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From Customer Lifetime Value to Shareholder Value

Theory, Empirical Evidence, and Issues for Future Research

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The authors propose a chain of effects framework for understanding how customer lifetime value (CLV) affects shareholder value (SHV). In the chain of effects framework, the authors propose that CLV serves as an intermediary in the relationship between firm actions and SHV. They also introduce the notion of the “prescient” value of CLV called CLV-P, which captures the impact on CLV from future modifications to a firm’s business model as well as competitive reactions. Finally, they identify

econometric and data-related challenges in establishing the link, which suggest directions for future research.

Keywords: *customer lifetime value; shareholder value; customer relationship management*

This article addresses the relationship between customer lifetime value (CLV) and shareholder value (SHV),

thus linking the results of marketing actions with their financial consequences. This is the next logical step in the evolution of marketing over the past 25 years, the focus on the measurability and accountability of marketing actions.

Prior to the early 1980s, direct/database marketing had been the “black sheep” of the marketing family, associated with activities that were considered “low class,” such as selling Ginzu knives on late-night TV or the sending of junk mail. However, due to societal changes (e.g., more women entering the workforce in numbers and, hence, having less time to shop and being more willing to buy by mail), lower computing costs, the increasing sophistication of data warehousing technology, the fragmentation of mass media, and the decreasing *relative* cost of direct mail, direct marketing took off. Databases were collected and list enhancement bureaus, advanced technology printing shops, personalization specialists, database service bureaus, automation specialists, and other ancillary industries started up.

What was the driving force behind these marketing activities? The answer is that an “income-statement-like” document was able to be determined for a marketing campaign—campaigns became measurable and thus accountable. Work on CLV and customer equity (CE) is a logical extension of this work. This progress was also furthered by advances in related accounting fields, such as the spread of activity-based costing, which permitted the computation of the true value of customer relationships. Combining the “direct/database marketing revolution” and the interactive channels, such as the Internet and highly centralized, automated call centers, many different opportunities are available. These include “multichannel marketing” (if not a “new” topic, it is clearly an “old topic examined in a very new light”), issues of customer relationship management (CRM), and the entire spectrum of customer centrality.

Both institutional and retail investors have reexamined their assumptions about what constitutes tangible and intangible value and broadened their scope to include brand equity and CLV as measures that can lead to long-term financial success. In marketing, customer value is considered an important constituent of firm value, and hence the question that needs to be answered is, “What is the linkage between customer value and shareholder value?” Some academic research shows evidence that the estimates of customer value are reasonably close to the market valuation of the respective firms and thereby linked to the SHV (Gupta, Lehmann, and Stuart 2004). However, comprehensive empirical support is needed for the nature of the linkage, the various components in this link, and the impact of marketing actions on this linkage. Empirical support for the linkage between CLV and SHV is critical especially in the current business environment

because of the pressure on marketing managers to measure, manage, and maximize the return on marketing investments (Kumar 2006; Rust et al. 2004).

