

Explaining Marketing ROI Beyond the Short Term

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Abstract

Cooper and Nakanishi (1988) compared traditional marketing mix modeling to a picture taken through a telephoto lens by suggesting: "while the one brand may be in excellent focus, the foreground or background are either excluded or out of focus. As pretty as the picture may seem, too much is ignored by this view." This led the authors to explore a more holistic approach known as Competitive Interaction Analysis (CIA) that provides ROI analytics in the context of portfolio or category management.

CIA requires the evaluation of asymmetric competitive factors for an entire category of products. It is therefore significantly more complex than the traditional Marketing Mix Analysis (MMA) for a single brand. However, this complexity provides a wide-angle focus on marketing investment that offers analytical insights tightly aligned with the needs of today's managers. Understanding the sources of volume in terms of brand shifting and category expansion is an incredible initial benefit. However, the true value of this cross-sectional view of the marketplace is the opportunity to investigate marketing's role in determining sales and profitability beyond the short term. Hence, CIA introduces longer term effects to marketing mix modeling and subsequent ROI analysis.

The assessment of these longer term responses was traditionally only available through more qualitative research methods that are often difficult to connect back to the ROI studies. However, approaching marketing mix modeling with the wide-angle view makes that link seamless. Initially, the CIA approach can address a volumetric assessment for customer-based brand equity by explaining both the value of a brand name, similarly to Bhattacharya and Lodish (2000), and demonstrating the differential effectiveness of marketing for the brand as explained by Cooper and Nakanishi (1988). At the same time, an approach explicitly accounting for asymmetric competitive factors can recover the medium term benefits of advertising described by Broadbent (2002) and the longer term impacts of advertising defined by Gascoigne and Ward (2001).

Keywords: Marketing Mix Modeling, Competitive Interaction Analysis, Brand Equity, and Longer-term Advertising Response

Introduction

This discussion builds on Kirk (2002). That WOW presentation introduces Competitive Interaction Analysis (CIA) as a viable methodology for marketing mix modeling and ROI assessment in the context of portfolio or category management. This was only the first of the exciting capabilities for tools leveraging the CIA foundations of Cooper and Nakanishi (1988). The emphasis of this WOW presentation is using CIA to account for the longer term effects of advertising in that same ROI assessment. Jedidi, Mela, and Gupta (1999) confirm that long term advertising effects have a positive impact on brand equity. Therefore, investigation of these longer term effects is dynamically linked to a valuation of customer-based brand equity. The discussion is divided into three parts. The first two parts explore current thought leadership on brand equity and longer term advertising impacts. The objective is to provide a construct that merges these concepts to

the CIA approach. The third part is a review of the CIA approach as presented in the 2002 discussion.

Investigating Brand Equity

Marketing researchers have often associated brand equity estimation with cross-sectional or market-share analyses like CIA. In fact, Ehrenberg (1993) goes so far as to argue that brand equity merely reflects market-share, i.e. relative position, when providing another example of the double jeopardy phenomenon. The key is that brand equity is very much a function of positioning. However, Keller, Sternthal, and Tybout (2002) point out that branding is more than how a brand differentiates itself from competitors. It is equally important to understand the frame of reference within which a brand works and identify the characteristics that the brand has in common with competitors.

Competitive positioning requires the identification of an appropriate frame of reference and associated points of parity or difference. The combination of these elements defines customer-based brand equity. A brand with positive customer-based brand equity can expect the following:

1. Higher brand loyalty and being less vulnerable to competitive marketing actions
2. Larger margins and more inelastic responses to price increases and elastic responses to price decreases
3. Greater channel cooperation and support
4. Increased marketing communication effectiveness
5. Significant licensing opportunities
6. Full support for line extensions

Figure 1



Note: Snuggle® Fabric Softener product is used solely for example, all rights held by UNILEVER understood.

Measuring the Value of a Brand Name

Is there an immediate way to identify customer-based brand equity through the value of a brand name? Keller (2002) reviews the vast number of current researchers applying conjoint analysis to the assessment of customer-based brand equity. Fader and Hardie (1996) introduce certain aspects of conjoint analysis within the traditional multinomial logit (MNL) model. Like conjoint, Fader and Hardie (1996) arrive at market-share forecasts for imitative new products by characterizing each SKU in a competitive category as a combination of its product attributes, i.e. brand name, package size, flavor, variety, type, etc. Forecasts are merely the projection of new combinations of product characteristics.

