

# Business Metrics

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## Introduction

Welcome to this lesson on working with business metrics, an essential topic for any business analyst. We will focus on metrics that are commonly used across industries and a wide range of business roles, such as marketing, growth, sales, and finance.



As a business analyst, it is important to analyze and convey your company's performance using specific metrics in each of these areas. You will not only learn about how to calculate these metrics, but also how to interpret them.



Choosing a Plot



Data Encodings

A picture can say a lot, which is why you will also learn how to create visualizations that will help everyone gain new insights into your company's performance. All of these new skills will help you enhance your data analysis work.

## Lesson Structure

Let's go over how this lesson is structured. Here are the topics we will cover.

### Topics Covered

- Key Performance Indicators:** We will start with a discussion about key performance indicators and how it differs by industries.

2. **Business Process Flow:** Then we will proceed to going through the business process flow across various business divisions. This will provide the context for learning about the business metrics.
3. **Business metric:**  
We will take on each business area, such as marketing and growth, and introduce you to a metric commonly used to measure success in that business area. We will discuss what each means, and how to calculate it. We will practice calculating the metrics and applying the metrics, and when and where to use the metric.
4. **Distribution and central tendency:** We will circle back to the topic of data distribution that you learned about in the previous lesson, and why paying attention to the distribution of the data and to the choice of measure of central tendency is important.
5. **Grouping data:** We will end with a discussion on how to look at the data across groups, cohorts, and time.

Ready to start? Let's jump in!

## Key Performance Indicators

Businesses need to be able to track how they are performing on key goals or objectives - whether they are growing number of customers, bringing down their costs, increasing revenue on an ongoing basis and myriad others. Key Performance Indicators or KPIs are how they measure their success on each of their key business objectives.

### Which KPI to use?

The decision regarding which KPI a business analyst should use depends on several factors, including which industry or domain they are working in, which business function they are focusing on, and the type of data they have available to them.

### Quiz

For this next quiz, use the link below to answer the question:

<https://kpidashboards.com/kpi/>(opens in a new tab)

Steps to complete the quiz below:

1. Click on the link above to get to the KPI Dashboards website
2. Scroll down to the header **\*\*KPIs By Department\*\***.
3. You can view the KPIs for each department by clicking on **\*\*View All\*\*** next to the department name.
4. This website provides the KPIs for several industries. Use the website to identify the correct KPI for that industry.

# KPIs by Department

## Customer Service

### MOST COMMONLY USED KPIS

- Average response time
- Top support agents
- Customer retention

[VIEW ALL →](#)

## Finance

### MOST COMMONLY USED KPIS

- Gross profit margin
- Working capital
- Budget variance

[VIEW ALL →](#)

## Human Resources

### MOST COMMONLY USED KPIS

- Overtime hours
- Training costs
- Talent satisfaction

[VIEW ALL →](#)

## Information Technology

### MOST COMMONLY USED KPIS

- Total tickets vs. open tickets
- Projects delivered on budget
- Server downtime

[VIEW ALL →](#)

## Marketing

### MOST COMMONLY USED KPIS

- Cost per lead
- Landing page conversion rate
- Engagement rate

[VIEW ALL →](#)

## Sales

### MOST COMMONLY USED KPIS

- Sales target
- Opportunity-to-win ratio
- Upsell & cross-sell rates

[VIEW ALL →](#)

## Question 1 of 2

Please identify which KPI is used by business analysts checking for performance management in Customer Service departments. Visit the link provided above to identify the KPI used for performance management in customer service departments.

Select all that apply.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Average queue time of incoming phone calls   | ✓ |
| <input checked="" type="checkbox"/> Percentage of calls transferred              | ✓ |
| <input checked="" type="checkbox"/> Costs of operating call center/ service desk | ✓ |
| <input type="checkbox"/> Average deal size                                       |   |
| <input checked="" type="checkbox"/> Inbound average talk time                    | ✓ |

## Question 2 of 2

Please identify which KPI is used by business analysts checking for performance management in the Manufacturing Industry. Visit the link provided above to identify the KPI used for performance management across manufacturing companies.

Select all that apply.

- |   |   |
|---|---|
| <input type="checkbox"/> Percentage of rent collected           |   |
| <input checked="" type="checkbox"/> Manufacturing cost per unit | ✓ |
| <input type="checkbox"/> Preferred stock equity                 |   |
| <input checked="" type="checkbox"/> Work-in-process (WIP)       | ✓ |
| <input checked="" type="checkbox"/> Demand forecasting          | ✓ |
| <input checked="" type="checkbox"/> Time on floor to be packed  | ✓ |

# Asking Data Questions

So, which KPI should be used as a business analyst? Well, that really depends on what question is being asked. As a business analyst, you're tasked with gathering appropriate information to help you solve business problems. You have to identify what needs to change and communicate the information in clear manageable chunks of data to allow you to move towards a solution.

There are specific steps you take to address the question.

- First, you need to think about the business goal or objective you're trying to meet, this will guide the type of data you need to collect and the KPIs you will track.
- Next, you actually do the data analysis and calculate the appropriate business metric on your data.
- Then, you use the results of your analysis to identify a solution or a strategy that will meet the original business goal.
- Finally, you present the metrics and visualizations to help you convey your findings in a digestible way to the stakeholders.



## WeCart Case Study for this lesson

To help you master the various concepts throughout this lesson, we will use a case study of an online app throughout this lesson. The online app is designed to pick up groceries from different stores and delivers it to the customer's home. We will assume WeCart uses a subscription model where people set up accounts and place orders on a regular basis. You'll find examples referencing WeCart throughout this lesson.

### Recap:

1. Identify business goal and questions.
2. Narrow down the type of data needed to answer questions.
3. Identify the KPIs that will be useful to show whether you are making progress on your business goal.
4. Conduct the data analysis using the KPIs and use visualizations as part of the analysis.
5. Provide recommendations and findings based on the completed data analysis.
6. Create succinct and visual presentations for the stakeholders.

## Quiz Question

If your question you were trying to answer was how much profit your business is making, which of the following KPIs or data points would you look at?

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Quantity of sales        | ✓ |
| <input type="checkbox"/> Quality of sales                    |   |
| <input checked="" type="checkbox"/> Number of paid customers | ✓ |
| <input checked="" type="checkbox"/> Number of returns        | ✓ |

That's right! These are some of the factors that could impact profit and can be directly measured.

## Business Process Flow

To understand business metrics, you first need to understand a typical business cycle so you know where to use the metric. So let's first understand that.

A business has two primary goals: to **increase revenue** and **reduce costs**. Metrics allow the company to know if they're on track to meet those goals. Let's use our WeCart example.

First, the business executives need to think about the cost they will encounter in building, promoting, and carrying out their business. Let's look at some broad categories of costs for WeCart.

For starters, their costs for setting up the website and engineering, salaries of staff, basic supplies for deliveries, costs for the payment system, legal contracts with the manufacturers and their delivery staff, and rent for the office.

Next, let's focus on **increasing revenue**. To do this, we will need to get new customers as there are a lot of people who don't know about the product. We need to get their attention. Getting you customers is a multi-step process. We need to get ads ready and track their effectiveness to generate interest among viewers on several platforms so they ultimately buy the product.



Each step of the journey is an opportunity to see how well we're doing with respect to our goal.

## Business Process Flow: Marketing

Marketing is about how and where you get the word out about your product. Traditionally, this used to be about choosing to advertise in the newspaper, radio, or TV.

But now, with the internet, the possibilities are endless. Companies can use social media like Instagram, Twitter, Facebook, Google Search, LinkedIn or even blogs to advertise their product.

Online marketing gives you one advantage.



With the use of cookies, a customer's journey can be tracked across time and across platforms.

Knowing about the customers path can help companies figure out places for targeting these and similar customers.

## Business Process Flow: Growth

This part describes a typical question business analysts try to answer when they are considering issues of a company's growth. To grow the business, companies need to not only focus on existing customers, but also new customers. This problem is at the heart of growth metric. Executive boards, investors and sales teams are constantly keeping their eye on this critical question about a company's overall health.

Let's take the case of WeCar to broadly think about the business question of growth. To grow the business, we got executives, would be interested in growing the customer base. But, growing it can occur in two ways.

- The first is to get new customers to increase the customer base.
- The second way is to get current customers to increase the order size or make repeated orders.



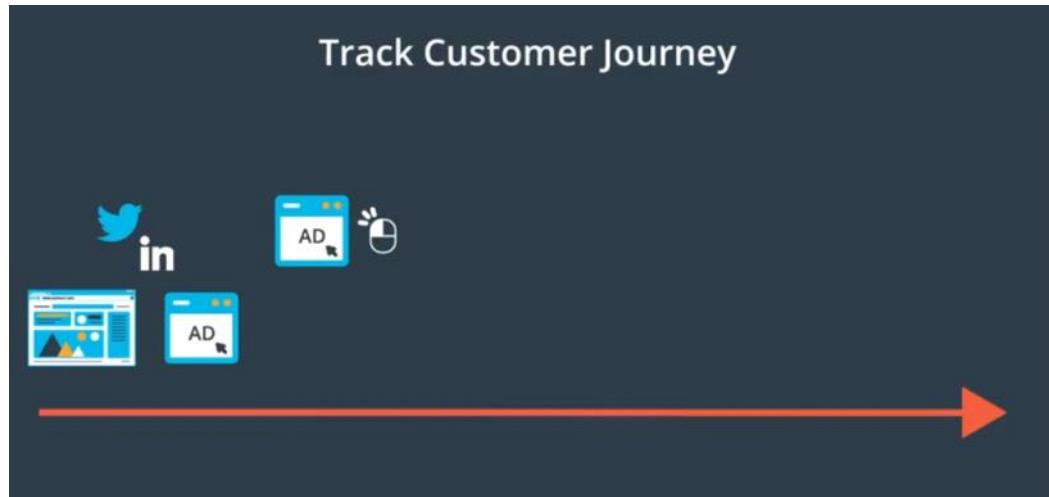
So, as business analyst, you need to break down the question of business growth to explore how we can

quantify or measure the answer.

## Customer Journey

Let's walk through the journey of WeCart, our hypothetical online app for grocery delivery.

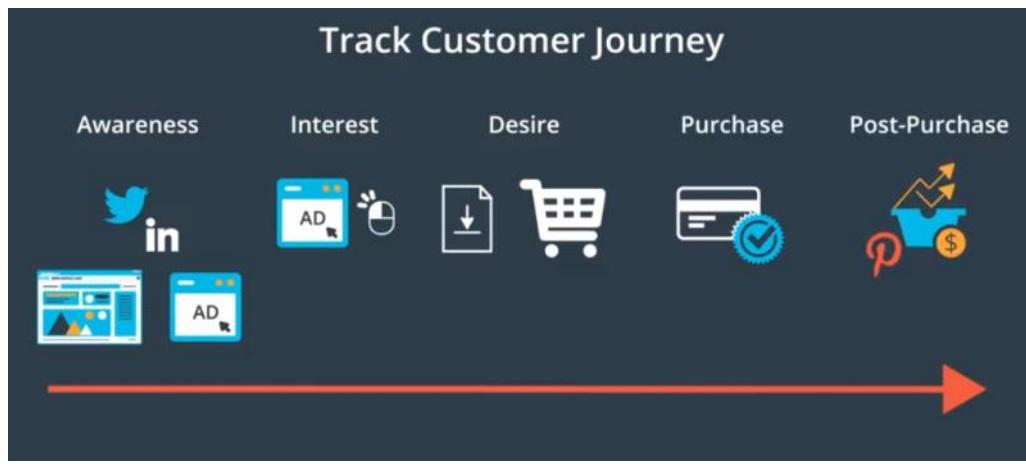
- To track the customer's journey in the online space, you begin with identifying specific ad platforms such as search engines, Instagram, Twitter, Facebook, and many others. This way, the app company can see how many users actually saw the ad.
- Next, in the marketing journey, a viewer who has seen the ad in any of these places will click on the ad. Great. Now, the viewer is on the WeCart website and a cookie gets placed on the viewer's browser.



You've probably encountered cookies when web surfing. You remember those warnings you get that cookies being placed, if you continue using the website? Yes, we're talking about that feature. Once that cookie is placed, the company is tracking what the potential customer is doing on the website.

For example, whether the person is browsing or selecting items for purchase. Essentially, it tracks a potential customer's progress along the customer journey whenever the customer interacts with the website.

- So, now the company's goal is to get this potential customer to do something on the website. In the case of WeCart, it could be something as simple as getting the customer to give their email address or download a brochure. When a customer's action is a result of a prompt, it is called Call to Action. So, when the customer is prompted to submit the email, that is referred to as Call to Action or CTA. Next step. If the customer adds items to their cart, the cookie tracks this step in the customer journey to becoming a paid customer.
- So, now WeCart would want these customers who have added items to the cart to make that purchase, and finally, the viewer submits the payment details and goes through checkout. Now, you have a paid customer and they've completed the customer journey.



This customer journey can be described by five stages; **Awareness, Interest, Desire, Purchase, and Post-purchase**. In each stage, the marketer uses different digital tools to attract a potential customer and try to transform them into an actual customer.

This customer journey can also be tracked along a marketing funnel which is a concept we will talk about in the next video. The funnel allows you to tie everything together on the customer journey and track with a good content along the journey.

### New Vocabulary

- **Call To Action:** A marketing term that refers to an action a website visitor is supposed to take when given a specific prompt on a website. These can be words or phrases, or icons that prompt and encourage the user to perform the action.
- **Post-Purchase:** Actions customers take after purchasing an item that promote and increase sales and advocate on behalf of the company. For e.g., coming back and purchasing more items, sharing or liking the company or product on social media, taking pictures of the item and tagging it on Pinterest.

### Marketing Funnel

Let's go through the concept of the marketing funnel. Now that we understand the journey a potential customer goes through, we can use the metaphor of a funnel to track and analyze each step in the journey with data.

