quite differently to a specific pricing strategy even though they have a similar reaction to a given promotional theme. Furthermore, the choice of an a priori base – such as demographics or psychographics – represents an implicit theory about marketing mix inputs and consumer response. It also tends to predetermine the type of result of any consequent empirical research and its recommendations (for example, if the base chosen is psychographics, it is almost certain that the outcome will be a focus on consumer attitudes and lifestyle, and an advertising positioning campaign).

Post hoc bases may have a closer affinity to patterns identified by the research, but do not necessarily generate internally consistent segments (Elrod and Winer, 1982).

Even if researchers can identify groups with similar attitudes or usage habits, members often vary demographically, making marketing decisions such as media buying difficult to action. Young *et al.* (1978) caution:

A common reason for [segmentation studies] lack of applicability is preoccupation with the techniques and method of segmentation... In too many instances marketing researchers have failed to analyse the marketing environment and competitive structure before applying their favourite methodological approach (p. 405).

Selecting the variables to express the base characteristics also involves subjective judgements. For example, researchers using benefits must decide which benefits to investigate and then establish a means of assessing their relative importance to respondents. Everitt (1974) cautions that this process may have a significant effect on the final outcome:

The initial choice of variables is itself a categorisation of the data which has no mathematical or statistical guidelines and which reflects the investigator's judgement of relevance for the purpose of the classification (p. 48).

Analysis method

Researchers have at their disposal a wide variety of techniques, such as various types of cluster analysis, factor analysis and discriminant analysis, with which to segment their data sets (see Beane and Ennis, 1987; Darden and Perreault, 1977; Frank and Strain, 1972; Green *et al.*, 1988; Rao and Winter, 1978, for a discussion of some of these). In practice, most commercial segmentation studies involve some form of cluster analysis; consequently our subsequent discussion concentrates on these methods. However, different clustering techniques may produce different solutions, and even the same technique may produce a different result for the same set of data because each technique requires substantial input from researchers at various stages (Dubes and Jain, 1976; Edelbrock, 1979; Esslemont and Ward, 1989; Funkhouser, 1983; Punj and Stewart, 1983). For example, in addition to deciding whether or not to transform or standardize the variables, analysts must select an algorithm and impose constraints on the extent of the data divisions (see Hoek and Esslemont, 1989, for a detailed discussion of these decisions).

While a large volume of literature asserting the advantages of one technique over others exists (see Acito and Jain, 1980; Assael and Roscoe, 1976; Tigert and Arnold, 1989, for example) researchers do not appear to have agreed on the most suitable technique to use in a given situation, thus providing little guidance to those undertaking segmentation studies.

Segment number and composition

Taking cluster analysis techniques as an example, typical segment diagrams imply that researchers have identified the optimal number segments. However,

these diagrams reflect subjective decisions based on a compromise between increased cluster homogeneity on the one hand and viable, accessible clusters on the other. That is, analysts must select a solution which gives them compact, widely separated segments. If the data really fell into such segments, this decision would be straightforward; however, this is rarely the case, and researchers must decide whether n segments are better than $n - 1$ or $n + 1$ segments.

Some help with this decision can be obtained, for example, examining how the ratio of between-group to within-group mean squares varies as the number of groups changes. A sharp increase in this F -ratio suggests that the new groups are more clearly distinct than the old. Unfortunately the allocation rules in most clustering algorithms use the F -ratio or some analogue of it, so it is not possible to use this as a test of the significance of the result (Alford, 1990).

In deciding how many segments to develop, researchers also implicitly decide how to allocate cases to segments. This decision raises some important questions, particularly with regard to outlying cases which have little in common with the central members of any segment, and so could be allocated to two or more groups. Programmes used in segmentation studies generally seek to minimize the within-group distances, and the decision to include outlying cases will increase these differences, thus altering a segment's position in the variable space and possibly resulting in a less accurate description of the group's characteristics. Researchers may create segments using only those cases that fall within certain boundaries, thus eliminating the problem that segments may run into each other (Beane and Ennis, 1987). However, in practice, this still requires a subjective decision which often results in a large number of unallocated cases.