The significance of these forecasts is the ability to disentangle the brand name from price, promotion, advertising, distribution, and other product attributes. This is demonstrated in Figure 1 above. Bhattacharya and Lodish (2000) leverage this facet of Fader and Hardie (1996) in their pursuit of measures to track the "health" of a brand using Cooper and Nakanishi (1988) to organize their analysis. Brand health is identified as a combination of "current well-being" and "resistance" in an analogous notion to similar concepts found in the established epidemiology literature. Current well-being is expressed as a series of metrics for how the brand name impacts a product's sales under typical conditions. Empirical evidence demonstrates this as being the first operationalization of customer-based brand equity.

Measuring Differential Brand Effectiveness

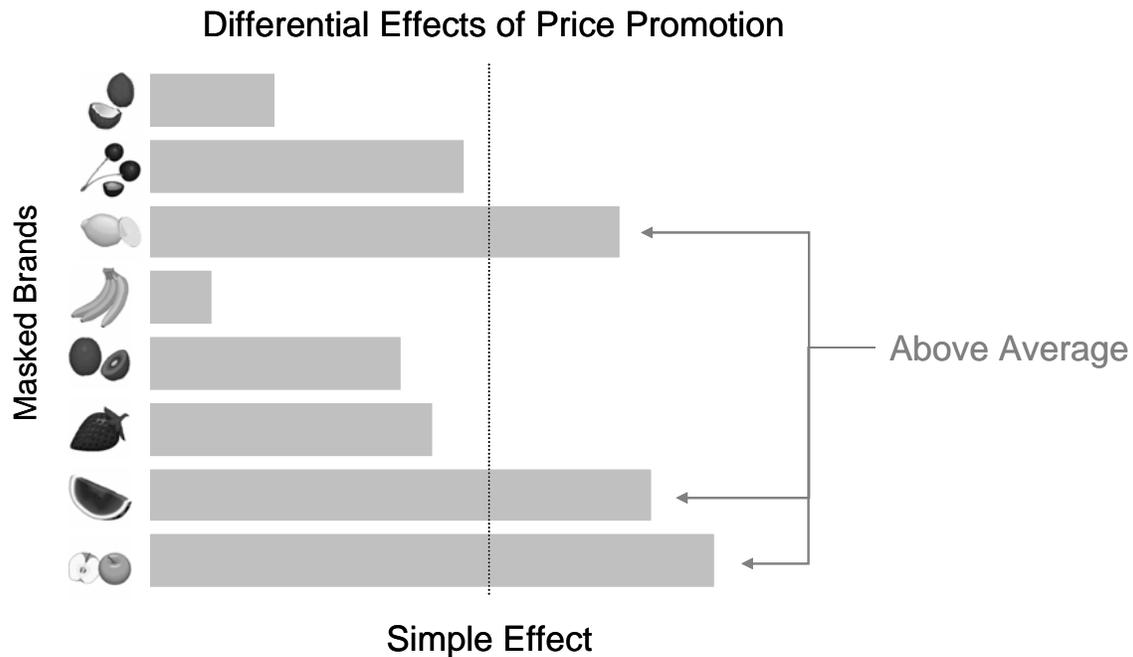
Is there an immediate way to identify customer-based brand equity through differential brand effectiveness? Keller, Sternthal, and Tybout (2002) also explain that the concept of customer-based brand equity is built on the differential effects that a consumer's brand knowledge, i.e. thoughts, feelings, perceptions, etc., has on a consumer's response to the brand's marketing activity. Cooper and Nakanishi (1988) point out that simple observation of competitive interactions in the marketplace reveals that some brands are capable of exerting inordinately strong influence over the shaping of demand and competition, while other brands are not. For example, price leaders can reduce their prices and obtain a large gain in market-share with little influence from competitor reactions. They further point out that the impact of one competitor's action may affect one rival or one group of rivals more than another.

