M A R K E T I N G S C I E N C E I N S T I T U T E

Driving Customer Equity: Linking Customer Lifetime Value to Strategic Marketing Decisions

Roland T. Rust, Katherine N. Lemon, and Valarie A. Zeithaml

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W O R K I N G P A P E R S E R I E S

MARKETING SCIENCE INSTITUTE

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Business success is based on customer relationships; however, because customer equity is difficult to measure, many companies continue to focus on metrics that capture product-based strategies rather than metrics that capture customer-based strategies.

In this study, authors Rust, Lemon, and Zeithaml develop an approach that unifies Value Equity (objective perceptions of the brand), Brand Equity (subjective perceptions of the brand, above and beyond its objective value), and Relationship Equity (the strength of the brand relationship, above and beyond its objective and subjective value) in a strategic "Customer Equity" framework.

Based on the concept of customer lifetime value (CLV), this framework offers a set of new metrics that enable a company to project and explicitly quantify the financial impact of marketing expenditures. Thus, Customer Equity facilitates the evaluation of marketing ROI, including return on service quality, return on advertising, return on loyalty programs, and even return on corporate ethical standards.

Study and Findings

Data were obtained from cross-sectional surveys in five industries (airline, facial tissues, rental cars, electronics, and grocery). These were combined with estimated company data such as the company's discount rate and time horizon, and market data such as the estimated total number of customers. Customer lifetime value was modeled using a brand switching model. For each industry, customer lifetime value for all survey respondents, projected to the aggregate number of customers in the market, was used to estimate the brand's total Customer Equity.

The findings revealed that a firm can measure its performance on the value, brand, and relationship drivers of equity (and their subdrivers) and compare to its competitors' performance on those drivers in order to reveal strategic competitive gaps.

Further, using the framework can provide valuable insights about which Customer Equity drivers are more critical in the industry in which the firm competes, and also which drivers are most important in driving the firm's own Customer Equity.

Most important, the results from the framework enable the firm to determine where to invest its marketing resources for the greatest impact, thereby maximizing return on marketing investment and minimizing wasted resources.

Managerial Findings

Analysis of data from the five industries suggests that Value Equity is more important for business-to-business companies, for which objective performance is more important. Brand Equity is more important for consumer packaged goods companies and other transaction-oriented businesses, and Relationship Equity is more important for relationship businesses.

Many firms already model their customer value, brand equity, and customer relationship management; however they do so separately. The Customer Equity framework offers a CEO-level view that unifies these three areas in a framework that enables quantitative evaluation of strategic marketing alternatives, based on the common criterion of effect on the firm's Customer Equity. This provides the firm a new strategic framework that is customer-centric as well as competitor-cognizant.

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Driving Customer Equity: How Customer Lifetime Value Is Reshaping Corporate Strategy *(Free Press 2000).*

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Introduction

Metrics to Match a Customer-Centered View of Marketing

Marketing experts have articulated a customer-centered viewpoint since the 1960s (e.g., Kotler 1967), and marketing theory and practice have become increasingly customer-centered over the last 40 years (Vavra 1997). For example, marketing has decreased its emphasis on short-term transactions and increased its focus on long-term customer relationships (e.g., Håkansson 1982). Much of this stems from the changing nature of the world's leading economies, which have undergone a dramatic shift from the product sector to the service sector, reflecting a century-long trend. In 1900 the service sector provided 30 percent of the nonfarm employment in the United States, while by 1995 that figure has risen to an estimated 80 percent (Quinn 1992; Shugan 1993).

Because service often tends to be more relationship-based, this structural shift in the economy has resulted in more attention to relationships, and therefore more attention to customers. This customer-centered viewpoint is starting to be reflected in the concepts and metrics that drive marketing management, including such metrics as customer value (Bolton and Drew 1991a) and voice-of-the-customer measures (Griffin and Hauser 1993). For example, brand equity, a fundamentally product-centered concept, is now being challenged by the customer-centered concept of Customer Equity (Blattberg and Deighton 1996; Dorsch and Carlson 1996). For the purposes of this paper, and consistent with Blattberg and Deighton, we define Customer Equity as follows:

Customer Equity is the sum of the discounted lifetime values of all the firm's customers.[1]

Because obtaining an accurate read on Customer Equity requires an accurate assessment of customer lifetime value, it is very important that customer lifetime value be conceptualized correctly. A more sophisticated approach to customer lifetime value and Customer Equity entails the use of a Markov brand-switching matrix, such as has been used in brand choice models for many years.

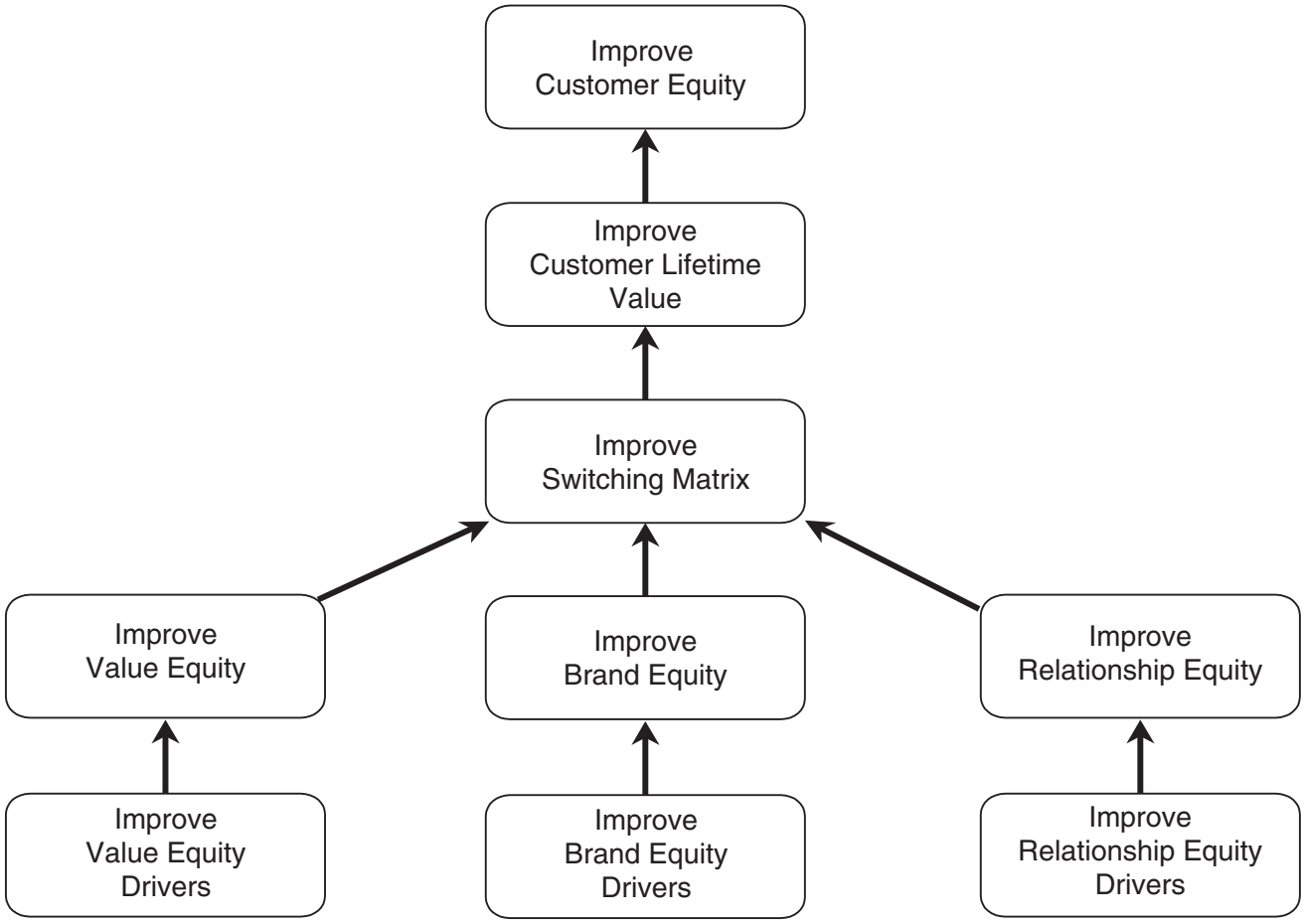
In fast-moving and dynamic industries that involve customer relationships, products come and go, but customers remain. This suggests that customers and Customer Equity may be more central to many firms than brands and brand equity, although current management practices and metrics do not fully reflect this shift yet. The shift from product-centered thinking to customer-centered thinking requires an accompanying shift from product-based strategy to customer-based strategy (Gale 1994; Kordupleski, Rust, and Zahorik 1993). In other words, a firm's strategic opportunities might best be viewed in terms of the firm's opportunity to improve the drivers of its Customer Equity.

Customer Equity and Strategy

Our purpose in this paper is to show how Customer Equity can be used to drive marketing strategy. To do this, we first conceptualize and describe three primary drivers of Customer Equity: Value Equity (objective assessment), Brand Equity (subjective assessment), and Relationship Equity (stickiness). These drivers are chosen because they correspond to distinctly managed elements in modern marketing practice (customer value management, brand equity, and customer relationship management), because they cover all the typical marketing initiatives, and because they form the basis for a brand-switching and retention model.

After collecting individual-level data on purchase, the Customer Equity drivers, and purchase intention, we can then use market-level model parameter estimates to build individual-level brand-switching matrices. Combining those matrices with individual-level information about purchase frequency and average quantity of purchase, we can then produce individual-level estimates of customer lifetime value for each firm in the industry. Aggregating customer lifetime values across customers yields each firm's Customer Equity (see Figure 1).

Figure 1. Pathways to Customer Equity



Our framework makes it possible to analyze what effect improving a driver (or subdriver) of Customer Equity has on Customer Equity overall. Identifying which drivers have the greatest impact on Customer Equity provides valuable strategic insight. Projections of return on investment can be made by combining the Customer Equity impact with the investment required to produce the shift. We illustrate how return on investment can be projected for a variety of marketing expenditures.

Benefits to Management

Our proposed Customer Equity decision framework provides the following:

- *Identification and measurement of the key drivers of Customer Equity*. Key drivers have been successfully identified and measured in the fields of customer satisfaction and customer value management (e.g., Gale 1994; Kordupleski, Rust, and Zahorik 1993). We extend this idea to Customer Equity. By identifying which drivers (Value Equity, Brand Equity, or

Relationship Equity) are most important to them, companies can focus resources where they will have the greatest impact. When taken to the subdriver level, this analysis answers questions such as "Should we spend more on advertising, or should we improve service quality? Which will have a bigger effect?"

- ❑ *Identification of a firm's competitive strengths and weaknesses.* A company can compare its Customer Equity numbers and the numbers for the drivers and subdrivers with those of its competitors to see whether it is gaining or losing competitive ground, with respect to the value of its customer base.

- ❑ *Projection of the financial impact of marketing initiatives.* Marketing has traditionally lacked formal methods for projecting and evaluating the financial impact of its expenditures. Decision areas such as advertising traditionally have not been able to project specific results in terms of return on investment. The Return on Quality approach (Rust, Zahorik, and Keiningham 1995) has been successfully used to project the ROI from service improvements. Our framework extends this approach to the analysis of any proposed expenditure related to Customer Equity and its drivers. For the first time, there is a unified framework for projecting returns on advertising, distribution, loyalty programs, and any other expenditures designed to increase Customer Equity.

