Making use of the strengths of the general approach to portfolio analysis.

The Stratlogic Approach to the Analysis of Competitive Position

Luiz Moutinho and Douglas Brownlie

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Introduction

Expert judgements have an important role to play in strategic marketing decisions. In the emerging field of expert systems techniques are being developed for systematically representing and deploying expert knowledge in computer systems. The authors believe that the computerization of elements of marketing expertise will enhance marketing management decision-making activities and they are engaged in a programme of research that investigates the potential for the development of an expert system for the analysis of competitive positioning.

The area of analysis of competitive positioning has the typical features of "semistructured" domains generally considered appropriate for the application of expert systems methodology, e.g., a large number of contingent contextual factors impinge on the decision; managers develop and use rules of thumb that help them to draw conclusions about competitive positioning that are informed by a personal view of the recipes that various players are using in the competitive domain; and conventional modelling techniques are generally inadequate for representing such heuristics.

An early part of this work has attempted to draw together various strands of thought on the substantive and methodological knowledge base in marketing regarding the analysis of competitive positioning and the managerial process that provides its context. Portfolio techniques have drawn attention and much has been learned about design and process issues as a result. The remainder of this article outlines the design of a methodology that the authors believe will have a place in an expert system for the analysis of competitive positioning.

Preliminary Issues

The work of Wensley (1981), Allessio (1982), Coate (1983), Day (1983) and Wind *et al.* (1983), among others, alerts us to the dangers of the blanket application of standardized portfolio analysis models. They share the view that parameters, rather than remit to the preferred off-the-shelf model of a consultant. This article builds on those observations. It argues that the selection of a portfolio model calls for close scrutiny of its construction and the sensitivity of its diagnostics to the dimensions employed as well as their measures. This is the starting-point for the Stratlogic approach. It has been developed in an attempt to address two key problems that beset portfolio analysis as a possible basis for an expert system for the analysis of competitive positioning:

(1) how to improve a portfolio model's "fitness for purpose" by tailoring it to the context of the user;

(2) how to balance theory with data in a portfolio's underlying analytical framework.

Fitness for Purpose

Much criticism, including that of Jacobsen and Aaker (1985), has been levelled at the assumed universality of the dimensions of competitive strategy that have been built into most portfolio models. The authors believe that tackling the need to ground those dimensions in managers perceptions and their accounts of actual competitive behaviour is at the nub of the design issue. Building on Wind and Mahajan's (1981) guidelines for portfolio design, the Stratlogic approach sets out to tackle this issue by deliberately creating a role for strategic management (users) in the selection and definition of *relevant* variables on competitive posture, as well as the collection, calibration, reduction and transformation of pertinent data.

Previous versions of the Stratlogic model have been based on pre-specified dimensions of competitive positioning such as market share, strategic marketing ambition, return on investment and growth (Moutinho, 1987). Trial applications have shown that those dimensions do not have universal applicability. They have also shown that managers often have important ideas and insights about the attributes of competition in a specific product market and how the various players measure against them and with what effects.

In the light of those observations, the Stratlogic approach makes use of a revised version of the original model. It now proposes that, through a dialectic process, users define the boundaries of the competitive domain as well as the measurable attributes of competition in any specific context. The aim is to build up a picture of the scope and resourcing of the competitive activities (*strategies*) and outcomes (*performances*) of a defined competitive set, operating within a clearly delineated product market area, and over a specified period of time.

Managers can exercise discretion over variables

Of course knowledgeable industry analysts or commentators may also inform the efforts of management. But it is charged with the task of identifying the various dimensions of competition in a domain that it defines, as well as their relative importance to the players in it. Clearly this requires that participating managers possess, or have access to, a thorough and authoritative understanding of the dynamics of competition in the defined domain.

To identify and then assess which dimensions best capture the basis of competition and competitive advantage in the context under study is a difficult task. Some degree of consensus is required if the Stratlogic approach is to proceed, but it is not mandatory. The approach is sufficiently flexible to allow analysis to proceed on the basis of several views of the dimensions that best suit the purpose. That managers can exercise discretion over the choice of variables measuring the scope, resourcing and performance of the competitive strategies of players also provides a capability for "What if" as well as "What is" analyses.

A dialectic routine would help facilitate the resolution and creativity needed in this task, especially where participants not only hold senior positions, but also strong opinions (Mason, 1969; Mitroff, 1971). By means of such a process, and a careful analysis of the content of previous studies and other documentation, managers can help to define the broad structure of an a priori descriptive model which should capture the various recipes for competitive positioning that the players seem to have mobilized over a specified period of time.