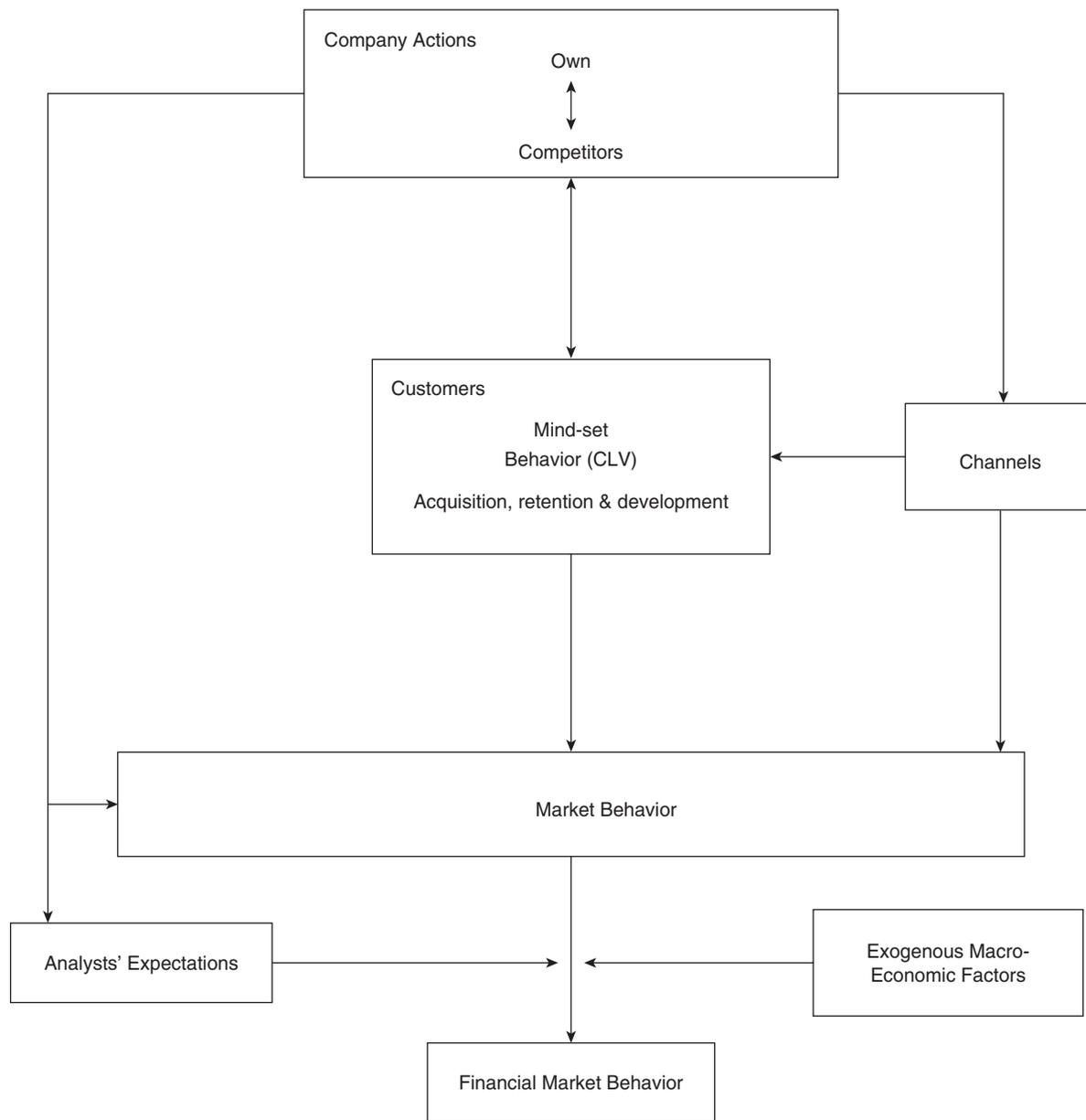
The purpose of this article is to tie together marketing programs and customer attributes (behavior, attitudes, etc.) to customer acquisition, customer retention, customer development, CLV, CE (the sum of the CLVs of current and future customers), and ultimately SHV. We present a general conceptual framework for the antecedents of CLV and how CLV of a firm would impact SHV. Next we visit the issues of CLV measurement and the notion of the “forward-looking CLV” (which we define and call “CLV-P”). We then summarize what we know about the various linkages from the extant literature. Finally, we elucidate the modeling issues and challenges that suggest directions for future research.

CONCEPTUAL FRAMEWORK

To organize the discussion, we offer a basic chain of effects framework for how customer behavior affects the market capitalization of a firm (Figure 1). Customer behavior forms the key driver of an operating firm’s SHV. The critical facets of a customer’s behavior are acquisition, retention/defection, development, and their costs. Acquisition refers to a prospect making their first ever (or first in a long time in the case of a lapsed customer) purchase with a firm. Retention refers to a customer’s repeat purchase of the product(s) from the firm. In contrast, development refers to increasing purchases either of new products and services or the same products previously bought from the firm. Customer development (or expansion) occurs when the purchase of new products and services more than compensates for any decrease in the level of his or her previous purchases with the firm. Of course, there can be deterioration (or negative development) as well, for example, as customers age and their tastes change. Defection corresponds to a customer totally discontinuing his or her relationship with the firm, that is, the ultimate deterioration.

There is an obvious hierarchy to the aspects of customer-level behavior. A prospect needs to be first acquired to become a customer. A customer can then proceed to make repeat purchases, that is, be retained or, alternatively, cease making purchases (defect). Repeat purchases can expand (or decrease) products purchased and therefore lead to development. Eventually, a customer is likely to stop making purchases and defect from the firm. In general, a customer’s lifecycle with a firm is expected to proceed through the phases in sequential order, that is, acquisition, retention, development, and finally defection. However, some customers skip some of

FIGURE 1
Conceptual Framework



NOTE: CLV = customer lifetime value.

the phases in their lifecycle. For example, some customers proceed directly to defection after acquisition if they are not satisfied with the firm's products.