- ❑ *Key metrics for top management.* In the spirit of the "Balanced Scorecard" (Kaplan and Norton 1992), we provide key measures that top management can monitor and track over time, to keep an eye on how the company is faring with respect to the drivers of its Customer Equity.

- ❑ *Rapid implementation.* Executives usually do not have time to collect months and years of data before making and implementing a decision. Although one could evaluate the financial impact of marketing initiatives in a straightforward way by conducting controlled experiments, such an approach is often impractical, not only because it runs the risk of tipping a company's hand to competitors (Lehmann and Winer 1994), but also because it simply takes too much time. Managers need to make decisions quickly, so data collection must be fast. Our framework requires only the collection of cross-sectional data.[2]

- ❑ *Easy implementation.* Our framework requires only statistical analyses that can be accomplished using widely-available statistics packages and spreadsheet software.

Drivers of Customer Equity

Consider what may influence customer lifetime value and, therefore, a firm's overall Customer Equity. Recent advances in our understanding of customer behavior suggests that three broad areas influence customers' decisions to purchase and repurchase products and services: (1) aspects of the firm's product and service offering, (2) aspects of the firm's brand, and (3) aspects of the customer's relationship with the firm. As we will discuss below, our approach seeks to unify these recent advances into a well-grounded theoretical framework.

A recent book (Rust, Zeithaml, and Lemon 2000) provides broad managerial guidelines for relating Customer Equity to strategy. It proposes that Customer Equity be broken down into the components that drive it: Value Equity, Brand Equity, and Relationship Equity (also known as Retention Equity). This paper provides a necessary extension to that work by providing the theoretical basis for the Customer Equity drivers and explaining how the Customer Equity approach can be implemented. The theoretical and managerial foundations of Value Equity, Brand Equity, and Relationship Equity all are supported by extensive research in marketing, both theoretical and applied.

Value Equity

Value equity derives from the concept of customer value, which academics recognize as a source of competitive advantage (Parasuraman 1997; Woodruff 1997), and which has been used as a basis for corporate strategy (Gale 1994; Grisaffe and Kumar 1998; Kordupleski 1993; Treacy and Wiersma 1995). Higgins (1999) provides an overview of how customer value measurement is applied in industry, and Holbrook (1994) presents the theoretical perspective in a broad philosophical treatise that discusses many different types of value. He argues that value is central to the mission of marketing. Zeithaml (1988) defines value as "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given." We see from this definition that value is viewed as resulting primarily from perceptions rather than emotions. This argues for a relatively rational and objective appraisal that alters behavior, a viewpoint that is supported by experimental research and field experiments (Bolton and Drew 1991b; Dodds, Monroe, and Grewal 1991).

Recent work in customer value has delineated an exhaustive set of drivers of customer choice (e.g., Sinha and DeSarbo 1998), but we find it useful to adopt a narrower definition that limits value's impact to the more objective and rational aspects. We define Value Equity as the customer's *objective assessment of the utility of a brand, based on perceptions of what is given up for what is received.*

Significant research in the areas of customer value and perceived value has identified three key antecedents of value: quality, price and convenience. Zeithaml (1988) and Gale (1994) found that key antecedents of value are quality and price. Recent research by Teas and Agarwal (2000) and Ordóñez (1998) also supports the

idea of quality and price as drivers of overall value. Other research on the role of price in consumers' determination of value and decision to purchase or repurchase a product or service includes Dodds, Monroe, and Grewal (1991), Erickson and Johansson (1985), Monroe and Krishnan (1985), and Lichtenstein, Ridgway, and Netemeyer (1993). Other research on the role of quality in consumer decision-making includes Carsky, Dickinson, and Canedy (1998), Garvin (1988), Geistfeld (1988), Holbrook and Corfman (1985), Maynes (1976), Monroe and Krishnan (1985), Morris (1971), and Reid (1938).

Zeithaml (1988) suggests that in addition to quality and price, convenience (which may include such attributes as time costs, search costs, and effort) also must be included. That opinion is corroborated by a growing body of work that has found a strong link between convenience and consumer choice (Athanassopoulos 2000; Eastlick and Feinberg 1999; Gentry 2000; Goldin 1998; Ketzenberg, Metters, and Vargas 2000; Seiders, Berry, and Gresham 2000). In evaluating the factors that influence Value Equity, our goal was to incorporate the key antecedents of customer perceived value while focusing on the items under the firm's control on which they could take action. Hence, as stated earlier, we arrived at quality, price, and convenience as Value Equity's primary drivers.

Brand Equity

Brand Equity is the current marketing focus of many, if not most, leading companies (e.g., Interbrand Group 1992), and has received considerable attention in the academic world as well. The usefulness of Brand Equity in the business world is well summarized by a series of books by Aaker and Keller (Aaker 1991, 1995; Keller 1998), and its theoretical and practical implications are explored by a proliferating research literature in marketing (e.g., Aaker and Keller 1990; Kamakura and Russell 1991). Everyone agrees that Brand Equity involves behavior change above and beyond that which would be observed if everything but the brand were held constant. Certainly, then, if perceptions of quality, price, convenience, value, etc., are held constant, but the brand changes, then any resulting behavioral shift is the result of Brand Equity.

This suggests that the role of Brand Equity is largely a subjective and emotional one, because the largely objective aspects (quality, price, convenience) are held constant. The idea that Brand Equity consists of emotional and subjective connections is supported by the work of Fournier (1998), who found that customers may form different kinds of relationships with brands (e.g., "committed partnerships" or "flings") but that all the relationships involved emotional ties with the brand.

The nature of Brand Equity can therefore be differentiated from that of Value Equity. Thus, although recent writings about Brand Equity have expanded its definition to include a broad set of attributes that drive customer choice (e.g., Keller 1998; Yoo, Donthu, and Lee 2000), we find it useful to adopt a narrower definition that is largely consistent with its classic definitions (e.g., Aaker and Keller 1990; Kamakura and Russell 1991). We define Brand Equity as *the customer's subjective and intangible assessment of the brand, above and beyond its objectively-perceived value.*

Where Value Equity is driven by perceptions of quality, price, and convenience, Brand Equity is driven by image and personal meaning. If Value Equity addresses the customer's head, then Brand Equity addresses the customer's heart. Research in the area of Brand Equity has been extensive. Specific antecedents of Brand Equity that have been identified include brand associations or attitude, brand awareness or familiarity, corporate ethics, perceived quality, and strength of the relationship with the brand (Aaker 1991, 1995; Keller 1998). Similarly, Shocker and Weitz (1988) suggest brand loyalty and brand associations as key elements of Brand Equity. Finally, Yoo, Donthu, and Lee (2000) recognize brand loyalty, brand awareness, and brand associations as common dimensions of Brand Equity. However, there is some overlap between the Brand Equity literature and the customer value literature. For example, although Aaker suggests that perceived quality is an antecedent of Brand Equity, we feel it is more accurately described as an aspect of the customer's objective perception of the product or service offering, and that it should be included under Value Equity. Similarly, as we will show below, the customer's relationship to the firm (known as brand loyalty) is more accurately described as an aspect of the customer's Relationship Equity. Therefore, given our narrower definition of Brand Equity, the antecedents of Brand Equity that we propose can influence the customer's probability of purchase (and, therefore, customer lifetime value and Customer Equity) are brand awareness, attitude toward the brand, and perceptions of ethics and corporate citizenship.

Much research supports the inclusion of those three key antecedents of Brand Equity. Research that has found a link between brand attitudes and Brand Equity includes Baldinger (1990), Dean (1999), Keller (1993), and Park and Srinivasan (1994) (see also the 1997 special issue of *Journal of Advertising Research* on Brand Equity). In particular, Buchanan, Simmons, and Bickart (1999) examine specific contexts in which inconsistent brand communications affect customers' attitude toward the brand and can reduce Brand Equity. Yoo, Donthu, and Lee (2000) find evidence that brand associations and brand awareness have a strong effect on Brand Equity. Specific marketing-mix variables have been found to influence Brand Equity as well. Simon and Sullivan (1993) and Jedidi, Mela, and Gupta (1999) find that advertising expenditures and advertising share influence Brand Equity; Aaker (1991) proposes that public relations and slogans or jingles can have an effect; Keller (1993) suggests that promotional events may also be factors in developing Brand Equity. Keller (1993, 1998) finds that company image in general and corporate ethics in particular affect Brand Equity. Research that has found a strong link between a company's ethical (or unethical) behavior and consumer brand choice or shareholder value includes Ackerstein and Lemon (1999), Bone and Corey (2000), Brabbs (1999), Curlo (1999), Griffin, Babin, and Darden (1992), Roberts (1996), Weaver, Trevino, and Cochran (1999a), Weaver, Trevino and Cochran (1999b). That list represents only a small sample of the large body of research on Brand Equity. Overall, the research supports the key antecedents of Brand Equity we model: brand awareness, brand attitude, and corporate ethics.

Relationship Equity

It has long been noted that seemingly small improvements in customer retention can have large economic consequences (e.g., Payne and Rickard 1997; Reichheld and Sasser 1990). Although researchers have consistently demonstrated a link between customer satisfaction and retention (Bolton 1998; Rust and Zahorik 1993), in recent years some practitioners have noted that customer satisfaction and customer value alone cannot fully explain customer retention (Gale 1997; Reichheld 1996), as many dissatisfied customers are retained and many satisfied customers switch. There must be elements in addition to customer satisfaction (and, by extension, customer value) that cause customers to stay or leave.

In the last decade, academics and practitioners alike have engaged in significant research in the area of customer relationship management. This research has identified several antecedents to customer loyalty or customer repurchase intention. For example, consulting companies such as Bain & Company have created practices in customer retention that have tended to focus on loyalty programs or frequent-user programs, which typically attempt to increase customer retention by increasing customer switching costs. An example is the familiar frequent-flyer program, invented by American Airlines, and soon imitated by every major carrier, in which passengers accumulate miles that can be redeemed for free flights or other benefits. Having accumulated a significant number of miles, passengers are reluctant to switch primary allegiance to another airline, because doing so may mean being unable to redeem the accumulated miles. The loyalty that arises is based not on the Value Equity or Brand Equity of the core offering, but on programs in which benefits are directly tied to repurchase. Academic research confirms the value of loyalty programs in helping a firm protect itself against competition (Bolton, Kannan, and Bramlett 2000).

Recent research also suggests that, in addition to loyalty programs and special recognition and treatment programs, other forms of relationship management may increase customer switching costs, and thus Relationship Equity. The literature in relationship management is extensive (e.g., Anderson and Narus 1990; Gummeson 1999; Håkansson 1982; Holmlund 1997; Kumar 1999) and tends to focus on the interdependence between the customer and the provider, as well as on customer-relationship profitability (Storbacka 1994). Relationship management has also attracted considerable attention in industry. Peppers and Rogers (1999) focus on the value of learning relationships. Recent research on the role of the community in building customer relationships (e.g., McWilliam 2000) suggests that affinity programs and community-building programs can also build Relationship Equity.

