Customer-based corporate valuation

Integrating the concepts of customer equity and shareholder value

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Abstract

Purpose – Synthesis of the customer lifetime value and the shareholder value (SHV) approach in order to develop an integrated, marketing-based method for corporate valuation.

Design/methodology/approach – Discusses the limitations and assumptions of existing methods to estimate customer value components and examines the limitations of the SHV concept. By linking the customer equity (CE) and the SHV approach, a formal model to calculate corporate value is developed. The discounted cash flow method is used for modelling the profit streams.

Findings – Provides formulas for the estimation of both the individual lifetime value of a customer and CE. Provides a comprehensive model to estimate corporate value based on customer-related cash flows and traditional financial metrics. Introduces typical cases, in which the use of a customer-based valuation seems beneficial. Illustrates how our approach can be applied by using a simple case study on M&A in the telecommunication industry. Gives suggestions on how to obtain the necessary data, partially even from publicly available sources.

Research limitations/implications – Advancement of the quantitative techniques for modelling the customer value components would allow for relaxing some restrictive assumptions. The explicit modelling of the future growth of the customer base (the acquisition rate) would increase the applicability of the model. Additionally, taking into account heterogeneity within the customer cohorts is a task for future research. Finally, our model needs to be applied more extensively using real data for the input variables.

Practical implications – A CE-based valuation approach can guide marketing investments and helps to avoid misallocation of resources. Based on an example in the field of M&A, we demonstrate the usefulness of the approach for obtaining a realistic indicator of firm value. It helps to assess whether an acquisition is economically sensible. We provide evidence for the superiority of a customer-based approach over traditional financial methods.

Originality/value – While the traditional SHV method considers cash flows at a highly aggregated level, our approach employs disaggregated cash flows on the level of individual customers. Thereby we do incorporate the lifetime values of future customers by considering different cohorts. We do capture customer defection by incorporating retention rates. Our model enables a more detailed and valid estimation of corporate value by accounting for the single customer activities that drive marketing actions. This enables a better forecasting of the free cash flow. Incorporating customer-related drivers into financial valuation models makes easier to assess the return on marketing investments.

Keywords Shareholder value analysis, Asset valuation, Customers

Paper type Research paper

Introduction

The fundamental shift toward value-based management has led to an increasing demand for corporate valuation methods. This development is driven by external forces, namely the capital market's pressure to accurately assess companies. This is particularly important in a strongly merger-driven economy with a growing transaction volume fostering the danger of false evaluation and misinterpretation. However, in this context, internal issues also play a major role, such as an efficient resource allocation, which requires determining the financial impact of strategic investments on a firm's tangible and intangible assets (Blattberg and Deighton, 1996; Srivastava *et al.*, 1999).

Market value orientation is usually interpreted as capital market orientation. Thus, the concept of shareholder value (SHV) is frequently employed. Resulting from the financial origins of the SHV concept, it considers cash flows at a highly aggregated level focussing on physical and financial assets. The value of intangible assets is hardly reflected in financial metrics. In consequence, traditional accounting tends to focus on cost reduction strategies and may lead employees to miss opportunities to increase value by improving customer equity (CE) drivers (Blattberg *et al.*, 2001). We suggest that the long-term value of customers is a more stable and relevant metric of firm value than financial metrics like market capitalization or price-earnings ratio. The latter are difficult to utilize when a company has negative earnings, as is typical in the early periods of internet-based businesses (Gupta *et al.*, 2001). Therefore, the development of valuation models based on the customer-firm interaction has been assigned top priority on the marketing research agenda (Berger and Nasr, 1998; Hogan *et al.*, 2002a).

In view of this, it appears important to consider the concept of customer lifetime value (CLV) as an appropriate metric to assess the overall value of a firm. A CLV-based approach evaluates companies by using disaggregated cash flows on the level of individual customers, i.e. by looking at the different profit streams yielded by the single value-enhancing customer activities like up buying, cross buying or word-of-mouth activities. The combined lifetime values of all current and future customers yield the value of the customer base (CE), which represents the entire operating cash flow of a firm. This is because operating assets provide cash flows only, if they are used to create products and services that are purchased by customers (Hogan *et al.*, 2002a). Consequently, CE and all cash flows generated from non-operating assets yield the overall value of a firm.

Our research efforts are aimed at the synthesis of the CLV and the SHV approach in a corporate valuation framework. It is not within the scope of this paper to explore the causal relationships between the two concepts in order to contribute to the implementation of the value management process (for a review of this research stream see Bayón *et al.* (2002) and Payne *et al.* (2001). Instead, this paper seeks to formally incorporate the customer value concept into the SHV model in order to develop an integrated, marketing-based method for corporate value calculation. Since both concepts are methodically analogous, this approach seems to be beneficial. With our model, all cash flows stemming from customers are determined using the CE approach while the remaining non-customer related cash flows are still estimated employing the traditional SHV framework. Such an integrated valuation model can show in more detail the role of marketing for enhancing the value of a company (Hogan *et al.*, 2002a).

It fosters the understanding of customer relations as the most critical asset (Rust *et al.*, 2001; Srivastava *et al.*, 1999). According to our research objectives, the paper is targeted at accountants and auditors, as well as business analysts who undertake valuations for market floatation or M&A of large corporations. Executive managers can apply the approach for internal analyses focused on controlling the firm value which is necessary for supporting strategic investment decisions and investor relations.

Our paper is structured as follows: at first, we present a comprehensive model for the estimation of both the individual lifetime value of a customer and CE. After briefly discussing the limitations of the SHV concept, a synthesis of the CE and the SHV approach will be presented which allow for a disaggregated and more realistic corporate valuation. Finally, we address practical cases that call for a customer-based valuation approach and provide suggestions on how to obtain the data necessary to calibrate our model.

The CLV concept
The underlying idea
Within the scope of this paper, we define customer value from a supplier-oriented point of view as the customer's economic value to the company, a definition, which differs from the frequently employed demand-oriented definition of customer value as the company's or its products' value for the customer (Staat *et al.*, 2002). A comprehensive understanding of customer value should comprise all different aspects of a customer's contribution to the company's success (Cornelsen, 2002). The CLV represents such a profound supplier-oriented understanding of customer value. The CLV measures the profit streams of a customer across the entire customer life cycle. In this context, marketing expenditures are viewed as investments in customer assets that create long-term value for the firm.

