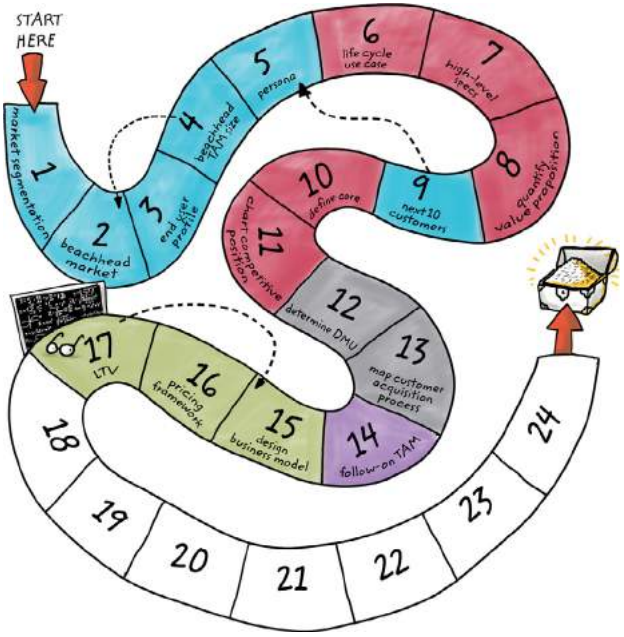
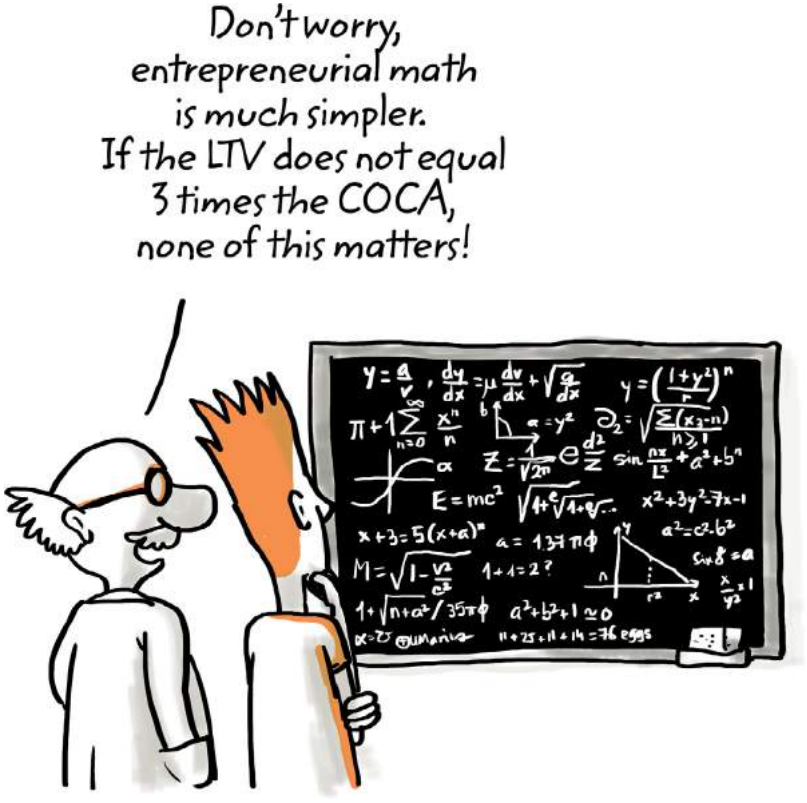
STEP 17

Calculate the Lifetime Value (LTV) of an Acquired Customer



IN THIS STEP, YOU WILL:

- Add up the revenue that you can expect to receive from an individual customer.
- Discount the revenue based on how much it will cost you to repay investors over time.



Now that you have determined at least a first pass on your value capture model and specifics, you can start to do the simple fundamental math for a new venture. Can you acquire customers at a cost that is substantially less than their value will be to your new venture over the customer's lifetime?

