

TECHNIQUES USED TO MEASURE ROI

The previous article in this series considered how consumer response can be immediate or delayed, how it can be based on content (the advertising message) or on the media through which the content is delivered, how the response can be linear or nonlinear, and how response can be affected by the activities of the competition. In general, such effects may be handled by a variety of techniques (see Exhibit 1). In addition to the techniques mentioned here, there are many others.



EXHIBIT 1: MEASURING CUSTOMER RESPONSE

Nature of Response	Some Suitable Technique
Immediate	Multiple regression Analysis of variance
Delayed	Lag model Log model (multiplicative to linear)
Nonlinear	Distributed lag models
Competition influenced	Hierarchical models Multivariate analysis of variance Bayesian models Mixture models

CUSTOMER LIFETIME VALUE (LTV), LAG EFFECTS, AND ROI

If we pose the question, “Why is a brand like Coke much more valuable than a lesser-known cola brand?” the answer comes down to the fact that Coke has a higher customer lifetime value (LTV) compared to lesser-known brands. It means that Coke, through its product, its marketing and its advertising efforts, has built a continuing propensity in consumers’ minds to keep buying Coke.

The stronger the propensity, the higher the LTV and the higher the customer equity.

Where does the equity come from? It comes, at least in part, from past advertising, marketing and research efforts. In a sense, it is similar to the delayed effects of advertising: a brand that is heavily advertised is likely to be remembered longer. Brand equity can be more than simply the delayed effect of advertising in that it can be more enduring and may

not necessarily be related to any particular advertising message. Equity can be seen as the internalization of product messages by the consumer. Since equity is not necessarily related to direct advertising and marketing messages, it is measured independently and not necessarily as the lagged effect of any specific advertising or marketing campaign.

Since a company’s financial value is determined in large part by customer or brand equity and such equity is unlikely to exist without marketing efforts, we can model equity as the cumulative effect of advertising and marketing efforts. In turn, since a large proportion of equity is (directly or indirectly) related to LTV, we need to understand how to calculate LTV as part of the measurement of marketing and research ROI (see Exhibit 2).

It is also important to remember that customer lifetime value is a necessary calculation in some industries. In the direct mail industry, for instance, the cost of customer acquisition is very high for many products. In many instances, the cost of acquiring a new subscriber to a financial newsletter may be equal to the

first year's subscription or even exceed it. This would give a zero (or even a negative) return on investment. However, this would be the case only if all new subscriptions were discontinued after the first year. ROI calculations could show that, on average, a subscriber stays with a newsletter about three years. (Some may end their subscription after year one, some after year two; some may stay for longer periods of seven, eight or ten years.) Therefore, the ROI of a marketing expenditure of \$100,000 might be zero per cent if we do not consider a customer's lifetime value, but it could be high if we do. Consequently, where repeat sales are important, the ROI of marketing and research cannot be properly estimated unless we take the customer lifetime value into account.

MEASURING CUSTOMER LIFETIME VALUE

Given the importance of LTV for ROI and for estimating the value of a company, it may be worthwhile to take a slight detour and spend some time understanding different ways of calculating LTV. Various methods can be used to calculate LTV. In this section, we will consider some common and some less common methods.

1. Data-based calculation of ROI

This method is very common in Internet marketing. It is used in all types of direct marketing in general and is used effectively in all cases where there is a reasonable customer database. We will start with a highly simplified example to see how this works.

Let us look at the example of a newsletter that costs \$120 and whose average subscription lifetime is known to be four years. From our research of the database, we know that we retain 25 per cent of our newly acquired customers at the end of year one, 15 per cent at the end of year two, five per cent at the end of year three, and less than one per cent at the end of year four. Exhibit 2 shows the economic implications of this decline in subscriptions.

EXHIBIT 2: CUSTOMER LIFETIME VALUE: SIMPLE CALCULATIONS

Cost to reach a potential customer (list, brochure, stamp, etc.)	1.30
Response rate to mailing	1.20
One year revenue (subscription)	120.00
Cost to get one client (1.3/1.2)	108.33
Costs to produce and mail the newsletter (COG)	25.00
Total cost	133.33
Profit on new subscribers in Year 1	-13.33
Cost of marketing during the year per customer	5.00
Response rate for Year 2	0.50
Second year revenue	120.00
Cost to retain a client	10.00**
Costs to produce and mail the newsletter (COG)	25.00
Total cost	35.00
Profit (on new subscriber renewals) Year 2	85.00
Profit (on new subscriber renewals) Year 3	85.00
Profit (on new subscriber renewals) Year 4	85.00

For every 100 customers acquired

	Unit profit	Discounted Profit*	Retained Customers	Discounted Profit per 100
Year 1	-13.33	-13.13	100	-1313.00
Year 2 (50% retained)	85.00	72.25	50	3612.50
Year 3 (25% retained)	85.00	61.41	25	1535.31
Year 4 (12.5% retained)	85.00	52.20	12.5	652.51
Total revenue (LTV for 4 years)		172.73		4487.32