The variables that might be chosen are summarized under the broad headings described in Table I. This table is not exhaustive. It considers only attributes of market posture, which are largely within the control of marketing management at the level of the business unit, and, having done so, it tends to define competition in terms of marketing strategy without signifying the importance of dimensions of competition that are influenced by other functional areas such as production and finance.

However, additional attributes of both broader strategy and performance measures can be added to reflect better the specific competitive context as managers perceive it. For instance, as Galbraith and Schendel (1983) argue, the dynamic nature of competition can be captured by including variables that measure the change in attributes over a specified period of time. Variables of a relative nature can also be constructed to measure one player's position with respect to a group of other players, e.g., the leading three competitors. Since firms typically compete on several platforms, while pursuing multiple performance objectives, a wide range of different attributes is initially desirable, although some economy is ultimately desirable.

The measurement of some attributes may require information that is not available, or is otherwise beyond the judgemental scope of management. And even with the best will in the world the exact nature of any competitor's marketing investments is impossible to determine with accuracy. The Stratlogic approach allows managers to estimate difficult to measure competitive activities relative to the observed actions of other players in the marketplace along a five-point ordinal scale.

Ultimately, as Feigenbaum *et al.* (1990) argue, the selection of relevant attributes to encompass both the scope and resourcing of competitive activities is a union of those typically used to capture strategic behaviour in the strategic management literature, those identified by industry analysts and researchers, and the strategic management of players within the defined competitive set. In some ways the variable set of the PIMS database provides a useful guide and ready-reckoner of definitions of strategy and performance variables and their measures which can be employed by the strategic approach.

Table I. *Constructs of Strategy and Performance in the Stratlogic Approach*

Strategic Marketing Ambition (SMA)[a]
Measured by estimating the investment made during the specified time-period by each of the players in the defined competitive set in each of the pre-specified mix elements. The revenue stream from which the investment was resourced is estimated. The SMA of any one player is then calculated by taking his aggregate marketing investment intensity and dividing it by the average investment intensity of all the players. This can also be done for each of the mix elements individually, e.g. the intensity of advertising, promotion, receivables, price, salesforce, new product effort; customer service quality; product quality and reliability; channel coverage; breadth and depth of customer base; breadth of product line

Scope (S)
Measured as that fraction of total revenue accounted for by revenue from sales made into the defined competitive domain

Productivity (P)
Value added per employee

R&D
A measure of process and product R&D intensity

Present market share (PMS)
Measured as the ratio of unit sales achieved by a player in the given time-period, to total volume achieved by all the players in the defined product market over the same period

Market share change (MSC)
The sum of the changes in market share achieved over a specified time-span divided by the number of periods

Relative market share (RMS)[a]
The PMS of any player divided by the total market competitors

Return on investment (ROI)
Net operating income over average investment for the period

Sales growth rate (SGR)
Sales growth of the defined products net of inflation

Asset growth (AGR)
Growth of the gross book value of assets attributable to the business unit

Return on sales (ROS)
Net income divided by net sales

Cash flow (CF)
Estimated as net income plus depreciation for one period, minus changes made to fixed plant and equipment and working capital between the last period and the current period. These changes can be estimated by averaging the investment intensity for both periods and multiplying the net income plus depreciation figure by the resultant

[a]These measures can also be made *relative* measures by comparing the measure for any one player with those for a selected number of the players in the competitive set for the same period. *Change* measures can be calculated by comparing the value for one specific measure for any one period of time with the value for the same measure over another period of time, e.g. the average value for the last three periods

Underlying Analytical Framework

In the Stratlogic context it is not enough to identify the forces of competition that are thought to be at work in a defined domain; those forces need to be clearly defined and measurable; and the metrics must be capable of calibration. And so there is a need for an underlying organizing framework to provide the context within which measures, measurements and their calibration can occur, so that an *analysis* of the model becomes possible. When calibrated in the context of this organizing framework, the descriptive model developed by managers will then drive data collection.

The Stratlogic approach utilizes an organizing framework that is informed by the view that the performance of any player in a defined competitive domain is a function of the strategy (conduct) he follows and how it differs, along key competitive dimensions, from the strategies being followed by the other players (structure). Since some strategies are better suited to particular contexts than others (Miles and Snow, 1978), what then differentiates high from low performance in any defined competitive domain is the degree of fit achieved between any player's strategy and the competitive circumstances within which he operates.