The CLV represents an application of the principles of contemporary finance to the evaluation of business relations (Day and Fahey, 1988; Doyle, 2000). The model aims at determining a customer profitability figure which is based on all prospective and directly attributable in-payments and out-payments. This procedure also accounts for effects that go beyond a customer's own transactions, for example referring the products to other potential customers through word-of-mouth activities. Although a considerable number of CLV models have been developed so far, no generally accepted superior approach exists (Jain and Singh, 2002).

Many CLV models do not incorporate marketing-relevant variables regarding customer-specific details, such as expected cross-selling revenue or recommendation behaviour. Additionally, various models do not consider retention rates (for such models see Jackson (1992), Mulhern (1999) and Niraj *et al.* (2001)). The underlying assumption of these approaches contradicts the economic reality, which is characterized by a strong tendency to switch vendors resulting in significant churn rates. Other CLV models do integrate customer retention rates and often also set out marketing or customer retention costs separately. Yet, these models lack further and more complex value drivers such as revenues from cross-selling or references (see the models of Berger and Nasr (1998), Blattberg and Deighton (1996), Blattberg *et al.* (2001), Dwyer (1997), Keane and Wang (1995), Libai *et al.* (2002), Reinartz and Kumar (2000), Rust *et al.* (2001) and Wang and Spiegel (1994)).

The above-mentioned approaches fail to integrate all relevant aspects of customer profitability into a single model. In the following, we will – based on the quoted research – provide a brief summary of all relevant components of CLV and integrate these facets into a comprehensive valuation approach.

The components of CLV
An examination of the basic CLV models reveals that the incorporated variables can generally be classified into three categories: revenue, costs, and retention rate (Reinartz and Kumar, 2000).

In principle, to calculate CLV is a straightforward exercise, projected net cash flows that a firm expects to receive from the customer (or more realistically from a particular segment) are adjusted to the probability of occurrence and are then discounted. In practice, however, estimating the three components can be a challenging task. Therefore, the questions that have to be answered in order to compute the CLV are discussed in more detail in the next section.

Retention rate. The retention rate is the probability that an individual customer will remain loyal to the supplier for the next period, provided that the customer has bought from that vendor on each previous purchase (Dwyer, 1997). The retention rate can be inferred drawing on empirically confirmed determinants of loyalty, such as customer satisfaction, switching barriers, variety-seeking behaviour, and attractiveness of alternatives (Jones and Sasser, 1995). Causal analyses such as the LISREL-approach represent adequate analytical instruments in order to quantify the direction and strength of these effects on customer retention.

Incorporating retention rates reflects a "lost-for-good" model of customer behaviour. It assumes that a customer who stops dealing with the vendor is totally lost. Returning customers are therefore treated as new ones. This model is applicable in contractual relationship settings or cases where switching costs are higher and commitment is a long-term one (Jackson, 1992). They seem to be realistic in many product markets (Berger and Nasr, 1998). In these cases, expected revenues can be forecasted fairly accurately depending on the usage of the services in the previous period and the contract terms (Bolton, 1998). We do not assume consumers that continuously experiment with new vendors, characterizing the "always-a-share" case. Here, the switching between vendors has to be captured by using migration models based on Markov-chains (Dwyer, 1997; Pfeifer and Carraway, 2000; Schmittlein *et al.*, 1987).

Revenue. The second constituent "revenue" can be classified into four sub-categories: "autonomous" revenue and up selling revenue (which together represent straight selling), cross-selling revenue, and contribution margins resulting from referral activities of existing customers (reference value (RV)). The first three sources of revenue result from direct transactions with the customer himself. As these activities lead ultimately to monetary sales success they can be denoted as direct-monetary transaction values. In contrast, the RV can be denoted as an indirect-monetary interaction value because it results from customer-to-customer interactions which may lead to further purchases by other individuals. As these additional transactions originate from the reference activities of an existing "active" customer they have to be included as indirect sales in the calculation of his individual value. Obviously, the value of a customer is not generated only within the narrow field

of a dyadic supplier-customer relation, but also outside of the actual business relationship by exchanging information with other individuals (Cornelsen, 2002).
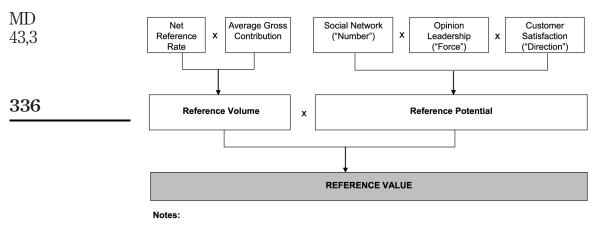
The "autonomous" revenue is not directly influenced by the company or is only affected by standard marketing measures such as TV advertising. It is the basic revenue not including direct marketing to raise up selling or cross-selling. It is usually calculated by means of traditional procedures of demand forecast, e.g. analyses of time sequences or stochastic brand choice models such as multinomial Logit models (Lilien *et al.*, 1992; Schmittlein and Peterson, 1994).

Up selling revenue is caused by additional purchases of the same product made by loyal customers as a consequence of increased purchase frequency and intensity in long-life relationships (quantity effect, i.e. higher purchase amount per transaction and more transactions per period). They also emerge from a price effect that is the selling of higher priced substitutes of the same category to long-term, less price sensitive customers (Reichheld, 1999; Reinartz and Kumar, 2000). Therefore, up selling revenues symbolize the retention value of a customer. They can, for example, be estimated using frontier function models, these models provide information about the maximum revenue that can be obtained on the basis of efficient relationship marketing and sales processes (Kim and Kim, 1999; Staat *et al.*, 2002).

In contrast to up selling, cross-selling can be defined as the selling of complementary products or product categories, which have not been bought from the vendor (Reichheld and Sasser, 1990). The cross-selling value indicates to what extent an existing relationship can be extended to other products. A typical case is the selling of a life insurance to an automobile insurance customer. In addition to cross-selling matrices, the same prognosis methods can be employed, which have been identified in the context of up selling revenue.

The RV measures margins stemming from new customers who were attracted through the referral behaviour of existing customers. The monetary RV is made up of the reference volume and the reference potential. As a product category specific figure the monetary reference volume is given by the annual contribution of an average customer weighted by the degree to which references influence the purchase decisions of consumers of the product under consideration. Thus, the reference volume represents the recipient side of the RV estimation. In contrast, the reference potential is determined on an individual basis and covers the ability of a current customer to influence potential customers in his or her social network by positive or negative information. Thus, the reference potential covers the perspective of the reference provider (Cornelsen, 2002). The calculation of the RV can be accomplished using the model introduced by Cornelsen (2002), which is shown in Figure 1.