In essence, market and competitive structures are defined by both the differential effectiveness of brands and asymmetries in cross-effects. Differential effectiveness among brands reflects that brands have different degrees of effectiveness in carrying out their marketing activities. An example is portrayed in Figure 2 below. These differences can depict the differential consumer's response summarized by Keller, Sternthal, and Tybout (2002). Recent advances in Bayesian Shrinkage Models, as outlined by Rossi, DeLurgio, and Kantor (2000), have made statistical assessment of differential effectiveness far more accessible.

Investigating Longer Term Advertising Impacts

Marketing researchers have long accepted the concept that the impact of advertising persists well beyond the period it is activated. The classic study of Clarke (1976) describes this rational as "intuitively attractive". However, practical ROI calculations in many marketing analyses remain focused on only the immediate impacts of advertising and other marketing mix elements. Bucklin and Gupta (1999) explain this situation. Marketing managers consider the long-run effects of advertising so difficult to quantify that they make little attempt to measure them, while the short term effects are readily observable. The challenge in accepting this position is that a reasonable paradigm for allocating resources, i.e. marketing mix modeling, across the total marketing budget is suboptimal. This is manifest in the recent criticism of North American marketing managers for their short term orientation, i.e. the explosion of emphasis on trade promotions in the Consumer Package Goods (CPG) sector.

Figure 2



In the last decade, significant work establishing the concept of "advertising persistence" within ROI assessment suggests that longer term effects are identifiable. Dekimpe and Hanssens (1999) utilize the physics phenomenon of "hysteresis" to define persistence through temporary marketing actions demonstrating sustained sales change. The ROI implication for activities exhibiting persistence comes from the capability to deliver two advantages:

1. Generate ongoing benefits from temporal investments
2. Provide a barrier to entry or position improvement to competitors

The Dekimpe and Hanssens (1999) approach provides full empirical evidence of the hysteresis effect in marketing by deriving the long term impact of advertising by attributing all subsequent effects across a broad time horizon to the initial advertising outlay. However, their Vector Auto-Regressive (VAR) modeling approach does not provide parameter estimates that can be interpreted directly in a dynamic resource allocation framework such as marketing mix modeling. Despite this limitation, measuring advertising persistence remains of key relevance to ROI assessment. Other research provides the opportunity to leverage their findings.

Measuring Medium Term Advertising Effects

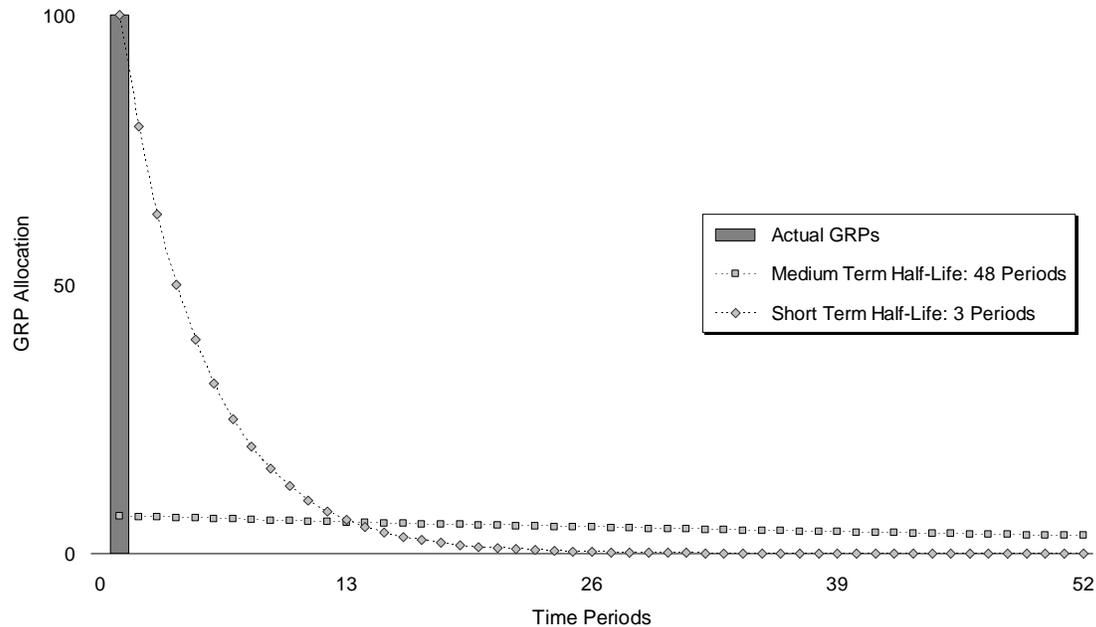
Is there an immediate way to identify the persistence of advertising in the medium term? Broadbent (2002) argues that too many current advertising effectiveness models miss the opportunity to use longer half-lives and improve the case for advertising based on its persistence in merely the Medium Term. There is certain evidence for investigating short term effects, but there may be medium term effects in addition to or instead of the short term alone. An example of the medium term pattern versus the short term pattern is depicted in Figure 3 below.