Customer behavior is a consequence of the customer's mindset toward the firm's products and services as well as company, competitor, and channel behavior. Keller and Lehmann (2003) proposed the customer mindset construct as part of a roadmap of how brands create value for the firm and shareholders. Clearly, brand equity and

CE influence each other. In fact, another article in this special issue focuses on understanding the relationship between brand and customer equity. (Although it is possible that customer mindset indirectly affects customer behavior through brand equity, to maintain simplicity we assume that customer mindset directly affects customer behavior.) As conceptualized by Keller and Lehmann, the customer mindset includes everything that resides in the minds of the customer with respect to a firm. The main

components of a customer's mindset are (a) *awareness*—the extent to which a customer can recall or recognize the firm's products, services or brands;¹ (b) *associations*—the strength, favorability, and uniqueness of perceived attributes and benefits provided by the firm's products; (c) *attitude*—the overall evaluation of a firm's products with regards to quality, satisfaction, and so on; (d) *attachment*—the extent of a customer's loyalty toward a firm's products; and (e) *advocacy*—the extent to which a customer would and does recommend the firm's products to others. The aggregation of each customer's individual behavior leads to overall market behavior. Customer purchases of a firm's products determine the sales and gross profits provided by the customer to the firm and the sum of the gross profits obtained from the current customers are the current gross profits for the firm.

In the rare instance of a monopoly in direct contact with the customers through a single channel, the companies' actions lead directly to the gross profits and sales of the firm. However, in most scenarios the competitive environment and the channel structure of a firm have a significant impact on its market performance. The level of competitive intensity in a market largely determines the prices a firm can charge for its products, which in turn influences the margin obtained by the firm. For example, the entry of Dell in the personal computer market is considered to be one of the primary reasons (in addition to standardization of technology) for the decline in the margin for all firms in the personal computer industry. Competitor actions also influence the acquisition and retention rates of a firm. Importantly, the customer mindset (which determines customer behavior toward a firm) is also determined relative to the product offerings of the various competitors.

The channel structure of a firm also has important implications for the link between customer profits and the firm's overall profitability. Most channels are independent decision makers whose actions impact product and financial markets. In the presence of channel intermediaries, the firm needs to share profits (i.e., CLV) with the channel members. The relative power of the channel members determines the profits a firm can obtain from each customer. For example, in consumer packaged goods industries, retailers such as Wal-Mart are very successful in negotiating lower wholesale prices. Lower wholesale prices in turn negatively impact the supplier firm's overall profitability. The channel(s) a firm chooses can also directly impact overall profits. For example, the cost of operating an online channel is, in general, considered to be lower than the cost of offline channels like physical stores. Dell is a good example of a firm that has leveraged its online channel to improve overall profitability and develop strong customer relationships. On the other hand,

Gateway closed its physical stores due to increasing costs of operating the channel. Firms can also leverage the multiple channels through which they allow customer transactions to improve customer profitability. Empirical evidence, at least in online retailing, indicates that multi-channel retailers charge higher prices than single channel online-only retailers (Ancarani and Shankar 2004; Venkatesan, Mehta, and Bapna in press). It is believed that multichannel retailers are able to charge higher prices because of the added services they provide to customers by integrating their transaction channels. For example, firms like Best Buy allow customers to order online and pick up or return the products in a brick-and-mortar store.

For publicly traded firms, the ultimate goal is to increase market capitalization or SHV (Srivastava, Shervani, and Fahey 1998). Based on the current and expected market behavior of the firm, the financial marketplace formulates opinions and makes assessments that have direct implications for firm value. Three important indicators of a firm's market value are the stock price, the price/earnings multiple, and, ultimately, overall market capitalization. Whereas several firm-level metrics impact stock price, the current and projected cash flows from customers (CLV) are critical. How much the performance of a firm (i.e., the cash flows of a firm) translates to SHV is moderated by the expectations of the financial community. Financial analysts and investors consider a host of factors in arriving at their firm valuations and investment decisions. For example, what are the dynamics of the financial markets as a whole (e.g., interest rates, investor sentiment, or supply of capital)? What is the growth potential for the firm and its industry? What is the potential for mergers and acquisitions? What are the facilitating and the hindering external factors that make up a firm's economic, physical, and legal environment, for example, how good is the top management team? What is the risk profile for the category in general and the firm in particular? What is the firm's history with regards to meeting or exceeding its expectations or performance targets?

A firm's actions obviously have an important role at several stages of the value chain. Through its marketing messages, product offerings, and customer service, the firm plays an important role in shaping a customer's mindset. The advent of customer level information from CRM systems allows firms to track and understand individual customer behavior with the firm and appropriately customize messages, products, and services. Whereas firm actions can positively impact a customer's mindset and as a consequence customer behavior, these actions also entail additional costs that negatively impacts customer profitability. Therefore, ideally, firms need to calculate the level of marketing investment for each customer that maximizes customer profitability.