Costs. The first cost category is made up of acquisition costs, i.e. the costs incurred to attract customers. Although for existing customers, they are no longer relevant for marketing decisions and have to be booked as sunk they should be incorporated in the calculation of CLV for the purpose of company valuation. Only if the remaining "net value" (the value exclusive of acquisition costs) exceeds the acquisition costs, the present value is positive and the customer is profitable (Jain and Singh, 2002). For decisions concerning prospects, the net value can be considered as the maximum costs the management should incur to acquire them. The calculation and assignment of acquisition costs depends on the acquisition practices used (for example, direct marketing vs mass marketing).

Figure 1.
RV model

Notes:

Net reference rate (e.g. 3%): Average proportion of the gross contribution of a gained customer (recipient) that is attributable to references (= degree to which customers are influenced in their purchase decisions by references from relatives, friends or colleagues); if for example references have an influence of 30% on the purchase decision of the recipient and the purchase is discussed with 10 persons (reference providers) then the net reference rate per reference provider is 30%/10 = 3%

Gross contribution (e.g. $ 500): Average annual gross contribution of a potential customer

Social network (e.g. 15): Size of the social network: number of persons (recipients) that are involved in product-related reference discussions with the reference provider in question

Opinion leadership (e.g. 70%): Degree to which a reference provider influences the purchase decisions of others (assertiveness), depending on his product and market know how

Satisfaction (e.g. +1): The reference provider's own satisfaction determines the direction of the reference talks; while a satisfied customer encourages purchases and thus provides positive references (+1) a dissatisfied customer advises against purchases and thus gives negative references (-1)

Reference value for the "exemplary"customer per annum : 0.03 x 500 x 15 x 0.7 x (+1) = $ 157.50

Marketing costs represent costs of customer retention and development, excluding those very specifically oriented toward acquisition. They comprise, for instance, measures that draw the customer's attention to higher priced variants (to enhance up selling) or to other product categories of the same company (to enhance cross-selling). General promotional expenditures and costs for soliciting, mailing catalogues or sending personalized greeting cards belong to this category. A problem may arise when image advertising and other routine promotional campaigns are assigned as retention costs, although they may also enhance acquisition (Berger and Nasr, 1998). Recovery costs are also included in the category of marketing costs. It is necessary to differentiate between two kinds of recovery costs: costs incurring before the termination of the relationship in order to avoid defection ("churn costs... as the costs of persuading a current subscriber to renew the subscription", Keane and Wang (1995, p. 62)) and costs emerging after the completion of the relationship, stemming from efforts targeted at regaining a customer.

Sales costs include both the production costs of the goods sold and all costs of serving the customer, including the cost of order procession, handling, warehousing, and shipping.

When customers are concerned who have defected but are not regarded as worth recovering, termination costs (TC) of a business relationship have likewise to be taken into account as the final costs. Administrative expenses when closing an account or costs of taking back mature products are typical examples. This aspect has – to our knowledge – not been integrated into a CLV model so far. The TC have to be spread over the relationship's projection period and to be based on the calculation of the defection probability of the remaining number of initial customers. This has to be done in a way that accounts for the probability of occurrence of these costs in the future periods. Following this modus operandi, the probabilities of occurrence of all periods necessarily add up to 1 in the long run; this means that all customers with a retention rate $r < 1$ migrate from an initial base over time and produce TC in full height. The migration probability for a distinct point of time can be described as the probability that the customer remains loyal until $t - 1$ and will migrate in t. To give an example, period t_2 can be calculated as $r(1 - r)$ and period t_3 as $r \times r \times (1 - r)$. Thus, the following term for the estimation of the TC – which can be said to occur with the same degree of probability as migration – can be formulated:

$$\sum_{t=0}^{T} \left(r_i^{t-1}(1 - r_i) \right) \frac{\text{TC}_i}{(1 + d)^t} \tag{1}$$

Finally, note that within the cost component fixed costs have to be excluded from consideration because they are not customer specific (Wang and Spiegel, 1994).

Joining the CLV components
Equation (2) summarizes all essential CLV components in accordance with the state-of-the-art in this research area, including aspects of revenue, as well as costs and retention rates. To ensure an appropriate calculation reflecting the broader view of customer value, indirect-monetary contributions resulting from word-of-mouth communication of active customers outside of the relationship are also included. Concerning our model, the RV has to be estimated by using the RV model shown in Figure 1. For reasons of clarity, we do not integrate this calculation step into our model.

$$\text{CLV}_i = -\text{AC}_i$$
$$+ \sum_{t}^{T} \left(r_i^t \frac{(\text{AR}_{ti} + \text{UR}_{ti} + \text{CR}_{ti} + \text{RV}_{ti}) - (\text{SC}_{ti} + \text{MC}_{ti})}{(1 + d)^t} - \left(r_i^{t-1}(1 - r_i) \right) \frac{\text{TC}_i}{(1 + d)^t} \right) \tag{2}$$

where CLV_i in the CLV of customer i (net present lifetime profit); AC_i the acquisition costs of customer i; r_i the retention rate of customer i; AR_{ti} the autonomous revenue of customer i in period t; UR_{ti} the up selling revenue of customer i in period t (retention value); CR_{ti} the cross-selling revenue of customer i in period t (cross-selling value); RV_{ti} the gross contributions from reference activities of customer i in period t (reference value); MC_{ti} the marketing costs for retaining customer i in period t; SC_{ti} the costs for serving customer i in period t (cost of sales); TC_i the termination costs for the relationship with customer i; d the discount rate appropriate for marketing investments; and T the Length (in years) of the projection period.

