expressanalytics
Innovative Data Solutions

01.13.2022

CUSTOMER LIFETIME VALUE

Improve your retail chain's customer acquisition

Marketing That Works

Analytics, Engagement, Intelligence

CONTACT

Express Analytics
info@expressanalytics.net

WHITE PAPER

A case study of applying Customer Lifetime Value Analytics to improve the customer acquisition processes of a retail chain.

Section 1: Defining Customer Lifetime value

A motivating Problem:

Suppose you are the Operations Planning Executive for a retailer. Each quarter, it is your responsibility to determine how to best maximize the return on investment for your company's marketing spend. But how do you determine how to go about doing this?

Suppose we had a customer base consisting of 1000 customers, where each customer selected purchased a product P that cost 100 dollars in the first year of their being a customer.

ID	Year 1	Year 2	Year 3	Year 4	Year 5
0001	1	1	0	0	0
0002	1	0	0	0	0
0003	1	1	1	0	0
0004	1	1	0	0	0
0005	1	1	1	1	1
⋮	⋮		⋮		
0998	1	0	0	0	0
0999	1	1	1	0	0
1000	1	0	0	0	0
	1000	631	468	382	326

Now, suppose that only 631 customers who bought P in Year 1 bought again in Year 2, only 468 of those initial customers are customers in Year 3, and so on. Given this trend, it might seem difficult to figure out what the most likely value of a customer is. Fortunately, we can use a formula to evaluate what an average customer's monetary contribution would be by taking the sum of their likely contribution assuming they have been a customer since Year 1.

That formula, $\sum_{0}^{?} \frac{100*?(?)}{(1.1)^{?}}$, where t is the Year Number minus 1 and where F(t) is the number of customers still alive at Year t, means that a customer who is alive at year 5 generates $100 + $100 × *0.631/ 1.1* + $100 × 0.468/ (1.1)² + $100 × 0.382/ (1.1)³ + $100 × 0.326/ (1.1)⁴ , or $247.01.

However, what if we wanted to see what the likely value of a customer would be if they were around for more than 5 years? How can we apply the formula above to customers who might be live options for six, seven, or even ten years? To do this, we will need to figure out what the formula f(t) we have been using actually is. This function, called a survivor function, must be such a function that F(1) = 1, F(2) = .631, and so on. Since we know what the function must measure essentially the decay of a population, we can assume that a logarithmic function will likely be an accurate function to model our survivor function after.

Type of relationship with your customers:

When considering sales models for business, one of the first things that is needed is the ability to identify what your company's sales environment is. What does this mean?

To determine your sales environment, you need to identify the answer to the following questions:

1. Are your customers on a contractual or non-contractual basis?
2. Is your customer's opportunity to make a purchase limited to only at certain instances, or can a customer come at any time of the year to buy from you?

All businesses will fall into one of four categories based on the answer to these questions:

Classifying Customer Bases

	Noncontractual	Contractual
Continuous	Grocery purchasing Doctor visits Hotel stays	Credit cards Utilities Continuity programs
Discrete	Conf. attendance Prescription refills Charity fund drives	Magazine subs Insurance policies "Friends" schemes

Opportunities for Transactions (vertical axis: Continuous / Discrete)

Type of Relationship With Customers (horizontal axis: Noncontractual / Contractual)

Adapted from: Schmittlein, David C., Donald G. Morrison, and Richard Colombo (1987), "Counting Your Customers: Who Are They and What Will They Do Next?" *Management Science*, 33 (January), 1–24.

Depending on which category your company falls in determines what challenges you may face when it comes to evaluating your customer base, and to see who is or is not a churned customer; for companies with contractual relationship with their customers, it is easy to measure whether customers have churned or not because the customer has to interact with you to stop provision of services, or else has to contact you when you think they are churned to reactivate those services. Companies in non-contractual discrete relationships with customers also have an easy go of determining whether customers are churned because their customers do not need to be tracked; these companies operate on the provision of a service that is only available on a discrete basis, so the only count needed for customer base is initial purchase.

Non-contractual companies with continuous opportunities for customer purchase, however, generally have the hardest time evaluating their customer base, because their control on when the customer can buy and what the customer will buy is limited. Therefore, those companies must employ a different

method of evaluating the value of their customer base and forecasting future earnings. One such method is to use Customer Lifetime Value, or CLV.

What is CLV?