In addition to shaping customer mindsets, firm actions also impact competitor actions and analyst expectations. A rich literature in marketing has documented that competitors react (sometimes intensely) and has explored the types of reactions. Whereas competitor actions may not affect a firm's profits in the current period, it can affect future profits through its impact on the firm's own actions. For example, a price reduction by a competitor can have a dual effect on a firm's future profitability; the firm could lose customers and/or may be forced to take actions that reduce its margin (e.g., reduce its own prices, improve service quality, increase advertising spending) to retain or win back lost customers.

The point of the previous discussion is to highlight the central role of CLV. Essentially, CLV is the bridge between the traditional focus of marketing on customers' attitudes and purchases to the focus of finance on ROI and SHV.

CLV MEASUREMENT

Many ways have been proposed for measuring CLV since the articles by Dwyer (1989) and Berger and Nasr (1998), for example, Gupta and Lehmann (2003). In its basic form, CLV is a function of a customer's future gross profits (revenue after deducting cost of goods sold and other marginal/variable costs), the propensity for a customer to continue in a relationship (customer retention), and the marketing resources allocated to the customer and can be calculated as

$$CLV_i = \sum_{t=1}^n \frac{(Future\ gross\ profits_{it} - Future\ Costs_{it})}{(1+r)^t} \quad (1)$$

where

- i = customer index,
- t = time index,
- n = forecast horizon, and
- r = discount rate.

Statistical models can be utilized to obtain predictions of future gross profits and future costs² based on historical data. We take the view that many of the "small details" concerning how CLV is measured are not central to the "larger" issue we address in this article. An example of these "small details" would be whether revenue is uniform during a year or occurs all at a fixed point in time (e.g., always at the beginning of the year). Another example of a "small detail," for the purposes of this article, would be assumptions that are made about the mathematical/statistical side, such as whether the Pareto/negative binomial distribution (NBD) models the data adequately, or whether it is better to use the proposed approach of Fader, Hardie,

and Lee (2005). As a practical matter, when analyzing past data, several statistical approaches work reasonably well in many situations. However, where there is no identifiable simple mathematical pattern, the statistical approach used may play a more important role. As an example, Berger, Weinberg, and Hanna (2003) examined data on the pattern of cruise-ship demand and retention and found no simple pattern of repeat-purchase was able to be identified. Nonetheless, as shown in Fader, Hardie, and Berger (2005), even such "nonpatterns" can be modeled by the right approach. There may also be minor differences in terms of whether acquisition costs are taken into account in CLV measurement.³

Key Issues

There are several issues that, for our purposes, are important in the measurement of CLV. One key is that the measure must be forward-looking. Thus, it cannot be based solely on past data, unless one were sure that retention patterns, acquisition patterns, marketing mix variables, cost of capital, and so on will be constant at least in the intermediate future. We believe this situation rarely exists. So, how do we accomplish a forward-looking approach when all we have available are past data? Clearly, future-oriented measures must acknowledge uncertainty. Although it is possible to simply consider the *expected value*, there is no doubt that, from the SHV perspective, market valuation is also related to the uncertainty of returns. Traditional accounting measures and expected value without a measure of uncertainty or risk (e.g., a confidence interval) will not suffice.

Another important issue for our purposes is that of the level of measurement. From a company valuation perspective, *must* CLV be done on an individual basis? Can it be done on a segment basis? Or can it be done for the company as a whole, without detailing the results by segment? As an example, companies that do report "customer measures" to financial analysts, for example, the customer churn and ARPU (average revenue per unit subscriber) numbers reported by wireless phone companies and some financial services firms, do so on an aggregated basis, despite the enormous spread in customer value within those industries. Using publicly available data, Gupta, Lehmann, and Stuart (2004) computed the CLV for the entire firm and found that their measure of a firm's CLV reflects the SHV of the firm reasonably well. Nonetheless, large heterogeneity in, say, retention rates (e.g., .1 to .9) means the average retention rate will be much greater than the average of .5 as loyal customers become a larger share of customers.

Whereas a single measure of CLV for the entire firm would be sufficient for estimating a link between just

CLV and SHV, a more disaggregate measure of CLV would be necessary to assess the impact of customer mindset and company actions on CLV and ultimately SHV. Understanding the link between customer mindset and company actions on CLV is, of course, necessary for developing marketing strategies and tactics that would maximize CLV and ultimately SHV.