So far you have done a lot of very important analysis grounded in real-world customer interaction to see generally if and how your new venture would work. Now you will do the math or "unit economics" to discern whether it is a sustainable and attractive business from a microeconomic standpoint. The Lifetime Value of an Acquired Customer (LTV) calculation, along with the Cost of Customer Acquisition (COCA) calculation, will help you determine how profitable your business will be in the beachhead market. The LTV serves as the most fundamental checkpoint both to determine how viable the business is, and to make sure you clearly understand what will drive the sustainability and profitability of the business so that you stay focused going forward.

A very expensive case study regarding the importance of LTV, COCA, and unit economics can be seen in Pets.com. The company was founded in August 1998 to sell products over the Internet to consumers for their pets. The concept was that people spent a lot of money on their pets and that this new company could capture those sales and become very large and profitable with a new business model that did not involve the costs of maintaining brick-and-mortar retail stores.

The concept and the strength of the management team allowed the company to easily raise millions of dollars from investors. In their drive to build a brand and acquire customers, they aggressively advertised their website, including a high-profile Super Bowl commercial in 2000. They were acquiring customers but had not rigorously analyzed the unit economics.

When they finally did so, they realized that because of the low margin on the products they were selling and the very high costs of customer acquisition, which had stayed relatively constant rather than decreasing as they should, the company was losing money with each new customer it captured. The company was bleeding cash but management doubled down and said it was simply a matter of volume, that when the customer base was large enough, the company would be cash-flow positive. This was wishful thinking rather than genuine economic analysis because management had not developed a clear path to increase the LTV, nor had they developed a clear path to significantly reduce the COCA. So the bleeding of cash just increased as they got more customers.

Soon the investors woke up and realized that the math for Pets.com did not work. In November 2000, the company was shut down and assets were liquidated. Three hundred million dollars of investor money had been lost, but, to put a positive spin on it, it can be viewed as a $300 million educational lesson to make sure people are disciplined and intellectually honest about their unit economics analysis before they invest too much time, money, or energy into a new venture.

One would think that this education would prevent future mistakes along this line, but this has not been the case. In what will most likely prove to be an even more costly example of not paying attention to the unit economics of a new venture, Groupon has failed to focus sufficiently on these fundamentals. The company, founded in 2008, grew slowly at first, but then began rapidly expanding with its product, which in a large number of regions offered a deep discount every day

for a different business. The company leveraged word-of-mouth advertising through social media to become a fast-growing company—in terms of revenue. It became the darling of many, including investors, the press, and its customers, but there was a problem. Groupon had not established a viable Core, so as competition increased, its LTV would likely go down and its COCA would go up as it fought in a crowded marketplace to find more customers. They never figured out the unit economics and once the buzz wore off and people started to look at their financials, this problem became clear. As of this writing, the story has not come to closure like the Pets.com case but I can assure you that many people wished they had spent more time on unit economics early on in the company's life cycle.

Over the next three steps, you will work to determine the LTV and COCA, starting with the LTV. Both are important, because if there is not a clear way to end up with the LTV substantially higher than the COCA, you will not be able to cover your business costs such as product development, finance, administration, and overhead.

All the work you have done in the previous steps, like defining the DMU, mapping the customer acquisition process, identifying a Core and a plan to grow it, will help you to logically estimate the unit economics over time. Big changes in these factors, like the DMU, could dramatically affect your unit economics; so it is crucial to keep a close eye on making those as real as possible and noting any changes in them over time.

KEY INPUTS TO CALCULATE THE LTV

Now I will take you through precisely how to calculate the LTV of a customer. While the final number will likely be a range and not necessarily correct the first time you do it, it is very important to understand what drives the value of LTV. In other words, you need to know much more than just a number; you need to understand the underlying factors so you can understand your risks and how you can increase LTV over time. It will also help you when you get real paying customers and you need to analyze what their LTV is and how it is trending. This is how and when you will make adjustments to continually monitor whether your unit economics are on track to a viable, sustainable, and attractive future. Here are the key inputs that you will need to understand to estimate the LTV:

1. **One-time Revenue Stream, If Any.** Typically, if there is an up-front charge for your product, it is a one-time source of revenue.
2. **Recurring Revenue Streams, If Any.** Subscription and maintenance fees, as well as repeated purchases of consumables, are all recurring revenues.