Previous empirical work has also shown there to be a limited number of identifiable strategies, each of which involves a different pattern of competitive positioning activities and resource deployments (Galbraith and Schendel, 1983). This view leads to the possibility of recurring patterns of competitive conduct and performance outcomes within a defined competitive domain. Those patterns in turn define groups of players on the basis of the similarity, or dissimilarity, of their competitive strategies along key dimensions; and the similarity, or dissimilarity of the performance outcomes they achieve. The potential for visually mapping those patterns is exploited in the Stratlogic approach.

The search for patterns should factor strategy attributes

Recent strategic group research has found that overlapping groupings and significant intra-group performance variations are also possible (Cool and Schendel, 1988; Fombrun and Zajac, 1987). Those findings provide an added dimension to the search for patterns of competitive positioning. It is not enough to search on the basis of a rubric that posits performance as a dependent variable and strategy as an independent variable – controlling for the environmental variables that typically define market structure through manipulating the definition of the competitive domain (sampling), or through using simultaneous equations. The search for patterns of competitive positioning should factor strategy attributes, as well as performance measures, into the classification or grouping scheme.

Empirically-derived patterns of competitive positioning are made on the basis of similarities and dissimilarities along derived dimensions of strategy and performance. Those patterns, or groupings, then have embedded within them comparisons and contrasts of the efforts of the players in a defined competitive domain. That it is then possible, via data reduction and spatial analysis methodologies, to construct a visual map of the competitive domain in terms of those similarities and differences is at the centre of the Stratlogic approach. The notion of vectors of variables in "competitive positioning space" provides one way of thinking about how to map out the differences and similarities, or proximity, of the players (Moutinho, 1987).

The concepts of points, vectors and distance in multidimensional space provide the basis on which to express any relationship of proximity between the players. The Stratlogic approach makes use of these quality and proximity data to map any player against the others in the defined competitive domain, along dimensions derived from the original strategy and performance attributes. Players can be grouped visually according to their proximity to one another in the competitive space mapping. However, a cluster-analytical routine is used in the Stratlogic approach, lending some rigour to the grouping procedure.

Patterns or groupings exist to the extent that the competitive efforts of the players, as measured by the defined strategy and performance attributes, converge or diverge quality to help users differentiate between core and dimensional competitors. *Core* competitors will score very similarly on the specified strategy and performance dimensions and in this sense will be close, forming a group with similar competitive conduct patterns. They will also represent the most directly dangerous competitors for players within the same strategic group. *Dimensional* competitors will be those players who achieve a similar score on any one strategy or performance dimension, but are otherwise distant from the player in question. They will represent players who, as members of another strategic group within the defined competitive domain, will be less direct and dangerous competitors.

The competitive positioning of any player is a function of the positioning of the other players, as defined by the spatial interrelationship of the realized dimensions of strategy and performance. The resulting mapping provides a visual representation of the various positionings in skeletal form. Its value lies in stimulating new ideas for competitive positioning strategies, perhaps to be pursued in imitation of an existing attractive positioning; or in pursuit of an innovative positioning. Clearly, management has to scrutinize carefully any analytically-derived mapping of competitive position and form a judgement about its validity, as well as the attractiveness of the various positionings it presents; the assets and skills needed to achieve them; and the feasibility of doing so, given any player's existing mix of assets and capabilities. There are also limits to the mobility of players and thus to their ability to change positioning.

The Stratlogic Approach

The Stratlogic approach is deliberately designed to be data driven. It draws on a combination of techniques that have found popularity in strategic group research (Cool and Schendel, 1988; Galbraith and Schendel, 1983; Harrigan, 1985; McGee and Thomas, 1986). This work has revealed the potential of various combinations of

multivariate techniques to explore the underlying structure of data describing the competitive profile of markets. The Stratlogic approach attempts to combine the exploratory power of such methodologies with management knowledge of a specific set of competitive circumstances, while also producing a visual representation of the data analysis.

The underlying analytical framework is supported by two broad methodological pillars: metric multidimensional scaling; and cluster analysis. The first basic pillar involves a two-step methodology which derives competitive positionings from the empirical data set by performing a spatial analysis using the bi-plot technique. The second pillar is a cluster analysis which uses as input to it the dimensions derived from the principal components analysis conducted as part of the bi-plot. The resulting cluster solution is then embedded on the bi-plot maps as a way of confirming visually defined groupings.