There are many problems associated with trying to estimate a company's future profit that can be viewed as the aggregate CLV. Usually, all we have available are past data. In fact, just having past data in a usable form is "above average" in terms of readiness for a CLV analysis. We suggest a three-step process to making a sensible (forward-looking) projection. The first step is to compute CLV, for example, by using recency, frequency, and monetary value (RFM) data and various profit and cost measures. Although we indicated earlier that we are not very concerned about what we referred to as the "small details," this is not a simple task. In particular, future projections require assumptions about retention rates, margin (expansion), and costs. Thus, it is not entirely surprising that in spite of the increased amount of literature on the subject, and the topic's identification by the Marketing Science Institute (MSI) and others as one of the, if not the, most important issue in the field of marketing today, use of CLV is *not* prevalent among the vast majority of companies. Often, a company will note, *at best*, that it is aware of CLV and "is starting to consider the metric . . ."

Relating CLV to Marketing Actions

Assuming that the first step *has been accomplished*, a second step is an examination of the relationship between CLV and marketing strategies and programs. There are relatively few studies in the academic literature that address this topic directly, partly because data are not available in useful form. Also, frequently there has not been enough variation in the values of the relevant variables to establish a relationship reliably. In some cases, various strategies have simply never been tried (and, hence, there is zero relevant data). Thus, one cannot, except in rare cases, estimate a comprehensive model of the effects of the various marketing mix variables, even if one ignores the potential multifactor interactions among them and the issues of simultaneity and reverse causation.

Optimization

Assuming a comprehensive flow model such as Figure 1 has been estimated, we are ready for Step 3: optimization. However, what criterion should be used? Should we maximize *expected* CLV or a risk-adjusted measure of CLV? In either case, we need to consider two types of

probabilistic phenomena. First, we need to consider "routine" uncertainty—that is, the traditional notion of the future being represented by a set of probability distributions. The second aspect of uncertainty we need to incorporate is the "real option" aspect, that is, the possible benefit that a significant change in company strategy or market conditions might produce. An example of this would be a company's option to abandon unprofitable customers. The use of real option theory is just beginning to receive attention in the marketing literature after having been a central area of research in the general investment arena for many years.

LINKING CLV TO SHV

We define the "prescient" (forward-looking) value of CLV—that is, the highest value we are able to receive from a customer, in essence the "dream value" or "complete real-option" value, which takes into account future changes in a company's business model and expansion strategies as well as competitive reactions. We call this "prescient" value CLV-P. How do we link CLV (or CLV-P) to SHV? Conceptually, this relationship can be estimated by a regression analysis. That is, set up a model that has SHV as a dependent variable and CLV-P as an independent variable along with whatever other variables and relations are relevant. The result is likely to be a system of equations such as that implied by Figure 1 that also includes feedback loops (e.g., from SHV to marketing actions) and a large number of covariates.

One can also investigate how different the results would be if CLV is used instead of CLV-P. Surely, there is a positive correlation between current CLV and CLV-P so the simpler measure may provide (close to) equally useful results. There is also the question of whether the relation of CLV to SHV is constant across time and companies. This raises issues of data pooling and aggregation.

A second question is *normative*: "What *should be* the relationship between these two variables?" This is a very different question. One might argue that, by definition,

$$\text{CLV-P} + \text{Assets} + \text{An Imputed Value to Non-CLV-Related Options} = \text{SHV.}$$

We defined CLV-P as the CLV when, among other things, customer-based options are taken into account. Note that we do not include options that involve entering different business with different target customers, that is, options that have no synergy with the current business. There are, of course, also options of different species, involving, say, commodity or real estate-based assets that can obscure the CLV to SHV link. Furthermore, there could

be an interaction effect between CLV-P and either or both of assets and non-CLV-related options. More specifically, the effect of certain marketing actions and, hence, the "optimal" marketing actions and CLV-P, may differ, due, for example, to economies of scale for different asset positions. Balancing completeness with simplicity and ease of use is a major concern in linking CLV to SHV.

WHAT DO WE KNOW ABOUT THE LINKS?

This section reviews what is known in the literature about the links identified in Figure 1. Some recent studies have shown that CLV is an appropriate metric for assessing the return on marketing actions and developing customer-level and firm-level strategies (Rust, Lemon, and Zeithaml 2004; Venkatesan and Kumar 2004). Therefore, establishing a link between CLV and SHV will help marketing practitioners show the consequences of marketing activity on the market capitalization of the firm, thereby making marketing expenditures more accountable.

One of the key research papers that connect marketing assets to SHV is Srivastava, Shervani, and Fahey (1998). They proposed a framework that captures the link between market-based assets (customer relationships, channel relationships, and partner relationships) and SHV. One issue in linking marketing actions to SHV is that very few actions have a pronounced direct effect on stock price. It is therefore necessary to establish the links between various metrics in a "value chain." A number of authors have developed models of how various metrics link together. These include the service profit chain (Heskett et al. 1994; Kamakura et al. 2002), the brand value chain (Keller and Lehmann 2003), and the chain of marketing productivity (Rust et al. 2004) as well as the models presented by Srivastava, Shervani, and Fahey (1998) and Lehmann (2004). The extant literature provides some support for the following links: (a) CLV to firm performance, (b) customer mindset to CLV, and (c) customer mindset to SHV.