- **Impressions and reach** capture the person seeing the ad.
- **Lead generation** is visiting the website, and buying something is conversion to a paid customer.

So, at the top, we're trying to build awareness and get our name in front of the potential customer. To do this, we use ad platforms and search engine optimization or SEO. With SEO, we can make sure our ad shows up for the right mix of search terms as people are searching for things online.



For example, search terms like grocery delivery or grocery shopping would be a good search term when we can see it ad shows up for the person. The **metrics** we can measure here are **the number of people who saw the ad**. Some of those people will click the ad and be taken to our website. To be counted at this level, the user should have clicked through the ad or the email sent to them. The metrics we use here are called **click-through rate** and **cost per click**.

At this third level, the user has been counted because they have visited the company website. But just because someone landed on your web page, that does not mean the person is interested in spending money on buying a product from your website. More sites try to capture some other piece of information about you to determine if you're indeed interested. The most common is your email.



With your email, they will then have the ability to send your marketing emails to try and convert you into a paying customer. If you provide your email or any other piece of information about yourself, you have indicated interest in the business, and the business will now think of you as a potential customer. They call this a **lead**. Other ways that businesses gauge your interests are if you download a document or create an account. Once visitors engage in any of these actions, the user is counted as a lead.

At this level, marketing teams often want to know how much it costs a business to get the viewers to get to this level. The **metric** we calculate is **the cost per lead**.

The final step is when the customer actually makes a purchase and becomes a paid customer.

In other words, the lead converted to a paid customer. Our ultimate goal is to maximize these conversions at the bottom of the funnel. In the following pages, we will address each of these specific metrics that capture the progress at each of these levels.



We will go over how to calculate them, and then you will practice. Now that you have an overview of this customer journey, calculating these metrics is not going to be hard.

## Two Additional Levels

Before we move on, I wanted to share 2 more levels that companies use.

### Loyalty

To grow their revenue and company profits, companies don't just want their customers to buy once from them, but to come back to their website. Especially if the product is not a high-priced product. That customer loyalty allows you to track how many revisits a customer is making after their first purchase, or how many of the customers have continued shopping after their first purchase.

**Metrics:** Some commonly used metrics include **Repeat Purchase Rate** and **Net Promoter Score**. We will not be going in depth with these, but please do check out the resources below to learn more about them.

### Advocacy

Another level companies sometimes track is whether their customer is advocating for their company. That is, saying good things about the product and services. Leaning on social media provides a great opportunity to do just that.

**Metrics:** Some commonly used metrics include **Customer Referrals** and **Leads from Social Media**. For example, as the paid customer tweets about the company, likes the product on FB, provides a good rating on Amazon or the company website, analysts can use those metrics, such as ratings and likes to show how many of the customers serve as advocates.

We will not be going in depth with these last two stage levels, but we have provided some resources below to help you understand these more.

## New Vocabulary

- **Search Engine Optimization (SEO)** : The goal of search engine optimization is to influence the frequency of a website appearing in response to specific search terms in a search engine. You can learn more about it on this [Wikipedia page](#) and this [Forbes article](#).
- **Lead**: A potential customer interested in the products or services of a company.
- **Conversion**: When the lead (potential customer) purchases the products or services being sold by a company.
- **Repurchase Rate**: This [Medium blog](#) describes how to calculate Repurchase Rate metrics.

- **Net Promoter Score:** This [Wikipedia page](#)(opens in a new tab) describes the calculations and origin of NPS.

Question being addressed	Level within the funnel
Have the leads purchased anything on the website?	Conversion
Are we reaching out to the potential customer?	Reach
Are the potential customers engaging with the website?	Lead Generation
Are the loyal customers sharing facebook posts about the company's products and services?	Advocacy
What percentage of the paid customers are returning customers?	Loyalty
Are potential customers clicking on the ad?	Impressions

## Reflect



Now think about whether all visitors arriving at the WeCart website are the same. How would returning customers impact the cost of marketing differently than new customers?

### Things to think about

Good attempt! Returning customers continue to bring us revenue once they have visited the website and become a paid customer. We don't have to spend additional money on creating an impression on them, or guiding them through the website to become a lead again. They know about the company, so we don't have to worry about advertising to them as much as new customers who have never bought anything from the website. When calculating the cost for advertising to new customers, we should also pay attention to the time window within which their visit will count. An extremely open time window is not as helpful as a well defined time window. These are some of the factors business analysts consider when choosing which metric to use.

### ChatGPT Explanation:

When calculating the cost of advertising to new customers, the **time window** refers to the period within which a customer's visit, action, or purchase is attributed to a specific marketing campaign. For example, if a customer clicks on an ad and visits the website, how long after that visit can their purchase still be credited to that ad? This window of attribution can vary—some companies might use a 7-day window, while others might use 30 days or more.

An **extremely open time window** (e.g., 6 months or longer) can dilute the effectiveness of the data. It might count customers who converted due to other factors unrelated to the original ad campaign, leading to inaccurate cost-per-acquisition (CPA) calculations. For instance, if a customer purchases months later, their decision might have been influenced by a subsequent campaign, word-of-mouth, or brand familiarity rather than the original ad.

On the other hand, a **well-defined time window** focuses on a realistic and relevant period—such as 7 or 14 days—where the likelihood of a customer converting due to the campaign is highest. This allows business analysts to measure the ad's true impact more accurately, ensuring marketing budgets are optimized.

Choosing the right time window is essential because it directly affects metrics like CPA, return on investment (ROI), and customer lifetime value (CLV). A poorly chosen window can mislead decision-making, while a well-chosen window ensures that marketing efforts are effectively aligned with customer behavior.

### Click Through Rate (CTR)

As potential customers view the ads, some of those potential customers will click the ad and be taken to the website for the company. To be counted at this level, the user needs to click through the ad and the metric we use here is **Click Through Rate**.



To calculate Click Through Rate, let's cover a few key concepts. Make sure you are making a note of this terminology and definitions.

### Terminology

- **Impressions** record an instance of an advertisement appearing on a website when it is viewed by a visitor. So if you visit the page 4 times, say in one hour, the gross impression count will include each repeated viewing.
- **Clicks:** Every time a website visitor views the ad and clicks it, this gets included in the "Click count"

### Calculation

$$\text{Click Through Rate} = (\text{Number of Clicks} / \text{Number of Impressions}) \times 100$$

Here's an example spreadsheet with some metadata for a website WeCart. So, it looks like at WeCart we created ads and marketed them on Facebook, Google Search, and Google Display.

To calculate the click-through rate or CTR, we include formula in this column for CTR.

The screenshot shows a Microsoft Excel spreadsheet with four columns: A, B, C, and D. Column A contains row numbers 1 through 6. Column B is labeled 'Impressions' and contains values 1100, 2000, and 1500 for rows 3, 4, and 5 respectively. Column C is labeled 'Clicks' and contains values 15, 67, and 25 for the same three rows. Column D is labeled 'Click Through Rate (in %)' and contains the formula  $(C3/B3)*100$  in row 3, resulting in 1.36%. Rows 4 and 5 show the formula and result as 3.35% and 1.67% respectively. The formula is also copied down to row 6.

A	B	C	D
1			
2			
3 FB ad	1100	15	1.36
4 Google Search	2000	67	3.35
5 Google Display	1500	25	1.67
6			

That gives us the rate in percentage. You copy down the formula and I'm going to just reduce the number of decimals to make it consistent and there we have it.

In general, a two percent CTR is good but the average ranging from 1.9 to 2.35, but it varies widely by industry. Check out the ad resources below to compare average CTR across industries.

## Interpretation of CTR

The Click Through Rate is an informative metric that informs your marketing team whether they should try and increase the number of impressions or when they should reword the ad to increase clicks. Remember, if a person clicks through the ad, it does not mean the customer purchased, but rather they are showing interest in what the ad is about. When your CTR is low, your ad campaign is not generating enough interest. When the CTR increases, it is an indicator of an effective and interesting content in your ad campaign and that maybe you should increase the number of impressions for that ad.

## Benchmarks for CTRs for Google Ads across industries.

- Check out this blog that provides useful benchmarks for CTRs across industries: [Wordstream Blog](#)

## Recap:

- **Click Through Rate (CTR)** =  $(\text{Clicks} / \text{Impressions}) * 100$  or Ratio of users clicking on a link or an ad to the number of total users who received the link or saw the ad.
- CTR measures the success of an advertising campaign or email campaign.
- When the CTR increases, it is an indicator of an effective and interesting content in your ad campaign and that maybe you should increase the number of impressions for that ad.

## Advanced Topics

A related concept called **Unique Click Through Rate** is examined when looking at email campaigns to see how often a link sent through an email was opened by person receiving the email. If the person receiving the email clicks on the link 5 times, the unique CTR stays one, even though the total CTR is 5. Comparing the unique versus total CTR can help the analyst know if the email campaign reflects interest among potential customers.

We will not be going into unique CTR in detail in this lesson, but if you are interested in learning more about it, the following web pages are good resources for you to explore.

- [Mailigen website](#)(opens in a new tab)
- [Optimizely.com website](#)

## New Vocabulary

- **Impressions** : Impressions record an instance of an advertisement appearing on a website when it is viewed by a visitor.

## Business Metric Terminology and Formulas

We have created a file with a list of business metrics covered in this lesson and their individual formulas - think of it as a cheat-sheet. You can locate it under the **Resources** tab on the top left under **Lesson Resources**. The file name is **Business Metrics Lesson Terminology and Formulas**.

## Cost Per Click

Cost Per Click refers to the cost to get a click on your ad. It helps us gauge the cost of advertising on the specific platform, so we can see which platform is generating more leads.

## Calculation

$$\text{CPC} = \text{Cost of Advertising on Source Platform} / \text{Number of Viewers who Clicked on the Ad}$$

Since platforms charge you for the number of ads on a page, you can compare the CPC for the different platforms you are advertising on and see which platform is generating more interactions with your website, or generating more traffic to your website.



This spreadsheet has marked data for a website week card. The purpose of this example, we created ads and marketed them on Facebook, Google Search, and Google Display. You will use a formula to calculate the cost per click or CPC.

So, I'm going to go ahead and create a row with that. I've put the formula here so you can see how I'm calculating this.

A	B	C	D	E
Source_platform	CPC Formula	FB ad	Google Search	Google Display
Spend		\$1,500	\$3,000	\$5,000
Clicks		700	2900	4995
Cost Per Click (CPC)	C3/C4	\$2.14	\$1.03	\$1.00
6				
7				

As you can see in this example, Google Search and Google Display give us about a dollar of CPC. In comparison, Facebook is more than \$2. Turns out \$2 is the average CPC across all industries. Again, under this, you want to compare your CPC rates to your industry-specific averages to get a better gauge of how your ad is performing on each platform.

### Interpretation of CPC

Different ad platforms cost differently, and it is important to remember that while one platform might be cheaper it may not necessarily deliver you as many potential customers as another platform. This is an important tradeoff that analysts and marketing teams have to consider. Some marketing channels or platforms convert amazing results but they are small and may not generate as many customers. While you may decide to continue using them, you will also need to identify marketing channels that deliver more potential leads.

### Recap:

- **Cost Per Click (CPC)** = Cost of advertising on the source platform / Number of people who clicked on that ad
- CPC is an indicator of the cost effectiveness of the ad platform and a useful tool to compare and strategize about which marketing platforms is yielding higher impression and reach and resulting in potential leads.

### Cost Per Lead

Remember, a lead is when a potential customer visits your website and does something on the website in response to a prompt, such as share their email , or download a document, create an account. Once the viewer takes that action, we know the viewer is showing some interest for the product or service, and this could possibly lead to a sale. With Cost Per Lead we are tracking whether the potential customer turned into a lead within a given time period, that could be a 30-day window or 60-day window.

Let's go back to our funnel - we are tracking how much did it cost us to get the potential customer to take that action on the website. We are calculating the cost of generating interest and nurturing the interest of the potential customer and figuring out how much did it cost us to get them to get to this level? The metric we calculate is the Cost Per Lead.



## Calculation

**Cost Per Lead (CPL) = Cost of advertising on the source platform / Total number of leads**

Let's do it on our previous spreadsheet.

So, now we're going to go ahead and calculate the cost per lead.

To calculate the cost per lead, we need the total number of leads, that were generated from an ad. So, I've created a row for total leads, and indicated the number of leads we got from each of these three platforms and displays.

Next, We calculated the cost per lead or CPL using the formula we mentioned above.

A	B	C	D	E	F
Source_platform	Formula	FB ad	Google Search	Google Display	Number of Leads
Spend		\$1,500	\$3,000	\$5,000	
Clicks		700	2900	4995	
CPC		\$2.14	\$1.03	\$1.00	
Total leads		16	63	112	191
Cost Per Lead (CPL)	C2/C5	\$93.75	\$47.62	\$44.64	
7					

So, as we can see, Google Search and Google Display cost us between \$45 and \$48 to get each lead. In comparison to Facebook's almost \$94, it's more expensive to create a lead there based on the ads.

## Interpretation of CPL

A lead is an indication that the advertisement or the advertising platform is targeting the right type of person. A low cost per lead means more of this particular type of person is likely to be interested in the product. Looking at the data in the video we can see that Google Display and Google Ads were comparable in terms of the Cost Per Lead. On the other hand, Facebook was costing us more to get to our potential customers. At the same time, Facebook also generated fewer clicks, so we need to consider if we need to tweak the ad for the Facebook platform, or consider other platforms that can generate same or higher number of clicks for a comparable price."

## Useful Resources and Links

The following websites provide some benchmarks for Cost Per Lead by industries.

- [Marketing Charts](#)(opens in a new tab)
- [Hubspot](#)

## Reflect



Given the marketing metrics you have calculated thus far for the Smoothie Rocks ad, which ad platform would you recommend your marketing team revisit or tweak the ad for? Think about the number of clicks, CPC and CPL as you examine the data.