3. **Additional Revenue Opportunities.** If there are opportunities to "upsell" the customer, where the customer purchases additional products with minimal additional effort from your sales team, include these as revenue streams. Remember to consider the DMU and the sales cycle you calculated earlier. Underestimating either of these could lead you to a distorted view.
4. **Gross Margin for Each Of Your Revenue Streams.** The gross margin is the price of your product minus the production cost of making an individual product. Cost does not include sales and marketing costs (which is factored into the COCA) or overhead costs like R&D or administrative expenses.
5. **Retention Rate.** For each recurring revenue stream, this rate is the percentage of customers who continue to pay the recurring fee for the product. This usually expressed as a monthly rate or a yearly rate. (The opposite of retention rate is "churn rate," which is the percentage of customers you lose.) Assume, for simplicity, that once the customer has stopped paying a recurring fee, the customer will no longer be receptive to upselling. Do not assume that on a multiyear or multimonth contract customers will make all of their payments. Early termination of a contract by the customer should be incorporated into the retention rate.
6. **Life of Product.** For each one-time revenue stream, this is the length of time you expect the product to last before the customer will need to either purchase a replacement or discontinue use of the product.
7. **Next Product Purchase Rate.** For each one-time revenue stream, this rate is the percentage of customers who will buy a replacement product from you when the current product has reached the end of its life.
8. **Cost of Capital Rate For Your Business.** Expressed as a yearly rate, this is how much it costs you, in debt or equity, to get money from investors for your business. For a new entrepreneur who lacks a track record and is just getting started, the appropriate number is most likely between 35 and 75 percent per year.[1] This number is so high because an investor gives you money he cannot get back for years at a time (an illiquid investment). The investor is also taking a great risk because you are a brand-new business. These two factors mean that investors will charge you quite a premium for capital.

[1] William A. Sahlman, "A Method for Valuing High-Risk, Long-Term Investments," *Harvard Business School*, Case 9-288-006, August 12, 2003.

HOW TO CALCULATE LIFETIME VALUE

The LTV is the Net Present Value of your profits from year 0 through year 5. As a brand-new business, you will calculate the LTV over a five-year period. When projecting more than five years out, the compounded cost of capital for a startup is so high that it negates what value your customer provides you beyond five years. The customer still has value to you beyond five years, but you also have to factor your cost of capital rate into the calculation.

The LTV is expressed in dollars per customer, so to calculate this you will use the prices that an individual customer pays.

For each revenue stream, you will use the gross margin and the retention rate to calculate your profit for the first year your customer buys the product from you ("Year 0"), as well as the subsequent five years. (Use the next product purchase rate instead of the retention rate for the years the customer would be expected to replace the product.)

Then, you will total the profit across all revenue streams for each year. You will need to do one more thing before you can add up the profit numbers and get the LTV, though. The last calculation is called the Present Value at Above Cost of Capital, which discounts the profit to take into account that your investors will need to recoup with interest their investment in your business. The present value for year 0 is equal to that year's profits. To calculate the present value for each year's profits beyond year 0, use the following formula:

$$\text{Present Value} = \text{Profit} \times (1 - \text{Cost of Capital Rate})^{t}$$

where t = number of years after year 0.

The LTV by itself will not tell you how attractive your business is; for this, you will also need to calculate the COCA, which you will do in the coming steps. An LTV of $10,000 per customer, for instance, is great if your COCA is $1,000 per customer, but is poor or at best "challenging" if your COCA is $50,000 per customer.