Link Between CLV and Firm Performance

When CLVs of customers are aggregated over the entire customer base of the firm, we get the value of customer assets of the firm. This should give us an indication of how the firm will perform in the future. Hence, it is relatively straightforward to expect that CLV is related to overall firm value and that it may be linked to the financial market performance of a firm (Hogan et al. 2002). Using publicly available data for five firms (one traditional and four Internet firms), Gupta, Lehmann, and Stuart (2004) showed that estimates of customer value are reasonably close to the market valuation of the firms in some cases and quite different from them in others and

suggested reasons for the disparity. Kim, Mahajan, and Srivastava (1995) used a customer-based method to evaluate cellular communications companies. They showed a strong relationship between the net present value of cash flows and the growth in the number of customers and stock prices. Wiesel and Skiera (2005) demonstrated an algebraic link between CLV and SHV. They then analyzed the SHV of two Internet firms (T-online and Freenet) and found that their measure of consumer equity (aggregate CLV) closely approximated the value of the two firms.

Some researchers have also shown that CRM processes (Hogan, Lemon, and Rust 2002) improve firm's performance (Ramaswami, Bhargava, and Srivastava 2004). Reinartz, Krafft, and Hoyer (2004) found that implementation of CRM processes leads to better company performance in the stage of relationship maintenance (strongest effect) and relationship initiation. Hogan, Lemon, and Labai (2003) estimated the value of a lost customer on the profitability of the firm taking into account social effects (e.g., word of mouth and imitation).

Link Between Customer Mindset and CLV

Whereas CLV impacts financial performance, CLV itself is a consequence of marketing actions. Berger et al. (2002) developed a framework to assess the impact of marketing actions on CLV. CLV is treated in this framework as a construct that influences allocation of marketing resources but is also influenced by marketing actions. CLV, which captures customer-level behavior, depends on acquisition, retention, and development. Therefore, any marketing actions that influence acquisition, retention, or development impact CLV. Bolton, Kannan, and Branlett (2000) showed that loyalty rewards programs have a positive effect on customer evaluations, behavior, and repeat purchase intentions. Another mindset metric that influences retention or repeat purchase, and hence CLV, is satisfaction. Rust and Zahorik (1993) have shown that satisfaction improves repeat purchase rates and generates favorable word of mouth. There is evidence that indicates that customer-specific and firm-level strategies (Blattberg, Getz, and Thomas 2001; Rust, Lemon, and Zeithaml 2004; Venkatesan and Kumar 2004) developed to improve drivers of CLV also impact the firm's future performance. Some drivers of CLV identified in the literature include marketing contacts by the firm (Venkatesan and Kumar 2004), brand equity, retention equity, and value equity (Rust, Lemon, and Zeithaml 2004).

Link Between Customer Mindset and SHV

Another important link in the CLV chain is the link between customer mindset and financial performance. Anderson, Fornell, and Lehmann (1994) have shown that

a 1-point increase in satisfaction (on a 100-point scale) each year over 5 years generated over a 10% increase in ROI for Swedish firms. Anderson, Fornell, and Rust (1997) compared the impact of satisfaction for goods and services. They found that both customer satisfaction and productivity are positively associated with ROI for goods and services. However, the interaction between satisfaction and productivity is positive for goods and negative for services. Hallowell (1996) illustrated the link between customer satisfaction and profitability using data on retail banking customers. The findings suggest that attainable increases in satisfaction improve profitability.

Some recent studies demonstrate the link between customer satisfaction at the aggregate level and several measures of SHV. Ittner and Larcker (1998) found that firm-level satisfaction measures can be economically relevant to the stock market. Bernhardt, Donthu, and Kennet (2000) showed that an increase in customer satisfaction has a positive impact on profits. Anderson, Fornell, and Mazvancheryl (2004) also found positive association between customer satisfaction (satisfaction scores based on the American Consumer Satisfaction Index [ACSI]) and SHV. Fornell et al. (2006) have demonstrated that firms with higher satisfaction ratings have higher returns with less volatility and that they outperform the broader stock market.

The link between marketing actions (like advertising and sales promotions) and customer mindset is fairly well established in the literature. By contrast, relatively little is known about the direct impact of most mindset measures such as awareness, associations, attitude, attachment, and advocacy on CLV. There is reason to believe that changes in customer awareness, attitude, and attachment toward a firm would influence the SHV of the firm. Because CLV is an intermediary between customer mindset and SHV, it is important to study the direct link between the above-mentioned customer mindset measures and CLV and its components (acquisition, retention, and development). Another link that needs to be validated is the relationship between brand equity and CLV.

