

MAKING CUSTOMERS PAY: MEASURING AND MANAGING CUSTOMER RISK AND RETURNS

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Abstract

CRM (Customer Relationship Management) builds on the Relationship Marketing idea that lifetime relationships with customers are more profitable than short-term transactional relationships. However, subsequent work on the profitability of customers has shown that some customers are very unprofitable. This leaves managers with a problem: how to focus their relationship management efforts to maximise shareholder value. A suggested theoretical approach is to view the customer base as an investment portfolio. This paper uses the portfolio management model of risk and return to explore the measurement of returns and of the risk of the customer. Some implications for CRM managers are outlined.

Key words: Customer Relationship Management (CRM), customer profitability, customer risk, customer portfolio.

INTRODUCTION

The emergence of Relationship Marketing with its emphasis on customer retention (Reichheld, 1993; Christopher et al., 1991) has sparked considerable interest in the relationship between customer retention and increased profitability (for example, Blattberg and Deighton, 1996; Reichheld, 1996; Reichheld, 1993; Reichheld and Sasser,

1990). More recently, it has been suggested that a company's relationships with its customers are one of its most important assets (Srivastava et al., 1998; Hunt, 1997; Kutner and Cripps, 1997) and that pro-active management of the customer relationship that leads to greater customer satisfaction can increase the profitability of the firm as a whole (e.g. Ittner and Larcker, 1998). This has encouraged companies to view their relationships with customers as assets in themselves (Hunt, 1997; Kutner and Cripps, 1997) which are capable of management. More recently, it has been suggested that one of the primary purposes of marketing is the delivery of shareholder value (Doyle, 2000) through customer relationship management (Srivastava et al., 1999).

If customer relationships are assets, how do they compare with the other business assets? Although not valued on the balance sheet, customer relationships share characteristics with other business assets and, in particular, with brand assets. Intuitively, customer relationships and brand relationships should have a lot in common. Both generate cash flow and profit for the business; both are intangible and difficult to measure. These two marketing assets differ, though, in the degree of recognition and the consequent attitude of companies to their measurement. The measurement of brand assets and brand equity is considered a topic of major importance to companies and to shareholders and has received considerable coverage (for two examples in a large field see Ward and Ryals, 2001 and Murphy, 1989) and it is recognised that brands need investment.

By contrast, despite discussion of the importance of customer profitability measurement and calls for measuring the financial impact of marketing strategies (Sheth and Sharma, 2001) and for marketing's central function in building customer relationships (Varadarajan and Jayachandran, 1999; Webster, 1992), most companies do not yet

measure the value of their customer relationships. Proponents of relationship marketing and of customer retention have argued that retained customers are more profitable (Reichheld, 1993; Reichheld, 1996; Reichheld and Sasser, 1990; Peppers and Rogers, 1995). However, more recent work has demonstrated that retained customers are not necessarily more profitable and what matters is how customers are managed (Reinartz and Kumar, 2000; Reinartz and Kumar, 2002; Leszinski et al., 1995).

As the foregoing discussion illustrates, the measurement of customer profitability is a significant topic in its own right and is linked to the management of customer relationships (Gupta et al., 2001; Rust et al., 2001; Zeithaml et al., 2001; Mulhern, 1999) and the considerable field of CRM (Ryals et al., 2000). Whilst these two fields are of interest in the current context, the purpose of this paper is to draw a further parallel between brands and customer relationships, the notion of the portfolio. It is commonplace for marketing managers to discuss the brand portfolio and the measurement and management of this portfolio, the impact of brand extensions on the performance of the overall portfolio, etc. (see, for example, Davidson, 1997). It is more unusual for marketing managers to discuss their customer portfolio.

Marketing portfolio analysis

Portfolio analysis is the process of reviewing a group of investments, usually with a view to making asset management or resource allocation decisions. In marketing, portfolio analysis has tended to focus on product portfolios, such as the Boston Matrix. Other authors have recognised the importance of customer attractiveness (profitability, growth, etc.) but have discussed this largely in qualitative terms (for example, Fiocca, 1982).