The nature of Relationship Equity can, therefore, be differentiated from Value Equity and Brand Equity. Although some recent research has expanded the definition of customer relationship management to include a broad set of attributes that drive continued customer choice (e.g., Gummeson 1999), we adopt a narrower definition. We define Relationship Equity as *the incremental tendency of the customer to stick with the brand, above and beyond the customer's objective and subjective*

assessments of the brand, arising from relationship management. Thus, we consider the drivers of Value Equity and Brand Equity, even though they may affect customer retention, to be beyond the scope of Relationship Equity. Given our narrower definitions, we consider loyalty programs, special recognition and treatment, affinity, community building, and knowledge building to be the primary drivers of Relationship Equity.

Modeling Customer Equity

Customer Equity and Customer Lifetime Value

Because Customer Equity is the sum of the lifetime values of all a firm's customers, modeling Customer Equity requires modeling customer lifetime value. Customer lifetime value first received serious consideration in direct marketing (Dwyer 1989), but the concept has gained increasing attention throughout marketing. Traditional approaches to customer lifetime value consider a customer's contribution to profit (which may or may not change over time), the likelihood that the customer is retained from period to period, and the firm's discount rate. There have been considerable improvements in the assessment of customer lifetime value in recent years (e.g., Berger and Nasr 1998; Keane and Wang 1995; Reinartz and Kumar 2000) due to the increasing prevalence of customer databases and increasing recognition of the value of customer relationships. Determining customer contribution to profit is itself a complicated and difficult problem, but considerable progress has been made in recent years (see Mulhern 1999 for an excellent review).

When Are Customers Gone?

Customer retention has traditionally been treated under one of two assumptions (Jackson 1985). The "lost for good" assumption uses the customer's retention probability (often the customer retention rate in the customer's segment) as the probability that a firm's customer this period is still the firm's customer in the next period. Because the retention probability is typically less than one, the probability that the customer is still retained declines over time. The implicit assumption is that the customer is "alive" until he or she "dies," after which he or she is "lost for good." Models for estimating the number of active customers have been proposed for relationship marketing (Schmittlein, Morrison, and Columbo 1987), customer retention (Bolton 1998), and customer lifetime value (Reinartz 1999).

The second assumption is the "always a share" assumption, in which a customer does not give any firm all of his or her business. Attempts have been made to use a migration model to model this assumption (Berger and Nasr 1998; Dwyer 1989). The migration model assigns a retention probability as before, but also, if the customer has missed a period, a lower probability to indicate the possibility that the customer may return. If the customer has been gone for two periods, then an even lower probability is assigned, and so on. This is an incomplete model of switching, because purchases from only one firm are included.

In the lost-for-good scenario, the customer, once gone, is gone. This approach is questionable, because it will systematically understate customer lifetime value to the extent that it is possible for customers to return. In the migration scenario, the customer may leave and return. Under this scenario the customer may be either serially monogamous or even polygamous (Dowling and Uncles 1997), with vary-

ing, and perhaps changing, degrees of loyalty. We can model the second (more realistic) scenario using a Markov switching matrix.[3]

The Switching Matrix and Lifetime Value

We propose using a Markov switching matrix to model customer retention, defection, and possible return. Markov matrices have been widely used for many years to model brand switching behavior (e.g., Bass et al. 1984; Kalwani and Morrison 1977), and have recently been proposed for modeling customer relationships (Pfeifer and Carraway 2000; Rust, Zeithaml, and Lemon 2000). In such a model the customer has a probability of being retained by the brand in the next period or purchase occasion. This probability is the retention probability, as is already widely used in customer lifetime value models. The Markov matrix includes retention probabilities for all brands. The Markov matrix also models the customer's probability of *switching* from any brand to any other brand. This is the feature that permits customers to leave and then return, even repeatedly. In other words, the Markov matrix expands the migration model to include the perspective of multiple brands.

To see how the switching matrix relates to customer lifetime value, let us consider a simplified example. Suppose a particular customer (whom we will call George) buys once per month, on average, and purchases an average of $20 per purchase in the product category (with a contribution of $10). Let us suppose that George most recently bought Brand A. Suppose George's switching matrix is such that 70 percent of the time, George will rebuy Brand A, given that he bought Brand A last time, and otherwise (30 percent) will buy Brand B. Suppose that when George has bought Brand B last, he has a 50 percent chance of buying Brand A next time and a 50 percent chance of buying Brand B. This is enough information to permit us to calculate George's lifetime value to both Brand A and Brand B.[4]

To see this, let us consider George's next purchase. We know that he most recently bought Brand A. The probability of purchasing Brand A in the next purchase is .7 and the probability of purchasing Brand B is .3. To obtain the probabilities for the purchase following that, we simply multiply the vector comprising those probabilities by the switching matrix. The probability of purchasing Brand A becomes (.7 x .7) + (.3 x.5) = .64, and the probability of purchasing Brand B becomes (.7 x .3) + (.3 x.5) = .36. We can calculate the probabilities of purchase for Brand A and Brand B for as many purchases out as we choose, by successive multiplication by the switching matrix. Multiplying our results by the contribution per purchase yields the contribution each brand expects from George from each future purchase. Because future purchases are worth less than current ones, we apply a discount factor to future expected contributions. Summing the results up across all purchase occasions (out to infinity or to a finite time horizon) yields George's customer lifetime value for each firm.

Modeling the Switching Matrix

We see that modeling customer lifetime value requires modeling the switching matrix for each individual customer. We model each customer's switching matrix

using market-level estimates from a multinomial logit model, combined with the data from a sample of individual customers.

The Utility Model. Using the Customer Equity drivers described previously, we construct the individual-level utilities that drive the individual-level brand switching matrix. In addition to the Customer Equity drivers, we also include the effect of brand inertia, which has been previously shown to be a useful predictive factor in multinomial logit choice models in the past (Guadagni and Little 1983). This is necessary to separate the simple inertia effect from the effects of Relationship Equity. The utility formulation may be conceptualized as:

Utility = Inertia + Value Equity + Brand Equity + Relationship Equity (1)

where the Inertia term and Relationship Equity term only occur for potential repeat purchases. Making this more explicit, let U_{ijk} be the utility of brand k to individual i, who most recently purchased brand j. Let $LAST_{ijk}$ be a dummy variable, equal to one if $j = k$, and equal to zero otherwise. Let VE_{ik} be a column vector of Value Equity drivers, obtained from the customer value items, let BE_{ik} be a column vector of Brand Equity drivers, obtained from the brand items, and let RE_{ijk} be a column vector of Relationship Equity drivers, obtained from the relationship items. Then we model

$$U_{ijk} = \beta_{0k} LAST_{ijk} + \boldsymbol{VE_{ik}\beta_{1k}} + \boldsymbol{BE_{ik}\beta_{2k}} + LAST_{ijk}\,\boldsymbol{RE_{ijk}\beta_{3k}} + \varepsilon_i \qquad (2)$$

where β_{0k} is a market-level[5] logit regression coefficient, $\boldsymbol{\beta_{1k}}$, $\boldsymbol{\beta_{2k}}$, and $\boldsymbol{\beta_{3k}}$ are column vectors of market-level logit regression coefficients, and ε_i is a random error term, assumed to have an extreme value distribution. The β_{0k} term captures purchase inertia in the market, and the other three terms capture the effects of Value Equity, Brand Equity, and Relationship Equity, respectively. The β coefficients (but not the customer evaluations, frequency and quantity of purchase, or switching matrices) are assumed to be homogeneous across the population.[6]

The individual-level utilities (see Figure 2 for the three-brand case) result in individual-level switching matrices. Essentially each row of the switching matrix makes a different assumption about the most recent brand purchased, which results in different utilities for each row. That is, the first row assumes that the first brand was bought most recently, the second row assumes that the second brand was bought most recently, and so on. The utilities in the different rows are different because the effects of inertia and Relationship Equity are present only in repeat purchases.[7]

Figure 2. Individual Switching-Matrix Estimated Utilities—Three Brands

		TO 1	TO 2	TO 3
FROM	1	Inertia + RE_1 + VE_1 + BE_1	VE_2 + BE_2	VE_3 + BE_3
	2	VE_1 + BE_1	Inertia + RE_2 + VE_2 + BE_2	VE_3 + BE_3
	3	VE_1 + BE_1	VE_2 + BE_2	Inertia + RE_3 + VE_3 + BE_3

Consistent with the multinomial logit model, the probability of choice for individual *i* is modeled as:

Pr[individual *i* chooses brand *k**, given brand *j* was most recently chosen] =

$$= \exp(U_{ijk}^*) / \Sigma_k \exp(U_{ijk}) \quad (3)$$

Thus we see that the individual-level utilities result in individual-level switching matrices, which result in an individual-level customer lifetime value.

Brand Switching and Customer Equity. To make the customer lifetime value calculation more specific, each customer *i* has an associated *J* x *J* switching matrix, where *J* is the number of brands, with switching probabilities p_{ijk}, indicating the probability that customer *i* will choose brand *k* in the next purchase, conditional on having purchased brand *j* in the most recent purchase. Denote the Markov switching matrix as $\boldsymbol{M_i}$, and define a 1 x *J* row vector $\boldsymbol{A_i}$ to have as its elements the probabilities of purchase for customer *i*'s current transaction.

For brand *j* let d_j represent firm *j's* discount rate and let f_i be customer *i's* average purchase rate per unit-time (e.g., three purchases per year). Let v_{it} be customer *i*'s expected purchase volume[8] in purchase *t,* let π_{ijt} be the expected contribution margin expected by firm *j* from customer *i* in purchase *t,* and let $\boldsymbol{B_{it}}$ be a 1 x *J* row vector with elements B_{ijt} being the probability that customer *i* buys brand *j* in purchase *t*. The probability that customer *i* buys brand *j* in purchase *t* is calculated by repeated multiplication by the Markov matrix:

$$\boldsymbol{B_{it}} = \boldsymbol{A_i}\,\boldsymbol{M_i}^t \quad (4)$$

The lifetime value, LV_i of customer *i* can be computed for brand *j* as:

$$LV_{ij} = \Sigma_{t=o}^{T_i} (1 + d_j)^{-t/f} v_{it}\, \pi_{ijt}\, B_{ijt} \quad (5)$$

where T_i equals the number of purchases until the time horizon.

Firm *j*'s Customer Equity, CE_j can be calculated as:

$$CE_j = \Sigma_i LV_{ij} \quad (6)$$

It is worth pointing out the subtle difference between Equation 5 and most lifetime value expressions, such as those used in direct marketing. Previous lifetime value equations have summed over *time period*, with the exponent on the discounting factor becoming *-t*. In our case, however, we are dealing with distinct individuals with distinct interpurchase times (or equivalently, purchase frequencies *f*). For this reason we sum over *purchase* instead of time period. The exponent *-t/f* is the correct exponent corresponding to purchase, given that -t is the correct exponent corresponding to time period. If $f = 1$ (one purchase per period) it is easy to see that (5) is equivalent to the standard CLV expression. If $f > 1$, then the discounting per purchase becomes less than the discounting per period, to an extent that exactly equals the correct discounting per period. For example, for $f = 2$, the square root of the period's discounting occurs each purchase.[9]

We may also use the Customer Equity framework to derive an overall measure of the company's competitive standing. Market share, although traditionally used as a measure of the company's overall competitive standing, can be very misleading, because it considers only current sales. Clearly a company that has built the foundation for strong future profits is in better competitive position than a company that is sacrificing future profits for current sales, even if the two companies' current market shares are identical. With this in mind, we define the Customer Equity Share (*CES*) as an alternative to market share that takes into account the lifetime value of the customer. We calculate Customer Equity Share as:

$$CES_k = CE_k / \Sigma_j CE_j \quad (6a)$$

Subdrivers of Customer Equity

It is common in this sort of model to think of the Customer Equity drivers as being scales, and to think of the individual items within the drivers as the scale items. Standard scale validation techniques are used to test the quality of the scales and to purify the scales as necessary. A structural model is then built to relate the scales to other scales of interest, such as behavior. Finally, structural equation model techniques are used to estimate the coefficients from both the measurement model and structural model simultaneously.