It is worth to acknowledge the assumptions that underlie our model. These entail some limitations, which show directions to advance the model by relaxing some of these assumptions. First, the model assumes yearly cycles of purchase (i.e. sales occur annually). Of course, in many industries the purchase cycle is not one year (Reichheld, 1999). Second, although we allow revenues and costs to vary over time, we assume that within a year the cash flows are discrete and take place at the end of each purchase cycle, therefore, yielding in identical discounting of all cash flows. Of course, one could assume that revenues and marketing expenses occur once in the middle of each cycle or even continuously. Cases of continuous cash flows are relevant for daily consumed products. With continuous purchase patterns the discrete summation function in equation (2) has to be replaced by an integral. Third, the idea behind our model is a constant retention rate over time reflecting a lost-for-good setting. Considering a migration model the purchase propensities vary for each period and have to be estimated on the basis of the recency of the last purchase (Dwyer, 1997). Fourth, the length of the projection period T has to be carefully defined depending on the industry considered. For high-technology industries forecasting cash flows beyond four or five years involves too much guesswork (Berger and Nasr, 1998). For stable settings, as in the case of durable products, looking at longer periods may be appropriate.

Calculating CE
Since the majority of CLV models belong to the realm of direct marketing, most models only address customer profitability on an individual level, without determining the collective value of the customer base as a whole in a next step. Furthermore, direct marketing typically focuses on current customers (and sometimes also its future development), thereby neglecting the value of a firm's future customer assets, i.e. those customers who currently do not buy from them because they buy from a competitor or they are not yet in the market. Customer value models that neglect the value of future customer cohorts are static representations of an initially acquired, current customer base, thereby implying a continuously decreasing customer base due to migration streams (for such models see Berger and Nasr (1998) and Fischer *et al.* (2001)). With these models a shrinking customer base over time is therefore implicitly assumed, resulting in an ultimate customer base of zero.

Thus, when considering the CE of a firm:

(1) the discounted lifetime values of all current and future customers have to be considered; and

(2) they have to be aggregated.

Consequently, in contrast to CLV models which yield the lifetime value of individual customers that already are doing business with the firm, so-called customer base models yield the CE as the sum of the CLVs of current customers, as well as prospects (Jain and Singh, 2002; Rust *et al.*, 2001). Thereby, it is not sufficient to consider merely the CLVs of customers that are specifically solicited by means of acquisition instruments like direct marketing. The CLVs of customers who are attracted by other measures or migrate autonomously have likewise to be integrated. In this context, stochastic choice models and attraction models (Logit models) can be employed to take into account the stochastic switching behaviour of customers in making purchases

(Bayon *et al.*, 2002; Jain and Singh, 2002; Pfeifer and Carraway, 2000). Those models help to estimate the probability that a customer moves to another product.

A quantitative approach commonly used to determine the acquisition rate of directly acquired customers (i.e. the number of prospects acquired relative to the number of potential customers that were solicited) is suggested by Blattberg and Deighton (1996). The estimation is based on the current level of acquisition spending, the resulting acquisition rate, a constant that expresses the effectiveness of acquisition activities and the maximum of the acquisition rate that would be achieved were there no limit on the acquisition expenditures (upper threshold). When using this method, it has to be critically noted that the achieved acquisition rate influences the retention rate in the future; often both rates develop in the opposite direction (Wang and Spiegel, 1994). Furthermore, a crucial variable of this model is the margin of future customers. In order to predict these margins, prospective customers could – on the basis of their observable socio-demographic characteristics – be assigned to value segments which are determined on the basis of the past purchase patterns of existing customers with specific socio-demographic profiles. Given the widespread existence of customer data warehouses in organizations, the procedure of profiling prospects with respect to their profitability potential does not seem to be unrealistic.

After having discussed the estimation of the number and values of future customers, we now briefly consider how to project the value patterns of current customers. Although even forecasting the lifetime profit streams from current customers is nontrivial, it seems to be more straightforward with appropriate methodology due to the availability of past purchase data. Schmittlein and Peterson (1994) calculate the probability that a customer is still active at period T since trial drawing on the past purchase history measured by the number of previous transactions x and the time t since trial at which the most recent transaction occurred. Based on these variables a function is determined yielding the number of repeat purchases the customer makes in the next periods. Now, by incorporating the dollar volume of transactions the function helps to forecast the future revenue potential of those customers on the list.

Taking into account the number of newly acquired customers in a particular future period, as well as their corresponding profit patterns (at least on a segment level), the value of these prospective cohorts (per period customer equities) can be determined as the sum of the individual CLVs for each cohort. After discounting the customer equities of the cohorts in each future period, they are summed up over all considered periods yielding the overall CE. In this context, the current customer base represents the initial stock at $t = 0$.

To mathematically formulate our equity model we start with calculating the lifetime value of an individual customer i in period 0, which is given by the following equation, which is a simplified version of equation (2):

$$\text{CLV}_{i0} = \sum_{t=0}^{T} r_i^t \frac{(R_{ti} - C_{ti})}{(1 + d)^t} \qquad (3)$$

To estimate the value of the entire customer base we assume that new customers are acquired in each time period s, i.e. in each period a new customer cohort emerges which we denote cohort s. The lifetime value of each customer is calculated according to

equation (3), the profit margin $R - C$ from each customer may vary over time. According to several empirical studies, for the future periods accelerating profits can be expected. It has been argued by several authors (Libai *et al.*, 2002; Reichheld and Sasser, 1990; Reichheld, 1999) that long-term customers buy more and at a higher frequency (because they are better acquainted with the firm's offerings), are cross-buying away from core products, cost less to serve (because the firm knows them better), and are willing to pay higher prices (because they have higher switching costs). In contrast, the findings of Reinartz and Kumar (2000) show that there is not necessarily a positive customer lifetime-profitability relationship. For several business scenarios, long-life customers are not yielding higher revenues over time and the costs of serving them are higher than the costs for serving new customers. Additionally, Gupta *et al.* (2001) and Libai *et al.* (2002) argue that as a company expands its customer base it tends to draw deal-prone consumers who do not spend as much money and are less loyal. Consequently, average revenue per customer may decline over time.