These medium term advertising effects are generally in two parts. The majority is constant over the period of analysis. This is directed at base sales and supporting brand equity development. The remainder is variable and accounts for a portion of the intermittent variation in total sales. However, Broadbent (2002) explains that persistence of advertising must be assessed in the context of competitive interaction, i.e. CIA. It is the contribution of the net medium term effects, ex-

pressed as the impact of our brand less the impact of competitors, which Broadbent points out as also highly correlated with his own definition of brand equity.

Figure 3

Medium Term versus Short Term Half-Life Patterns



Measuring Longer Term Advertising Effects

Is there an immediate way to identify the persistence of advertising in the longer term? Gascoingne and Ward (2001) further develop the concept persistence through the use of a Cumulative Long Term Share of Voice. They too place persistence in the context of competitive interaction by expressing a relative measure such as SoV to capture longer term effects. In essence, both brands and their advertising have a form of inertia by looking at the cumulative change in the share of voice across a number of brands in a competing category. An example of the cumulative share of voice is depicted in Figure 4 below. Gascoingne and Ward (2001) refine the longer term contribution by introducing a weighted approach where the quality of copy is introduced based on Millward Brown awareness tracking indices. This data can greatly enhance the analysis when available. This also links back to the Keller (2002) concept of communicating with a consistent voice.

The CIA Approach

Kirk (2002) defined CIA in the context of marketing mix modeling as a system that merges several strategic marketing databases into a single data-mart, develops a series of integrated models, and processes the results in a way that marketing managers can communicate profitable volume growth opportunities across their enterprise. This system is depicted in Figure 5 below. The investigation of brand equity and longer term advertising impacts are applied within this context through the product attributes and competitive marketing components of the system. The form of the model takes on a methodology similar to the "Mind of the Consumer" (MOC) approach explained by Lodish (2001).