### Your reflection

Facebook



### Things to think about

Our recommendation for the marketing team would be that Facebook appears to have the highest Cost Per Lead of \$5.83 while getting 450 clicks. For a comparable number of clicks (497), Google YouTube not only has a lower Cost Per Lead (\$1.18). Facebook also appears to have a high Cost Per Click of \$0.70 compared to Google YouTube (\$0.23).

## Recap:

- **Cost Per Lead (CPL)** = Cost of advertising on the source platform / Total number of leads
- CPL is an indicator of the cost effectiveness of the ad platform and a useful tool to compare and strategize about which marketing platforms yielded more leads.

## Customer Acquisition Cost

Customer Acquisition Cost or CAC is used as a metric in the very last step in our funnel, where the customer has actually bought a product or service on the website.



We use the CAC metric to figure out how much it costs to acquire a paid customer. Remember, our ultimate goal is to increase these conversions at the bottom of the funnel.

Considering e-commerce shopping cart abandonment rates are well over 60%, each company's goal is to make sure you're getting higher levels of conversions for the minimum cost of sales in marketing. This idea is linked to the concept of optimizing the funnel. We will cover this later in the lesson.

CAC is computed by dividing all the costs spent on acquiring more customers, marketing expenses, sales and marketing salaries, by the number of customers converted to paid customers in the period the money was spent.

## Customer Acquisition Cost(CAC)

- = (Total marketing expenses + total marketing & sales salaries) / # of customers converted to paid customers

### Calculation

A good rule of thumb is that you want your CAC to be 25% of the revenue, the money you earn from all your customers. Next, you'll perform a sample computation of CAC.

Here, you can see a slightly different spreadsheet, but it's actually building on the previous example. In row one, marketing costs, and including the cost of building, the ads across the street, ad platforms from our previous examples.

Then, I've added in the sales and marketing salaries, and included any overhead costs for sales and marketing. So, these show up in these three rows. We add them up to get our total sales and marketing cost.

	A	B	C	D	E
1		Formula	August	September	October
2	Marketing Costs		\$9,500	\$12,000	\$5,000
3	Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000
4	Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500
5	Total Sales & Marketing Costs	SUM(C2:C4)	=SUM(C2:C4)		
6	Number of Paid Customers			SUM(number1, [number2], ...)	350
7	Customer Acquisition Cost (CAC)	C5/C6			

Then, to get the customer acquisition cost, I'm going to take this total sales and marketing cost and divide it by the number of paid customer.

	A	B	C	D	E
1		Formula	August	September	October
2	Marketing Costs		\$9,500	\$12,000	\$5,000
3	Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000
4	Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500
5	Total Sales & Marketing Costs	SUM(C2:C4)	\$44,500	\$45,000	\$38,500
6	Number of Paid Customers		300	325	350
7	Customer Acquisition Cost (CAC)	C5/C6	\$148.33	\$138.46	\$110.00

As you can see in this example, our CAC was less than a \$150 in range between 148-110. A good rule of thumb is that the CAC should be a fourth of your revenue.

- If you're spending more than that, then you are spending too much. So, you're spending too much to get a customer, to acquire a customer.
- Now, If you're spending less than that, you're actually losing business opportunities.

So, this was one example to calculate the customer acquisition cost.

It is important to remember that sometimes some customers take a long time to convert from leads to paying customers. Maybe they sign up or register for a free account for some months, and then they are prompted to become a paying customer. In other words, your marketing campaign may take some time to realize the revenues it is trying to generate.

To come for that dealing in a lead conversion, CAC is often calculated on the basis of your average sales cycle. Let's look at the following example.

	A	B	C	D	E
		August	September	October	
19	Marketing Costs	\$9,500	\$12,000	\$5,000	
20	Sales & Marketing Salaries	\$25,000	\$25,000	\$25,000	
21	Overhead costs for Sales and Marketing	\$10,000	\$8,000	\$8,500	
22	Number of Paid Customers	300	325	350	
23					
24	CAC	N/A			
25			(B19 + (0.5 * (B20+B21)) + (0.5 * (C20+C21))) / C22		
26					

Here, we have a slightly different formula based on a **60-day average sales cycle**.

We use the marketing cost for August, and then use a ratio of the sales and marketing salaries, and overhead costs, for the previous two months. Don't get bogged down by the formula just yet.

Let's make sure we cover the concept first. So think of it as you're still paying for those costs, the salaries, and the overhead cost, as you wait for the marketing cost, the 9,500, to realize the lead conversion which is the average cycle of two months in this example.

So here's a formula. We are going to add the marketing costs for August to half of the overhead costs for August, plus half of the overhead costs for September.

	A	B	C	D	E
		August	September	October	
19	Marketing Costs	\$9,500	\$12,000	\$5,000	
20	Sales & Marketing Salaries	\$25,000	\$25,000	\$25,000	
21	Overhead costs for Sales and Marketing	\$10,000	\$8,000	\$8,500	
22	Number of Paid Customers	300	325	350	
23					
24	CAC	N/A	= B19 + (0.5 * (B (B19 + (0.5 * (B20+B21)) + (0.5 * (C20+C21))) / C22		
25					
26					

I think it's done. So this is the numerator, and what you're then doing is you're actually dividing it by the number of paid customers that you got in September. Because you're trying to gauge what was the cost of acquiring these paid customers in September.

IF	A	B	C	D	E
		August	September	October	
19 Marketing Costs		\$9,500	\$12,000	\$5,000	
20 Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000	
21 Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500	
22 Number of Paid Customers		300	325	350	
23					
24 CAC	N/A		+C21))/325		
25			(B19 + (0.5 * (B20+B21)) + (0.5 * (C20+C21)))/C22		
26					

If your sales cycle is two months, then you want to take the overhead costs for two months, so August and September, and average them, and that's what the 0.5 is doing, and then you include the marketing cost. This amount you spent on marketing to these paid customers back in August, and you divide it by the number of paid customers that you got in September.

A	B	C	D	E
	August	September	October	
19 Marketing Costs	\$9,500	\$12,000	\$5,000	
20 Sales & Marketing Salaries	\$25,000	\$25,000	\$25,000	
21 Overhead costs for Sales and Marketing	\$10,000	\$8,000	\$8,500	
22 Number of Paid Customers	300	325	350	
23				
24 CAC	N/A	\$133.85	\$129.29	
25		(B19 + (0.5 * (B20+B21)) + (0.5 * (C20+C21)))/C22		
26				

I've also included the formula here for you to see. So that's how you arrive at the CAC for the two month average cycle, and I copy the formula over to October as well.

So yes, you can see that the CAC is different and lower than it was for the one-month cycle.

It was 148 and 138 before, but now it's lower. There's a reason for this. Previously, you were overestimating it. You were hoping that the leads will convert to customers in a month.

When in fact, it takes them two months. Businesses can decide their marketing campaign spending based on CAC. So for that reason, it is important to get more accurate estimate of CAC.

## Interpreting CAC

The CAC metric is an indicator of how much it cost to acquire a customer. If your customer service team is doing a good job of keeping the paid customers happy, that can lead to future leads and paying customers, and thus keep the cost of acquiring customers low. The company's goal is to keep the CAC low, while increasing revenue as this has a positive impact on the profit margin and profits.

Additional note regarding the timeline of the customer journey. If you are unsure of the timeline of your customer journey, think about when the ad was placed online, how long it was out, and when the ad was pulled out. That gives you a rough timeline of when you started getting paid customers, and estimate how much time an average customer took from seeing the ad to buying your product.

## Recap

- Customer Acquisition Cost (CAC) = (Total marketing expenses + total sales expenses and salaries)/ # of customers acquired
- The CAC formula can be modified with weighting for different months based on the length of the sale cycle.
- CAC is a useful metric used to get an estimate of how much it cost us to acquire the customer in the period the money was spent to reach out to them.

## Optimizing Marketing Funnel

In order to acquire new customers, customers must step through each step of the funnel. Now, let's take a few minutes to talk about optimizing the funnel. **Optimizing the funnel requires identifying at what level of the funnel your customer loss is the greatest.** So, the business team can target those leakage points.



In other words, are you losing the most customers at the awareness and interest age, or is it when you are converting them into leads?

- If you're losing many of them in the early stages of awareness, you need to focus on the types of ads you're creating, or the ad platforms you're choosing to reach your potential customers.
- On the other hand, if you're losing many of them at the conversion stage, you need to look at your website, or online app. It's possible the site is not easy to navigate, and that's why not many customers are converting to paid customers.

So, essentially, you're calculating the conversions, or your success rate at getting a potential customer to do what you want them to do at each level of the marketing funnel, and you compare this number against your impressions.

## Conversion Rate

### Calculation

- $= \frac{\text{Number at each level in the funnel}}{\text{Number of Impressions}}$

The goal with optimizing the funnel is to reduce the drop at each level. For example, if you find only 5% of the people seeing the ad click on the ad, it could be an indication that your ad needs more work and that you need

to think about its relevance.

Further down the funnel, the goal of the marketing team is that once the leads or visitors are on the company website, the website design should cause no confusion to the visitor. There should be plenty of options available to stay engaged and the website, and there should be no confusion about what steps the visitor needs to take to make the purchase.

As you can see in this worksheet, we've captured the steps in the funnel, with some additional customer touch points where you want the customer to do something once they arrive on your website, download a brochure, share the email, add items to the cart.

A	B	C	F
1 Months	Numbers	Conversion rates based on impression	
2		B4/B3	
3 Arrived on site	1000		
4 Downloaded brochure	430		
5 Added items to cart	193		
6 Purchased item	75		
7			

- First, We will calculate the conversion rates based on impressions where their denominator, is the number of original count of people who arrive at your website; the impressions.
- Second, where the denominator is the number of people who completed the Call to Action at the previous level in the panel.

Let's first calculate the conversion rates based on the number of visitors to the website. So, we have a column; conversion rates based on impression. Here, it shows you the formula that I'm using, and you're going with B4 divided by B3.

A	B	C
1 Months	Numbers	Conversion rates based on impression
2		B#/#B3
3 Arrived on site	1000	
4 Downloaded brochure	430	0.43
5 Added items to cart	193	0.19
6 Purchased item	75	=B6/B3

- So, you can see that 43% roughly of the people who saw the actual ad, downloaded the brochure.
- And 19% of the people who arrived on the site, added items to the cart.
- So, about 8% of the people who arrived in the website actually purchased the item.

Now, let's calculate the conversion rates, based on the number of people who completed the Call to Action at the previous level in funnel. I have the formula here, so that you can track what I'm doing.

A	B	C	D	E
Months	Numbers	Conversion rates based on impression	Conversion rates based on each level	Formula
Arrived on site	1000	B#/B3		
Downloaded brochure	430	0.43	0.43	B4/B3
Added items to cart	193	0.193	0.45	B5/B4
Purchased item	75	0.075	0.39	B6/B5

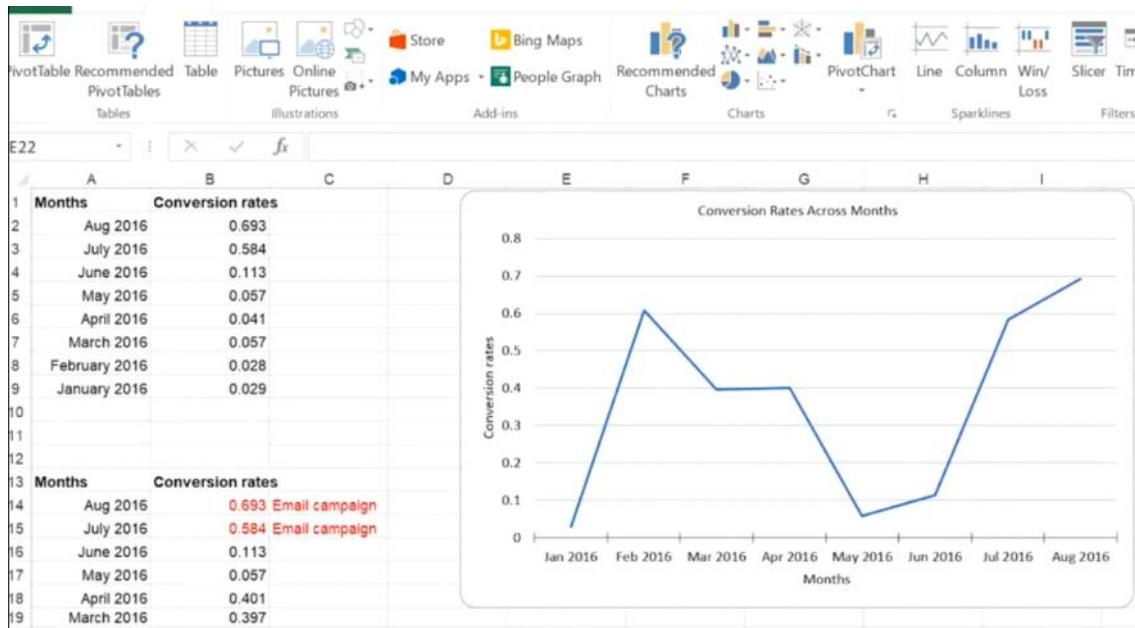
Here, this will be B4 divided by B3, because that's the original step. So, people arrive in the website, and then they download of the brochure.

Next, we're going to go B5 is divided by the number of people who downloaded the brochure.

And the number of people who purchased the item divided by the number of people who added the items to a cart.

So, we can see this indicates that 45% of the people who download the brochure added their items to the cart. And Of those who added their items to the cart, 39% actually purchased the item.

I wanted to share out this visualization for depicting the conversion rates that can be very helpful for business analysts to depict the data on conversion rates to their stakeholders.



This is a line chart showing the time on the X-axis and the conversion rate on the Y-axis.