Quantitative portfolio analysis was popularised through the work of Nobel Laureate William Sharpe in the early 1960s (Sharpe, 1964). Sharpe's work is associated with Modern Portfolio Theory (MPT) and with the capital Asset Pricing Model (CAPM). The work is based on share portfolios; essentially, MPT suggests that investors will aim to maximise returns for a given level of risk. Rational investors will demand higher returns for higher levels of risk; they will also prefer the lower-risk of any two investments which have the same returns, and prefer the higher return investment of any two which have the same risk. The CAPM shows how the required return can be calculated (Brealey, 1983; Sharpe, 1981).

Although MPT has been enormously influential in financial markets, its influence in the fields of management and marketing has been limited. The work of Larréché and Srinivasan is an exception; they call for the application of quantitative portfolio analysis using discounted cash flow techniques and discuss the application to business unit sales and marketing expenditure (Larréché and Srinivasan, 1981 and 1982). More recently, Dhar and Glazer (2003) have proposed treating the customer portfolio as a share portfolio.

This paper builds on the work of Larréché and Srinivasan and Dhar and Glazer and applies MPT to marketing. Specifically, it argues for a parallel between the measurement and management of the customer portfolio and the measurement and management of share portfolios. In particular, this paper will build on the current work on customer lifetime value and the customer portfolio (for example, Lemon et al., 2001)

and will draw on portfolio theory to argue that the risk of the customer should play an important part in the measurement and management of the value of individual customers and of the customer portfolio.

Financial portfolio management and the customer portfolio

In share portfolio management, there are two levels of management: the overall risk and return profile of the portfolio, and the measurement and management of the constituent shares (for example, Brealey, 1983; Sharpe, 1981). Both risk and returns are actively managed. This paper argues that the same should be true of the customer portfolio; the overall risk and returns of the customer portfolio should be a matter for marketing measurement and management, as well as the relationships with individual customers.

The management of customers as portfolios is not unknown. For example, in the financial services industry in the management of credit relationships that mortgage, loan and credit card customers have with banks, where the measurement and management of the risk as well as return of the overall portfolio is taken very seriously. The overall risk and return profile of the customer portfolio in these cases drives decisions about how many and which customers to accept; individual customer profitability and risk determines how those customers are managed by the lender.

This paper explores the application of Modern Portfolio Theory to a portfolio of customers or customer segments and demonstrates that MPT and CAPM can be usefully applied to a customer portfolio. Using MPT and CAPM, the paper argues that the overall risk and returns of the customer portfolio are important and two methodologies

for analysing customer risk are presented and analysed. Finally, the managerial implications of MPT for marketing are examined. Risk and return analysis would allow marketing managers to raise issues about which types of customers are under-represented in the portfolio, which customers are over-represented, which customers are not represented at all and which customers are in the portfolio but perhaps should not be. Drawing on parallels from the management of share portfolios and on practical examples from the customer portfolio management practices of the financial services industry, the paper suggests how portfolio management can help CRM managers maximise their returns from customers.

RISK AND RETURNS IN THE CUSTOMER PORTFOLIO

As previously discussed, one of the most influential theories in portfolio management is MPT and the Capital Asset Pricing Model (CAPM). In CAPM, high risk investments are associated with higher returns, which rational investors require to compensate them for taking on higher risk (Brealey, 1983). The risk/return trade-off of MPT is important in determining marketing resource allocation to maximise shareholder value. High return marketing investments may seem unduly attractive unless the concomitant risk is also taken into account. Focusing marketing investment on certain customers or segments may be attractive in the short-term but may lead to problems medium to longer term if these customers are inherently riskier than others. To apply modern portfolio theory to the management of customer relationships, managers need to know how to identify both customer returns and customer risk. The application of CAPM to

the customer portfolio and methods of evaluating customer returns and customer risk will now be discussed.