CLV refers to a system of metrics that are used to evaluate an individual's value to your business over the course of their tenure as a customer. There are three major metrics that are used to capture CLV, each of which is vital to creating a value profile:

- Discounted Monetary Value (M): The first factor we must consider when evaluating a customer is what amount of revenue they will deliver over the course of their tenure as a customer. This is done by using past buying to determine what their lifetime spending will most likely be, then discount that valuation by a percentage factor for each year they are likely to be alive. Once this new discounted value is determined, it is what can be used to decide how much marketing spend should be apportioned to acquire and maintain this customer as an asset.
- Purchasing Frequency (F): The second factor to consider when determining CLV is how frequent of a customer that individual is; are they someone whose purchases till now were diffuse over many years, or were those purchases made in rapid succession over a short period of time? The difference between the two is that a customer who has a diffuse spending pattern is someone who has been a customer of your brand for a long time, and the likelihood of that person being a loyal customer is higher.
- Recency of Last Purchase (R): The third factor to consider is the recency of last purchase. Customers who make high value purchases and frequent purchases are objectively good, but unless that customer is also someone who has recently made a purchase from you, it is difficult to determine if that customer is still a customer or has already churned.

In addition to these three factors, there is a fourth, but less used, CLV metric:

- Tenure of customer (T), which is a measurement of the time that has passed from first contact with the customer to the present. This metric allows for a better and more accurate measurement of our Discounted Monetary Value because it allows us to determine whether the customer is near the beginning or end of their customer life cycle, which will in turn better determine how to evaluate their Frequency and Recency. However, this value enhances the value of the three other factors but is not able to be used to classify a customer, so it is not generally highly prioritized.

How do you calculate CLV?

To calculate CLV, we take each of the three major factors of evaluating customers for each member of our customer base and use it to group all customers into a set of quintiles on each metric, where members of the 1st quintile are have the best monetary value, frequency or recency respectively, while those in the fifth quintile have the worst value in each of these categories. This will result in most users having a combination of ranks in these metrics that allow us to categorize them. For example, users with RFM composite rank of 1-1-1 (that is to say, they are in the first quintile in all three metrics) can be grouped together as they are likely our best customers, and we can safely assume that marketing that would work on one of them will likely work on all of them.

Calculating M: To explain how we can calculate a customer's monetary value, we will turn to Bruce Hardie's Motivating Problem.

Example: **Why would a company use CLV? What value does CLV analytics bring to a company?**

So why would you use CLV? Ultimately, it comes down to the core reason why all marketing strategies are being adopted: Maximizing profit. As is the case with all marketing strategies, CLV can be used to improve profit by finding out how to best allocate marketing spend. This is because while common sense might dictate that it is best to spend the most of your resources courting customers who are currently the most prolific buyers in your base in order to secure profits for the current quarter, CLV allows you to get a more holistic view of which customers are going to provide a consistent stream of income for multiple years. At its core, CLV analytics differs from many other marketing strategies because the insights that are produced are centered more on generating sustainable growth over the long term, rather than just maximizing growth in the current quarter that may perpetuate a cycle of grand expansion followed by downsizing that expends valuable resources.

Where in a business strategy can CLV analytics be applied? How does using CLV affect the decisions a company makes for other parts of their business?

Fundamentally, Customer Lifetime Value is the generation of a quantifiable measure of value for a customer so that a company can see what similar customers are worth. Once a customer's CLV has been determined, different parts of your company can use it to improve your business processes:

- *A marketer can know with confidence how much they can afford to spend to attract that customer and customers like him or her without losing value on marketing spend.*
- *A member of the Operations Planning team can use CLV to estimate the expected cash flow in the quarter being forecast and thus more accurately advise changes to your company's buying strategy from outside vendors.*
- *A member of the team in Product Allocation for your company can use CLV alongside location data to see which areas have higher densities of high CLV customers and allocate more shipments of high demand products to stores in that area.*
- *A member of your team responsible for location expansion can use CLV alongside demographic data to predict where customers who are likely to have high value will be located, then select new premises for store locations where the most new customers might be acquired this way.*

In addition, using CLV in making Marketing decisions changes the way in which customers are evaluated for the purposes of new customer acquisition; since we can evaluate customers by their CLV, we can begin applying our insights from this to customers who are first time buyers to better predict their CLV and thus begin sorting them into appropriate categories.

THANK YOU

For taking the time out to read this white paper.

SCHEDULE YOUR DEMO

Want to learn more about how we can help scale your business? Schedule a demo with our customer success team to learn more.

🏠 www.expressanalytics.com

[Schedule Demo](#) ⇒

✉ info@expressanalytics.net

2021