And this is a particularly useful tool when you want to engage the stakeholders, such as the executive team, around what the conversion rate data is telling us.

So, line charts like this can allow you to indicate how specific customer, facing tools, and methods, such as email marketing campaigns, website features are showing higher success rate in converting leads to paying customers. And this type of visualization allows the marketing and growth team to identify these successful tools and campaigns or failed ones as well, and plan future efforts to maximize conversions.

So, this is a useful tool to have in your toolkit as well.

## Cost Per Acquisition

This far, we've been focusing on the conversion metrics within a marketing metrics. However, you can also capture the impact of marketing campaign in terms of revenue using metrics that capture the financial cost. These include cost per acquisition and lifetime values. Let's tackle cost per acquisition first. Before we get

started, acquisition refers to a non-paying customer.

**Cost per acquisition** focuses on the sales and marketing costs including cost of supplies, labor and marketing, overhead, and sales that it took to convert a non-paying customer into a paying customer. You calculated by dividing the marketing and sales cost by the number of newly customers.

## Cost Per Acquisition (CPA)

### Calculation

- $= (\text{Marketing and Sales Cost}) / \text{Number of new leads}$

If you're feeling confused about CPA and CAC at this point, don't worry, it confused me too.

Let's go over the difference between these.

CPA is focused on the marketing and sales cost, so it includes overhead and salaries for staff in addition to marketing and sales costs. CPA also focuses on sales leads, not actual paying customers.

### Distinctions between CAC and CPA

- $(\text{Marketing and Sales Cost}) / \text{CPA} = \text{number of new leads}$
- Note: CPA includes just leads or non-paying customer in the denominator
- $(\text{Total marketing expenses} + \text{total marketing & sales salaries}) / \text{CAC} = \# \text{ of customers converted to paid customers}$
- Note: CAC includes actual paying customers in the denominator

Now, let's do a calculation for the cost per acquisition. You may recall seeing a similar spreadsheet for CAC. But notice, here we're talking about leads.

	A	B	C	D	E
1		Formula	August	September	October
2	Marketing Costs		\$9,500	\$12,000	\$5,000
3	Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000
4	Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500
5	Total Sales & Marketing Costs	SUM(C2:C4)	\$44,500	\$45,000	\$38,500
6	Number of Leads (non-paying customer)		191	135	130
7	CPA (non-paying customer)	C5/C6			

In the CAC video, you saw a number of paid customers. So, that is a difference between CPA and CAC.

A	B	C	D	E
	Formula	August	September	October
Marketing Costs		\$9,500	\$12,000	\$5,000
Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000
Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500
Total Sales & Marketing Costs	SUM(C2:C4)	\$44,500	\$45,000	\$38,500
Number of Paid Customers		300	325	350
Customer Acquisition Cost (CAC)	C5/C6	\$148.33	\$138.46	\$110.00

The other thing I want to cover is how do I get the number of leads? So, I actually got this from a spreadsheet where I was tracking the number of leads from all the various platforms, and so for say the number of leads for August, I just added these up across the various platforms, and that's how I arrived at the 191 number, and so I repeat this process for each of the months and I input here.

A	B	C	D	E	F	G
Source_platform	Formula	FB ad	Google Search	Google Display	Number of Leads for August	
Spend		\$1,500	\$3,000	\$5,000		
Clicks		700	2900	4995		
CPC		\$2.14	\$1.03	\$1.00		
Total leads		16	63	112	191	
Cost Per Lead (CPL)	C2/C5	\$93.75	\$47.62	\$44.64		

So, to calculate the cost per acquisition, remember these are the non-paying customers. You just take the total sales and marketing costs, so that's marketing costs, sales and marketing salaries, and overhead costs divided by the number of leads.

A	B	C	D	E
	Formula	August	September	October
Marketing Costs		\$9,500	\$12,000	\$5,000
Sales & Marketing Salaries		\$25,000	\$25,000	\$25,000
Overhead costs for Sales and Marketing		\$10,000	\$8,000	\$8,500
Total Sales & Marketing Costs	SUM(C2:C4)	\$44,500	\$45,000	\$38,500
Number of Leads (non-paying customer)		191	135	130
CPA (non-paying customer)	C5/C6	\$232.98	\$333.33	\$296.15
8				

And that gives you the cost per acquisition or the amount of money you spend on acquiring a customer that may turn into a lead.

## Interpretation of CPA

Cost Per Acquisition provides insight into whether or not the marketing campaigns are successful from a business perspective. For the purposes of calculating the CPA, the cost of the marketing campaigns should not be restricted to the cost of developing the ad, but also other costs of labor and overhead. In other words, CPA allows a business to gauge whether the marketing campaign is generating enough potential leads to cover a broader range of costs other than just direct advertisement costs.

## Question 1 of 4

Which one would you use if you were asked to show how much did it cost to get a lead?

Select all that apply.

- Cost Per Lead (checkmark)
- Customer Acquisition Cost
- Life Time Value

## Question 2 of 4

Which one would you use if you were asked to show how much did it cost to get a paying customer?

- Cost Per Click
- Cost Per Lead
- Cost Per Acquisition
- Customer Acquisition Cost (checkmark)

## Recap:

- Cost Per Acquisition (CPA) = (Marketing and Sales Cost)/ number of new leads customers
- CPA is referring to marketing + sales costs (overhead, salaries) in the numerator and includes only leads (non-paying customer) in the denominator.
- Here "acquisition" refers to a non-paying customer.

## [CAC vs CPA: Why Knowing the Difference Can Save Your Digital Marketing Budget! | LinkedIn](#)

Are you tired of feeling like you're in a marketing maze, trying to decipher all the confusing acronyms and metrics? Fear not, my fellow marketers! Today we're going to tackle two similar-sounding but very different metrics: Cost Per Acquisition (CPA) and Customer Acquisition Cost (CAC). And let me tell you, understanding the difference between these two is going to feel like a breath of fresh air. No more staring at spreadsheets and feeling like you need a degree in rocket science to make sense of it all.

There are several metrics that are used to track the effectiveness of campaigns and strategies. Two of these metrics that are often confused with each other are Cost Per Acquisition (CPA) and Customer Acquisition Cost (CAC). While they may sound similar, they are different metrics that measure different things. In this article, we will explore the differences between CPA and CAC and how they can be used to optimize marketing efforts.

### What is Cost Per Acquisition (CPA)?

CPA is a metric that measures the cost of acquiring a new customer. It is calculated by dividing the total cost of a

campaign by the number of new customers acquired as a result of that campaign. CPA is typically used in performance marketing campaigns where the goal is to generate leads or sales. For example, if a company spends \$1,000 on a Facebook advertising campaign and acquires 10 new customers, the CPA would be \$100. This means that it cost the company \$100 to acquire each new customer. CPA can be calculated for various types of conversions, such as leads, sales, app installs, or form completions. It provides insights into the effectiveness of a campaign and helps marketers optimize their strategies to improve ROI.

### What is Customer Acquisition Cost (CAC)?

CAC is a metric that measures the cost of acquiring a new customer over a longer period of time. It takes into account all the costs associated with acquiring and retaining customers, such as marketing expenses, sales commissions, and overhead costs.

CAC is calculated by dividing the total cost of sales and marketing by the number of new customers acquired during that period. CAC provides a more comprehensive view of the cost of acquiring customers, as it includes all the costs associated with the sales and marketing process.

For example, if a company spends \$50,000 on marketing and sales in a month and acquires 500 new customers during that period, the CAC would be \$100. This means that it costs the company \$100 to acquire and retain each new customer.



### CPA Vs CAC

#### What are the Differences Between CPA and CAC?

While CPA and CAC may seem similar, there are several differences between the two metrics. The main differences are:

1. Timeframe: CPA measures the cost of acquiring a new customer for a specific campaign or conversion, while CAC measures the cost of acquiring and retaining a customer over a longer period of time.
2. Inclusion of Costs: CPA only takes into account the costs associated with a specific campaign or conversion, while CAC includes all the costs associated with acquiring and retaining customers.
3. Focus: CPA is focused on individual campaigns and conversions, while CAC is focused on the overall sales and marketing process.
4. Strategic Insights: CPA provides insights into the effectiveness of individual campaigns and can help marketers optimize their strategies for better ROI, while CAC provides insights into the overall cost of customer acquisition and can help businesses optimize their sales and marketing processes for better profitability.

#### How to Use CPA and CAC to optimize Marketing Efforts?

CPA and CAC are both important metrics that can help marketers optimize their strategies for better results.

Here are some tips on how to use these metrics to improve marketing efforts:

1. **Understand the difference between CPA and CAC:** Cost Per Acquisition (CPA) is the cost of acquiring a new customer, while Customer Acquisition Cost (CAC) is the cost of acquiring a new customer over a period of time.
2. **Calculate your CPA and CAC:** To calculate CPA, divide the total cost of a campaign by the number of new customers acquired. To calculate CAC, divide the total cost of acquisition (including marketing, sales, and other expenses) by the number of new customers acquired over a period of time.
3. **Set realistic goals:** Use your CPA and CAC data to set realistic goals for customer acquisition and marketing spend. This will help you allocate resources more effectively and make informed decisions about where to invest your marketing dollars.
4. **Monitor and adjust:** Regularly monitor your CPA and CAC data to identify trends and make adjustments to your marketing efforts accordingly. This may include adjusting your targeting, messaging, or campaign tactics to improve your customer acquisition and reduce costs.
5. **Test and iterate:** Test different strategies and tactics to improve your CPA and CAC over time. This may include A/B testing, experimenting with new channels, or adjusting your pricing or offers to improve conversion rates.

By using CPA and CAC data to inform your marketing efforts, you can optimize your campaigns for better customer acquisition and more efficient spending.

By understanding and leveraging Cost Per Acquisition (CPA) and Customer Acquisition Cost (CAC) is critical for optimizing marketing efforts. By calculating CPA and CAC, setting realistic goals, monitoring and adjusting campaigns, and testing and iterating on strategies, businesses can improve their customer acquisition and marketing efficiency.

This data-driven approach allows marketers to make informed decisions about where to invest marketing dollars, allocate resources more effectively, and ultimately, drive better results. Incorporating CPA and CAC into your marketing strategy is not only important for achieving short-term success, but also for building a strong, sustainable business over the long term.

So start calculating your CPA and CAC today, and get on the path to more effective and efficient marketing!

## Lifetime Value

When you decide how to spend your marketing budget, you want to focus on some of your best customers, customers who will stay with you for the long-term, who will continue to generate revenue for the company longer than say, a customer who finds a cheaper deal somewhere else and leaves your website. In other words, you want to identify your high-value customer, so that you can focus on bringing in more of these customers. Think of it this way: Your goal is for every dollar you spend on your marketing efforts to give you a higher rate of return and generate revenue multiple times over. How do you go about doing that? You use a business metric called lifetime value of a customer.

To calculate lifetime value, let's cover a few key concepts. Again, make sure you make a note of the terminology and definitions. They are going to get slightly complicated, but we will walk through each of them one by one. So, keep in mind we want to be able to estimate how much revenue we can expect to earn per customer as far into the future as we can.

To calculate this, we need to take into account a lot of different metrics and data to create a single LTV metric.

- **First, purchase cycle is a time period that depicts the general frequency with which your products are purchased.** At Udacity, if we start a new nano degree class every two weeks, two weeks would be the purchase cycle.
- **Total sales revenue per cycle** is the revenue earned from all customers per purchase cycle.
- **Number of sales per purchase cycle** is the number of times your average customer buys during the

purchase cycle.

- **Cost per acquisition**, you've seen this before. It's a total cost of marketing and sales divided by the number of new leads.
- Next, we have **expectation retention time**. This is the amount of time you expect to retain the customer. This is measured in terms of purchase cycles, what we covered right at the top of this list. So, if we expect a customer to be retained for a year given a two-week purchase cycle, then we have an ERT of about 26.
- **Average sales revenue** is the revenue you earn from the average customer per transaction during the cycle. This is the total customer revenue divided by the number of purchases in the cycle.
- **Profit margin per customer** is the percentage of sales that has turned into profits.

## Lifetime Value (LTV)

### Terminology

- Purchase Cycle
- Total Sale Revenue Per Purchase Cycle
- Number of Sales Per Purchase Cycle
- Cost Per Acquisition
- Expected Retention Time
- Average Sale Revenue  
= Total customer revenue  
/ Number of Sales in the cycle
- Profit Margin Per Customer  
= ((Average Sale Revenue - Average Cost of Sale)  
/ Average Sale Revenue) x 100

Next, we have one last thing to do, calculate the lifetime value. Lifetime value is the average sale times the number of repeated sales times expected retention time times profit margin.

Essentially, this is the net profit you can attribute to the customer over the length of their relationship with the company. Let's do this in Excel in the next video.

## Lifetime Value (LTV)

### Calculation

- = Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin

So, to calculate the lifetime value, let's use this formula. We're going to go ahead and break each piece up, so that we can see how to calculate each of these components of the formula, and we're going to use the WeCart example again. Let's assume a typical week our customer orders groceries once a week, for say \$70 per order.

Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin			
A	B	C	D
1			
2 Purchase Cycle	Time increment adopted for business calculations	1 week	1
3 Total Sale Revenue Per Cycle	Revenue earned from customer per purchase cycle	\$70 per order X 1 orders per week	70
4 Number of Sales Per Purchase Cycle	Number of times customer buys during the purchase cycle	1 orders per customer per cycle	1
5			
6			
7			
12 Life Time Value	Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin		
13			

- So, our **purchase cycle** we can make it to be **one week**.
- **Total sales revenue per cycle** would be the \$70 we expect to earn from the customer during this purchase cycle, to 70, and then
- **The number of sales per purchase cycle** would be the number of times the customer buys during the purchase cycle, which would be one order per week. So, one order per customer cycle, which is one.