In CAPM, returns on a share are measured in terms of the increase in capital value of the share plus the income received in the form of dividends. Customer returns are usually measured either as customer profitability or customer lifetime value. However, customer profitability, a single-period measure of the returns from a customer, can be very misleading as a guide to the total value of that relationship (Wilson, 1996). Customers may be unprofitable in one year because of one-off factors such as the cost of acquisition (if the customer is new) or perhaps some customer-specific factor (for example, if the customer is in temporary financial difficulties and purchase volumes fall faster than servicing costs). Single-period measurement of customer profitability may not be a reliable guide to the true value of that customer. A better measure of customer returns is, therefore, customer lifetime value, defined as the stream of profits over the course of the relationship lifetime.

Methodology

The application of MPT and the CAPM to a customer portfolio took place during a longitudinal, collaborative research project with the customer management team of a leading insurance company (Ryals, 2002b). Throughout the project lifetime of 18 months, the application of MPT and CAPM was carried out through researcher interventions with the Customer Delivery Team (CDT) and auxiliary team members, as appropriate. Researcher interventions included workshops, face-to-face interviews and the iteration of 22 spreadsheets to arrive at customer lifetime value (returns) adjusted for risk. In total, researcher intervention occurred on 14 separate occasions.

The accuracy of quantitative data was checked in two ways. Successive versions of a spreadsheet (Microsoft Excel) were fed back to members of the CDT and their views solicited. This led to considerable changes in the customer revenue and cost forecasts. Other quantitative data were checked for accuracy of calculation and transcribed by a third party who had data entry experience.

Measuring returns from the customer portfolio

This section includes examples of customer risk and returns calculations carried out by the customer development team (Ryals, 2002b). The first step in applying CAPM to the customer portfolio is to measure returns from the customer portfolio by estimating the relationship lifetime and forecast likely revenues, costs and hence customer profitability each year for the lifetime of the relationship. Customer lifetime value has three elements: duration of relationship, revenues, and costs. Relationship duration can be forecast by the key account manager or extrapolated from previous experience. Revenues are a function of actual and anticipated product or service sales. Customer-specific costs are more difficult, since most organisations are not able to identify the precise costs of servicing their individual customers. Tracking customer-specific costs is a live issue for CRM managers although technology can help. For example, call centre and sales force automation systems can automatically identify time spent, customer by customer.

Table 1 shows the returns forecast for a major customer, a charitable foundation.

[Table 1: Measuring customer lifetime value]

The total value of the customer portfolio, or customer equity of the firm, can be calculated as the sum of the individual customer lifetime values (Lemon et al., 2001). However, MPT and the CAPM model suggests that customer lifetime value, or customer equity, may be an inadequate measure of the true value of the customer. Customer lifetime value and customer equity is about a profit stream, but MPT and CAPM says that risk, as well as returns, must be taken into account if shareholder value is to be created. When calculating the lifetime value of a relationship with a specific customer a discount rate is usually applied to future profits to determine customer lifetime value (see Table 1) but this discount rate does not necessarily bear any necessary relationship to the risk of the customer. The application of MPT and the CAPM to the customer portfolio means that the returns from a customer should be adjusted for the risk of that customer. This risk assessment has not hitherto been incorporated into customer lifetime value and customer equity calculations. Two approaches to assessing the risk of a customer will now be described; later, the way in which each approach was applied to the insurance company's key customer portfolio will be discussed.

Assessing the risk of a customer

Many companies assess the risk of their customers using some form of risk or credit scoring. Risk scoring is an effective way of evaluating certain specific types of risk in a customer relationship, normally the risk of default.

However, other types of risk associated with a customer, such as the risk of defection or purchasing swings, may not be captured by traditional risk scoring. Therefore, for marketing purposes and for the development of customer management strategies, it may be valuable to use a method for assessing customer risk that forces managers to define and evaluate customer risk for themselves (McNamara and Bromiley, 1999).

This evaluation can take one of two forms. Either the discount rate used to calculate customer lifetime value can be adjusted for the risk associated with that customer or segment, or the risk evaluation can be expressed as a probability of obtaining the forecast future revenue stream from that customer or segment. Each method will now be discussed.