MODELING ISSUES AND CHALLENGES

In this section, we list the issues or challenges that we believe are critical to address before an empirical relationship between CLV and SHV can be established.

Simultaneity/endogeneity. Simultaneity/endogeneity can exist among the various components in the chain of effects framework (Figure 1). For example, CLV and, therefore, the CE of a firm are influenced by customer-level behavior. Moreover, customer-level behavior itself is

influenced by actions taken by the company and competitors as well as market and channel behavior. The company's actions or customer-specific strategies to improve CLV are in turn based on the CLV of the customers and competitive behavior. This leads to simultaneity/endogeneity issues that are not generally well addressed by the CLV models that are available at present. Structural models that explicitly accommodate these conditions in the estimation of model parameters would be especially useful (e.g., Manchanda, Rossi, and Chintagunta 2004).

Omitted variables. Current CLV models compute CLV based on information from transaction data and customer-firm interaction data. In other words, the models take into account only the behavioral variables while computing CLV. However, there may be other variables such as the 5As (awareness, association, attitude, attachment, and advocacy) that affect CLV, for example, by capturing expansion potential and network effects. There is a reliance on transactional information in current CLV models (even though consumer theory, e.g., Morgan and Hunt 1994, indicate that attitudes play a significant part in determining CLV) partly because of the abundance of transactional information in current CRM systems. Tracking customer mindset measures would require ongoing customer surveys, which pose several challenges. First, the surveys are cost-effective when only a sample of customers are contacted, and second, the same customers would need to be targeted by surveys over time to measure the effect of company actions on the customer mindset and CLV. These challenges in tracking customer mindset measures imply (a) a need for a panel of customers that are recruited by firms or by independent agencies and (b) a need for developing methodologies that would impute the mindset measures for customers who were not contacted by the survey (or did not respond to the survey). Overall, omission of customer mindset measures can result in underestimation/overestimation of CLV, which in turn can have implications for linking CLV to SHV.

Missing data problems. Missing data problems exist for both customers and prospects. The transaction data available within a firm reveal information only about customers' business with the focal firm but has minimal to no information about the customers' transactions with competitors. In other words, we do not have the size of wallet or share of wallet information for most customers. This makes it harder to arrive at an accurate value of the firm's customers. In addition to transactions, firms have rich information about their marketing actions with individual customers but almost no information at the customer level about competitor actions. Using only a company's own marketing actions in CLV models can lead to biased estimation of customer response elasticity and CLV.

Also, we frequently have little information about prospects or potential customers. Although we may have profile information about the prospects, we have no information on their purchase behavior or their potential in terms of size and share of wallet. We cannot, therefore, compute their CLV using available models or have the CLV computed based on profile or zip code information because these are in general very inaccurate. Because the analysts include the value provided by prospects when valuating firms, CLV estimates that do not capture the worth of potential customers may be inadequate for accurately explaining SHV.

There is the *rare* case where one does have fairly detailed information about the size of the prospect list. For example, a company that sells medical devices for delivering a specific self-administered drug, when working with one of the authors and considering the decision of allocating promotional expenses to acquisition and retention activities, claimed to know almost exactly the entire prospect list due to government registration requirements. This is also partially true in the financial services industry where firms have come together to pool their data (on an anonymous basis) about portfolio sizes and other investment characteristics of their customers or to share application and credit repayment information.

Option value. As discussed earlier, the option value includes not only the value of the firm in its present business model but also the potential value from future expansions. Firms may enter into new markets, market new products or brands, or acquire new customers. If the market and the analysts anticipate the future expansion plans of a firm, the SHV will be based on this information. How can we incorporate this information in CLV measurement? This is especially important for firms with a very high option value. For instance, an oil drilling company has a large option value. Similarly a firm in rapidly growing global markets will have a large option value (as did many Internet firms). In such cases, to what extent can we use CLV (or CLV-P) as a link to SHV?

Detecting major shifts in customer behavior. Another major challenge in CLV measurement is detecting and incorporating major shifts in customer behavior. These may be due to the lifecycle changes such as a student taking a job, a person retiring, or a traveling consultant shifting to a nontravel job. In such cases, the change in customer behavior may be relatively permanent and shift the level of customer activity to a different level. On the other hand, the shift in customer behavior may be temporary (e.g., induced by a wedding or home purchase) or just random fluctuations. Can we identify such shifts as random, temporary, permanent, or trending by, for example, using persistence modeling (e.g., Dekimpe and Hanssens 1995) adapted to the sparse data available?