Venture capitalist David Skok has written brilliantly about unit economics on his blog www.forentrepreneurs.com; he simplifies things down to their essence. For software as a service (SaaS) companies, he believes a sound rule of thumb for the ratio of LTV to COCA should be 3 to 1. That might sound aggressive but isn't for at least three major reasons. First, consider that COCA does not include many other costs in your business such as research and development, finance and administration, and other overhead (not to mention profit). Therefore, there needs to be a significant allowance for these factors. Secondly, there is also usually at least some over-optimism built into the LTV and COCA calculations despite your greatest efforts to make it real;

so a 3:1 ratio ensures there is plenty of room for error. Third, a new venture is a highly variable system, so having a high ratio of 3:1 or greater will ensure that you have the ability to manage through the tough times when the unexpected happens (e.g., product delays, competitive reaction, recession).

HOW TO CALCULATE THE LTV: "WIDGET" PLUS YEARLY MAINTENANCE FEE

The following is an example of how to calculate the LTV based on a conceptual case of company that makes a "widget." In the business model, there is a one-time charge for the widget, with an annual recurring charge for maintenance.

- One-time revenue: The widget is priced at $10,000.
- Recurring revenue: Yearly maintenance fee of 15 percent of the widget's price after a six-month warranty period. The fee would therefore be $750 in year 0 and $1,500 in subsequent years.
- Additional revenue opportunities: None.
- Gross margin for each revenue stream: Widget: 65 percent. Maintenance: 85 percent.
- Retention rate: Maintenance: 100 percent per year in the first year; 90 percent per year in subsequent years.
- Life of product: Five years.
- Next product purchase rate: 75 percent of those customers who are still paying the maintenance fee at the time of next product purchase.
- Cost of capital rate: 50 percent.

As you can see from Table 17.1, all the above factors matter in determining an estimate for LTV. Some key drivers, however, are the very high cost of capital that new companies have because their limited ability to attract investments gets very expensive. This means that profits tomorrow are much less valuable than today's profits. This makes the subscription and consumables business models not as clear a winner as one would think. The other big drivers are the gross profit margin for your various streams of revenue and your customer retention rate. It is typically cheaper to keep an existing customer than to find a new one, making this a big leverage point.

Table 17.1 Widget LTV

The line items "Retention rate" and "Cost of capital rate" are not a direct part of the calculations, but should instead be factored into the "Cumulative retention rate" and "Net present value factor," respectively.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue Time Series: Widget						
Price of widget	$10,000					$10,000
Next product purchase rate (beyond year 0)						75%
Gross margin for widget	65%					65%
Profit from widget	$6,500					$4,875
Revenue time series: Maintenance						
Price of yearly maintenance contract	$750	$1,500	$1,500	$1,500	$1,500	$750
Retention rate	*100%*	*90%*	*90%*	*90%*	*90%*	*n/a (see next product purchase rate)*
Cumulative retention rate Cumulative retention rate = r^t where r = retention rate and t = no. of years after year 0	100%	90%	81%	72.9%	65.6%	65.6%
Next product purchase rate						75%
Gross margin for maintenance	85%	85%	85%	85%	85%	85%
Profit from maintenance	$637.50	$1,147.50	$1,032.75	$929.48	$836.40	$313.65
Sum of profits	$7,137.50	$1,147.50	$1,032.75	$929.48	$836.40	$5,188.65
Cost of capital rate	*50%*	*50%*	*50%*	*50%*	*50%*	*50%*
Net present value factor Net present value factor = $(1 - r)^t$ where r = cost of capital rate and t = no. of years after year 0	100%	50%	25%	12.5%	6.25%	3.125%
Present value above cost of capital	$7,137.50	$573.75	$258.19	$116.19	$52.28	$162.15
Net present value of profits (LTV)	$8,300.06					

Likewise, there are many factors that entrepreneurs initially overlook in determining the Lifetime Value of their customers, but the biggest one is the cost of capital. If you have access to low-cost capital, it can make a huge difference. When entrepreneurs do this calculation, they are usually surprised at how low the Lifetime Value of a customer is for their business.