The CAPM expresses the risk of a share in terms of its beta. The beta measures the volatility of share price movements relative to a benchmark (for example, to a stock market index). A share with a beta of 1.0 will be expected to move in line with the index; a share with a beta of 1.5 is riskier and will be expected to move 1.5 times as much as the index. For this reason, high beta shares are preferred in rising stock markets and low beta shares (which move less than the index) are preferred in falling stock markets. Betas are calculated by observing historic share price movements relative to the index over the previous 5 years. It is theoretically possible to calculate customer betas in the same way, relative to the customer portfolio (Dhar and Glazer, 2003), but such data does not exist in most companies (Reinartz and Kumar, 2000) and did not exist in the insurance company participating in the study. Therefore, drawing on McNamara and Bromiley's (1999) approach, a risk assessment exercise was devised in which the customer managers identified a set of risk factors, gave each factor an

importance weighting, and then scored each customer against each risk factor. The risk factors included how well managed the customer's business was; how much the customer managers knew about the customer; the risk that the customer would be taken over and would change suppliers; and the relationship with the customer. The weighted risk score for each customer was then calculated relative to the average (unweighted)¹ risk score for the customer portfolio. The application of the first approach to risk adjustment (adjusting discount rates to reflect customer risk) will now be discussed.

Adjusting discount rates to reflect customer risk

To adjust the discount rate for the risk of a customer, a weighted risk score can be used. For example, if the average weighted risk score is 6.00, a customer with a weighted score of 9.00 could be assigned a risk loading that is 50% higher than average. Therefore, if the company's discount rate is 10%, the discount rate applied to the risky customer could be 15% ($10\% \times 9.0/6.0$). Table 2 demonstrates the impact that risk-adjusted discount rates could have on the measurement of customer lifetime value for a customer that is 50% riskier than the portfolio average.

[Table 2: Measuring customer lifetime value using risk-adjusted discount rates]

As Table 2 illustrates, even quite a substantial change in the risk-adjusted discount rate from 10% to 15% would not result in a major change to the customer lifetime value.

¹ In the interests of simplicity. Portfolio betas in CAPM are expressed in weighted terms.

The impact of a 50% increase in the discount rate is to reduce the customer lifetime value by 10% from £422,000 to £379,000.

Risk-adjusted discount rates are analogous to applying CAPM to a customer portfolio, although the analogy is imperfect, as described above. However, risk-adjusted discount rates have two drawbacks. The first is that the impact on customer lifetime value is small. This is because, typically, forecast future lifetimes are relatively short. In addition, risk-adjusted discount rates have a second major drawback, which is that risk is calculated relative to the customer portfolio average. Changes in the portfolio average (losing or gaining customers) may result in changes to the apparent risk and returns of all remaining customers. This may not be a problem where customers are very numerous, as shares on a stock market are, but can be a serious drawback to the use of this method where relatively few key accounts are to be considered. Each time a customer enters (or leaves) the customer portfolio, the risk of all the customers would have to be recalculated leading to changes in apparent lifetime value.

There is a considerable body of finance literature that explores the shortcomings of CAPM (Jagannathan and McGrattan, 1995). Recent criticism has focused upon MPT's approach to risk evaluation which treats upside and downside risk as equally undesirable, whereas Prospect Theory has shown that investors are far more concerned about downside risk (Leggio and Lien, 2003). The risk factor analysis presented above and subsequent discussions with the customer delivery team revealed that the main risk they identified was the extreme downside risk of losing the customer.

Thus, a second approach to adjusting for customer risk was developed. This is to express customer risk in terms of a probability of obtaining the future profit stream. This method will now be discussed.

Introducing probability forecasting to reflect customer risk

Where future profits from a customer relationship are uncertain, a forecasting probability method may be used. The forecasting probability method can be operationalised using a process analogous to the development of a risk scorecard. Customer managers are asked to evaluate the riskiness of a customer on a series of measures. In the case of the insurance company these focused on factors that might increase or reduce customer defection risk and included the number of contacts that customer has with the company, how warm the relationship is, the number of products purchased, and the amount known about the customer. A probability is then assigned to forecast profits in each future year of the customer's relationship lifetime, based on these responses (Table 3). These probabilities were assigned based on discussions with the customer delivery team and a senior actuary and, for consistency with the previous risk assessment approach, an unweighted average probability of renewal is used.