Recent work designed to address this problem includes continuous segmentation (Rust, 1990; Wedel and Steenkamp, 1991) which produces a density map rather than a set of individual segments, thus acknowledging that segments may merge, and eliminating the need to categorize outliers. However, this method implicitly assumes that the areas of greatest density are similar to discrete segments, though these have fuzzy rather than clearly defined margins, and the other analytical problems described above still remain.

Solution validity

Despite the subjectivity of the decisions made when using cluster analysis to produce segmentation solutions, few researchers attempt to establish the validity of the outcomes they describe. Calantone and Sawyer (1978) suggest splitting data sets and analysing each half independently. They argue that if the same technique produces very similar solutions for both data sets, researchers can reasonably assume the segments to be real, rather than artefacts of the analysis. However, this procedure is no guarantee of a valid outcome, since cluster analysis run on the split halves of a set of randomly generated data may produce similar segments, when in fact there are no real segments.

Similarly, Klastorin (1983) proposes a method of testing whether segments generated by a particular technique differ significantly from randomly derived segments. Esslemont and Ward (1989) argue that researchers have grounds for claiming that the data contain real segments only if several different algorithms detect groups with similar positions and sizes. But, in practice, few researchers describe the results of these or other verification exercises.

This discussion identifies a number of decisions which researchers must make throughout the course of a segmentation study and which affect the final outcome. While there is no reason to suppose that researchers will necessarily make bad decisions, neither is there any guarantee that they will arrive at an optimal solution, nor one which is of significant benefit to their client. That is, identifying a base, selecting the variables to express this, choosing an analysis method and determining the number and composition of segments, all involve subjective decisions that may not be empirically verifiable.

Rather than identifying the one “true” outcome, a segmentation study will usually present only one of a range of unexplored possibilities. The fact that a variety of quite different outcomes is possible would not present so great a problem if researchers had criteria enabling them to select the most appropriate segmentation analysis approach and technique, and the best solution; however, a thorough search of the marketing literature has failed to locate such criteria. As a result, marketers using segmentation have no guarantee that they will be able to predict behaviour, or identify the outcomes that will maximize their profitability. The following unresolved, and largely unaddressed issues also suggest marketers should interpret the results of segmentation studies sceptically and cautiously.

Problems of interpretation

Stability over time

Even if segments were compact and widely separated, their stability over time remains questionable (Assael and Roscoe, 1976). As segmentation analyses usually involve one-off studies, rather than continuous data collection and analysis, marketers implicitly assume that segments remain stable, at least during the short to medium term. However, Calantone and Sawyer (1978), investigating the stability of benefit segments, found significant changes in benefit importance over time which greatly altered the original segments’ size and composition.

Yuspeh and Fein (1982) attempted to reclassify respondents to a benefit segmentation study two years after the original study was undertaken. Although limited by some methodological variations, their results provide cause for concern: only 40 per cent of the original “core” respondents were accurately reclassified, while only a third of those in key target segments were correctly reassigned. This suggests that the original study had not provided reliable long-term predictions of consumers’ behaviour.

Haley and Weingarden (1986) attempted to counter this argument by claiming that marketers direct their attention to groups, not individuals. But the objective of marketing is to influence and adapt consumers' behaviour, so changes in benefit importance, usage habits or attitudes should not be surprising. Indeed, it seems illogical to expect the size, composition and behaviour of market segments defined in these terms to remain constant. Thus, if a market is changing, original study data may not include currently, important and relevant variables.

As well as this issue of "real" changes in segments over time there is also the problem of apparent segment volatility which is an artefact of the data analysis technique used. This is a particular weakness of cluster analysis approaches when fresh samples are gathered, because the technique is not robust to small changes in the data due to sampling variances, or to the inclusion or deletion of some variables.

Where predictive segmentation models are developed (using multiway ANOVA or discriminant analysis, for example) the size of segments may still change when fresh samples are analysed, but less dramatically than is often the case with cluster analysis, and the main descriptors of the segments do not change.

However, regardless of the segmentation technique used, unless the segmentation base includes the variables that predict consumer behaviour (which in turn implies a prior study of the main predictors of behaviour), it would be surprising if segmentation studies were able to provide stable, reproducible segments. If the key predictors of behaviour are included in the base, then even if the size of segments changes over time, the nature of the segments, or their main "describing variables", should remain fairly constant.