Now, let's go ahead and calculate the other pieces of the formula. To calculate the other two pieces of the formula, you need to take into account cost per acquisition as well as average sales revenue. So, let's walk through these.

8 Cost Per Acquisition	Sales and Marketing costs to get a lead	\$25	25
9 Expected Retention Time	Amount of time (measured in purchasing cycles) you expect to retain the customer	7 years x 52 weeks	364
10 Average Sale Revenue	Total customer revenue divided by the number of purchases in the cycle	\$70 / 1	
11 Profit Margin Per Customer	((Average Sale - Average Cost of Sale) / Average Sale)	((70 - 25)/70)	
12 Life Time Value	Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin		

- So, the **cost per acquisition** is the CPR that we've calculated before. So, let's assume this to be \$25. So, it takes about \$25 of sales and marketing costs to get a lead.
- **The expected retention time** is the amount of time which is measured in purchase cycles that you expect to retain the customer. I think we can aim a customer to stay with our business for, say seven years, when she says, think of our own experience as a grocery buyer and online shopper. So, this would be seven years, but since we need this in the purchase cycles as that is our unit. So, we're going to go seven years times 52. So, that's how I got this. So, this would be seven times 52 weeks per year, so that gives us 364 weeks across seven years.
- **Average sales revenue** is the average revenue we receive from the customer per transaction during the cycle. We calculate this above. This is \$70 per cycle, so that's 70 here.
- **Profit margin per customer**. The way to calculate this is average sale, which is \$70 minus the average cost of sales. So, this would be where you can plug in the cost per acquisition, so over the average sales.

7			
8 Cost Per Acquisition	Sales and Marketing costs to get a lead	\$25	25
9 Expected Retention Time	Amount of time (measured in purchasing cycles) you expect to retain the customer	7 years x 52 weeks	364
10 Average Sale Revenue	Total customer revenue divided by the number of purchases in the cycle	\$70 / 1	70
11 Profit Margin Per Customer	((Average Sale - Average Cost of Sale) / Average Sale)	((70 - 25)/70)	=D10-D8/D10

Okay. So, that's \$0.64 on a dollar. That's the profit margin per customer.

Now, we're ready to plug all of that in into the lifetime value formula. So, we're ready to plug in the values for the lifetime value now.

D11		=D10*D4*D9*D11	
A	B	C	D
1			
2 Purchase Cycle	Time increment adopted for business calculations	1 week	1
3 Total Sale Revenue Per Cycle	Revenue earned from customer per purchase cycle	\$70 per order X 1 orders per week	70
4 Number of Sales Per Purchase Cycle	Number of times customer buys during the purchase cycle	1 orders per customer per cycle	1
5			
6			
7			
8 Cost Per Acquisition	Sales and Marketing costs to get a lead	\$25	25
9 Expected Retention Time	Amount of time (measured in purchasing cycles) you expect to retain the customer	7 years x 52 weeks	364
10 Average Sale Revenue	Total customer revenue divided by the number of purchases in the cycle	\$70 / 1	70
11 Profit Margin Per Customer	((Average Sale - Average Cost of Sale) / Average Sale)	((70 - 25)/70)	0.642857143
12 Life Time Value	Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin	=D10*D4*D9*D11	16380

So, 16,380 or the value that a customer would bring to a company. So, now that you know that an average customer value is 16,380, the company should spend less than this to obtain a new paying customer.

12 Life Time Value

Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin

16380

If it is spending more than this, the company may be making losses in the long run. One other thing, I have seen several equations for lifetime value. It is generally recommended to calculate lifetime value using a few different ways, so you can get a better estimate of your average lifetime value.

We've provided a few links below for you to see what are the other ways to calculate lifetime value of a customer.

Check out the following websites to read up on additional ways to calculate Lifetime Value:

1. [Multiple ways to calculate LTV\(opens in a new tab\)](#)
2. [Identifying your High value customers\(opens in a new tab\)](#)
3. [Using Cost of capital](#)

## Quiz Question

Calculate the Lifetime Value for Smoothie Rocks given the following information.

An average purchase cycle of 2 weeks, with total sale revenue of \$8 per order.

The average customer order 5 orders per purchase cycle. The Cost per Acquisition is \$7.50 and we expect to retain the customer for 3 years.

- \$390
- \$975
- \$195 ✓
- Can't be calculated based on the information provided.

## Solution:

Value Category	Description	Value
Purchase Cycle	2 weeks	2
Total Sale Revenue Per Cycle	\$8 per order x 5 orders per 2 weeks	\$40
Number of Sales Per Purchase Cycle	5 orders per customer per cycle	5
Cost Per Acquisition	\$7.50	7.5
Expected Retention Time	3 years x 26 weeks	78
Average Sale Revenue	\$40/5	8
Profit Margin Per Customer	((8 - 7.5)/8)	0.0625
Life Time Value	8 x 5 x 78 x 0.0625	<b>\$195</b>

That's correct! And remember, there are several other formulas for Lifetime Value. We have focused on only one for this lesson. Check out the resources outlined below.

## Recap:

- **Lifetime Value (LTV)** = Average Sale x Number of Repeat Sales x Expected Retention Time x Profit Margin
- Items needed to calculate Life Time Value:
  - **Purchase Cycle:** The time increment adopted for business calculations
  - **Total Sale Revenue Per Cycle:** Revenue earned from customer per purchase cycle
  - **Number of Sales Per Purchase Cycle:** Number of times customer buys during the purchase cycle
  - **Cost Per Acquisition:** (Cost of marketing and sales)/ number of new leads
  - **Expected Retention Time:** Amount of time (measured in purchasing cycles) you expect to retain the customer.
  - **Average Sale Revenue:** (Total customer revenue/ Number of purchases in the cycle) OR Average revenue received from the customer per transaction during the cycle
  - **Profit Margin Per Customer:** ((Average Sale - Average Cost of Sale) / Average Sale)
- LTV takes into account future uncertainty around sales and is a good estimated guess about the future actions of the customer. It is important to use LTV as a tool to inform business strategy, and not a business strategy.

## Reflect



Based on your calculation of the LTV, what advice would you have for Smoothie Rocks regarding how much it spends on acquiring new customers?

## Things to think about

Here is our thinking. Based on the LTV of \$195, we believe Smoothie Rocks should not spend more than \$195 on the most loyal customers. These customers will continue to bring value to Smoothie Rocks.

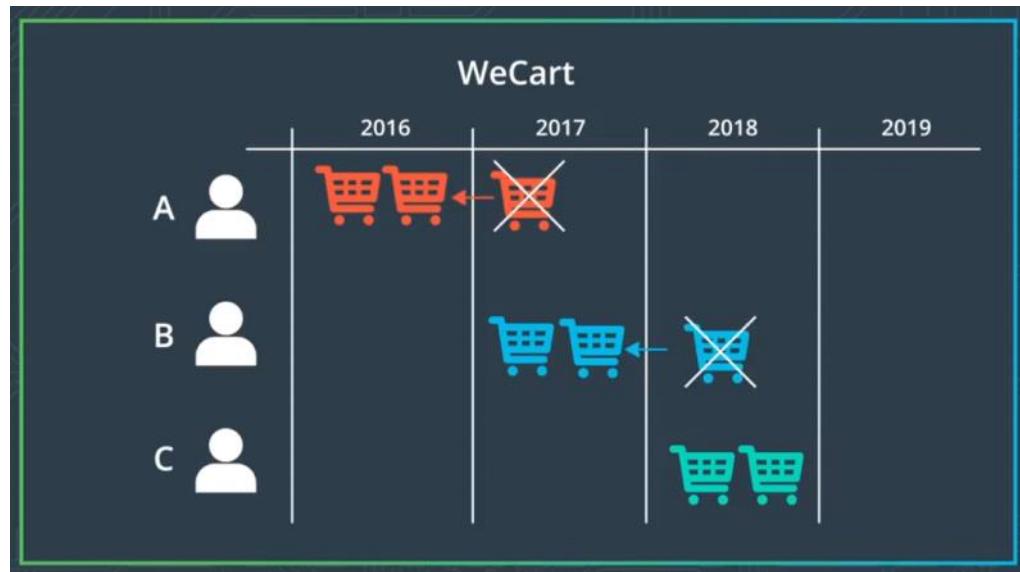
If Smoothie Rocks spends more than \$195 on their customer, Smoothie Rocks will likely make a loss in the long run because the customers will not stay loyal customers long enough for Smoothie Rocks to recoup the money spent to get these customers.

## Interpreting Life Time Value

One thing business analysts sometimes rip up on are the assumptions they make about the data. Let's go back to our WeCart company.



Say you're the business analysts, calculating the LTV across the years, and you're counting the number of transactions by converted customers during each year. For example, you want to know the LTV for a customer acquired in 2016. You want to include all the transactions the customer had even those in 2017.



LTV takes into account future uncertainty. It is a good estimate about the future actions of the customer.



Another thing to keep in mind is the actual value of the product. Most high value products, such as a car or a house, won't have customers coming back and buying it again and again. For example, it's very likely you have bought cars from different dealerships.



So, for the dealership, it is more important to focus on the individual customer value rather than the lifetime value. The value you provide each dealership is restricted to that single purchase you made because you never visit them again. Compare that to smaller orders at Amazon.



There, the lifetime value will make sense as you're likely to come back and make orders several times. Calculating lifetime value matters in this case.

### Quiz Question

For which of the following products will calculating the Life Time Value be a useful metric?

- Mobile app providing delivery of grocery purchases (e.g., InstaCart) ✓
- Online realtor website (e.g., Redfin)
- Online and Mobile site of store providing everyday items for families (e.g., Target) ✓

### Sales Metrics

Sales metrics borrow some terminology from marketing metrics. Sales can not only focus on the end customer such as the consumer, but also a company who will likely generate customers. In the case of WeCart from marketing, we have thus far focused on the end consumer, and their order as our marketing focus, or unit of analysis.



This type of model is called a business to consumer model or B2C. Let's say that we add an additional focus on generating sales by reaching out to grocery stores. This is where WeCart partners with the local grocery stores. We can now gain access to their customers and the local grocery stores can access a delivery service. This type of business model is called a business to business model or B2B. So, part of our sales team can focus on the B2B model, where each sales rep is trying to create a sales lead.



A **sales lead** would be a **grocery store** interested in partnering with WeCart. If a grocery stores signs a deal, then it becomes a **booking or a closed deal**. We will talk about a sales funnel, next.

## New Vocabulary

- **Business to Business (B2B)**: When one business makes a business transaction (goods or services) with another business. Often takes place when one business is providing source materials to the other business to in turn finally sell it to the consumer.
- **Business to Consumer (B2C)**: When a business sells products and services to the final consumer.

## Sales Funnel

The sales funnel also called the sales pipeline, tracks the number of incoming leads or prospects. These are leads that a sales team member has identified as being potentially interested in the product.



Then, the sales team member follows up for an interested lead to ask more about what they're looking for, possibly making presentations. Here, you track metrics like number of sales leads.

This is followed by a qualifying process whereas the sales team qualifies the leads. Checks to see if the product offering is within the leads budget, a sort of vetting, to identify the ideal buyer and confirm their viable lead.



Here, you track metrics like ratio of qualified leads to sales leads. Once the sales team has a qualified lead, you end with a closed deal or booking. At this stage, you can also have a lead on hold or lost. Here, you track metrics like bookings, close ratio, and average size of deal in pipeline.

Bookings is a very important metric for tracking the success of the sales team. Close ratio is the ratio of closed deals to leads, you had in the sales pipeline.

As you may have noticed, sales metrics are measuring the performance of the sales team internal to the company. As opposed to tracking the behavior of individual customers in the marketing metrics. For this lesson, we will cover the metrics at the bottom of the funnel. But we have provided links and resources below for you to learn more about the others if you're interested.

## New Vocabulary

- **Sales Lead:** Sales leads refers to the number of potential customers who have shown interest or have been identified by the sales team member as being potentially interested in the product.
- **Qualified Lead:** A potential lead who has been vetted by the sales team as meeting key requirements of an ideal buyer. Sales teams check to see if the product offering is within the lead's budget that will make them a viable buyer.
- **Booking:** Booking is a closed deal when the qualified buyer has committed to make the purchase. It is a key metric for tracking the success of the sales team.
- **Sales Pipeline:** Refers to the collection of steps a sales representative takes while navigating incoming leads or prospects through to making the final purchase. It is also used to track how well individual sales representatives are meeting their sales quota.

## Recap

- Sales Funnel captures prospects, leads, qualified leads and bookings at each of the 4 levels in a sales funnel.
- Sales leads refers to the number of potential customers who have shown interest.
- Qualified leads refers to the vetted leads that meet the ideal buyer profile based on the sales team discussion (potential factors to consider include, buyer budget requirements, and industry).
- Bookings is a closed deals, and a very important metric for tracking the success of the sales team.
- Sample sales metrics include pipeline engagement, average size of deal in the pipeline, ratio of qualified leads to leads, and close ratio in pipeline.

## Additional Resources to learn more about Sales Metrics

- [Matrix Marketing Group](#)(opens in a new tab) lists several sales specific metrics and provides definitions and how to calculate them
- [InsightSquared](#)(opens in a new tab) provides examples of visuals and lists additional sales metrics

## Total Bookings

Bookings is the most important sales metric. **Booking is a won deal that is signed or where the purchaser is committed to buying the product.** Once you have the sales bookings value, you can track it across specific time periods and even product lines.