[Table 3: Measuring customer lifetime value using forecast probability]

Even if the probability of retaining the customer is comparatively high (in Table 3, it is 90% for the first two years then 75% in the following two years of the relationship lifetime), using probability-adjusted forecasts has a considerable impact on the present value of the relationship with that customer. As Table 3 shows, the customer lifetime value falls from £422,000 to £344,000 (26%) using this approach to measurement.

More risky customers would have lower probability percentages and, hence, still lower customer lifetime values.

MANAGERIAL IMPLICATIONS

The managerial implications of risk-adjusting customer lifetime value will be considered at the level of the overall customer portfolio and of the individual customer. Calculating total customer equity based on the risk-adjusted customer lifetime value for a customer portfolio may reveal that the customer portfolio, as currently constituted, may not deliver profits targets in future years. This then gives the CRM manager two strategic choices for customer risk management: to try to reduce the risk of the current portfolio of customers; or to try to acquire less risky customers. Both strategies will have the impact of increasing risk-adjusted customer equity; the question for the CRM manager is then how to do this using the most efficient allocation of marketing resources.

An example from the research participants may serve to illustrate how risk-adjusted customer lifetime value can raise urgent issues for customer managers. One key customer's probability of retention was calculated at 75% falling to 50% in two years. This discovery led to a discussion about how the customer manager should spend her time; based on the analysis, the manager herself suggested that she should spend half her time trying to manage the existing relationship and half on trying to find a new (replacement) customer.

Developing risk-aware CRM strategies

Risk-aware strategies for CRM fall into two broad categories: risk reduction, and risk-based pricing. Risk reduction can be thought of as reducing the risk of losing the customer (relationship management), whereas risk-based pricing can be thought of as reducing the damage potential to the company of risky customers. The precise mix of strategies that are used for individual customers or for customer segments will depend on the risk factors identified during the customer risk measurement exercise.

Risk reduction strategies are becoming more common a part of CRM. One example concerns Wesleyan Insurance Society, a medium-sized provider of life and pensions products based in Birmingham in the Midlands of the UK. Wesleyan, which has won several awards for its CRM systems, wanted to reduce customer defections. An analysis of several months of data on customers who had defected used micro-pattern matching to identify certain key behavioural characteristics. From this, an algorithm was developed that identifies similar behaviour patterns in current customers who may be thinking of defecting. Customer records from these customers are transferred to a relationship recovery team (Ryals, 2002a).

Risk-based pricing is used to a greater or lesser extent by many financial services institutions; risky customers may have to pay more for insurance or loans than less risky customers. Some very risky customers may even be refused insurance. This is, however, the exception rather than the rule. In many cases, very risky customers can be managed by setting special terms (through higher pricing, or limiting the insurance company's exposure to the risk through higher excess or limited cover). In other

industries, companies routinely manage the risk of individual customers by setting differing credit limits.

The presence of risky customers in the customer portfolio is inevitable. Just because a customer is risky does not mean that they cannot be a profitable customer. In fact, to grow business quickly will often entail taking on customers who are more risky or whose risk is unknown. However, portfolio theory says that the overall risk profile of the portfolio is critical. Higher-risk share portfolios perform better when times are good and worse when times are bad than low-risk portfolios. The same may well be true of customer portfolios.

LIMITATIONS

The analogy between financial portfolios and customer portfolios is, this paper argues, useful in bringing the notion of customer risk to the attention of CRM managers and in helping them to develop customer strategies to manage risk.

As with all analogies, however, there are limitations. Managers of share portfolios, broadly speaking, aim simply to maximise returns for a given level of risk; there are usually no strategic reasons for the particular investments that they choose to make beyond risk-return maximisation² CRM managers, by contrast, may choose to continue a relationship with customers who do not create maximum risk-adjusted returns for other reasons. One reason could be regulatory; there might be legal reasons for

² An exception to this general principle is found with ethical investment funds.

continuing to serve certain customers. Other reasons could be strategic. The strategic reasons might include volume throughputs that help keep the supplier's costs down or because high-profile customers attract others to that supplier or to benefit from shared innovation.