We believe that this structural equation paradigm is inappropriate in our application. Our drivers are not scales, and our subdrivers are not scale items. In our framework subdriver improvements result in improvements for the corresponding drivers, but an action that improves one subdriver within a driver may have little or no effect on the other subdrivers within that driver. We also assume that the subdrivers are unique to each driver, and that each subdriver corresponds to a particular managerial arena (e.g., quality improvement efforts may improve quality, a Value Equity subdriver, while having little or no effect on the convenience subdriver).

Bollen and Lennox (1991) refer to the situation in which drivers form a construct as involving *causal indicators.* They point out that the use of causal indicators, as in

our model, makes standard scale validation procedures ill-advised: "Researchers relying on factor analysis or the examination of correlation matrices for selecting indicators may be overlooking valid measures of a construct if the indicators determine the latent variable." They also point out that common discriminant validity procedures do not work, either. In other words, the assumptions of our modeling framework are incompatible with the assumptions required for conventional scale validation methods.

Estimation

Data Required for Implementation. We assume that individual-level survey data can be collected from a probability sample of customers (not just the focal firm's customers[10]) in the market. The survey data include the most recent brand purchased, probabilities of brand choice for the next purchase, rating data on each firm's Value Equity drivers and Brand Equity drivers, and rating data on the Relationship Equity drivers for the firm from which the customer most recently purchased. We also assume the collection of a set of managerial inputs, including discount rate, average contribution margin, number of customers, and market size.

Principal-Components Multinomial Logit Estimation. In ratings data of this sort, multicollinearity is a potential problem. For this reason, we adopt an estimation approach that addresses the multicollinearity issue. Principal-components regression (Massy 1965) is an approach that performs reasonably well (Frank and Friedman 1993) and can be implemented with standard statistical software. The idea is to reduce the dimensionality of the independent variables by extracting a smaller number of principal components that explain a large percentage of the variation in those predictors. The principal components are then used as independent variables in the regression analysis, which in our case is a multinomial logit regression. This two-stage procedure is called principal-components regression (PCR), and is widely known in statistics, econometrics, and marketing (e.g., Freund and Wilson 1998; Hocking 1996; Naik, Hagerty, and Tsai 2000; Press 1982). Principal-components multinomial logit regression has been used successfully in the marketing literature, leading to greater analysis interpretability and coefficient stability (e.g., Gessner et al. 1988).

Because each of the factors is a linear combination of the original variables (Nunnally 1978), it is also possible to estimate the effects of the original independent variables on the dependent variable. Separating out the Value Equity, Brand Equity, and Relationship Equity drivers, and averaging across the customers in the sample, we have:

$$VE = \text{Value Equity} = \text{average } (\exp [\boldsymbol{VE}_i \boldsymbol{\beta}_1])$$

$$BE = \text{Brand Equity} = \text{average } (\exp [\boldsymbol{BE}_i \boldsymbol{\beta}_2])$$

$$RE = \text{Relationship Equity} = \text{average } (\exp [\boldsymbol{RE}_i \boldsymbol{\beta}_3]) \qquad (6b)$$

with the exponentiation necessary to make the quantities proportional to probability of purchase, as in Equation 3. We can also calculate the industry inertia value, which is $\exp[\beta_0]$. For example, an inertia value of 2.0 would imply that, all other

things being equal, a customer in the industry was twice as likely to buy the same brand the next time.

For the purposes of the principal-components analysis, let each customer-by-firm combination represent a data point. Let us denote the original independent variables for each customer-by-firm combination as the vector $\boldsymbol{X_{ik}}$, including $LAST_{ik}$, $\boldsymbol{VE_{ik}}$, $\boldsymbol{BE_{ik}}$, and $\boldsymbol{RE_{ik}}$. (We suppress the j subscript here because the brand previously purchased is fixed.) Treating the customer-by-firm combinations as replications, we extract the largest principal components of $\boldsymbol{X_{ik}}$ and rotate them using varimax rotation, to maximize the extent to which the factors load uniquely on the original independent variables. Th varimax rotation makes it easier for managers to interpret the data.[11] Let $\boldsymbol{F_{ik}}$ denote the rotated factor vector. These form the independent variables for our multinomial logit regression.

From Equation 2 we have:

$$U_{ik} = \boldsymbol{F_{ik}}\boldsymbol{\gamma} + \varepsilon_i \qquad (6c)$$

As noted before, there exists a matrix $\boldsymbol{A}$ for which $\boldsymbol{F_{ik}} = \boldsymbol{X_{ik}}\boldsymbol{A}$. Denoting $\boldsymbol{A}^*$ as the subvector of $\boldsymbol{A}$ corresponding to the reduced factor space, and γ^* as the estimated γ, we can express (6c) as:

$$\textit{est. } U_{ik} = \boldsymbol{X_{ik}}(\mathbf{A}^*\boldsymbol{\gamma}^*) \qquad (6d)$$

where est. U_{ik} is the estimated utility, which means that we can use $\boldsymbol{A}^*\boldsymbol{\gamma}^*$ as our estimated coefficient vector for $\boldsymbol{X_{ik}}$.

Usually in multinomial logit regression, the observed dependent variable values are 1's and 0's, corresponding to whether or not each brand was purchased (1 = brand was purchased, 0 = brand was not purchased). By contrast, in our case the dependent variable values are proportions, corresponding to the stated purchase intention probabilities.[12] Gensch and Soofi (1992) have devised an MDI/MLE approach, based on information theory, for the case in which proportions are the dependent variable in a multinomial-logit-like application. They showed that the coefficient estimates arising from their method were identical to those obtained by standard multinomial logit software. This result implies that, for the purpose of obtaining coefficient estimates, standard multinomial logit software such as LIMDEP can be used if the dependent variables are proportions. Also the LIMDEP software package expressly accommodates proportional dependent variables (Greene 1998). The only loss is that the reported significance tests do not apply.

Importance of Customer Equity Drivers

The results from estimating the model in Equation 2 can show which Customer Equity drivers are most critical in a given industry as well as which drivers are most important for an individual firm's Customer Equity. When examining an industry, it is useful to know what its key success factors are. Viewed from the standpoint of Customer Equity, is the key success factor Value Equity, Brand Equity, or

Relationship Equity? Are two of the Customer Equity components more important than the remaining one, or are all components equally important?

One simple way to answer this question is to ask by what factor the average firm's choice probability will improve if it brings a particular driver up to industry-best standards. Illustrating this calculation in the context of Value Equity, we have:

Importance of Value Equity = best Value Equity / average Value Equity

$$= \max \left(VE_k \right) / \textit{average} \left(VE_k \right) \quad (7)$$

We can also normalize this across the drivers, so that the importances sum to 100 percent, by computing the expression:

Relative Importance of Value Equity = [Importance of Value Equity / (Importance of Value Equity + Importance of Brand Equity + Importance of Relationship Equity)] x 100 (7a)

Making Marketing Financially Accountable

Effect of Changes

A firm may seek to improve its Customer Equity by making improvements in the drivers of Value Equity, Brand Equity, or Relationship Equity. The impact of such changes can be projected using standard spreadsheet models.[13] A firm might also drill down to improve subdrivers that influence the drivers (e.g., improving ad awareness to influence Brand Equity). The subdrivers may be related to the drivers by regression analysis.[14]

A shift[15] in a subdriver (e.g., advertising awareness), thus, produces an estimated shift in the driver (e.g., Brand Equity), which in turn produces an estimated shift in utility (from Equation 2) and a shift in the probabilities of choice (Equation 3), resulting in a revised Markov switching matrix (see Figure 2). This, in turn, results in an improved customer lifetime value (equations 4 and 5). Summed across all customers, this results in an improved Customer Equity (Equation 6).

The estimated rating shift that will result from an improvement effort may be obtained in several different ways. For example, if similar improvement efforts have been implemented previously, in similar markets or similar industries, then the rating shift that resulted in those markets may be a good beginning estimate for the current market. If no such data are available, then managerial judgment may be used to provide the estimate. Such an approach has been proven successful in many applications, especially in the context of decision calculus (Blattberg and Deighton 1996; Little 1970; Parker and Sarvary 1997). If greater accuracy is desired, then it is often possible to conduct a limited market test to gauge the degree of improvement actually experienced (Rust et al. 1999; Simester et al. 2000).

Projecting Financial Impact

Our models and empirical analysis suggest that investments in Value Equity, Brand Equity, and Relationship Equity can improve Customer Equity—but are those investments always profitable? Modern thinking in finance suggests that improvement expenditures should be treated as capital investments and viewed as profitable only if the return on investment exceeds the cost of capital. Financial approaches based on this idea are known by such names as Economic Value Added (EVA)(Ehrbar 1998) or Value-Based Management (Copeland, Koller, and Murrin 1996). The increased interest in EVA has attracted more attention to ROI approaches in marketing (Fellman 1999). For example, the Return on Quality approach (Rust, Zahorik, and Keiningham 1995) applies ROI to evaluating expenditures on service quality improvement. We extend the Return on Quality frame-

work to project the financial return from Customer Equity improvement expenditures, consistent with EVA and current financial thinking.

The calculations are straightforward. Let E be the discounted expenditure stream, discounted by the cost of capital, and let ΔCE be the improvement in Customer Equity that those expenditures produce. The return on investment is then calculated as:

$$ROI = (\Delta CE - E) / E \quad (8)$$

The calculation is accomplished using a spreadsheet program, which is set up to compute the links in the chain:

Subdrivers => Drivers => Choice Probability (each customer) => Customer lifetime value (each customer) => Customer Equity (summed across customers)

In other words, improvements in the subdrivers produce improvements in the drivers, which increase the individual choice probability (for the next and subsequent purchase occasions), which increases the customer lifetime value, which increases the Customer Equity.

Financial Opportunity

Often managers find it useful to quantify the financial opportunity associated with prospective managerial actions. Our approach enables managers to quantify the financial benefit from improving to industry-best level on one of the Customer Equity drivers. For example, how worthwhile is it to achieve a level of Value Equity that is equal to that of the best firm in the market? To calculate this, let max(VE) be the best Value Equity in the industry, and let VE_k be the Value Equity for firm k. Then, by increasing the firm's Value Equity by a factor of $\max(VE)/VE_k$, it will be made equal to the industry-best Value Equity. For simplicity, let us assume that this improvement is constant across all customers.[16] Then, because of the construction of equations 3 and 7, the probability of choosing firm k in each customer's switching matrix increases by that same factor. Following this improvement through the spreadsheet results in improved probability of choice, customer lifetime value, and Customer Equity. The increase in Customer Equity may be viewed as the financial opportunity for increased Customer Equity from achieving an industry-best standard on a particular driver or subdriver. Similar analyses can be conducted for the drivers of Brand Equity, and Relationship Equity, drilling down as many levels as is feasible from the standpoint of data collection.