## Calculation

**Total Bookings is the sum of all closed deals**

	A	B	C	D	E
<b>Bookings</b>					
3		September	October	November	December
4	Costco	\$ 8,000.00	\$ 6,400.00	\$ 39,000.00	-
5	Sam's Club	\$ 33,600.00	\$ 58,500.00	\$ 87,750.00	\$ 39,000.00
6	Sprouts	\$ -	\$ 29,250.00	-	\$ -
7	Safeway	\$ 5,200.00	\$ 5,600.00	\$ 4,000.00	\$ 3,200.00
8	<b>Total bookings</b>				
9					
10					
11					
12		<b>Number of orders</b>			
13	Costco	500	400	200	0
14	Sam's Club	2100	300	450	200
15	Sprouts	0	100	0	0
16	Safeway	325	350	250	200
17					
18					
19					
20		<b>Subscriptions</b>			
21	Monthly	\$ 16.00	\$ 105.00	\$ 105.00	\$ 105.00
22	Monthly	\$ 16.00	\$ 105.00	\$ 105.00	\$ 105.00

So here, we have an example of the car sales bookings. You see the list of grocery stores in the first column.

Column B through E are the bookings for the last quarter of the year.

	Bookings			
	September	October	November	December
4 Costco	\$ 8,000.00	\$ 6,400.00	\$ 39,000.00	-
5 Sam's Club	\$ 33,600.00	\$ 58,500.00	\$ 87,750.00	\$ 39,000.00
6 Sprouts	\$ -	\$ 29,250.00	-	\$ -
7 Safeway	\$ 5,200.00	\$ 5,600.00	\$ 4,000.00	\$ 3,200.00
8 Total bookings	\$ 46,800.00	\$ 99,750.00	\$ 130,750.00	\$ 42,200.00
9				

Add up the values for each store in each month, and that gives you the total bookings for each of the months. Just a little side note, so these are bookings for each of the stores.

So, that means is that they'd been able to get monthly or annual subscriptions to the customers. It's that value of the subscriptions that is reflected in these. So, these are the new bookings that they got every month. You can see that there are some cells which are empty. For example here, Sprouts is actually annual bookings. Once they have that then, they don't have any follow-up in November and December. So, that's what's being reflected here, okay? See you in the next video.

## Average Deal Size

### Average Deal Size (in \$)

Another important metric to keep in mind is the Average Deal Size. This refers to the average deal size in dollars of all of the won deals. Reminder, a won deal is when the account buyer has committed to making the purchase.

#### Calculation

**Average Deal in Size (\$) = Total (\$) Sale Value of Deals or Orders / (#) of Orders over a Specific Period**

So, to get the average deal size for all the accounts, I've set up a spreadsheet so that we can first calculate the total bookings in dollars that we already did in the past, in the previous video and then the number of deals for each of the accounts, and then we're going to go ahead and calculate the average deal size. So first, we're going to go ahead and calculate the sum of the bookings for each of these accounts.

B4	=SUM(B4:E4)				
	Bookings (in \$)				
	September	October	November	December	Total Bookings (in \$)
4 Costco	\$ 8,000.00	\$ 6,400.00	\$ 39,000.00	+ <input type="button" value="SUM(B4:E4)"/>	<input type="text" value="SUM(B4:E4)"/>
5 Sam's Club	\$ 33,600.00	\$ 58,500.00	\$ 87,750.00	\$ 39,000.00	<input type="text" value="SUM(number1, [number2], ...)"/>
6 Sprouts	\$ -	\$ 29,250.00	-	\$ -	
7 Safeway	\$ 5,200.00	\$ 5,600.00	\$ 4,000.00	\$ 3,200.00	
8					
9					

I'll just copy and paste it down, and then the short number of deals where each of the accounts and then again, I'm going to just copy this formula down. I'm going to go ahead and copy these.

	A	B	C	D	E	F
1						
2		Bookings (in \$)				
3		September	October	November	December	Total Bookings (in \$)
4	<b>Costco</b>	\$ 8,000.00	\$ 6,400.00	\$ 39,000.00	\$	53,400.00
5	<b>Sam's Club</b>	\$ 33,600.00	\$ 58,500.00	\$ 87,750.00	\$ 39,000.00	\$ 218,850.00
6	<b>Sprouts</b>	\$ -	\$ 29,250.00	\$ -	\$ -	\$ 29,250.00
7	<b>Safeway</b>	\$ 5,200.00	\$ 5,600.00	\$ 4,000.00	\$ 3,200.00	\$ 18,000.00
8						
9						
10						
11		Number of Deals				Total Number of Deals
12	<b>Costco</b>	500	400	200	0	1100
13	<b>Sam's Club</b>	2100	300	450	200	3050
14	<b>Sprouts</b>	0	150	0	0	150
15	<b>Safeway</b>	325	350	250	200	1125
16						

So, I'm going to just go ahead and copy and paste the values, and then to get the average deal size that we got from each of the accounts all you have to do is you divide the total bookings by the number of deals, and that tells you the average amount for each deal or that we got from each of these accounts.

		Total Bookings (in \$)	Total Number of Deals	Average Deal Size
19	<b>Costco</b>	\$ 53,400	1100	\$ 48.55
20	<b>Sam's Club</b>	\$ 218,850	3050	\$ 71.75
21	<b>Sprouts</b>	\$ 29,250	150	\$ 195.00
22	<b>Safeway</b>	\$ 18,000	1125	\$ 16.00
23				
24				

Right away, we can see, Sam's Club had really high bookings that it seems to me there was a mix of monthly and annual subscriptions that we got and the reason is because we know that the monthly subscription is \$16 and you're yearly subscriptions are \$195.

		Subscriptions
29	<b>Monthly</b>	\$ 16.00
30	<b>Yearly</b>	\$ 195.00
31		
32		

So, with that knowledge in mind, we can see that this- the amount that we got from Sam's Club and Costco was a combination of monthly and yearly accounts, purely orders. So, the average deal size tells us that. We got a **combination of monthly and yearly subscription** from Costco and Sam's Club.

Case of Sprouts, the book yield was smaller, but the booking size was bigger, and that's because the average deal size was a 195 which turns out to be a yearly subscription.

So, all of the a 150 deals that we got for **Sprouts**, for this account, were all **annual** versus in **Safeway** where even though we've gotten the more number of deals, the unit price was \$16 which happens to be a **monthly** subscription.

So, we didn't get as much bookings for that. But this kind of analysis allows the sales team to see okay, which account is actually generating more bookings for them and focus their efforts on the type of deals that they get and the type of customer that they're getting.

### ChatGPT Explanation:

The **average deal size** is an essential metric for analysts to monitor, as it provides insight into the typical value of the deals a company secures. Deals exceeding this average are often riskier because they are larger in scale and potentially harder to close. Such deals typically have a **lower win rate**, but this does not mean sales teams

should avoid pursuing them. Instead, they should approach these larger deals with greater care and consider them more thoughtfully in **sales forecasting**.

If historical data reveals an **increase in the average deal size**, it suggests an opportunity for the sales team to shift their focus toward larger deals. This increase could also indicate changes in customer behavior, market conditions, or improvements in the company's value proposition. The sales team should analyze what is driving these larger deals—such as specific strategies, products, or markets—and capitalize on these insights to refine their **lead generation efforts**.

Overall, tracking and interpreting the average deal size can help sales teams balance risk while identifying opportunities to grow revenue strategically.

## Average Time to Close

Average time to close deal is the average number of days it takes a member of the sales team to close the deal from the prospect stage to a closed deal.

This metric can be calculated for each sales team member, product, or lead source. **Lead source** refers to whether the prospect inquired through the website or had an **inbound inquiry**. On the other hand, **outbound methods** refers to cold-calling through email lists or phone calls. This means the customer has lower intent to purchase to begin with, and this lengthens the time to close the deal.

## Terminology

- Sum of Total number of days from first contact to closing the deal for all closed deals
- Average number of days for typical Sales Cycle =  $\text{Sum}(\text{Total number of days to close deal}) \text{ for all closed deals} / \text{Number of closed deals}$

## Calculation

Step 1. **Sum (Total number of days from first contact to closing the deal)** for ALL closed deals.

Step 2. **Average number of days for typical Sales Cycle = Sum (Total number of days from first contact to closing the deal) for ALL closed deals / Number of deals**

---

**Outbound methods** refer to sales techniques where sales representatives actively reach out to potential customers, rather than waiting for them to express interest. This can include tactics like cold calling, sending emails to purchased lists, or direct mail campaigns.

In the context of the Average Time to Close metric, outbound methods typically result in longer closing times compared to inbound methods, where prospects have shown interest in your product or service. This is because outbound leads often have a lower initial intent to purchase, which can extend the sales cycle.

**Inbound inquiry** refers to situations where potential customers reach out to a business or sales team, expressing interest in a product or service. This can happen through various channels, such as filling out a contact form on a website, calling a business, or responding to marketing campaigns.

In the context of the Average Time to Close metric, inbound inquiries typically lead to shorter closing times compared to outbound methods. This is because prospects who initiate contact usually have a higher intent to purchase, making them more likely to move through the sales process quickly.

In the context of sales and the Average Time to Close metric, "lead source" refers to the origin from which a potential customer (or lead) comes. Understanding the lead source helps businesses analyze the effectiveness of their marketing and sales strategies.

There are generally two main types of lead sources:

1. Inbound Lead Sources: These are leads that come to the business through channels where the customer expresses interest. Examples include:

- Website inquiries
- Social media interactions
- Referrals from existing customers
- Responses to online advertisements

2. Outbound Lead Sources: These involve proactive outreach by the sales team to potential customers.

Examples include:

- Cold calls
- Email campaigns to purchased lists
- Networking events

Analyzing lead sources can help businesses understand which channels are most effective in generating leads and closing deals. This, in turn, can inform marketing strategies and resource allocation.

If you have any more questions about lead sources or how they impact sales metrics, let me know!

So to calculate the average time to close a deal, we follow two steps. First, we're going to go ahead and calculate the total number of days for all sales combined. So, we have our four accounts here, and each of these numbers tells you the number of days from first contact by the sales team member to closing the deal with Costco. So, for instance, this one took 150 days, so approximately five months. This one took six months and so on and so forth. So, we add these up so that this just be the sum of these days for each of your accounts.

We got 720.

Number of days from first contact to closing the deal	
Costco	150
Sam's Club	180
Sprouts	210
Safeway	180
Total number of days for all sales combined	720
Number of accounts	4
Average Time to Close	180

Number of accounts is just these accounts that we have, and so I could just hard code for in here, but I just want to show you a little trick. So, if you do **COUNTA**, it tells you if they're not empty. You can actually just select the cells you want and it will give you the count because these are the number of rows that I'm counting.

To get the average time to close, you just take the total number of days you took for all the sales combined divided by the number of accounts, and that gives you a 180 days. So on average, it took a 180 days to close the deals in this dataset.

## Recap:

Step 1: **Calculate the number of days from first contact to closing the deal for EACH closed deal**

Step 2: **Average number of days for typical Sales Cycle** = Sum of number of days for all sales combined / Number of deals

## Excel Function:

**COUNTA** = Allows you to count the number of non-empty cells within an array

## Check For Understanding: Sales Metrics

### Question 1 of 3

**What does the average deal size indicate?**

- The total number of units in the sales pipeline
- The average number of units a sales person has leads for
- The average bookings size a sales person has closed the deals for



### Question 2 of 3

A sales person for a company has won three deals with three big corporate accounts. The value of these deals is \$500,000, \$850,000 and \$560,000. **What is the total bookings for this sales person?**

- \$636,666.66
- \$1,910,000
- \$850,000
- Can't be calculated based on the given information.



### Question 3 of 3

Let's revisit the scenario from the previous question. A sales person for a company has won three deals with three big corporate accounts. The value of these deals is \$500,000, \$850,000 and \$560,000. **What is the average deal size for this sales person?**

- \$850,000
- \$636,666.66
- Cannot be calculated based on the given information.
- \$1,060,000

### Check For Understanding: Marketing

Marketing Metric	Abbreviation
CTR	Click Through Rate
CPL	Cost Per Lead
CPC	Cost Per Click
CAC	Customer Acquisition Cost
LTV	Life Time Value

Formula	Metric
(Marketing and Sales Cost)/ number of new leads customers	Cost Per Acquisition (CPA)
Cost of advertising on the source platform / Total number of leads	Cost Per Lead (CPL)
Cost of advertising on the source platform / Number of people who clicked on that ad	Cost Per Click (CPC)
(Clicks/ Impressions) * 100	Click through rate (CTR)
(Total marketing expenses + total marketing sales expenses and salaries)/ # of customers acquired	Customer Acquisition Cost (CAC)

## Growth Metrics

Now, we will shift gears to talk about metrics useful for measuring your company's growth. Here growth for a website or app is counted in the number of users. Are we seeing the number of people actually using the site increasing or decreasing? If you see your website use is high, are they unique users or the same people coming back?

An important aspect of growth is not just whether you have users but whether they continue to actively use or engage with the website. We'll talk about the following metrics: active users, which can range from monthly, weekly, to daily; stickiness, which is derived from the monthly and daily active users; and finally, churn rate. Ready? Let's jump into it.

## Growth Metrics

- Monthly Active Users
- Daily Active Users
- Stickiness
- Churn Rate

## Engagement Metrics

To get the active user account monthly or daily, you need to first define what active means. For example, if you were on a social media platform like Facebook, a user is counted as active if the user logs in, likes, comments, or shares a post. Defining what constitutes an active user is an important part of calculating your growth metrics.

**Monthly active users** tell the number of users who were active in the last month. Daily active users are the users who were active in the previous day.