Figure 4

Cumulative Long Term Share of Voice

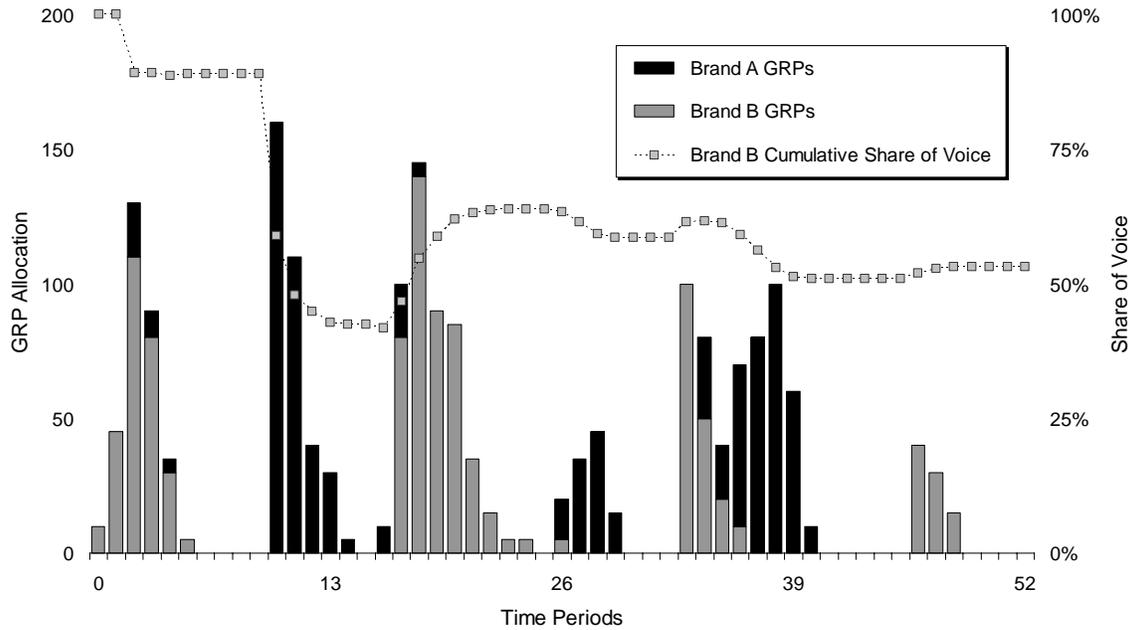
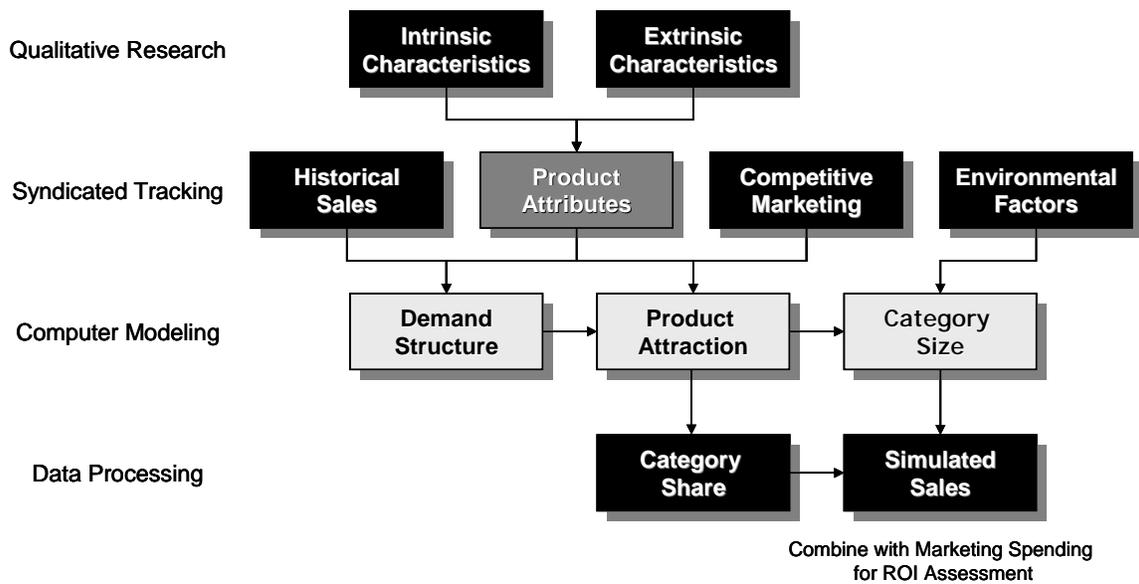


Figure 5



Measuring Interaction between Brands or Product Groups

Initially, CIA establishes the structure of competition within the market. This idea is manifest as the Demand Structure component based on Theil (1965):

1. The relationship between dollar share, category size, and absolute price differentials establishes a hierarchy of competition or demand structure
2. Uses classical restrictions so that the estimates of the demand parameters conform to economic theory such as zero sum elasticities

- The change in quantity demanded q_{ist} is a function of the change in total consumer spending Q_{st} and the change in pricing of all goods or services p_{jst} in the competitive set

$$w_{ist} \Delta \ln(q_{ist}) = \Theta_i \Delta \ln(Q_{st}) + \sum_{j=1}^N \pi_{ij} \Delta \ln(p_{jst})$$

Transformation Weight
Estimated Parameters

Measuring Share Change

Next, CIA establishes the influence of certain marketing actions on brand performance. However, this evaluation of marketing effectiveness relies on the position of the competitive environment. These ideas are manifest as the Product Attraction & Category Share components based on Nakanishi & Cooper (1982):