Another limitation of the application of financial portfolio theory to the management of customer portfolios is that customers may be interconnected in ways that shares in a financial portfolio are not. This discovering and managing interconnectedness might pay off in major ways for CRM managers; thus, finding customers of a common type who talk to one another, and then developing or tailoring products or services to this particular group of customers, might pay off for CRM in ways that more than compensate for the increased risk of focusing on one group of customers.

A third limitation of the application of portfolio theory is, of course, that customers can take independent action. Unlike shares in a financial portfolio, customers can elect to leave, or even just to scale down a relationship; or they can negotiate tougher deals and higher service levels. These are all considerable risks that customers have but shocks and shares do not have. This paper has indicated how some of these risks can be measured and managed and urges that such risk management is an essential function of CRM.

FUTURE RESEARCH DIRECTIONS

The measurement of customer risk is an area of concern to practitioners that has been relatively neglected in management literature. Empirical research to examine the ways in which companies actually do evaluate the risk of the customer would add to the domain. The links between risk measurement and MPT versus Prospect Theory would provide a useful theoretical perspective. Such work could also provide a fuller definition of the risk of the customer than that employed by this paper.

Research is also needed to build a full conceptual model of the risk of the customer, relaxing the assumption in the work discussed above that all risk drivers are equally important. Such work could explore dependencies between different risk factors.

More generally, the application of MPT and of Prospect Theory to the customer portfolio could be explored in the context of how CRM managers prioritise marketing activities and make marketing resource allocation decisions.

SUMMARY

From a CRM perspective, analysing the risk of a customer or segment helps managers develop strategies not only to maximise the probability that forecast future profits from that customer are secured, but also to minimise the impact that risky customers might have on their company. For example, risk evaluations allow the marketing manager to make pricing decisions based on risk as well as return. This in turn may suggest new customer relationship management strategies such as retention programmes to reduce the risk of customer purchasing volatility; or customer information gathering to identify

potential defectors. Such strategies might even include NOT delivering costly CRM programmes to groups of customers whose risk/return profile suggests that doing business with them can never create shareholder value for an organisation.

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Table 1: Measuring customer lifetime value

	Yr 1	Yr 2	Yr 3	Yr 4
Revenue streams (£'000)				
Insurance premiums	73	71	83	91
Other fee income	93	93	108	119
Total Revenue	166	164	191	210
Product costs	44	44	50	55
Apparent profit (revenue – costs)	122	120	141	155
Present value at 10% discount rate	111	100	106	105
CUSTOMER LIFETIME VALUE				422

Table 2: Measuring customer lifetime value using risk-adjusted discount rates

	Yr 1	Yr 2	Yr 3	Yr 4
Revenue streams (£'000)				
Insurance premiums	73	71	83	91
Other fee income	93	93	108	119
Total Revenue	166	164	191	210
Product costs	44	44	50	55
Apparent profit (revenue – costs)	122	120	141	155
Present value at 10% discount rate	111	100	106	105
CUSTOMER LIFETIME VALUE				422
Present value at risk-adjusted discount rate (15%)	106	91	94	88
DISCOUNT RATE ADJUSTED CUSTOMER LIFETIME VALUE				379

Table 3: Measuring customer lifetime value using forecast probability

	Yr 1	Yr 2	Yr 3	Yr 4
Revenue streams (£'000)				
Insurance premiums	73	71	83	91
Other fee income	93	93	108	119
Total Revenue	166	164	191	210
<i>Probability of retention</i>	<i>90%</i>	<i>90%</i>	<i>80%</i>	<i>80%</i>
<i>Risk-adjusted revenues</i>	<i>149</i>	<i>147</i>	<i>153</i>	<i>168</i>
Product costs	44	44	50	55
Risk-adjusted profit (revenue – costs)	105	103	103	113
Present value at 10% discount rate	96	85	77	76
RISK-ADJUSTED CUSTOMER LIFETIME VALUE				334
				422

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