Empirical Illustration

Data

Surveys. A consumer survey was developed to examine industry- and company-specific differences in the drivers of Customer Equity. In designing the survey, we drew heavily upon prior research in the areas of customer perceived value, brand equity, and relationship marketing. The resulting survey contained four sections for each industry: (1) shopping behavior (2) value perceptions, (3) brand perceptions, and (4) relationship questions. The four sections of the survey were customized to each industry, focusing on Value Equity, Brand Equity, and Relationship Equity for each industry. In addition, several demographic questions were asked at the end of the survey. An example of the survey for one industry appears in the appendix.

To better understand the key drivers of Customer Equity, it was important to choose very distinct industries, each with relevance at the consumer level. Industry categories were selected based on the following criteria: The industry had a finite set of well-defined players (to provide tractable Markov matrix estimation), key brand names in the category would be recognized by most consumers (to minimize noise from consumers' lack of knowledge of an option), and consumers would be likely to have consumed the product or service in the prior 12 months (for ease of data collection). Airlines, electronics stores, facial tissues, grocery stores, and rental cars were chosen to represent a broad set of consumer goods and services.

Population. Illustrative data were obtained from two communities in the Northeastern United States—an affluent small town, and a medium-sized city adjoining a larger city. Respondents were real consumers who had purchased the product or service in the industry in question in the last year. Demographic statistics suggest that the sample is representative of similar SMSAs (Standard Metropolitan Statistical Areas) within the United States, although with higher than average levels of education and income. In the small town (population around 20,000), the average age of the respondent was 47, with two adults in the household and one child, average household income of $91,000, and at least an average of 17 years of education. In the large city, the average age was somewhat lower (39), again with two adults in the household and one child, with an average household income of $70,000, and at least college-level education.

Sampling. Respondents were obtained from three random samples. The first sample, drawn from the city population, answered questions about electronics stores and rental car companies. The second sample, also drawn from the city population, answered questions about groceries and facial tissues. The third sample, drawn from the small town, answered questions about airlines. Potential respondents were contacted at random by recruiters from a professional market-research organization (either through phone solicitation or building intercept). To be eligible to participate, the respondent had to have purchased from the industry in the

past 12 months and had to have a household income of at least $20,000 per year. Respondents received $20 compensation for completing the questionnaire.

In the electronics stores and rental cars survey, 246 consumers were approached, 153 were eligible, 144 participated, and 7 were disqualified, resulting in a total of 137 surveys completed. In the groceries and facial tissues survey, 177 consumers were approached, 124 were eligible, 122 participated, and four were disqualified, resulting in a total of 118 surveys completed. In the airline survey, 229 consumers were approached, 119 were eligible, 105 participated, and 5 were disqualified, resulting in a total of 100 surveys completed.

Data Collection and Preliminary Analysis. The data were collected by a professional marketing research data collection facility. Data were collected in December 1998 and January 1999 at the firm's offices in each location. The respondents came to the facility to complete the pencil-and paper-questionnaire, which took about 30 minutes. In addition, we obtained aggregate statistics regarding the small town and city (e.g., percentage of the population who use rental cars, average spent at grocery stores, etc.) from secondary sources and used them in subsequent analysis. For purposes of financial analysis, we used local population and aggregate usage statistics for predominantly local industries (electronics stores and grocery stores) and national statistics for predominantly national industries (airlines, facial tissues, and rental cars).[17] Data were cleaned to eliminate obviously bad cases and extreme outliers. Because listwise deletion of cases would have resulted in too many cases being removed (even though only a relatively small percentage of responses were missing for particular items), mean substitution was employed as our missing data option for all subsequent analyses.[18] The Relationship Equity drivers were mean-centered for the cases in which the brand considered was the previously purchased brand, and were set equal to zero for the cases in which the brand considered was different from the previously purchased brand. This enabled the inertia effect to be separated from the Relationship Equity effect.

Principal-Components Logistic Regression Results

We reduced the dimensionality of the predictor variables in each industry by conducting a principal-components analysis using SPSS 9.0. We used an eigenvalue cutoff of .5, which we judged to provide the best trade-off between parsimony and managerial usefulness. This resulted in between 6 and 11 factors being extracted. Because presenting the results from all industries would be onerous and repetitive, we illustrate the principal-components phase of the analysis using the airline industry.

The airline analysis began with 17 independent variables, and 11 factors were retained. Table 1 shows the loadings on the rotated factors, with loadings over .5 shown in bold. We see that there is remarkable separation between the variables, and that all the factors are easily interpretable. This was also true in the other industries. There are no large negative loadings. Where more than one variable loaded on a factor, they tended to be items from the same Customer Equity driver. For example, Factor F1 has four Relationship Equity drivers loading on it (seemingly related to frequent-flyer programs), and F4 has two Brand Equity drivers

with high loadings (advertising and information). Many of the variables (e.g., inertia, quality, price, convenience, trust, corporate citizenship) load highly only on their own unique factor.

Table 1. Factor Loadings—Airline Industry

C.E. Driver	Variable	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
	Inertia	-.013	-.004	.033	.038	.015	.116	-.024	**.984***	.029	.043	.002
Value Equity	Quality	.097	.058	.174	.076	.147	.212	.014	.049	.068	**.904**	.083
	Price	.044	-.007	.128	.054	.078	.023	.039	.030	**.975**	.059	.034
	Convenience	.078	.068	.219	.161	.043	**.830**	.066	.163	.018	.260	-.015
Relationship Equity	Investment in loyalty program	**.921**	.044	.090	.032	-.007	-.060	.018	.014	-.003	.137	-.103
	Preferential treatment	**.898**	.087	.082	-.002	.022	-.071	-.029	.032	-.007	.077	.104
	Know airline procedures	**.708**	.232	-.022	.116	.029	.166	.058	-.033	.010	-.069	.240
	Airline knows me	**.681**	.309	-.073	-.059	-.001	.356	-.012	-.061	.136	-.075	.219
	Recognizes me as special	.214	**.851**	.069	.077	-.036	.042	.138	-.004	-.044	.118	.092
	Community	.175	**.876**	.065	.031	.166	.035	-.015	.001	.036	-.042	.129
	Trust	.246	.227	.179	.069	.041	-.003	.031	.006	.038	.091	**.889**
Brand Equity	Advertising	-.031	.130	.038	**.938**	-.010	.022	.048	-.011	.074	.101	.058
	Information	.216	-.077	.248	**.656**	.322	.299	-.207	.125	-.038	-.058	.016
	Corporate citizenship	.011	.122	.150	.093	**.880**	.001	.256	.021	.077	.137	.006
	Community events	.021	.100	.188	-.042	.226	.051	**.921**	-.026	.041	.011	.029
	Ethical standards	-.016	.044	**.605**	.105	.458	.266	.028	-.034	.104	.109	.218
	Image fits my personality	.098	.112	**.878**	.107	.069	.092	.203	.058	.110	.142	.081

*Loadings > .5 shown in bold

It is clear that there is discrimination between Value Equity, Brand Equity, and Relationship Equity, in that their drivers do not correlate highly on the same factors. As expected, Value Equity, Brand Equity, and Relationship Equity are not unidimensional. The items making up the Customer Equity drivers may be grouped in the way managers think about them, but it is important to note that those items are often quite distinct in the customer's mind.

Using the resulting factors as independent variables, we conducted multinomial logit analyses, using proportional dependent variables, using LIMDEP 7.0. Table 2 shows the coefficients arising from the multinomial logit regression analysis. All coefficients with an absolute value greater than .35 are highlighted. The largest

coefficients span all three Customer Equity drivers. There are also some notable themes. Inertia is always an important factor (at least .48 in every industry). Among the Value Equity drivers, the factors related to quality and price have large coefficients in most industries, as do factors related to convenience. Brand Equity loads highly on important factors in every industry, and Relationship Equity shows up as important in some industries but not others.

Table 2. Multinomial Logit Principal-Components Regression Coefficients

	Coefficient (Items loading highest on factor)				
	Airlines	Electronics Stores	Facial Tissues	Grocery	Rental Cars
Factors	11	8	6	8	9
F1	.32	.08	.09	-.03	.11
F2	-.03	**.81** (convenience, 2 Brand Equity drivers)	**.67** (3 Brand Equity drivers)	**1.24** (conv., 2 Brand Equity drivers)	.02
F3	**.42** (2 Brand Equity drivers)	.01	.35 (price)	.00	**.56** (2 Brand Equity drivers)
F4	**.46** (2 Brand Equity drivers)	**.37** (quality, image)	**.52** (quality)	.20 (quality)	.11
F5	.21	**.37** (community events)	**.40** (convenience)	.03	**.49** (corporate citizenship)
F6	.33	**.39** (price)	**.68** (inertia)	.10	**.46** (price)
F7	-.08	**.48** (inertia)		**.41** (price)	**.49** (inertia)
F8	**.63** (inertia)	.03		**.67** (inertia)	**.48** (quality)
F9	.03				**.61** (convenience)
F10	.18				
F11	-.33				

Performance and the Importance of Customer Equity

Table 3 shows Customer Equity results for each company in each industry. The first column gives the total Customer Equity, projected for the relevant market. Projections were based on the average customer lifetime value for our sample, multiplied by the total number of adult customers in the population. We can see that a company's Customer Equity can be very large. For example, United Airlines is projected to have a Customer Equity of over $8 billion. The second column expresses the Customer Equity share as a percentage. The most dominant brand in the five industries in terms of Customer Equity is Kleenex, with a Customer Equity share

of 51.7 percent. The least concentrated market is electronics stores; no store has a Customer Equity share over 26 percent.