Decision guidance

Many segmentation solutions are presented as neat, discrete circles of varying size positioned on a product or service map (Green, 1977). These diagrams imply that segments are compact and widely separated, and that their members share similar traits which also differentiate them from members of other segments. (This impression is often compounded by researchers who report the mean scores of segments, without standard deviations or any indication of the degree of segment overlap.) They also imply that knowledge of the market structure, as presented in the segment map, will aid decision making.

However, managers still need to interpret and act on this information; for example, they still need to select a particular segment or segments to target. If usage rate was the segmenting variable, marketers may face several possible options. They could opt to target heavy users, since they are already receptive to the product, or they may choose light users, in the belief that a good promotion campaign directed at them could significantly increase their usage rate. Nothing in the segmentation process itself indicates which of these is the best decision.

Nor does segmentation necessarily produce a viable outcome. Even assuming the segments identified were internally consistent and significantly different from each other, they may not prove practical if they are uneconomic to reach, well-served by competitors against whom the company has no real advantage, or too small to warrant the investment in time and capital.

Conclusions

Despite the widespread use of segmentation as an aid to decision making, the commonly used segmentation techniques involve a number of subjective decisions, and managers and researchers may not appreciate fully the extent to which these decisions affect the outcome. Although there will always be a subjective component in segmentation analysis techniques such as clustering or mapping, nevertheless, confidence in the reality of the segments identified would be increased if the solution could be shown to be robust.

Some researchers routinely split their data sets and analyse the two halves independently. This is a practice which we suggest should be more widespread, though it is not foolproof. Where this is not possible, we believe that researchers should test the sensitivity of their solutions to changes in the decision criteria used. If the use of different algorithms and different allocation criteria, for example, produce similar segments, then managers and researchers can have greater confidence that the final segmentation solution is not simply an artefact of decisions made during the analysis.

Ultimately, however, *post hoc* validation of segmentation solutions is no substitute for the development of a soundly based and explicit model of the factors influencing consumer behaviour before undertaking segmentation studies. If there is one overriding criticism that can be levelled at market segmentation research in general, it is the failure of researchers to recognize the role of guiding theory in predetermining the general directions and findings of empirical research. Many researchers do not appear to be aware that the choice of a particular technique imposes an implicit model or theory which can predetermine the results of their analysis. Nor is there widespread recognition among researchers of the need to develop explicit data analysis *strategies* for segmentation, rather than simply to make a choice between alternative data analysis *techniques*.

Managers, too, must take greater responsibility for the segmentation research they commission and the results they receive. Until they request the validation we have suggested, they cannot be confident about the reality of the segments described. Similarly, unless they specifically test the predictive capability of the segmentation solution and the responsiveness of segments to marketing mix variables, they can have no confidence in the relevance of the segmentation to marketing strategy. However, even if the segmentation solution is validated and evaluated as we have suggested, segment maps do not identify the most appropriate action; managers must still decide which segment or segments to target, and they cannot necessarily be certain that a segmentation solution will contain a viable option.

The main focus of this article has been on cluster analysis, because this is the most common commercial segmentation approach. But there are other, predictive approaches, to segmentation analysis, such as multiple classification analysis (MCA) and automatic interaction detection (AID), which involve fewer assumptions and fewer methodological problems than cluster analysis. However, these predictive techniques require more expertise and more highly developed quantitative skills on the part of researchers.

Cynics might argue the neglect of these alternative approaches in favour of cluster analysis and various forms of mapping has a lot to do with the higher demands they place on researcher time, skills and expertise in achieving a solution which "makes the client happy".

There may be a role for segmentation studies in marketing; we would not deny that. However, we do question the assumption that segmentation is necessarily a logical or profitable approach for all markets.

So long as managers who commission expensive segmentation studies in the expectation that the results of this exercise will enable them to make better marketing decisions are aware of the limitations of what they are buying, no harm is done. But if managers are unaware of these limitations and assume that a segmentation study will inevitably improve their chances of success, their efforts may be as expensive as the search for the Holy Grail, and just as futile.

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