### Monthly Active Users (MAU)

- Define Active user
- MAU = Number of unique active users in the previous month

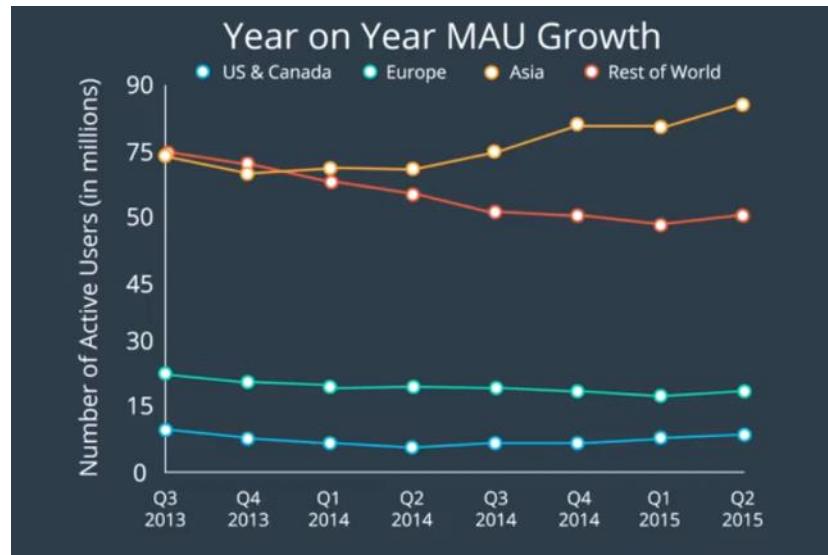
### Daily Active Users (DAU)

- DAU = Number of unique active users on the previous day

#### Calculation

Engagement or actual use of the website will differ depending on the website. For a WeCart business, engagement could take the form of users who are using it to check the prices or those ordering groceries. Once you have your active user accounts, it is easier to see how the visitors are using the website. You can even narrow this down to specific features or market segments.

Let's look at this graph from the website linked below.



This timeline graph shows the year-on-year monthly active user growth for Facebook across specific world regions between 2013 and '15. On the y-axis is the number of active users in millions.

You can see right away how the monthly active user growth in Asia was much higher than for North America and Europe. That meant Facebook users in Asia were using the site more frequently, and the number was increasing steadily. The line for North America and Europe shows the monthly active users trend flattening off. In the next video, we capture how to use monthly active user and daily active user metric together to create a new engagement metric.

*Citation for original graph included in video: [Thoughts of Facebook's Q2 2015 Earnings](#)*

## Recap

- Engagement metrics are used to define the number of active users within a specific time period (ranging from daily, weekly to monthly).
- Monthly Active Users:** Number of unique active users in the previous month
- Daily Active Users:** Number of unique active users the previous day

## Stickiness

Stickiness of a website or online app involves using the monthly active user and daily active user count together.

### Stickiness

#### Calculation

- = Daily Active Users/ Monthly Active Users

The ratio of the daily active users compared to the monthly active users is called **stickiness**. The stickiness ratio is a very useful tool for several stakeholders, such as investors, to know if the website or app has a potential for growth or either on the trajectory, for growth.

Essentially, stickiness tells us if the customers are coming back to the website or app every day, or rather, sticking around to actually engage with it.



So, a DAU by MAU ratio of 0.5 indicates that the average user is engaged or using the app 15 out of 30 days that month. The common benchmark for social networking site is 0.5, while for gaming apps, it is 0.1 to 0.2, while most other apps strive to achieve a stickiness ratio of 0.2.

So, why is stickiness important? It is a useful KPI for management and investors. Investors want to know if this app or website has the potential to make money in the future. For example, if the plan is to introduce advertising into the app, the potential evaluation will depend on whether the app has a large number of users that keep coming back to it. In other words, they need to know the number of active users will likely increase over time.

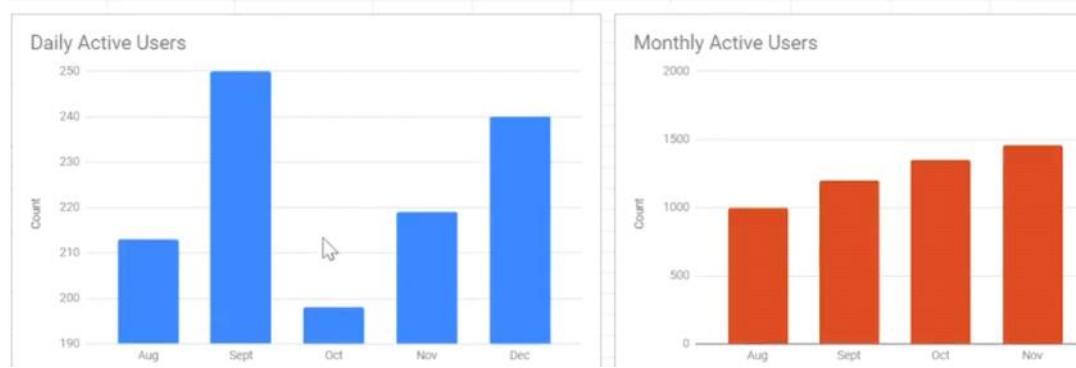
So, to calculate your growth metrics, you would actually get the data from your data team. So, for daily active users, this would be the number of users who were active in the particular 24-hour time window, and the particular 24-hour time window is defined by the date you give the data team.

For monthly active users, that would be the number of users who were active within the month-long time window.

	E	F	G	H	I	
			Daily Active Users	Monthly Active Users		
	Aug		213	1000		
	Sept		250	1200		
	Oct		198	1354		
	Nov		219	1460		
	Dec		240	2000		

So, let's assume for our mock data here that we have the daily active users provided based on the last day of each month, and the monthly active users are calculated from that. So, for the whole month, give us the number of users who were active.

I created the bar graphs here to depict the numbers we had up here, and you can see that there is a dip in the number of active users on October 30th compared to September 30th, but it steadily improves after that.



But the monthly active users count, which is the number of users who were active in the last month, were steadily increasing. A better interpretation of the DAU and monthly active user metric is using the stickiness ratio.

So, let's go ahead and calculate the stickiness. I'm using the formula provided here, and I'm using it for all of the months. So, this would be daily active users over monthly active users, and I have a graph that I will go over in a minute.

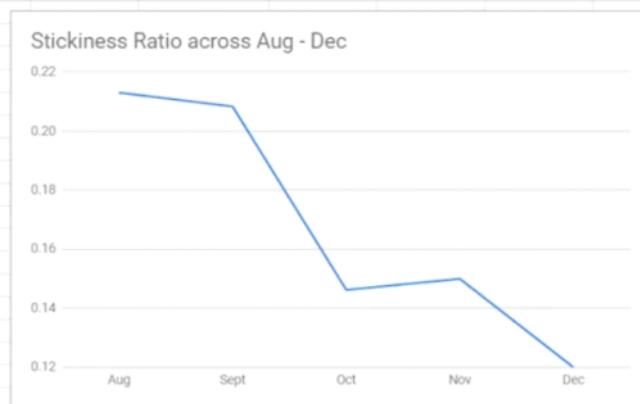
	Daily Active Users	Monthly Active Users	Stickiness	Formula
Aug	213	1000	0.21	B35/C35
Sept	250	1200	0.21	
Oct	198	1354	0.15	
Nov	219	1460	0.15	
Dec	240	2000	0.12	

So now, we have the stickiness ratio calculated here. When the stickiness ratio is equal to 1 (or 100%), it means that every user who was active during that month also returned to engage with the website on the specific day you measured the DAU. In other words, if you had 100 monthly active users and 100 daily active users on a particular day, it indicates that all of those monthly users were active on that day.

You can see here that our stickiness ratio range between 0.1 to 0.21.

This is the proportion of monthly active users who came back to your product in that 24-hour or day window. So, 0.2 ratio means 20% of the month. So six days out of the last month, the user was back online looking at the website or app. If you're ratio is say 0.01, that's less than a day, and that's a problem scenario.

So, engagement metrics are useful metrics to gauge how often your website is being used and a good guide for your business. This line chart is a visualization tool business analysts use to show the stickiness ratio.



It can be used to show email campaigns or experiments when your website features were introduced. They coincide with high or low stickiness ratio and can help guide future plans to introduce or revisit specific

effort.

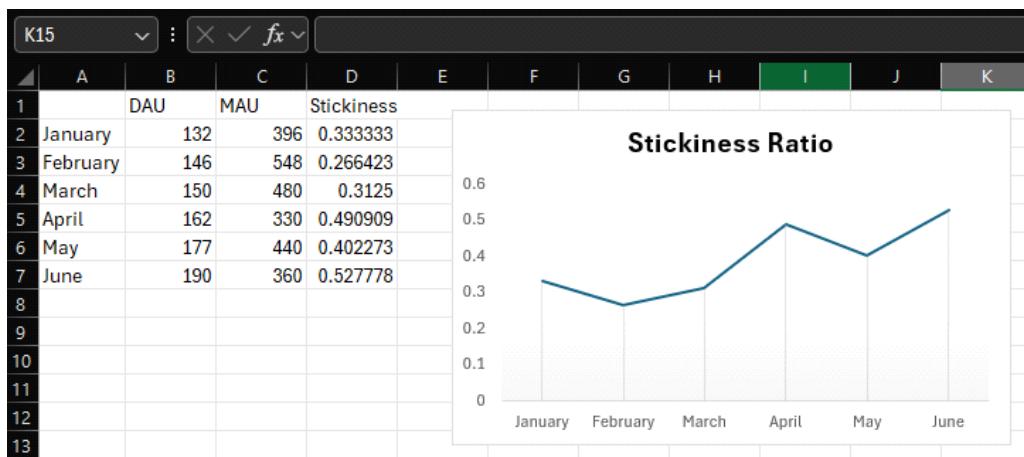
## Interpretation of Stickiness Ratio

- A 50% stickiness ratio indicates the average customer used the online app or website 15 of the 30 days in that month. In contrast, a .01 stickiness ratio indicates the average customer used the online app or website only one day that month.
- A higher stickiness ratio indicates the website or online app is engaging the customers.

## Question 2 of 2

The investors of Smoothie Rocks want to know if the mobile app is showing customers engagement is high. They want to know if the last three months of data (April, May, June) show that Smoothie Rocks mobile customers have been coming to the site at least half of each month. What would you tell them?

- Yes, April through June the stickiness ratio was at least 0.50.
- No, the stickiness ratio was above 0.50 only for the month of June. ✓



The stickiness ratio for June was 0.53, but the ratio for April and May was 0.49 and 0.40, respectively.

## Recap:

- **Stickiness** = Daily Active Users/ Monthly Active Users
- It is a useful KPI for management and investors. It tells the management what is their company's growth rate. Investors want to know if this online app or website has potential to make money in the future. For example, if the plan is to introduce advertising into the app, the potential valuation will depend on whether the app has a large number of users that keep coming back to it.

## Criticisms of Stickiness

It is important to note that there are also criticisms of some of these metrics. Let's review those for a moment:

1. One argument is that stickiness doesn't tease out the depth of engagement. It does not give much detail on what the users are doing. If the metric is based solely on whether users logged in, then it doesn't tell you if the user is just viewing, or using a website feature. When you are analyzing your website's engagement levels for a specific feature of your website, stickiness cannot help you distinguish between engagement levels for specific features.
2. In the start-up phase, not too much emphasis should be placed on this metric. It does not give an accurate metric of a reliable count of MAU because companies are in the marketing stage to get their name out.
3. Stickiness is not a useful metric when the app is **not** meant to be used monthly. For e.g., for a travel app where you need to book your flights for travel but since most people travel only a few times a year - at least for non-business purpose, this metric does not serve its purpose well.

## Churn Rate

Churn Rate captures the number of people we retain at the end of a time period.

Let's think about our online grocery delivery store WeCart. If customers don't renew their subscription, or request a refund, this impacts our growth. Thus to grow the business, we need to make sure we are retaining the customers we have already acquired. Churn Rate is often adopted by companies using a subscriber-based service model, especially in the telecommunication industry. In recent years, ecommerce and SaaS based companies have adopted the churn rate metric too.

To calculate the customer churn rate you need 2 simple things - Customers at the beginning of usage interval and Customers at the end of the usage interval. Just looking at these two numbers will tell you whether you end the interval with the same or fewer customers.

**Important note:** We only want to calculate the churn rate based on the customers we started the time interval with. When getting the number of customers at the end of the interval, we do NOT add the customers who converted during the interval . Churn rate should only tell you whether the current customers have left or stayed.

## Calculation

Customer Churn Rate =  $(\text{Customers at the beginning of usage interval} - \text{Customers at the end of usage interval}) / \text{Customers at the beginning of usage interval}$

## Terminology

- **Usage Interval:** This time period should make sense for the service or product the customers are using. It can range from a day, a week, to a month or quarter. It depends on the service or product the company is providing and how often you would expect a customer to be active on the website.

For e.g., WeCart is an online grocery business, so we would expect an existing customer to place at least 1 order over a month. We will use the usage interval of 1 month. If the customer has not placed any order over the course of a month, we can count that customer as having churned. Once we have identified these users as having churned, we can focus on the efforts to bring them back to the website and make the active again.

To calculate churn rate, we need two pieces of data for the time period we're calculating the churn rate for. First, how many customers were with us at the beginning of the time period? Then, of those customers, how many remained with us by the end of the time period? So, for WeCart here, we have churn rate being calculated for each month. This is the formula we're going to be using.

	A	B	C	D
1		Beginning	End	Churn Rate
2	Formula			$(B2-C2)/B2$
3	January	135	130	0.04
4	February	155	140	0.10
5	March	158	158	0.00
6	April	170	165	0.03
7	May	197	195	0.01
8	June	228	220	0.04
9	July	240	225	0.06
10	August	280	263	0.06
11	September	300	275	0.08
12	October	305	283	0.07
13	November	305	303	0.01
14	December	324	320	0.01

So, as you can see, they have some churn over the year with the highest being in the month of February. When we started with 155 customers, but we're left with only 140 of those. But we more than made up by having a few months of very good growth rate.

Remember, growth rate is tracking the number of new users per month, which is reflected in the increasing number of new customers at the beginning of the month in the second part of the year.

While the churn rate keeps a tally of lost customers, the growth rate follows how many new paid customers started buying from the company. **To experience growth, a company should aim to have a growth rate that is higher than the churn rate.**

## Interpretation of Churn Rate

While the churn rate is inevitable, in general an **annual** churn rate of 5% is seen as a reasonable benchmark. Keep in mind that the range for churn rates is wider for B2C companies.