It must also be noted that while we use the cost of capital to determine LTV, there is also value in knowing the absolute number of the revenue stream and users in the out years. This will be a key determinant in the value of the asset you have created, which will make it much easier for you to get lower-cost money and potentially make you an attractive and valuable acquisition target. So while LTV is critically important to make you sustainable and ensure your lack of dependence on others, a deeper understanding than just the single number is important as well.

Overall, it is important for you as a disciplined entrepreneur to operate not with blind optimism but rather with real numbers and to understand what drives those numbers.

IMPORTANT CONSIDERATIONS

There are many other secondary factors to consider when determining the Lifetime Value of your customer. Even if your LTV is too low for your product to be viable you should consider whether these elements are correct first; then consider whether you can positively impact your LTV with some adjustments.

1. **The Business Model Decision Is Very Important.** Your choice of business model can greatly affect your LTV and the amount of revenue you earn. Recurring revenue models such as subscription models often increase revenue but require additional capital from investors up front, and thus have a very high cost of capital. A one-time charge up front can reduce the amount of capital you need to get started, but is not as lucrative on an ongoing basis.
2. **LTV Is about Profit, not Revenue.** Your gross margin and cost of capital rates are integral to determining an accurate LTV. The most common mistake entrepreneurs make on LTV calculations is they simply tally up the revenue streams; but it is the profit that matters.
3. **Overhead Costs Aren't Negligible.** To simplify the LTV calculation, overhead is excluded; but to account for this, the LTV must be substantially higher than the COCA. These overhead costs, which may include R&D and administrative expenses, are not included when determining the gross margin of a product. These costs can be spread out over the total units of a product sold; so as volume sold goes up, the overhead cost per item goes down.

4. **Gross Margins Make a Big Difference.** Wrapping your lower-margin core product with high-margin add-on products will substantially help your LTV. LARK Technologies started out selling a silent alarm clock, which is a hardware solution; but their business model was not sustainable until they developed an additional revenue stream from a subscription business that produced an expert sleep analysis report for the user. Not only did this increase overall revenue, it produced a much higher-margin recurring revenue stream and allowed LARK to stay in touch with their customers to potentially sell more products to them in the future.
5. **Retention Rates Are Very Important as Well.** The longer you can keep a customer, the better your LTV becomes. This is one of a few levers you can easily control to improve the profitability of your business. A small increase in customer retention rates will mean significant improvements in your cumulative profits.
6. **Finding Additional Real Upselling Opportunities Can Be Very Attractive.** Upselling additional products to your customer can significantly improve your profit as we see in the LARK Technologies example above. Make sure to drive upselling based on the needs of your Persona, not just to improve your numbers. Companies that over-upsell can lose track of what value they are creating for their customer and also lose the trust and confidence of the customer.

Example: Helios

As we discussed in Step 16, Helios had created a coating that deices windshields. They had determined the price should be $100 per unit. This price (the expected net price after discounts) included the window cover and the software to remotely control the deicer on a smartphone for one year.

Based on their business model, pricing decisions, and research on how much the average customer would buy in a typical transaction, the team determined that the yearly revenue per customer in the first year would be $100,000. The typical customer fleet they targeted had 1,000 vehicles (some had more and some had less, but 1,000 was the average fleet size of their target market) and hence the $100K net revenue per new customer estimate for the first year. In subsequent years, an average of 20 percent of the fleet would be replaced, so the new vehicles would need coating to be applied as well, providing a recurring revenue stream.

As you see in the model in Table 17.2, it is expected there would be a 5 percent price increase each year, a 90 percent customer renewal rate (an aggressive assumption), 97 percent gross margin because there will be additional marginal service and maintenance costs for each fleet, and a 40 percent cost of capital, as the business happens to have access to some lower-costs funds to get

Table 17.2 Lifetime Value Calculations for Helios
Numbers may not add up exactly to LTV per Fleet due to rounding.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue per Year (Assumes 5% Yearly Price Increase) =	$ 100,000	$18,900	$17,861	$16,878	$15,950	$15,073
Gross Margin Profits from Revenues =	$ 97,000	$18,333	$17,325	$16,372	$15,471	$14,620
Net Present Value at Above Cost of Capital =	$ 97,000	$11,000	$ 6,237	$ 3,536	$ 2,005	$ 1,137
NPV of Profit Stream or LTV per Fleet =	**$120,915**					