- Consumer attraction to a product is a multiplicative function of the varying competitive degrees of the K marketing mix elements logically consistent with the multinomial logit (MNL), solvable using regression-based approaches, and defined as the multiplicative competitive interaction (MCI) model

$$A_{ist} = \prod_{k=1}^K f_k(X_{kist})^{\beta_k}$$

Transformation Weight
Estimated Parameter

- Market share S_{ist} is the weighted attraction relative to the weighted attraction of all M relevant alternatives

$$S_{ist} = A_{ist} \div \sum_{m=1}^M A_{mst}$$

As discussed above, some products are capable of exerting inordinately strong influence over the shaping of demand and competition, while other products are not. This observation illustrated the differential effectiveness of brands and asymmetrical competitive structures. Differential effectiveness among products reflects that the products have different degrees of effectiveness in carrying out their marketing activities. However, differential effectiveness alone does not provide asymmetries.

Asymmetries reflect differential cross effects among products. Therefore, the nature of competition suggests that products must be differentially effective. This is not only with respect to their own shares and sales, but also with respect to their ability to influence the shares and sales of other brands or products. This argument revolves around discussions involving the Independence of Irrelevant Alternatives or IIA constraints of attraction models. Naert and Weverbergh (1985) present a detailed discussion of this criticism. To assure asymmetric response, several techniques, such as Hardie, et al. (1998) provide a process to explicitly accounts for these differential cross effects.

Measuring Category Expansion or Contraction

Finally, CIA establishes the influence of various marketplace dynamics based on the relevance of given markets and time-periods. This explicitly illustrates how the marketing activities forming one consumer experience relate to similar measures in other marketing exposure situations. Predicting sales and subsequent ROI, requires more than the knowledge of market shares. To un-

derstand potential penetration and usage behavior, marketing analysis must be holistic. In economic jargon, changes to the marketing mix impact both market shares and the product class as a whole.

At the same time, variables exogenous to the marketing of products within the category also influence expansion or contraction of the category. This implies a distinction between specific factors that affect a product group and general factors that affect the entire category. This idea is manifest as the Category Size component based on Mason (1990):

1. Changes to the marketing mix impact both market shares within a consumer product category and demand for the product class as a whole
2. The expansion or contraction of the category Q_{st} is a function of the total attractiveness of the category A_{mst} and variables Z_{est} exogenous to the category, i.e. weather, holidays, local events, other categories, competing outlets, etc.

$$Q_{st} = f_a \left[\sum_{m=1}^M A_{mst} \right]^{\beta_M} + \sum_{e=1}^E f_e (Z_{est})^{\beta_e}$$

The diagram shows the equation $Q_{st} = f_a \left[\sum_{m=1}^M A_{mst} \right]^{\beta_M} + \sum_{e=1}^E f_e (Z_{est})^{\beta_e}$. An arrow labeled "Transformation Weights" points to the coefficient f_a and the exponent β_M . Another arrow labeled "Estimated Parameters" points to the exponents β_e in the second term of the equation.

Application of CIA

The objective of CIA is to simultaneously evaluate the effectiveness of marketing actions in both a competitive and holistic environment. Brand equity and longer term advertising effects are merely a segment of that environment. However, this represents a different perspective that is not easy to accept at first glance. The complexity involved in a fully competitive analysis might indeed look formidable to marketing planners that are comfortable analyzing the performance of one product or brand at a time. Nevertheless, the true difficulties lie in the perceptions of the marketing research community and not the availability of analytical approaches or computing resources for this decision support system framework.

Summary and Conclusions

Last year's WOW discussion, Kirk (2002), demonstrated the ability of the CIA approach to provide simultaneous market response results at the category, manufacturer portfolio, brand, and SKU level for marketing mix modeling. These response results fit neatly into the context of advertising ROI assessment by producing sales effectiveness and profit efficiency metrics. However, those results concentrated on traditional short term assessment. The purpose of this discussion has been to augment last year's presentation with the investigation of ROI beyond the short term.