The Stratlogic approach thus specifies a spatial model, rotational scheme, type of cluster analysis and sequence of use. The recent work of Desarbo *et al.* (1991) reminds us of the technical limitations of such hybrid methodologies, the main one being the difficulty of embedding the cluster analysis in the spatial representation. They propose a new and very sophisticated stochastic procedure for *simultaneously* performing multidimensional unfolding and cluster analysis which helps to address this limitation. It also utilizes mixtures of multivariate conditional normal distributions to estimate a joint space of stimulus co-ordinates and K ideal points, one for each cluster, in a T-dimensional space. The stochastic and simultaneous qualities of this new model are technically attractive and future developments of the Stratlogic approach should draw on them. As it currently stands the Stratlogic approach has the advantage of being managerially oriented. The cluster routine is used to suggest to users possible patterns of competitive positionings, not to specify the best, or optimal clustering solution.

The first stage of the Stratlogic approach is to derive the *n*-dimensional scaling space of strategy and performance attributes using the bi-plot technique. The first step determines the similarity of the players as measured by the Euclidean distance between the residuals of the strategy and performance attributes. The metric multidimensional scaling technique, principal co-ordinates analysis, is then applied to the derived distance matrix to produce an *n*-dimensional solution; if ordinal data were to be processed, a mapping is to represent the original hyperspace in two dimensions, a two-dimensional solution is to be preferred, but this depends on the "goodness of fit" achieved. The number of dimensions can be increased to three and even four dimensions, but the configuration of the mapping diagram has to change accordingly. A solution involving more than three dimensions would be represented as a unidimensional plot with the requisite number of parallel lines calibrated against the same metric.

The bi-plot then calculates the correlations between all the strategy and performance attributes, taken in pairs, across the scores for each of the players in the defined competitive set. The resulting correlation matrix is then subjected to a principal components analysis (PCA). It transforms the original strategy and performance attributes into a reduced number of derived dimensions such that the loss of information is minimized. Prior to performing a PCA, strategy and performance attribute scores must be standardized where original measures were made in non-compatible units. The PCA extracts factors (derived dimensions) sequentially; so, the first factor accounts for the maximum common factor variance across all the variables (strategy and performance attributes); the second factor is then extracted at right angles to the first, etc. Once again it is desirable to use a two-dimensional plot, where the "goodness of fit" achieved allows this.

It is desirable to use a two-dimensional plot □

The strategy and performance attributes (i.e. the variables) are plotted as vectors in two dimensions with the cosine of the angle between any two of them representing the correlation between them. By visually examining the location of groups of strategy and performance attributes with respect to the axes (derived dimensions), especially those lying at the extreme positive and negative poles, it is then possible to take a view on what the axes represent. The profile of the loadings of the strategy and performance attributes against each of the derived factors also gives clues as to the structure of a factor, especially where particular attributes dominate the factor.

The results from the two plots can be interpreted directly if they both use Euclidean distance as the measure of similarity; and if the row and column effects of the original data matrix are added by scaling the axes of the two maps so that they are equivalent, they can then be superimposed to produce a joint mapping. This would then provide an informative visual display of the strategy

and performance attributes and the players, showing which strategy and performance attributes applied to which players. The relationship between any player and any strategy or performance attribute can then be examined. The bi-plot also allows the user to ask "what if" questions, such as what would happen to the competitive position of the players if strategy attribute Q was thought to apply 30 per cent more to players A and B than it is currently perceived ?

Choices influence the clustering outcome

The second stage of the Stratlogic analysis is to perform a cluster analysis as a way of grouping players on the basis of the derived dimensions. The principal components derived by the PCA are used as input to the cluster analysis. In this way the clustering routine that follows is then performed in a metric space with orthogonal dimensions, which, as Galbraith and Schendel note (1983), makes the use of distance analogies in cluster analysis conceptually sounder than in many other cluster algorithms. Euclidean distance is used as the measure of similarity and a hierarchical agglomerative method is used as the clustering technique. This method proceeds sequentially from the lowest level, where all the players to be clustered are independent; then, following the application of the single linkage algorithm, players are merged until the highest level is reached, where all players have been fused into a single cluster. Clusters produced in this way are nested and this nesting is represented in a dendrogram. It provides a visual idea of the relationships implied by the correlation matrix. The system of nested clusters derived from the analysis can then be diagrammatically embedded on the bi-plot maps to get a picture of the relationships between the players in terms of the derived dimensions of competitive positioning.

To some extent the derived cluster solution will be a function of the type of cluster analysis used; the choice of algorithm used within the analysis; the distance metric used; and the preprocessing of the variables. Desarbo *et al.* (1991) argue that those, sometimes arbitrary, choices influence the clustering outcome in non-trivial ways. Their new methodology evaluates the impact of such choices through performing six different clustering analyses on the data for each of two distance metrics. It also performs a means partitioning method for two to six clusters and finds that with the exception of the popular Ward's procedure, the methods lead to similar clustering results. The Stratlogic approach does not have this degree of technical sophistication at the clustering stage. It does advise that basic checks be made on the homogeneity and efficiency of the cluster solution, and that whenever possible the stability of the cluster solution should be checked through varying the parameters of the clustering procedure.