Data requirements. The data required for validating the link between CLV and SHV include cross-sectional data across different firms and/or the time series data from one or few firms. Developing public databases upon which to base research is thus an important task.

As discussed earlier, validating the link between CLV and SHV in its basic form includes regressing SHV on CLV and other variables. If we rely on cross-sectional data for estimation, we need to obtain data on CLV, SHV, and other related variables from a large number of firms and control for firm-specific effects. An alternative is to obtain data on CLV, SHV, and other variables from one or a few companies across different time periods and model changes. The compelling question here is that if we link CLV to SHV in a single company/sector, can we generalize the findings to other companies or sectors? One approach is to carefully select a few companies/sectors according to some logical design to help generalize findings. Another issue in using time series data for a single company/sector is in choosing the updating interval for CLV. It is difficult to update CLV on a daily basis even though SHV changes daily. What is a reasonable update interval for CLV?

CONCLUSION AND FUTURE DIRECTIONS

A surrogate measure of firm value, which can quite accurately predict the SHV, will be well received by both the financial market and investors. However, there is lack of agreement among both practitioners and academicians as to what should such a metric be, and they are still in search of the link between an overall measure of firm value and the SHV. One of the strong candidates for the overall measure of firm value is CE (and therefore CLV), which is the value of the customer assets of a firm. Establishing a link between CLV and SHV is not only congruent with the transition from a product-centric to a customer-centric approach but will also bring more accountability to marketers' actions. Realizing the importance and urgency of establishing a link between firm value and SHV, we have laid a basic framework for linking CLV to SHV in this article.

Using the chain of effects framework, we identified certain key linkages that need to be established and incorporated before linking CLV to SHV. Some of the key linkages that have partial support in the academic literature include the links between (a) CLV to firm performance, (b) marketing actions to CLV, (c) marketing actions to customer mindset, and (d) customer mindset to SHV. However, little is known about the direct link between customer mindset and CLV. Nor does any method for CLV measurement include customer mindset variables. Also, the link between brand equity and CLV is

yet to be established. Identifying these linkages is only a first step toward achieving the goal of linking CLV to SHV to the extent that knowing CLV/CE would help predict SHV. Another important factor that needs serious consideration is the expectation of market analysts and how these expectations are formed. Even factors like a firm's expansion plans, diversification, or entering a new market/product category can influence the analysts' expectation and, thereby, SHV.

Establishing the link between CLV and SHV requires better models for measuring CLV that (a) incorporate customer mindset variables and accounts for major shifts in customers' behavior; (b) address issues such as simultaneity/endogeneity, competitive reaction, and data requirements; and (c) include the option value of a firm in its CLV measure. At present, there are few models that link attitudinal variables, especially the 5As to CLV. It is important to understand which aspects of consumer behavior carry forward to impact SHV. Is it advocacy or other attitudinal variables, or is it behavioral variables? Our current knowledge in this area is limited. Empirical evidence regarding the influence of the customer attitudes on CLV is also an essential for designing marketing strategies that maximize customer profitability and, thereby, SHV. Similarly, model frameworks and empirical evidence that link a brand value and a customer's word-of-mouth behavior to CLV are also necessary for establishing a robust link between CLV and SHV.

Modeling the "option value" of a firm is another challenge that needs to be overcome for linking CLV to SHV. Models that can predict the value of a firm when it changes the business model such as entering a new market, expanding globally, or introducing a new product need to be developed. Because the SHV of a firm depends on the expectations of the market and the analysts' expectations are based on available information, researchers who develop models for option value probably need to look at how market expectations are formed and incorporate this information in the model building.

In addition to these "inside-the-company" questions, one wonders if a company would be evaluated (i.e., judged) by the market on the basis of customer value unless competitors are able to be similarly evaluated. Will a company be rewarded simply for making appropriate customer data available and publicly acknowledging the addressing of the issue of customer value? Will those companies that take the lead in reporting these measures force their competition to follow suit? Further, CLV is no panacea. Estimating it is likely to involve substantial subjectivity, which leaves open the possibility of "creative" analysis and reporting. Finally, the appropriate updating interval for CLV that matches with the changes in SHV is a critical factor that needs consideration.

The challenges identified here can be surmounted only by concerted effort by both practitioners and academicians. Multiple empirical replications would be necessary before CLV (or CE) is widely used by corporations as well as financial markets for firm valuation.

NOTES

1. In the rest of the article, products will refer to all the products, services, and brands provided by a firm.
2. In most cases, the future costs include the firm-customer interaction costs through different channels of communication. It does not include the acquisition costs.
3. For a review of different approaches for customer lifetime value (CLV)/customer equity (CE) measurement, please refer to Kumar and George (in press).

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