Table 3. Competitive Standing Across Five Industries

		Overall Measures		Customer Equity Drivers			Value Equity Subdrivers		
Industry	Company	Customer Equity ($ millions)	Customer Equity Share	Value Equity	Brand Equity	Relationship Equity	Quality	Price	Convenience
Airlines	American	$7,303	29.5%	1.05	1.04	1.87	3.64	3.40	3.57
	Delta	$5,092	20.6%	1.07	1.04	.67	3.48	3.50	3.73
	Southwest	$4,003	16.2%	.79	.83	.87	3.46	4.19	2.99
	United	$8,330	33.7%	1.19	.95	.74	3.68	3.42	3.73
Electronics	Best Buy	$1.836*	17.9%	1.28	1.08	.63	3.74	3.96	3.13
	Cambridge Sound Works	$1.851*	18.0%	.76	.71	.89	3.89	3.40	2.77
	Circuit City	$2.680*	26.1%	1.27	1.35	1.10	3.58	3.69	3.68
	Sears	$1.900*	18.5%	1.09	1.09	1.24	3.32	3.55	3.89
	Tweeter, etc.	$2.010*	19.6%	.74	.89	1.55	3.77	3.40	2.86
Facial Tissues	Kleenex	$1,488	51.7%	2.08	1.92	1.04	4.41	3.52	4.52
	Puffs	$ 825	28.7%	1.32	1.32	.95	4.28	3.36	3.92
	Scotties	$ 439	15.3%	.83	.89	1.29	3.55	3.46	3.88
	Store Brand	$ 124	4.3%	.47	.44	.69	2.39	3.94	3.86
Grocery	Bread & Circus	$1.243*	7.4%	.50	.67	.70	4.41	2.68	2.14
	Market Basket	$3.804*	22.8%	1.37	.81	.85	3.44	4.10	2.65
	Nature's Heartland	$ .706*	4.2%	.33	.38	.76	3.72	2.83	1.72
	Star Market	$4.781*	28.6%	1.94	2.12	1.21	3.84	3.45	3.82
	Stop & Shop	$6.157*	36.9%	2.13	2.26	1.00	3.76	3.56	3.89
Rental Cars	Alamo	$ 837	20.2%	.79	.97	1.10	3.35	3.37	3.03
	Avis	$1,002	24.2%	1.30	1.05	.96	3.71	3.24	3.24
	Budget	$ 732	17.7%	.93	.92	.82	3.42	3.37	3.13
	Hertz	$1,215	29.3%	1.90	1.24	1.12	3.93	3.20	3.44
	National	$ 354	8.6%	.47	.86	.97	3.22	3.01	2.92

*Local market only

The companies' performance on the Customer Equity drivers is presented in the next three columns, with the Value Equity subdrivers shown in the following three columns. For example, the most dominant Value Equity brands are Stop & Shop, which excels in convenience, and Kleenex, which excels in both quality and convenience (availability). Lowest in Value Equity are store-brand facial tissues, which rate very low in quality, and Nature's Heartland, a natural-foods grocery store, which customers rate as inconvenient and pricey. American Airlines, which pioneered the frequent-flyer program, comes out best on Relationship Equity.

Table 4 shows the aggregate Customer Equity results for each industry, giving the number of customers in each industry, the total Customer Equity, and the average

customer lifetime value per customer. The industry Customer Equity ranges from $24.7 billion for the national airline market to $10.3 million for the local electronics-store market. Customer lifetime value ranges from $565.27 for airline customers to only $21.70 for facial tissue customers. Clearly an airline can justify greater expenditures to maintain a customer relationship than a facial-tissue brand can. Also shown in Table 4 is the industry inertia factor, the factor by which sales are increased by having purchased the brand in the most recent purchase, controlling for the Customer Equity drivers. This ranges from a high of 6.94 for grocery-store customers (reflecting regular and routine purchasing) to a low of 3.73 for electronics-store customers (reflecting infrequent purchasing).

Table 4. Industry Summary

	Airlines	Electronics Stores*	Facial Tissues	Grocery*	Rental Cars
Number of Customers	43.7 million	32,547	132.5 million	70,272	20.8 million
Customer Equity	$24.7 billion	$10.3 million	$2.9 billion	$16.7 million	$4.1 billion
Average LTV per Customer	$565.27	$315.79	$21.70	$237.52	$198.67
Industry Inertia Factor	4.30	3.73	4.73	6.94	3.95
Importance of Value Equity	15.5%	24.6%	44.0%	37.8%	68.1%
Importance of Brand Equity	7.5%	31.9%	38.9%	43.9%	20.5%
Importance of Relationship Equity	77.0%	43.5%	17.1%	18.3%	11.3%

*Local market only (otherwise projected to U.S. market)

Table 4 and figures 3a–3c show the relative importance of each of the Customer Equity drivers across the five industries. Value Equity is most important in the rental car industry (68.1 percent), which tends to be predominantly a rational, business-to-business market. It is least important in the airline industry (15.5 percent), where such factors as frequent-flyer programs may sometimes swamp the effect of customer value. Brand Equity is most important for grocery stores (43.9 percent) and facial tissues (38.9 percent), two categories that involve frequent discrete transactions, and is least important for airlines (7.5 percent) where relationships are key. Relationship Equity, not surprisingly, is most important for airlines (77.0 percent), for whom frequent-flyer programs are important marketing weapons, and least important for facial tissues (17.1 percent), where relationship-building is difficult, and rental cars (11.3 percent), where customer value dominates. Averaging across the five industries, the importance of the three Customer Equity drivers is fairly balanced, with Value Equity (38.3 percent) followed by

Relationship Equity (33.4 percent) and Brand Equity (28.5 percent) in average importance. This suggests that Brand Equity is not the key to marketing success in every industry.

Figure 3a. Importance of Value Equity by Industry

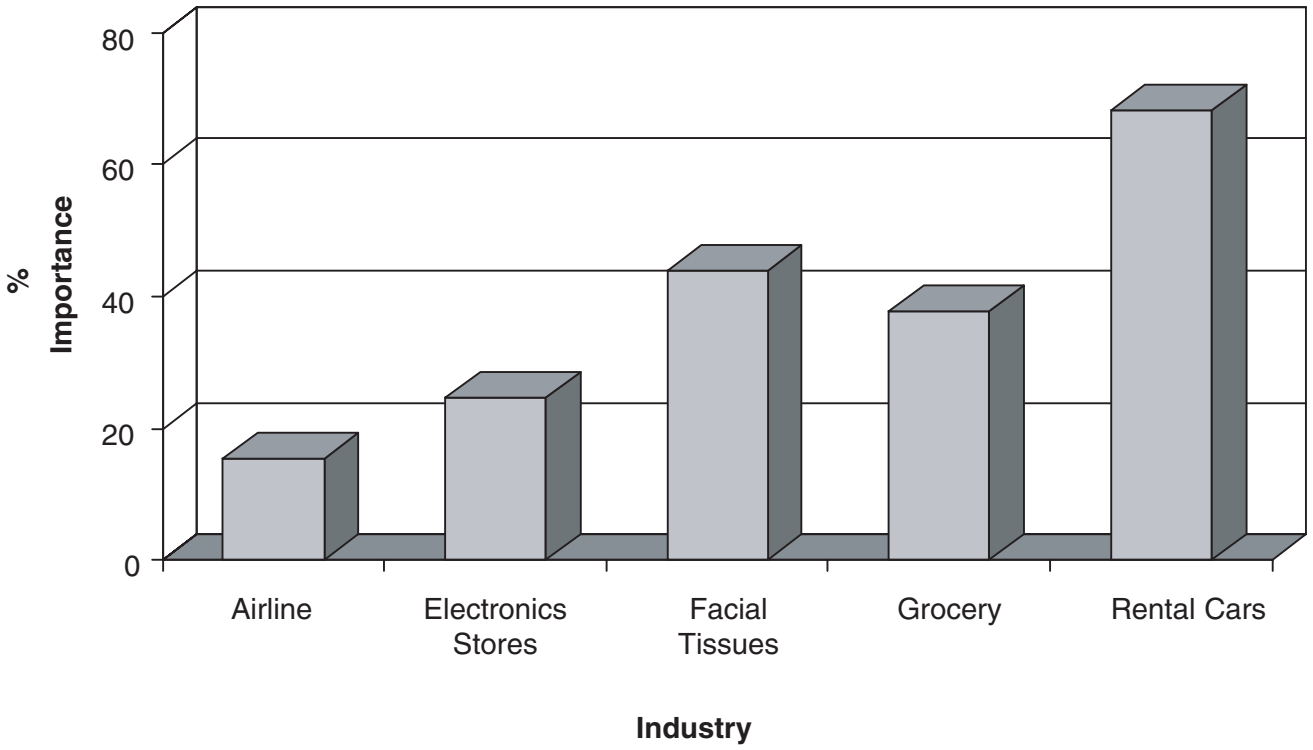


Figure 3b. Importance of Brand Equity by Industry

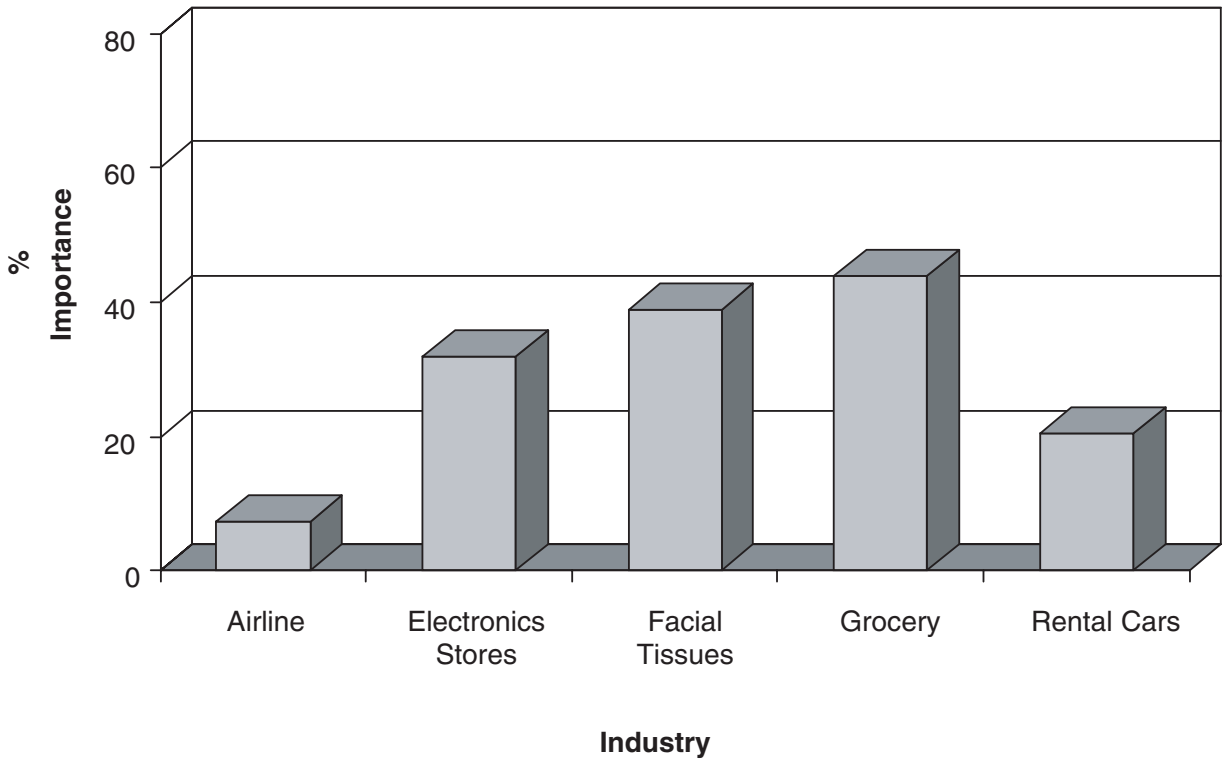
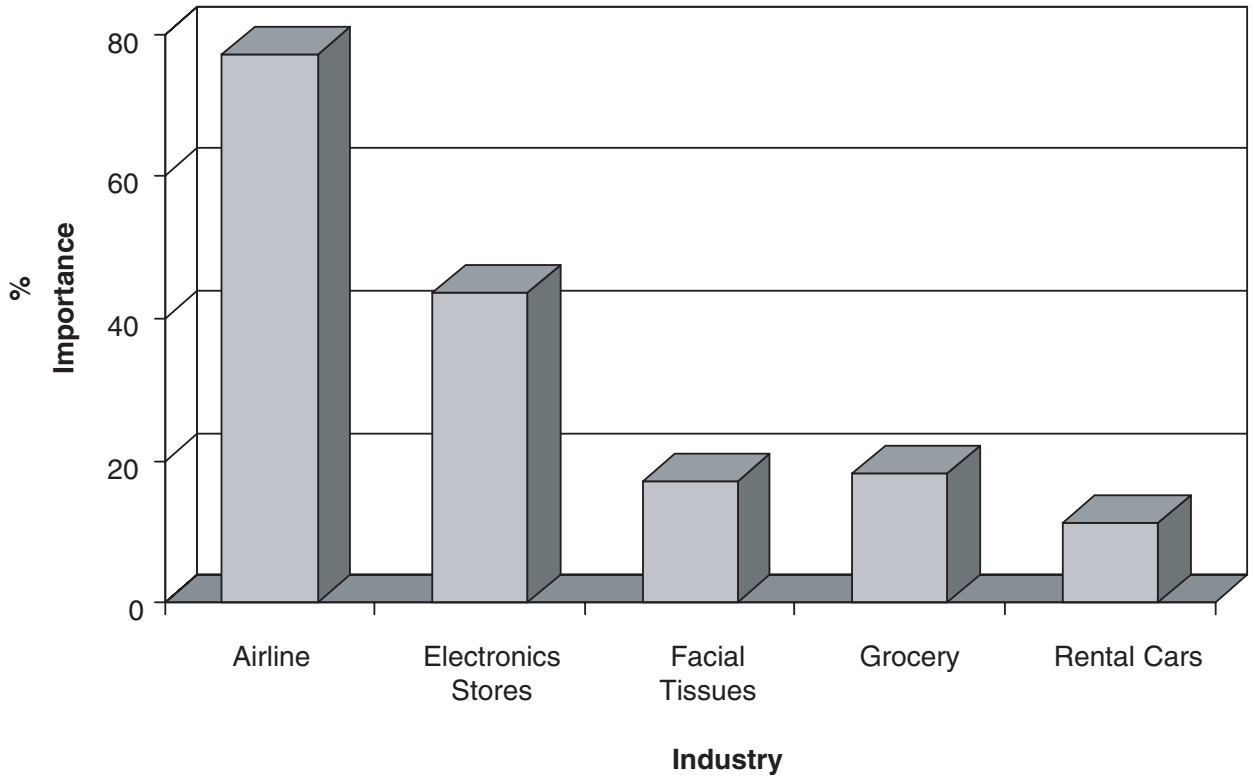