Conclusion

This article attempts to make use of the strengths of the general approach to portfolio analysis. It builds a data-driven methodology which combines multidimensional scaling and cluster analysis in a procedure that will help to explore the underlying structure of data on the competitive positioning of players operating in a defined competitive domain.

The Stratlogic approach reduces and transforms data without imposing a pre-ordained prescriptive step. It will help to visualize competitive positionings so to trigger the definition of marketing strategies in terms of desirable and undesirable positions. In so doing it will deliberately exploit management's creativity and insight, thus facilitating the strategic thinking that would be constrained where a predefined set of general propositions was imposed.

Clearly, the analysis of competitive positioning needs to be repeated at regular intervals to be of any real managerial value. For this reason the Stratlogic approach is reasonably simple and portable. Yet, there is a price to pay for those advantages in terms of technical limitations that diminish its analytical power. However, the next phase of the authors' work is to conduct field trials of the Stratlogic approach in companies that are participating in the development of an expert system for the analysis of competitive positioning

References

Allessio, H. (1982), "Market-Share Madness", *Journal of Business Strategy*, Vol. 3 No. 2, Autumn, pp. 76-9.

Coate, M.B. (1983), "Pitfalls in Portfolio Planning", *Long Range Planning* (UK), Vol. 16 No. 3, June, pp. 47-56.

Cool, K. and Schendel, D. (1988), "Performance Differences among Strategic Group Members", *Strategic Management Journal*, Vol. 9 No. 2, pp. 207-23.

Day, G.S. (1983). "Gaining Insights through Strategy Analysis", *Journal of Business Strategy*, Vol. 4 No. 1, Summer, pp. 51-8.

Desarbo, W., Jedidi, K., Cool, K. and Schendel, D. (1991), "Simultaneous Multidimensional Unfolding and Cluster Analysis: An Investigation of Strategic Groups", *Marketing Letters*, Vol. 2 No. 2, pp. 129-46.

Feigenbaum, A., Sudsharsan D. and Thomas, H. (1990), "Strategic Time-periods and Strategic Groups Research: Concepts and an Empirical Example", *Journal of Management Studies*, Vol. 27 No. 2, pp. 133-48.

Fombrun, C., and Zajac E. (1987), "Structural and Perceptual Influences on Intra-industry Stratification", *Academy of Management Journal*, Vol. 30 No. 1, pp. 33-50.

Galbraith, C., and Schendel, D. (1983), "An Empirical Analysis of Strategy Types", *Strategic Management Journal*, Vol. 4, pp. 153-73.

Harrigan, K. (1985), "An Application of Clustering for Strategic Groups Analysis", *Strategic Management Journal*, Vol. 6, pp. 55-73.

Jacobsen, R. and Aaker, D.A. (1985), "Is Market Share That It's all Cracked up to Be?", *Journal of Marketing*, Vol. 49 No. 4, Autumn, pp. 11-22.

McGee, J., and Thomas, H. (1986), "Strategic Groups, Theory, Research and Taxonomy", *Strategic Management Journal*, Vol. 7 No. 2, pp. 141-60.

Mason, R. (1969), "A Dialectical Approach to Strategic Planning", *Management Science*, Vol. 15 No. 8, pp. B403-14.

Miles R., and Snow, C. (1978), "Organizational Strategy, Structure and Process", McGraw-Hill, New York, NY.

Mitroff, I. (1971), "A Communication Model of Dialectical Inquiring Systems – A Strategy for Strategic Planning", *Management Science*, Vol. 17 No. 10, pp. 4B634-48.

Moutinho L. (1987), "Portfolio Analysis : A Competitive Management Approach", *Management Bibliographies & Reviews*, Vol. 13 No. 4, pp. 5-33.

Wensley R. (1981), "Strategic Marketing: Betas, Boxes or Basics?", *Journal of Marketing*, Vol. 45, Summer, pp. 173-82.

Wind,Y., and Mahajan, V. (1981), "Designing Product and Business Portfolios", *Harvard Business Review*, Vol. 59, January/February.

Wind, Y., Mahajan, V. and Swire, D.J. (1983), "An Empirical Comparison of Standardized Portfolio Models", *Journal of*

Luiz Moutinho is Professor of Marketing at the University of Wales, Cardiff, UK, and Douglas Brownlie is Reader in Marketing at the University of Stirling, UK.