The lifetime value of the 0th cohort at current time 0 is the sum of the lifetime values of all customers acquired in period 0 ($s = 0$).

$$CE_0 = \sum_{k=(v_{0-1}+1)}^{v_0} \sum_{t=0}^{T} r_i^t \frac{(R_{ti} - C_{ti})}{(1+d)^t} \tag{4}$$

Let us assume that 100 customers were won in period $s = 0$. Since there is no before period $s - 1$ and, therefore, no initial customer base exists, v_s equals 100 yielding $v_s - v_{s-1} = 100$ customers in cohort s. Obviously, the variable $v_s - v_{s-1}$ reflects the acquisition rate for period s that has to be estimated using the customer base models presented above. If we consider a forecast horizon of T periods, T cohorts exist. Consequently, the firm's overall CE is the sum of the values of all T cohorts discounted on $t = 0$ which is given by:

$$CE = \sum_{s=0}^{T} \frac{1}{(1+d)^s} \sum_{k=(v_{s-1}+1)}^{v_s} \sum_{t=s}^{T} r_i^t \frac{(R_{ti} - C_{ti})}{(1+d)^t} \tag{5}$$

with $v_{-1} = 0$, where CE in the customer equity; s the index over time periods (i.e. index over customer cohorts); T the forecast horizon in years (=number of periods); d the discount rate (cost of capital that is employed for marketing investments); v_s the total of customers left at the end of period s (i.e. $v_s - v_{s-1}$ = number of newly acquired customers in period s = size of cohort s); k the index over customers of a particular cohort; r_i the retention rate of customer i in period t; t the time index over the remaining periods of the relationship with customer i; R_{ti} the revenues of customer i in period t; and C_{ti} the costs of customer i in period t.

The first sum towards the end of equation (5) represents the lifetime value of the individual customer i in period s. The second sum is the total of the lifetime values of all newly acquired customers of period s, i.e. the value of the cohort s (cohort-specific CE). The third sum represents the sum of the equities of all cohorts discounted to the present (i.e. the overall CE).

Relating CLVs to corporate value

Limitations of the SHV concept

Since the SHV concept represents the state-of-the-art in traditional financial valuation, it is not outlined here in more detail. Basically, the SHV falls into four components. In addition to the market value of debt assigned to the business and non-operating assets (Copeland *et al.*, 2000), there are two crucial components. First, present value of cash flows from operations during the forecast period that can be realistically predicted. And, second, the present value of the cash flows attributable to the period beyond the forecast period (continuing value (CV), Doyle, 2000). The latter is often calculated based on the assumption of constant cash flows. In the following section, we will briefly examine some limitations of the traditional SHV approach that call for linking the SHV concept with the CLV concept in order to develop a more marketing oriented approach of corporate valuation.

Although the level of the SHV primarily depends on the free cash flow (FCF), a lot of research efforts mainly address capital costs, investment structures or aspects of taxation (for example, Brealey and Myers (2000) and Copeland *et al.* (2000). An exact calculation of the FCF should be the primary objective of SHV models because of the inherent subjectivity of risk mark-ups and, hence, the discount rates.

According to Rappaport (1998), the FCF is influenced by seven value drivers: sales growth, return on sales (operating profit margin), income tax rate, incremental investments in fixed and working capital, weighted average cost of capital, and the value growth duration. These SHV drivers are hardly predictable and, for this reason, it is necessary to revert to the original causal factors of success underlying these drivers. However, only the first two value drivers, sales growth and operating profit margin, are of an operative nature. Yet even these metrics lack a direct linkage to the critical factor "customer" as the source of value creation. These drivers originate from a too high aggregation level and are not suitable for the exact prediction of customer profitability in heterogeneous markets.

For this reason, the disaggregation of strategic aspects along with the prediction of the FCF on a lower aggregation level is requested in the literature (Gregory, 1992; Gupta *et al.*, 2001). By using the CLV concept, the FCF components (revenue and cost streams) can be split up with regard to their different sources represented by different customer activities. Regardless of the actual definition of corporate value, the relationships with the customers and outcomes stimulated by customer management (e.g. customer satisfaction and customer retention) always represent the initial stages of the profit chain (Heskett *et al.*, 1997). These initial effects render a customer valuable and finally determine the enhancement, acceleration, and volatility of cash flows (Srivastava *et al.*, 1999).

The synthesis of CLV and SHV concept for corporate valuation

Both the CLV and the SHV draw on discounting forecasted net cash flows by the risk-adjusted cost of capital and both account for a comparably long forecast horizon. While the SHV belongs to the category of financial valuation methods and is therefore, located on a high, strategic level of aggregation, the CLV concept – due to its origin – is situated on the operative management level (Hoekstra and Huizingh, 1999). Accordingly, drawing on more comprehensive, individual data with direct purchase behaviour relevance the customer-related valuation procedures should be applied to

decompose the strategic level by operative aspects (Gupta *et al.*, 2001; Reinartz and Kumar, 2000). This entails a significantly better forecasting of the FCF in comparison to simple market volume or market share analyses of the SHV method, which usually apply trend projections of the macro value drivers.

Estimating the FCF by using CE. Above all, using CLVs makes a valuable contribution to the quantification of operating value drivers within the SHV concept, such as the sales growth rate and the profit margin, the two main components of the FCF. The CE model developed above covers these drivers and, therefore, constitutes the lion's share of a company's FCF. The CE components comprise all cash in-flows in a differentiated way, as well as all customer-attributable cash out-flows.

Another value driver is the duration of value-creating growth, which is usually considered to be identical with the forecast period. Owing to the unrealistic assumption of infinite value-creating growth, in contrast to other models (Fischer *et al.* 2001; Gupta *et al.*, 2001), we do not base our model on an infinite planning horizon. Moreover, forecasting cash flows seems feasible only for a few periods. Beyond the forecast horizon, it is assumed that the cash flows are stable and can be summarized in a residual. The CLV method can serve as a tool for the specification of the forecast period. The observed profit growth of past periods indicates the current stage of the customer life cycle, which provides information of the expected duration of generating returns above capital costs.

Estimating the residuals by using the SHV method. All components which are part of the FCF but are not customer-specific and are therefore, not covered by the CE model, have to be approximated using the traditional SHV method. Financial and taxation aspects belong to this category, namely income tax rate, changes of net working capital, incremental fixed capital investment, and capital costs. Another residual which can be ascribed to the value driver profit margin, but cannot be estimated using the CLV approach, are fixed costs that are not attributable to the individual customer. These marketing overhead costs (costs for brand management, costs of training the sales force or call centre team, costs of market research including complaint management) and fixed product costs (manufacturing costs that cannot be allocated to the customer via cost of sales) have to be dealt with separately.

Subsequently, the CV, too, has to be calculated according to the concept of SHV. The estimation of the CV is performed under the common assumption of constant growth rates (e.g. with long-term brand strength that can be leveraged to future growth options) or the assumption that future cash flows are a perpetuity that is an infinite stream of identical cash flows (Doyle, 2000).