Figure 3c. Importance of Relationship Equity by Industry



On the individual firm level, we may investigate the opportunity (in increased Customer Equity) that a company has by achieving an industry-best level on one of the drivers or subdrivers of Customer Equity. This provides the potential magnitude of investments that may be justified to improve the firm to a level on par with the best in the industry. Figure 4a show results for Avis. We can see that Value Equity provides the best means of increasing Customer Equity. By matching Hertz on Value Equity, Avis can increase its Customer Equity by $146.8 million. Both Brand Equity and Relationship Equity provide Avis with far less opportunity. Drilling deeper, into the drivers of Value Equity, we can see from Figure 4b that improving quality is most important. Matching Hertz on quality improves Avis's Customer Equity by $103.4 million. Convenience ($51.9 million) also provides a large opportunity, whereas price ($38.5) provides the least opportunity of the three drivers.

Figure 4a. Customer Equity Opportunity—Drivers of Customer Equity (Avis)

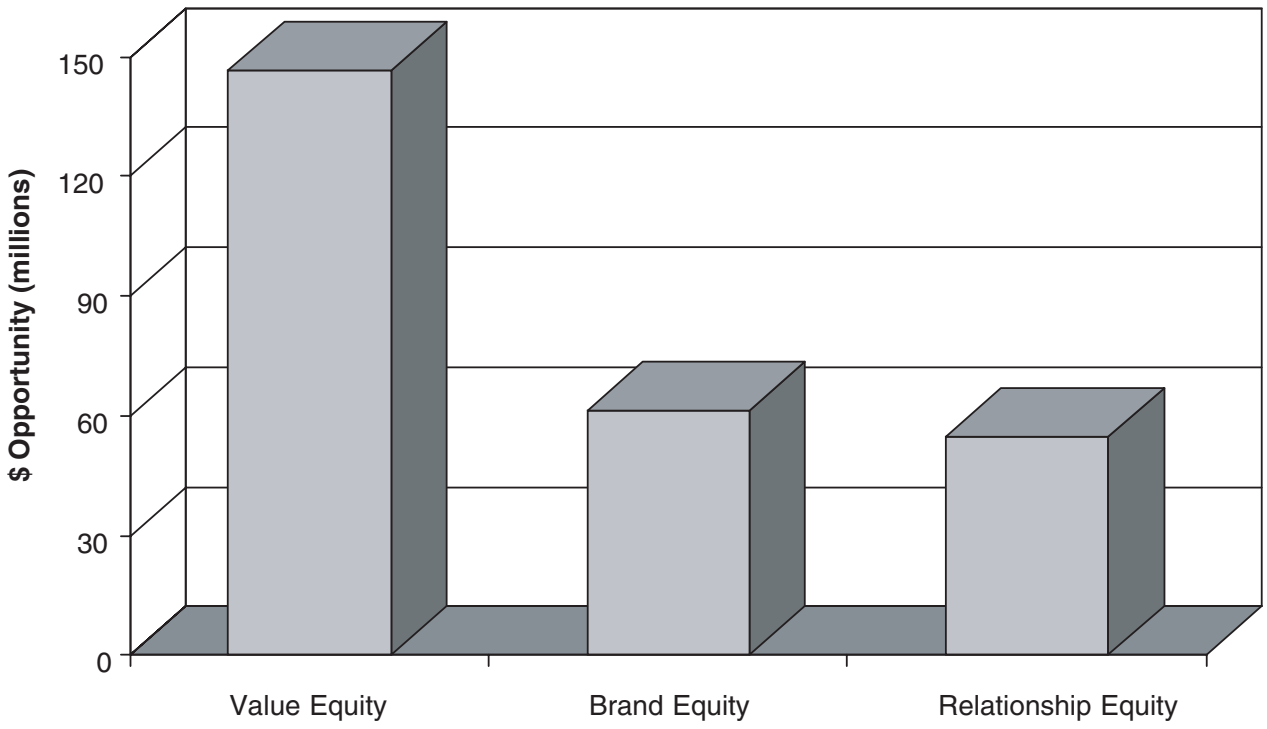
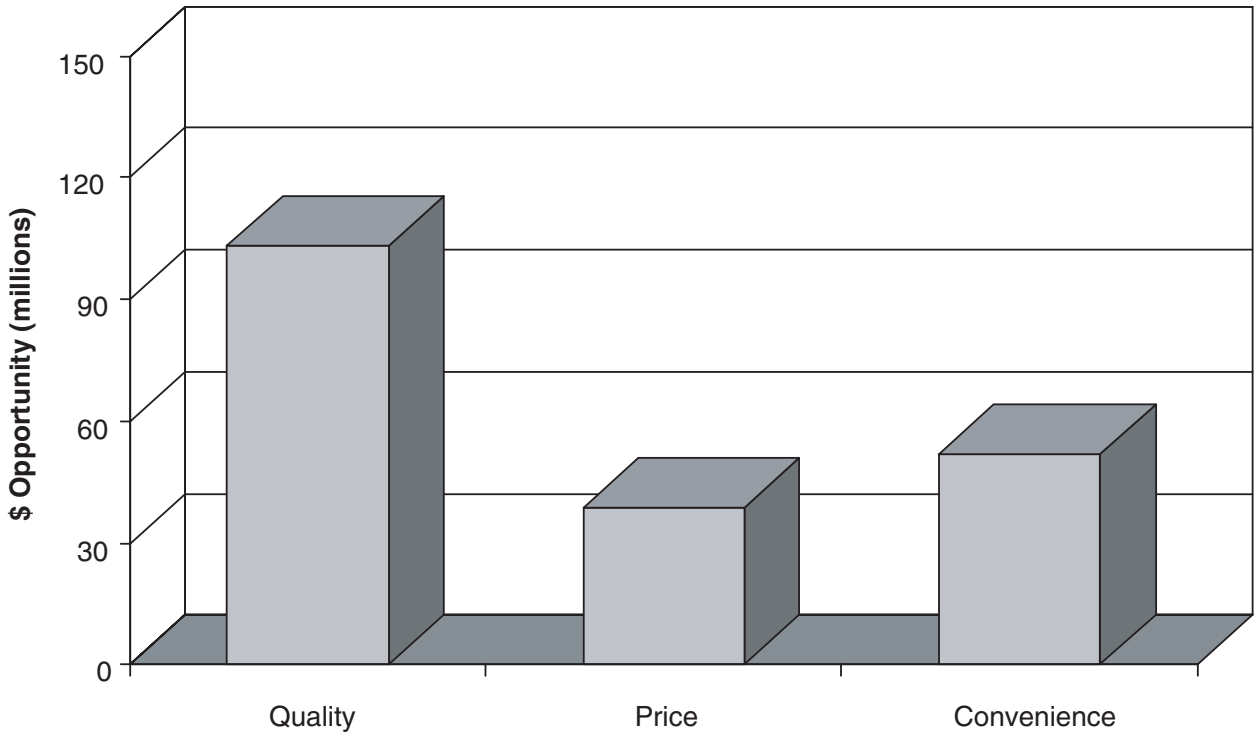


Figure 4b. Customer Equity Opportunity—Subdrivers of Value Equity (Avis)



Financial Impact

Our framework permits the financial impact of improvement efforts for any of the usual marketing expenditures to be analyzed. For example, recently American Airlines reportedly spent $70 million to upgrade the quality of its passenger compartments in Coach class. Was the investment justified? If we assume that the average for the item measuring quality of the passenger compartment (a subdriver of Quality, which itself is a subdriver of Value Equity) increases by .5 rating points on the five-point scale, then our spreadsheet analysis (see Table 5) indicates that Customer Equity will improve by 3.67 percent, resulting in an improvement in Customer Equity of $267.7 million nationally. This projects to an ROI of 282 percent, which indicates that the program has an opportunity to be a big success. Even a much smaller improvement in passenger compartment quality could justify the $70 million expenditure. Likewise, a $15 million expenditure by Puffs facial tissues to improve ad awareness by .1 rating points would result in a $19.2 million improvement in Customer Equity, and an ROI of 28 percent.

Table 5. Projected Return on Investment from Marketing Expenditures

Company (Industry)	Area of Expenditure	Geographic Region	Investment	Amount Improved	% Improvement in Customer Equity	$ Improvement in Customer Equity	Projected ROI
American (Airlines)	Passenger compartment	USA	$70 million	.5 rating pt.	3.67%	$267.7 million	282%
Puffs (Facial tissues)	Advertising	USA	$15 million	.1 rating pt.	2.32%	$19.2 million	28%
Delta (Airlines)	Ethical standards	USA	$50 million	.1 rating pt.	1.68%	$85.5 million	70%
Bread & Circus (Groceries)	Loyalty programs	Local market	$50,000	.5 rating pt. in two measures	1.12%	$13,872	-72%

It is even possible to measure the financial impact of corporate ethical standards or corporate citizenship. For example, if Delta spent $50 million to improve customers' perceptions of Delta's ethical standards by .1 rating points, this would project to a Customer Equity improvement of $85.5 million (a 1.68 percent increase, and an ROI of 70 percent). Such findings may cause some airlines to think twice about practices such as canceling flights that are not full enough to be profitable.