Pricing (Unit Price)	$100	Business Model is a one-time charge with no recurring revenue
Average Yearly Revenue per Fleet in Yr 1	$100K	
Gross Margin	97%	
Price Increase per Year	5%	
Life of Product	5 years	
Retention Rate	90%	
Cost of Capital for Company (est.)	40%	

started. As you can see from the calculations, when the customer unit considered here is a car fleet customer (which is appropriate), the LTV from these assumptions is estimated to be between $100K and $125K.

The Helios example raises many interesting points, as is usually the case when doing LTV calculations; they vary greatly and understanding the underlying drivers and leverage points is extremely important.

This new venture was driven to make a big initial sale to a fleet and move on, rather than building a "sticky" product that leveraged happy existing customers to gain additional sales. The business would collect its largest payment in the first year (the $100K to outfit all of the vehicles in an average fleet, a figure that they did not have to discount for cost of capital), so it had weak incentives to continue to work with customers and gain follow-on orders for the 20 percent annual turnover of

vehicles. Further, the 90 percent retention rate figure, assuming that 90 percent percent of the customers who initially installed the product would continue to purchase it for new vehicles added to their fleet, seems aggressive based on other companies' experiences.

It was also surprising that the LTV was not higher; but the choice of the business model and pricing left the company with these economics for LTV. To sell a new fleet would take a lot of time, effort, and ultimately cost. The COCA would be in excess of $30K and probably in excess of $50K because of the high number of sales calls required.

After Helios did their LTV calculation, they saw they would need to revisit their business model and pricing to find if there was a better way to monetize, as well as potentially expand their value proposition by adding more functionality and thinking about new ways to leverage the smartphone app that would activate the deicing system on vehicles.

Extreme Example of LTV: Pet Rock

One example I use to illustrate why hardware without recurring revenue streams can be a difficult business at the unit economics level is Pet Rocks. In 1975, advertising executive Gary Dahl invented the idea of a Pet Rock. It was a pet that required no maintenance and no cost after the initial purchase. Such was the attraction of this "product" (some might refer to it as a fad, or worse, a bit of a scam). It sold for $3.95 each.

This was simple enough and made our calculations easy. Gary got $1 per product placement and that was it. There was no recurring revenue nor product obsolescence where the customer would buy a new product. There were no consumables involved with this product either. This was the value proposition to the target customer; but it presented a real dilemma for the company providing the product, as demonstrated below:

- One-time revenue: The widget is priced at $3.95.
- Recurring revenue: None.
- Additional revenue opportunities: None.
- Gross margin for one-time revenue (which is the only revenue): 25 percent.
- Retention rate: Doesn't matter because there is no revenue stream and they won't buy more.
- Life of product: Infinite.
- Next product purchase rate: 0 percent (they would not buy more—the joke doesn't scale).
- Cost of capital rate: 50 percent.

So Gary Dahl got $1 per rock sold and the company (really just Gary Dahl) made $1 million. There was no Core for the company and competitors moved in; within the year the fad was over. The LTV was $1 and the TAM very limited. It was not even a social or interactive fad that had much of a viral component, and as such, might not only increase the TAM but also make it more likely it would come back, like a yo-yo or hula hoop. The LTV was $1 and it was a one and done phenomenon. This is not a model for the type of innovation-driven new ventures that we are teaching here how to create. Don't be a Pet Rock business model.

SUMMARY

The Lifetime Value of an Acquired Customer calculation is the profit that a new customer will provide on average, discounted to reflect the high cost of acquiring capital that a startup faces. It is important to be realistic, not optimistic, when calculating LTV, and to know the underlying drivers behind LTV so you can work to increase it. You will be comparing the LTV to COCA. An LTV: COCA ratio of 3:1 or higher is what you will be aiming for.