Formal synthesis of CLV and SHV concept. Merging the CE model and the SHV method leads us to an integrative model to calculate the corporate value:

$$
\text{Corporate value} = \text{CE} - \sum_{t=0}^{T} \frac{\text{FC}_t + \text{InvWC}_t + \text{InvFC}_t + \text{Tax}_t}{(1+d)^t}
$$
$$
+ \frac{\text{CV}_T}{(1+d)^T} + \text{NA} - D \tag{6}
$$

where CE in the customer equity of the firm (equation (5) for calculation); t the time index for the forecast period; T the forecast period in years; d the discount rate (cost of

capital that is employed for marketing investments); FC_t the fixed costs in period t; $InvWC_t$ the net investments in working capital in period t; $InvFC_t$ the net investments in fixed capital in period t; Tax_t the tax payments for cash flow in period t; CV_T the continuing value; NA the non-operating assets; and D the market value of debt.

The extended model presented in equation (6) shows the integration of CE into the traditional SHV formula. The CE is the customer equity measure developed in equation (5) which is derived from the individual CLVs of current and future customers. The monetary streams which are generated by the customers are the main source of the FCF. The cash in-flows are represented by autonomous revenue, up selling and cross-selling revenue, and RV. Cash out-flows are acquisition costs, marketing costs, cost of sales, and TC.

The fixed costs represent one part of the residual value. The remaining parts investment in net working capital and investment in fixed capital, as well as tax payments are factors well known in the context of the common SHV approach. The same holds true for the CV towards the end of the forecast horizon and the market value of debt. The discount rate has to be regarded as identical for all elements that is, the CE is also discounted along with the capital costs. A universal discount rate guarantees consistency across all business functions. In this way, a discussion about the equal treatment of marketing investment is avoided.

Practical issues of a customer-based valuation
Areas of application
Obviously, a customer-based evaluation is necessary when traditional financial approaches fail. First, this is the case if business analysts try to valuate high growth and start-up companies. They usually invest heavily in early periods which results in no or negative earnings or negative cash flows. For start-up companies the additional problem arises that only limited or no historic cash flow data exist on which traditional financial metrics could be based (Gupta *et al.*, 2001). In both cases, it is hardly possible to employ price-earnings-ratios or financial DCF approaches. The limitations of traditional accounting methods that focus on tangible assets hold especially true for all companies that are highly virtual (e.g. internet firms). These firms derive their value predominantly from market-based assets like customer relations or brands (Srivastava *et al.*, 1999). Taking into account intangible assets gives a more accurate picture of the potential of such companies.

Second, the valuation of marketing-related synergies conducted by acquirer companies in the context of mergers and acquisitions makes a CLV-based corporate valuation particularly relevant. Despite the fact that marketing and sales synergies often have stronger effects than production, personnel or procurement aspects, their assessment has long been neglected. Companies attempt to create and use synergies primarily in the field of costs (Gaughan, 1999). The merger between Allianz and Dresdner Bank provides a good example demonstrating the utility of customer value-based corporate valuation. The merger was aimed at the creation of the Allianz Group and the provision of one-source financial services ranging from current accounts to building loan contracts and automobile insurances, thereby using cross-selling effects. In this context, a detailed analysis of the interrelations between different products revealed high affinities; yet it also disclosed that only one of the two additional products was covered by the existing product program. This resulted in

purchasing external competencies. Since the CLV model covers the entire spectrum of operative revenue and cost in a customer-related way it can provide hints for identifying synergies with regard to acquisition and marketing costs (e.g. economies of scale and quantity discounts in the field of advertising, promotion or direct mailing). With regard to revenues, a customer-based model can assess whether a higher customer retention rate can be achieved through offering better products and services or through leveraging customer loyalty programs to the customer base of the acquired company.

Finally, the value of the customer base of an exterior company can be used to determine an upper bound for the acquisition costs. Or, respectively, the minimal lifetime value can be estimated that has to be achieved in order to economically justify the price that has been paid to acquire the customer. For example, in May 2001, the German telecommunication firm Deutsche Telekom closed its long-delayed acquisition of the US wireless carrier VoiceStream in order to gain access to 2.3 million customers. As DT spent $35 billion to acquire VoiceStream, $15,200 were paid per customer; an amount that has never been paid before in the telecommunication industry. Referring to our formula in equation (3) and assuming an infinite time horizon, an optimistic but not unrealistic retention rate of 90 per cent (Reichheld, 1999), an average annual margin of $540 (implying a monthly margin of $45 which seems to be realistic for the mobile communication sector according to industry reports) and a usual discount rate of 10 per cent the lifetime value of each acquired subscriber is $2,430. Let aside the physical assets that were also acquired by spending $15,200 per customer, the estimated lifetime value implies that in the future each customer must attract at least five new customers through word-of-mouth referrals in order to recover the acquisition costs. Otherwise, DT needs to create exorbitant cross-selling revenues by leveraging current customers from the core product (telephony) to new businesses (WAP, mobile commerce services, gaming). Obviously, it seems not very realistic to achieve these goals. Soon after the deal, *Financial Times* reported about a lawsuit against the DT executive board that had been submitted to German District Courts on behalf of DT shareholders that accused DT for having paid an unrealistically excessive price for VoiceStream. In course of this, even the German federal audit court mandated an auditing firm to assess the VoiceStream deal. According to their findings DT overpaid $26 billion for the VoiceStream acquisition. Considering the estimated value of the customer base of about $5.6 billion (2.3 million customers × $2, 430), obviously a customer value-based approach could have provided a more reliable proxy of the firm value.

Data requirements

Concerning the data requirements, an advantage of our approach lies in the fact that it is not necessary to have detailed proprietary customer-related information. To apply a customer-based approach one can draw upon detailed publicly available information from annual reports and analysts' researches, as well as financial statements. Those data include the number of current and past customers, gross margin, growth rates, marketing expenditures, risk premium and capital costs (Gupta *et al.*, 2001). We now shortly examine how the data on the three key input variables for our customer-based valuation approach can be obtained and which reasonable assumptions are necessary.

Number of customers. The number of new customers in future cohorts, gained by communication activities of the supplier or word-of-mouth activities of current

customers, is the key input to a CLV-based valuation model. For estimating CE, it is irrelevant whether the purchases of customers that are induced by references are assigned to the CLV of the reference provider (indirect method) or whether it is included in the CLV of the recipient itself (direct method) because CE is defined as the total of the CLVs summed over all current and future customers. In order to estimate this figure, industry specific retention rates can be used that are published in several studies. Using a retention rate of 80 per cent, which is suggested by Reichheld (1999) as an average retention rate among established firms, and the number of customers at the end of a period leads to the number of lost customers for each period. This figure is necessary in order to calculate the number of acquired customers, which is given by the difference between the number of customers at the end and at the beginning of a period the lost customers (Skiera and Wiesel, 2002).