It should be pointed out that not all investments will project to be profitable. For example, suppose that the grocery store Bread & Circus decides to spend $50,000 in the local retail area to improve its loyalty program ratings, across two measures, by .5 points. It turns out that the projected benefit ($13,872 increase in Customer Equity) is not enough to justify the expenditure. The ROI is -72 percent.

These examples illustrate only some of the marketing expenditures that can be evaluated using the Customer Equity framework. Any marketing expenditure can be related to the drivers of Customer Equity, measured, and evaluated financially. This capability enables a firm to screen improvement ideas either before they are applied, or after a test market has nailed down the degree of improvement to be expected (Rust et al. 1999; Simester et al. 2000).

Discussion and Conclusions

Implications for Marketing Theory and Practice

This work is highly relevant to the current needs of the marketing field, as reflected by the 1998–2000 research priorities of the Marketing Science Institute (MSI 1998). Of all of its research topics, the very most important were "capital topics." For 1998–2000 the top-priority capital topic was "Marketing Metrics and Performance Measures."[19] Our work addresses all the elements of MSI's top-rated capital topic. We address each subpoint of MSI priority topic 1 in turn:

- ❑ "Research that measures 'marketing performance' in new and creative ways—especially linking such performance to enterprise success." The Customer Equity framework enables marketing performance to be measured in terms of return on investment. Marketing performance is directly linked to Customer Equity, an important measure of enterprise success.

- ❑ "Value of customer—value of loyalty, lifetime value of customer, brand loyalty (across products)." We describe a new model of the lifetime value of the customer, based on a Markov switching matrix, that can accommodate the full range of customer switching behaviors, including switching away from a brand and then back again. This extends previous conceptualizations that had either assumed that customers who left were gone for good, or had not explicitly modeled the competitive environment. Further, the Customer Equity framework directly facilitates the calculation of return on brand loyalty (through Return on Relationship Equity and Brand Equity).

- ❑ "Early warning' marketing indicators." We propose a new early-warning metric that we call Customer Equity Share (the firm's share of Customer Equity within the market), and argue that it is a better indicator of future prospects than the more commonly used metric, market share.

- ❑ "The relationship between actual company performance and measures of customer satisfaction." The Customer Equity framework makes it possible for a firm to explore the effect of customer satisfaction on Customer Equity, an important measure of company performance.

- ❑ "New metrics—customer valuation vs. unit sales; 'share of wallet'/loyalty vs. repeat purchase." Customer Equity share is an aggregate competitive measure of customer valuation, which we contrast with market share, one form of which is an aggregate competitive measure of unit sales. We also model share of wallet, loyalty, and repeat purchase.

- ❑ "Evaluating marketing accountability." Our framework makes Customer Equity and its drivers, which include all the major marketing expenditures, financially accountable.

Customer Equity also provides the basis for customer-centered strategy. By creating a conceptual framework that brings together recent advances in our understanding of customer value management, brand equity management, and relationship management, we can begin to understand the distinct roles of value, brand, and relationship in growing the firm. Basing strategic investment on the drivers of Customer Equity directly operationalizes those marketing concepts. Seen another way, the Customer Equity framework makes strategic decisionmaking inherently information-driven, which is consistent with long-term trends of decreasing costs for information gathering and information processing.

The Customer Equity framework is also practical to use. Because the measurement approach requires only cross-sectional data, the cycle time required to fully implement the method is reduced to a matter of months. Furthermore, the mathematical infrastructure can be implemented using widely available statistical packages and spreadsheet programs.

Directions for Future Research

In this paper, we have developed and illustrated a new strategic framework for marketers. As with any new endeavor, there is much work yet to be done. Specifically, we identify three key areas for future research. First, we see a distinct opportunity to link Customer Equity and corporate valuation. Although Customer Equity arises from the EVA corporate valuation tradition, a deeper understanding of the connection between Customer Equity and the value of a company is needed. Second, the theoretical framework could be extended to accommodate rapid-growth industries, such as e-commerce. To do so requires more attention to the modeling of customer acquisition within an industry. One would anticipate the overlay of a formal birth-death process for customers in an industry, which would then directly impact customer lifetime value and Customer Equity. Third, applications of this framework and further empirical validation of its elements would be very useful, especially across different cultures. For example, in what kinds of cultures is Value Equity (or Brand Equity, or Relationship Equity) most important, and why? As we seek to understand the role of marketing in the new century, we have significant opportunities to deepen our understanding of the antecedents and consequences of Customer Equity.

Appendix. Example Survey Items (Airline Survey)

Here are some examples of survey items that might be used to measure Customer Equity and its drivers. These items are from the survey that we used to analyze the airline market:

Market Share and Transition Probabilities (the headings in this appendix are for explanatory purposes, and would not be read to the respondent)

1. Which of the following airlines did you most recently fly? (please check one)

American Airlines _____

Delta Airlines _____

Southwest Airlines _____

United Airlines _____

2. The next time you fly a commercial airline, what is the probability that you will fly each of these airlines?

Airline *Probability (please provide a percentage for each airline, and have the percentages add up to 100%)*

American Airlines _____

Delta Airlines _____

Southwest Airlines _____

United Airlines _____

Size and Frequency of Purchase

3. When you fly, how much on average does the airline ticket cost?

_____less than $300

_____between $300 and $599

_____between $600 and $899

_____between $900 and $1,199

_____between $1,200 and $1,499

_____between $1,500 and $1,799

_____between $1,800 and $2,099

_____$2,100 or more

4. On average, how often do you fly on a commercial airline?

_____once a week or more

_____once every two weeks

_____once a month

_____3–4 times per year

_____once a year

_____once every two years, or less

Value Equity Drivers

5. How would you rate the overall quality of the following airlines?

Airline	*Very High Quality*				*Very Low Quality*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

6. To what extent is the quality of the following airlines worth the price paid?

Airline	*Worth Much More*				*Worth Much Less*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

7. How would you rate the competitiveness of the prices of each of these airlines?

Airline	*Very Competitive*				*Not at All Competitive*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

8. The airline flies when and where I need to go.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

9. It is easy to make reservations with the airline.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

10. Please rate the "everyday" or regular prices charged by each of these airlines, compared to other airlines.

Airline	*Much Lower than Other Airlines*				*Much Higher than Other Airlines*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

11. Please rate the discounted prices offered by each of these airlines.

Airline	*Much Lower than Other Airlines*				*Much Higher than Other Airlines*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

Brand Equity Drivers

12. My attitude toward the airline is extremely favorable.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

13. I often notice and pay attention to the airline's media advertising.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

14. I often notice and pay attention to information the airline sends to me.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

15. The airline is well-known as a good corporate citizen.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

16. The airline is an active sponsor of community events.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

17. The airline has high ethical standards with respect to its customers and employees.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

18. The image of this airline fits my personality well.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

19. I have positive feelings toward the airline.

Airline	*Strongly Agree*				*Strongly Disagree*
American Airlines	5	4	3	2	1
Delta Airlines	5	4	3	2	1
Southwest Airlines	5	4	3	2	1
United Airlines	5	4	3	2	1

Relationship Equity Drivers (asked only for the airline most frequently flown)

20. I have a big investment in the airline's loyalty (frequent-flyer) program.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

21. The preferential treatment I get from this airline's loyalty program is important to me.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

22. I know this airline's procedures well.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

23. The airline knows a lot of information about me.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

24. This airline recognizes me as being special.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

25. I feel a sense of community with other passengers of this airline.

Strongly Agree				*Strongly Disagree*
5	4	3	2	1

Notes

1. For expositional simplicity, we assume throughout much of this paper that the firm has one brand and one market, and therefore use the terms "firm" and "brand" interchangeably.

2. When the appropriate longitudinal data are readily available (or easily collected) as in the direct mail industry, a longitudinal approach may be preferred.

3. It is also possible to model the share-of-wallet scenario common to business-to-business applications, using the concept of fuzzy logic (e.g., Varki, Cooil, and Rust 2000; Viswanathan and Childers 1999; Wedel and Steenkamp 1989, 1991).

4. Actually George's customer lifetime value will also depend on word-of-mouth effects (Anderson 1998; Danaher and Rust 1996; Fornell and Wernerfelt 1988; Hogan, Lemon, and Libai 2000), as he may make recommendations to others that increase his value to the firm. To the extent that positive word-of-mouth occurs, our customer lifetime value estimates will be too low. Similarly, negative word-of-mouth will make our estimates too high. Although these two effects, being of opposite sign, will tend to cancel out to some extent, there will be some unknown degree of bias due to word-of-mouth. Word-of-mouth effects are, however, notoriously difficult to measure on a practical basis.

5. It may often be useful to obtain these estimates at the segment level instead.

6. To the extent that heterogeneity in the regression coefficients exists, the state dependence effect will likely be overestimated (Degeratu 1999; Frank 1962). This would result in underestimation of the effects of the Customer Equity drivers, which means that the effect of violation of this assumption would be to make the projections of the model more conservative.

7. It would also be possible to not limit the Retention Equity effect to repeat purchases, although our current data do not permit us to test that possibility.

8. To simplify the mathematics, we assume that purchase volume is exogenous. Modeling purchase volume per purchase as a function of marketing effort is left for future research.

9. We should also note that the expression implies that the first purchase occurs immediately. Other assumptions are also possible.

10. This is already common practice for firms conducting customer value analysis (Gale 1994).

11. Dunteman (1989) advocates the use of rotation in PCR following the extraction of the most important principal components when managerial interpretation is enhanced.

12. While bias may sometimes occur with purchase intention measures (e.g., Lee, Hu, and Toh 2000; Morwitz, Steckel, and Gupta 1997), it is always possible to improve the validity and accuracy of the resulting probabilities by calibrating the purchase intention item in a one-step-ahead empirical test. This will result in adjustment factors for the stated probabilities. The adjusted probabilities can then be input into our model. A more sophisticated correction, using customer characteristics, is also possible (Mittal and Kamakura 2000).

13. We have performed the analyses in this paper using Microsoft Excel.

14. Because these drivers are likely to be multicollinear, it is again important to employ a robust regression technique (such as principal-components regression).

15. For purposes of this paper, we assume an equal shift (e.g., .1 rating points) for all customers, but this assumption can be relaxed if deemed appropriate, because our modeling framework does not require a constant shift across customers.

16. This assumption can be relaxed, resulting in differential improvement in each customer's switching matrix.

17. Although our sample may not be fully representative of U.S. users, we nevertheless extrapolated to the national market for national industries, because, given that our examples are illustrative, truly precise dollar estimates are not necessary; we merely wanted to show the kind of dollar magnitudes that can arise given a large population.

18. Mean substitution can result in biased estimates, but in our judgment the additional effort of employing a more sophisticated missing-values procedure (e.g., data imputation) was not justified in this case, given the relatively low percentage of missing values.

19. "Metrics/Measuring Marketing Performance" is also a "Gold Topic" in MSI's recently released 2000–2002 research priorities.

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For Further Reading

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