Our main concentration here has been the pursuit of an approach to address a valuation for the longer term phenomenon. The first part of this is an assessment for brand equity by explaining the value of a brand name in line with the work of Bhattacharya and Lodish (2000) and the differential effectiveness of the brand's marketing as explained by Cooper and Nakanishi (1988). The second part of this is an assessment of the medium term benefits of advertising as described by Broadbent (2002) and the longer term impacts of advertising as illustrated by Gascoigne and Ward (2001).

Once again, the approach at MMA is to take leading-edge thinking from various sources and combine them into a single construct based on CIA. In this process, we hope frameworks from other advertising research can help to offer intuitively appealing explanations of the patterns found in both the WOW case study and further analyses based on the CIA approach. The desired outcome is that this research will advance the understanding of marketing resource alloca-

tion and ROI assessment beyond simply the short term and therefore help marketing managers to market smarter and sell better.

References

Bhattacharya and Lodish (2000) "Towards a System for Monitoring Brand Health from Store Scanner Data", Marketing Science Institute: Report No. 00-111.

Broadbent (2002) "Advertising is More Than a Quick Fix", presented at the 48th ARF Annual Convention and Research Infoplex: 22 April 2002.

Bucklin and Gupta (1999) "Commercial Use of UPC Scanner Data: Industry and Academic Perspectives" Marketing Science, Vol. 18 No. 3: pages 247-273.

Clarke (1976) "Econometric Measurement of the Duration of Advertising Effects on Sales" Journal of Marketing Research, Vol. 13 (November): pages 413-417.

Cooper and Nakanishi (1988) *Market Share Analysis: Evaluating Competitive Marketing Effectiveness*, Norwell, MA: Kluwer Academic Publishers.

Dekimpe and Hanssens (1999) "Sustained Spending and Persistent Response: A New Look at Long-Term Marketing Profitability" Journal of Marketing Research, Vol. 36 (November): pages 397-412.

Ehrenberg (1993) "If you are so strong, why aren't you bigger? Making the case against brand equity" ADMAP, October: pages 13-14.

Fader and Hardie (1996) "Modeling Consumer Choice Among SKUs" Journal of Marketing Research, Vol. 33 (November): pages 442-452.

Gascoingne and Ward (2001) "The Long and Short of it ... Advertising Effectiveness", presented at the 47th ARF Annual Convention and Research Infoplex: 6 March 2002.

Hardie, Lodish, Fader, Sutcliffe, and Kirk (1998) "Attribute-based Market Share Models: Methodological Development and Managerial Applications", University of Pennsylvania: The Wharton School Marketing Department Working Paper 98-009.

Jedidi, Mela, and Gupta (1999) "Managing Advertising and Promotion for Long-Run Profitability" Marketing Science, Vol. 18 No. 1: pages 1-22.

Keller (2002) "Three Branding and Brand Equity" in *Handbook of Marketing* edited by Weitz & Wensley, London: Sage Publications: pages 151-178.

Keller, Sternthal, and Tybout (2002) "Three Questions You Need to Ask About Your Brand" Harvard Business Review, September: pages 3-8.

Kirk (2002) "Maximizing Your Marketing Portfolio's Return on Investment", presented at the ARF Week of Workshops (WOW): 10 October 2002.

Lodish (2001) "Building Marketing Models that Make Money", Interfaces, Vol. 31 No. 3 part 2 special issue: pages S45-S55.

Mason (1990) "New Product Entries and Product Class Demand", Marketing Science, Vol. 9 No. 1: pages 58-73.

Naert and Weverbergh (1985) "Market Share Specification, Estimation, and Validation: Toward Reconciling Seemingly Divergent Views", *Journal of Marketing Research*, Vol. 22 (November): 453-461.

Nakanishi and Cooper (1982) "Simplified Estimation Procedures for MCI Models", *Marketing Science*, Vol. 1 No. 3: pages 314-322.

Rossi, DeLurgio, and Kantor (2000) "Making Sense of Scanner Data" *Harvard Business Review*, March: page 24.

Theil (1965) "The Information Approach to Demand Analysis", *Econometrica*, Vol. 33 No. 1: pages 67-87.