A more complex way is to use the Blattberg-Deighton model proposed above, but here proprietary information are necessary, which in most cases are not available.

Acquisition costs and contribution margin per customer. The acquisition expenditures per customer can be operationalized by dividing the marketing costs by the number of newly acquired customers for each past period. Here, the assumption is made that the marketing expenditures are only used to attract customers although, evidently, they are also used for retaining customers (Gupta *et al.*, 2001). Most often no separation of the marketing expenditures is available from company reports (Reinartz and Kumar, 2000).

To model the contribution margin per customer over time, the models mentioned above are available, but request very detailed information and high mathematical efforts. A simpler procedure is to draw on the total annual EBITDA-margin of the current year and divide this by the total number of customers at the end of that year (Skiera and Wiesel, 2002). It has to be noted that in some cases not all costs incurred to serve customers are included in the margin. After having determined the margin for the current period, analysts could assume margins to be constant over time or at least a constant growth rate of the margins based on the average of the last quarters (Gupta *et al.*, 2001). Thereby analysts can cope with the conflicting evidences concerning the pattern of margin in future periods, which have been discussed above.

Discount rate. To estimate the discount rate that accounts for the financing mix of a company as well as its risk, standard financial methods (e.g. Capital Asset Pricing Model) can be used. Finance texts generally suggest a range of 8-16 per cent for this annual discount rate (Brealey and Myers, 2000). Beta factors, necessary to choose an appropriate discount rate, can be taken out of reports of financial information companies as Reuters or Bloomberg.

Conclusion

Marketing-related issues of valuation are gaining increasing attention. In the meantime, also the financial market calls for a more appropriate consideration of the customer base for corporate valuation and, in this context, for a synthesis of the SHV and CLV concepts (Hall, 2002). By merging the CLV and SHV concepts, our approach attempts to contribute to a more market-oriented valuation. While the traditional SHV method considers cash flows at a highly aggregated level, our approach employs disaggregated cash flows on the level of individual customers (CLVs). Thereby we do incorporate the lifetime values of future customers by considering different cohorts.

Thus, we do not simply project the value of existing customers. Moreover, we do capture customer defection by incorporating retention rates which has a significant impact on corporate value.

There are several implications of a customer-based valuation framework. First, in contrast to methods employing the traditional SHV approach, our model enables a more detailed and valid estimation of corporate value by accounting for the single customer demands and activities that drive marketing actions. By incorporating the marketing actions on customer acquisition and retention into corporate valuation a better forecasting of the respective revenue and cost streams is possible. Second, incorporating customer-related drivers into financial valuation models makes easier to assess the return on marketing investments. A customer-based measure of firm value should be used to guide marketing investments and clearly link them to SHV. Finally, as the marketing's role is to manage customer relations it can facilitate the growth of SHV by increasing CE. Thus, the framework fosters rethinking the role of marketing within the organization.

We acknowledge several limitations of our paper that are subject for future research. First, advances in modeling the CLV components are necessary to provide quantitative techniques to calculate the variables. For example, it has to be modelled in more detail how customer word-of-mouth behaviour can contribute to the value of future customer by affecting product adoption and therefore, influencing the growth factor and through reducing the acquisition costs of a firm (Hogan *et al.*, 2002b). Moreover, the explicit modeling of the future growth of the customer base (the acquisition rate) would increase the applicability of the model. Then, an assumption about the length of the planning period (i.e. the period with value-enhancing growth), which is required for our model, is not necessary. At the current state of our model, the acquisition rate has to be estimated for each cohort using the procedure introduced by Blattberg and Deighton (1996). A more sophisticated modeling of the development of the customer base over time could be based on diffusion theory. For example, the growth of the customer base in past quarters could be assessed in order to identify the type of diffusion function that best fits this pattern (Schmittlein and Mahajan, 1982). Additionally, taking into account heterogeneity within the customer cohorts is a task for future research.

Second, our model needs to be applied using real data for the input variables as mentioned in the previous section. However, we provide a simple example for estimating the customer-based value of a telecommunication company. Moreover, we provide information that could guide future studies in obtaining the necessary figures. Most data that are necessary to calibrate our model are publicly available. A good example on how customer value-related data can be extracted from annual reports and other financial statements, as well as business analyst's research is given by Skiera and Wiesel (2002).

Obviously, a comprehensive customer-based corporate valuation may legitimate additional costs resulting from the implementation of CLV systems by facilitating more precise and reliable results and reduces the risk of miscalculation. Meanwhile, most companies consider a long-term customer value assessment as important. The more widespread the CLV concept becomes as a management tool in the operative sphere, the more easily corporate valuation efforts via CLV can be undertaken. The method we developed may serve as a starting point for valuation of firms based on individual CLVs and may at the same time stimulate further research efforts on the marketing-finance interface.

References

Bayón, T., Gutsche, J. and Bauer, H.H. (2002), "Customer equity marketing: touching the intangible", *European Management Journal*, Vol. 20 No. 3, pp. 213-22.

Berger, P.D. and Nasr, N.I. (1998), "Customer lifetime value: marketing models and applications", *Journal of Interactive Marketing*, Vol. 12 No. 1, pp. 17-30.

Blattberg, R.C. and Deighton, J. (1996), "Manage marketing by customer equity", *Harvard Business Review*, Vol. 74 No. 4, pp. 136-44.

Blattberg, R.C., Getz, G. and Thomas, J.S. (2001), *Customer Equity: Building and Managing Relationships as Valuable Assets*, Harvard Business School Press, Boston, MA.

Bolton, R.N. (1998), "A dynamic model of the duration of the customer's relationship with a continuous service provider", *Marketing Science*, Vol. 17 No. 1, pp. 45-65.

Brealey, R.A. and Myers, S.C. (2000), *Principles of Corporate Finance*, McGraw-Hill, Boston, MA.

Copeland, T., Koller, T. and Murrin, J. (2000), *Valuation: Measuring and Managing the Value of Companies*, Wiley, New York, NY.