* Discounted from Year 2 onwards for potential risk and inflation at 15% per year

** Based on \$5 per customer spent on marketing. Since only 50% were retained, the marketing cost per customer was \$10.

The first year's marketing costs (converting a prospect into a customer) are high. To reach 1,000 prospects, we need to spend \$1,300; we get twelve customers (1.2% of the prospects) out of this expenditure, each of them paying \$120, for a total of \$1,440. If we deduct the cost of marketing, we generate a total profit of \$140, or \$11.67 per customer. But we need to take into account the costs of producing and mailing the newsletter. Let's say this amounts to \$25. When we subtract this amount from the gross profit of \$11.67, our initial profit turns into a loss of \$13.33 per subscriber. However, the cost of marketing comes down drastically for year two,

because we are marketing to our customers rather than prospecting. Our profitability goes up, even though 50 per cent of new customers drop out in year two and the attrition continues.

Although the profit goes from negative \$13.33 to positive \$85, because of attrition our total profit will not be proportionately higher. For every customer we acquired in year one, only 50 continued with us in year two. Also, we need to take into consideration the fact that today's dollar will not have the same value a year or two from now. A dollar in the hand is worth more than a dollar that is expected to materialize sometime in the future for two reasons: inflation

erodes the value of the dollar, and the future is somewhat unpredictable. So, we need to adjust the future revenue to take into account the risk involved as well as attrition of customers when we project. These calculations are shown in the bottom part of Exhibit 2.

Thus, when we consider the LTV, we made \$4,487 on every \$130 we invested – about 35 times our initial investment. If we do not consider the LTV, then our return on an investment of \$130 is a loss of \$13.33. What appeared to be a losing proposition can turn into an attractive ROI once LTV is taken into account. (This is not just a theoretical point. Many businesses, especially in the direct marketing industry, operate this way. New customers are initially acquired at a very high cost. Factors such as renewals and purchase of related products can turn an apparently losing proposition into a winning one.)

2. Markov analysis of LTV

Another interesting approach to measuring LTV is to use Markov analysis. Consider a brand that has two major competitors. Over any given time period, it loses a certain number of customers to its competitors and gains a certain number of customers from them. Markov analysis converts the gains and losses into probabilities of gains and losses. Using this method, we can calculate how many customers the brand would gain and lose over each time period and estimate the LTV accordingly.

Here is how it works. Consider three brands (A, B, and C) that are tracked using panel research. At the end of the first month,

- Brand A retains 80% of its customers, but loses 10% to brand B and 10% to brand C;
- Brand B retains 75% of its customers, but loses 17.5% to brand A and 7.5% to brand C;
- Brand C retains 85% of its customers, but loses 8.3% to brand A and 2.9% to brand B.

EXHIBIT 3: GAIN-LOSS OF 1,000 CUSTOMERS

Dairy	t ₁ Customers	Gains			Losses			t ₂ Customers
		from A	from B	from C	to A	to B	to C	
A	200	0	35	25	0	20	20	220
B	500	20	0	20	35	0	15	490
C	300	20	15	0	25	20	0	290

EXHIBIT 4: USING TRANSITION PROBABILITIES TO OBTAIN T₂ MARKET SHARES

	Transition Probabilities			t ₁ Market Share	Probable t ₂ Market Share
A	.800	.070	.083	.22	.234
B	.100	.900	.067	.49	.483
C	.100	.030	.850	.29	.283
				1.00	1.000

The data for 1,000 customers are presented in Exhibit 3 above. The data can be converted into a probability matrix, as shown in Exhibit 4. Markov models assume that the brands will repeat this pattern for time period two. If this happens, the gains and losses will change as given above.

(Readers who are familiar with matrix algebra will know how the t₂ market shares are derived: the transition probabilities are multiplied by t₁ market shares to obtain projected t₂ market shares. Those who are not, may want to assume that the shares of t₂ can easily be calculated from t₁ shares using the above procedures.)

For the next time period, we multiply the transition probabilities by t₂ market shares. We can repeat this type of analysis until the probabilities stop changing (steady state equilibrium). Another method of doing the analysis is to calculate only one period at a time, wait to observe what actually happens in the market, and input the new gain-loss probabilities for the following pe-

riod. Either way, what we are assuming is that the current patterns of gains and losses will hold in the future, an assumption unlike the one we use when we carry out regression analysis to predict the future.

Markov analysis is a pure mathematical model that uses patterns in gains and losses over any given period to forecast what will happen in the subsequent period or periods. If the predictions based on Markov turn out to be too far from reality, the probabilities may be revised accordingly.

There is yet one other method, and it asserts that observed variables are ineffective in predicting future buyer behaviour. It assumes that observed behaviour is the outcome (rather than the cause) of a random process governed by latent characteristics. This method – recently proposed by Peter Fader of the Wharton School, Bruce Hardie of London School, and Ka Lok Lee of Catalina Health Resource – will be discussed in the next article in this series.

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