Cornelsen, J. (2002), "What is the customer worth? Customer value analyses in relationship marketing on the basis of car buyers", *Yearbook of Marketing and Consumer Research*, Vol. 1 No. 1, pp. 27-46.

Day, G. and Fahey, L. (1988), "Valuing market strategies", *Journal of Marketing*, Vol. 52 No. 3, pp. 45-57.

Doyle, P. (2000), "Value-based marketing", *Journal of Strategic Marketing*, Vol. 8 No. 4, pp. 299-311.

Dwyer, R.F. (1997), "Customer lifetime valuation to support marketing decision making", *Journal of Direct Marketing*, Vol. 11 No. 4, pp. 6-13.

Fischer, M., Herrmann, A. and Huber, F. (2001), "Return on customer satisfaction", *Zeitschrift für Betriebswirtschaft*, Vol. 71 No. 10, pp. 1161-90.

Gaughan, P.A. (1999), *Mergers, Acquisitions, and Corporate Restructuring*, Wiley, New York, NY.

Gregory, A. (1992), "Strategic value analysis: the danger of oversimplification", *Management Accountant*, Vol. 70 No. 8, pp. 42-6.

Gupta, S., Lehmann, D.R. and Stuart, J.A. (2001), "Valuing customers", working paper No. 01-119, Marketing Science Institute, Cambridge, MA.

Hall, R. (2002), "Linking customer and shareholder value", *ABA Bank Marketing*, July/August, p. 9.

Heskett, J.L., Sasser, W.E. Jr and Schlesinger, L.A. (1997), *The Service Profit Chain*, Free Press, New York, NY.

Hoekstra, J.C. and Huizingh, E.K.R.E. (1999), "The lifetime value concept in customer-based marketing", *Journal of Market Focused Management*, Vol. 3 No. 3, pp. 257-74.

Hogan, J.E., Lemon, K.N. and Rust, R.T. (2002a), "Customer equity management", *Journal of Service Research*, Vol. 5 No. 1, pp. 4-12.

Hogan, J.E., Lehman, D.R., Merino, M., Srivastava, R.K., Thomas, J.S. and Verhoef, P.C. (2002b), "Linking customer assets to financial performance", *Journal of Service Research*, Vol. 5 No. 1, pp. 26-38.

Jackson, D.R. (1992), "In quest of the grail: breaking the barriers to customer valuation", *Direct Marketing*, Vol. 55 No. 3, pp. 44-7.

Jain, D. and Singh, S.S. (2002), "Customer lifetime value research in marketing: a review and future directions", *Journal of Interactive Marketing*, Vol. 16 No. 2, pp. 34-46.

Jones, T. and Sasser, W.E. Jr (1995), "Why satisfied customers defect", *Harvard Business Review*, Vol. 73 No. 6, pp. 88-9.

Keane, T.J. and Wang, P. (1995), "Applications for the lifetime value model in modern newspaper publishing", *Journal of Direct Marketing*, Vol. 9 No. 2, pp. 59-66.

Kim, B-D. and Kim, S-O. (1999), "Measuring upselling potential for life insurance customers", *Journal of Interactive Marketing*, Vol. 13 No. 4, pp. 2-9.

Libai, B., Narayandas, D. and Humby, C. (2002), "Toward an individual customer profitability model", *Journal of Service Research*, Vol. 5 No. 1, pp. 69-76.

Lilien, G.L., Kotler, P. and Moorthy, S.K. (1992), *Marketing Models*, Prentice-Hall, Englewood Cliffs, NJ.

Mulhern, F.J. (1999), "Customer profitability analysis: measurement, concentration, and research directions", *Journal of Interactive Marketing*, Vol. 13 No. 1, pp. 25-40.

Niraj, R., Gupta, M. and Narasimhan, C. (2001), "Customer profitability in a supply chain", *Journal of Marketing*, Vol. 65, pp. 1-16.

Payne, A., Holt, S. and Frow, P. (2001), "Relationship value management", *Journal of Marketing Management*, Vol. 17 Nos. 7-8, pp. 785-817.

Pfeifer, P.E. and Carraway, R.L. (2000), "Modeling customer relationships as Markov chains", *Journal of Interactive Marketing*, Vol. 14 No. 2, pp. 43-55.

Rappaport, A. (1998), *Creating Shareholder Value: A Guide for Managers and Investors*, Free Press, New York, NY, London.

Reichheld, F.F. (1999), *The Loyalty Effect – The Hidden Force behind Growth, Profits, and Lasting Value*, Bain, Boston, MA.

Reichheld, F.F. and Sasser, E.W. Jr (1990), "Zero defection: quality comes to service", *Harvard Business Review*, Vol. 68 No. 5, pp. 2-8.

Reinartz, W.J. and Kumar, V. (2000), "On the profitability of long-life customers in a noncontractual setting: an empirical investigation and implications for marketing", *Journal of Marketing*, Vol. 64 No. 4, pp. 17-35.

Rust, R.T., Lemon, K.N. and Zeithaml, V.A. (2001), "Modeling customer equity", working paper No. 01-108, Marketing Science Institute, Cambridge, MA.

Schmittlein, D.C. and Mahajan, V. (1982), "Maximum likelihood estimation for an innovation diffusion model of new product acceptance", *Marketing Science*, Vol. 1, pp. 57-78.

Schmittlein, D.C., Morrison, D.G. and Colombo, R. (1987), "Counting your customers: who are they and what will they do next?", *Management Science*, Vol. 33, pp. 1-24.

Schmittlein, D.C. and Peterson, R.A. (1994), "Customer base analysis", *Marketing Science*, Vol. 13 No. 1, pp. 41-67.

Srivastava, R.K., Shervani, T.A. and Fahey, L. (1999), "Marketing, business processes, and shareholder value", *Journal of Marketing*, Vol. 63 No. 4, pp. 168-79.

Staat, M., Bauer, H.H. and Hammerschmidt, M. (2002), "Structuring product-markets: an approach based on customer value", *Marketing Theory and Applications*, Vol. 13 No. 1, pp. 205-12.

Wang, P. and Spiegel, T. (1994), "Database marketing and its measurements of success: designing a managerial instrument to calculate the value of a repeat customer base", *Journal of Direct Marketing*, Vol. 8 No. 2, pp. 73-81.

Wiesel, T. and Skiera, B. (2002), "Company valuation by using customer values", research paper, Johann Wolfgang Goethe-University, Frankfurt.