As you calculate your annual churn rate, keep in mind a few other "data assumptions" that you need to watch out for.

1. Select a time interval during which you calculate the churn rate is consistent with the company's subscription or usage model. There is no ideal usage interval - the usage interval depends on the length of time the company expects the user to be active at least once.
2. Pay attention to different customer segments, especially if they have different churn rates (e.g., by region).
3. Make sure your data does not include new customers gained during the time interval. Churn rate is focusing on customers who stayed or are active vs. stop being active on the website.

## Additional Resources

- [Chaotic Flow](#): Nice article on what data considerations one should keep in mind when calculating annual churn rate.
- [Six Ventures](#): A blog on differentiating between 5% annual vs. 5% monthly churn rate.
- [Recurly](#): This website talks about benchmarks for Churn rate across industries, so check those out to learn about industry specific churn rates.

## Quiz

For the following quiz, please download the corresponding file **BAND Churn Rate Quiz**. You can download the file by clicking under the Resources at the bottom of the page.

A	B	C	D
1	Beginning of the Month	End of the Month	Churn Rate
2 January	132	125	0.053
3 February	146	137	0.062
4 March	150	155	-0.033
5 April	162	175	-0.080
6 May	177	200	-0.130
7 June	190	225	-0.184

### Question 1 of 3

What is the churn rate for the following months?

These are the correct matches.

Months	Churn Rate
January	0.053
February	0.062
April	-0.080
June	-0.184

### Question 2 of 3

What are some conclusions you would make based on the churn rate for each month?

*Select all that apply*

- Smoothie Rocks was losing customers the first two months of the year.
- Smoothie Rocks was losing customers from March through June.
- Churn rate improved over the first half of the year.

### Question 3 of 3

What values do you need to calculate the Churn Rate?

- Paid customers at beginning of the month ✓
- Leads at the end of the month
- Leads at the beginning of the month
- Paid customers at end of the month ✓

### Recap:

- **Churn Rate** =  $(\text{Customers beginning of usage interval} - \text{Customers end of usage interval}) / \text{Customers beginning of usage interval}$
- Churn rate is a measure of declining growth. Business need to make sure that they are acquiring new customers at a rate faster than their "churn rate"
- Growth rate is a measure of new customers being added in the usage interval.

### New Vocabulary

- **Software as a service (SaaS)**: SaaS is a software distribution model in which the application is made available on servers hosted by a third-party provider, which in turn provides the software to customers over the Internet.
- **Subscribed based service model**: Subscribed based service model is a model where consumers agree to pay a subscription fee to gain access to the service or product.

### Financial Metrics

Now we shift our attention to Financial Metrics.

When you look at the financial metrics, you are focusing on tracking your performance against your company's financial goal. You are trying to answer the following questions.

- How is your revenue comparing to the costs?
- How are sales trending against sales goals?
- How are sale and marketing lead metrics comparing against acquisitions?

The video above provide you with the basic information about financial metrics. There are entire graduate degrees people take to master as part of financial metrics. We have provided some additional information below the videos to give you more information about each metric. But if you find this interesting, you should definitely explore your career options more!

## Reflect



In business, there are some costs that can change vs. costs that can't change? These are called variable costs and fixed costs, respectively. In what ways do you think variable costs impact the company's revenues compared to fixed costs?

*It's OK if it is just a guess for now, but go ahead and give it a try.*

## Things to think about

Fixed costs remain steady over a period of time and can be anticipated with fair amount of certainty when running the financial modeling and preparing financial statements. Variable costs change in response to output. To generate more output, products and services, variable costs relatively grow in proportion.

## Quiz Question

What is an example of a fixed cost?

- Rent ✓
- Cost of raw materials
- Cost of machinery ✓
- Labor to develop product

## Useful Resources and Websites to Learn More About Finance and Accounting

1. [Difference between Finance and Accounting](#)(opens in a new tab)
2. [Careers in Finance](#)

## Profit & Loss Statement

A profit and loss statement or PNL statement is also called an income statement. It is one type of financial statement that shows a company's performance position over a period of time. It is typically prepared at the end of each quarter or on an annual basis.

As part of the PNL statement, you list your revenue and expenses, and it tells you the profit or loss your organization is experiencing over a specific period of time. Below, I provided the terminology you will see included in the PNL statement.

## Profit & Loss Statement(P&L statement) OR Income Statement

### Terminology

- Revenues
- Cost of Goods Sold OR Cost of Sales
- Gross Profit
- Selling, General and Administrative expenses
- Total Operating Expenses
- Operating Profit/ Income
- Interest & Taxes
- Net Income/ EBIT

## Items in Profit and Loss Statement

The following list is a breakdown of the individual items within the Profit and Loss Statement.

- **Revenues:** The money a company makes from the sales of its products and services.
- **Cost of Goods Sold (COGS) or Cost of Sales:** These are the direct costs the company incurs to develop the product or service being sold.
- **Gross Profit:** The difference between the revenue earned and the costs summarized in COGS.  
**Gross Profit = Revenue - COGS**
- **Selling, General and Administrative expenses (SGAs):** Includes the following expenses:
  - Marketing, sale commissions
  - Salaries for office staff
  - Supplies and computer hardware
  - Note: Some companies list total operating expenses separately from SGAS while others treat them as synonymous with SGAS.
- **Operating expenses:** Expenses incurred outside of direct manufacturing costs:
  - Overhead costs
  - Legal
  - Rent
  - Utilities
  - Taxes
  - Interest
  - R&D expenses.
- **Total Operating Expenses** = Sum of SGAs and Operating expenses  
**Total Operating Expenses= SGAs + Operating Expenses**
- **Operating Income:** The difference between Gross profit and Total operating expenses  
**Operating Income = Gross Profit - Total Operating Expenses**
- Note: **Operating Income** is also referred to as **Earnings Before Interest and Tax (EBIT)**
- **Net Income:** Subtracting the Interest and Tax from Operating Income gives the Net Income  
**Net Income = Operating Income - (Interest and Taxes)**

So let's go ahead and create a profit and loss statement for WeCart. Since WeCart is a service company, I've included expenses that are typical service company and sales company would incur. If this was a manufacturing company, some of the expenses that are missing in here would be the cost of the raw materials that you need to make your product.

B3	A	B	C
		2016	Formula
1	Total Revenue	\$70,000	
2	Cost of Goods Sold	=SUM(B4:B7)	SUM(B4:B7)
3	Engineering and Hosting Costs	\$10,000	
4	Charges for Third-party Payment System	\$5,625	
5	Packaging Costs	\$3,700	
6	Delivery Service Cost	\$7,500	
7			
8			

Let's get started. So, cost of goods sold would be the sum of these expenses. The engineering costs for hosting the websites, for the charges for the payment system, packaging, and delivery costs. So, I'll going ahead and added those up and that gives me the cost of goods sold.

It's important to remember that your P and L statement and what goes into each line item changes by the type of business you are working with. Again, if you're curious about it, feel free to check out the links below. All right. Moving on, our gross profit is our revenue minus cost of goods sold, and our selling general and administrative expenses are the salaries, legal fees, rent for office and utilities. This will be sum of these numbers.

B12	A	B	C
		2016	Formula
1	Total Revenue	\$70,000	
2	Cost of Goods Sold	\$26,825	SUM(B4:B7)
3	Engineering and Hosting Costs	\$10,000	
4	Charges for Third-party Payment System	\$5,625	
5	Packaging Costs	\$3,700	
6	Delivery Service Cost	\$7,500	
7			
8			
9	Gross Profit	\$43,175	B2-B3
10			
11	Selling, General and Administrative expense	\$25,462	SUM(B12:B15)
12	Salaries	\$20,000	
13	Legal Fee	\$1,000	
14	Rent for Office	\$3,500	
15	Utilities	\$962	
16			

To get the total operating expenses, I'm going to add in the recent development expenses as well. So, this will be sum of this and this SGAs.

So, to arrive at EBIT or earnings before interest and tax or operating profit or income, these are all synonymous for the same word, you have to subtract the total operating expenses from the gross profit.

Then, finally, to arrive at our net income or net profit, you need to subtract from your EBIT or operating profit the sum of your interest expenses and the income tax, and so we arrive at our net income. So, that's a profit and loss statement.

16		
17	Research & Development	\$2,000
18		
19	Total Operating Expenses	<b>\$27,462</b>
20		SUM(B11, B17)
21	Operating Profit/Income/ EBIT	\$15,713
22		B9-B19
23	Interest Expense	\$2,300
24	Income Tax	\$4,600
25		
26	<b>Net Income</b>	<b>\$8,813</b>
27		B21 - SUM(B23:B24)

You started with the total revenue, took out the expenses of building the products, which in the case of the WeCart here, it's a SaaS company, I've included the services cost as well. For a manufacturing company, this would include the cost of raw materials, got the gross profit.

Then I took out the overhead expenses as a selling general and administrative expenses, and then added the R & D expenses to get the total operating expenses, then took out and used gross profit to take out the total operating expenses and got my EBIT or operating profit.

Then, finally, the interest expenses and income tax are taken out to get your net income.

## Quiz

A14	:	X	✓	f <sub>x</sub>	v
A	B	C			
1					
2	Total Revenue	\$500,000			
3	Salary of staff	\$27,500			
4	Cost of cash machine	\$534			
5	Cost of sales and marketing	\$7,243			
6	Cost of fruits and vegetables	\$325,000			
7	Cost of laptop	\$790			
8	Cost of smoothie cups, straws	\$10,000			
9	Cost of furniture	\$5,783			
10	Rent	\$10,500			
11	Utilities	\$2,000			

You are creating a Profit and Loss statement for a smoothie and juice bar named Smoothie Rocks. Please match the expenses to their correct P&L statement category in the table below.

 These are the correct matches.

Expense	Profit and Loss Statement category
Amount generated from selling 10,000 units.	Gross Sales Revenue
Cost of buying fruits and vegetables	Cost of Goods Sold
Rent for Shop	Operating Expenses
Cost of bottles and straws	Cost of Goods Sold
Cost of furniture and computer	Selling, General and Administrative Expenses

A	B	C	D	E	F
1 Total Revenue	\$500,000		COGS	SGAs	Operating expenses
2 Salary of staff	\$27,500		Cost of cash machine	Salary of staff	Cost of laptop
3 Cost of cash machine	\$534		Cost of fruits and vegetables	Cost of sales and marketing	Cost of furniture
4 Cost of sales and marketing	\$7,243		Cost of smoothie cups, straws	Rent	
5 Cost of fruits and vegetables	\$325,000			Utilities	
6 Cost of laptop	\$790				
7 Cost of smoothie cups, straws	\$10,000				
8 Cost of furniture	\$5,783				
9 Rent	\$10,500				
10 Utilities	\$2,000				
11					
12 COGS	\$335,534	SUM(B3,B5,B7)			
13 Gross Profit	\$164,466	B1 - B12			
14 SGAs	\$47,243	SUM(B2,B4,B9,B10)			
15 Operating expenses	\$6,573	B6 + B8			
16 Total Operating expenses	\$53,816	B14 + B15			
17 Operating Income	\$110,650	B13 - B16			

The owner of Smoothie Rocks wants you to prepare a Profit and Loss Statement for the company. Download the list of expenses and basic information provided by the SmoothieRocks owner and complete a Profit and Loss Statement for the owner. After creating the P&L statement, match the values with the P&L statement category.

 These are the correct matches.

P&L statement category	Value
Gross Profit	\$164,466
Cost of Goods Sold	\$335,534
Selling, General and Administrative expenses	\$47,243
Total Operating Expenses	\$53,816
Operating Income	\$110,650

## Recap:

- **Profit and Loss Statement:** (P&L statement) is also called income statement. It is one type of financial statement that shows a company's performance and financial position and is prepared at the end of each quarter or an annual basis.
- Items needed to create the P&L statement are:
  - **Revenue:** Money that a company makes from the sales of its products and services
  - **Cost of Goods Sold (COGS) OR Cost of Sales:** Direct costs the company incurs to develop and build the product or service being sold
  - **Gross Profit** = Revenue - Cost of Goods Sold
  - **Selling, General and Administrative expenses:** Marketing, sale commissions and salaries for office staff, supplies, computers, legal expenses, rent, utilities, taxes and interests on any loans. SG&A typically exclude research and development expenses.
  - **Total Operating Expenses:** Expenses incurred outside of direct manufacturing costs
  - **Operating Income/ Operating Profit/ EBIT** = Gross Profit - Total Operating Expenses
  - **Net Income/ Net Profit** = Operating Income - (Interest expense + Tax expense)

## Additional Resources

Check out the following pages to learn more about P&L statement across different types of industries.

1. [What is COGS for a service business?\(opens in a new tab\)](#)
2. [Wikipedia page on P&L Statement\(open in a new tab\)](#)
3. [More information on P&L statement\(open in a new tab\)](#)
4. [Investopedia\(open in a new tab\)](#) is a fantastic dictionary for business terms.

## Gross Margin

Gross Margin is a statement about the overall profitability of the company.

## Calculation

Gross Margin = (Total Sales Revenue - Cost of Goods Sold) / Total Sales Revenue

which is the same as Gross Profit / Total Sales Revenue

This metric identifies the revenue that remains after accounting for direct costs of production.

You take your gross profit and divide it by the total revenue and if you want the same value in percentage, you just multiply that by a 100. We have a relatively high gross margin. You can see, even as you eyeball the sales revenue compared to the cost of goods sold, this gross margin tells if you got executives. The 46% of the sales revenue or 46 cents over each sales revenue dollar is available to cover operating expenses.

	A	B	C
1			
2	Total Revenue	\$50,000	
3	Cost of Goods Sold	\$26,825	SUM(B4:B7)
4	Engineering and Hosting Costs	\$10,000	
5	Charges for Third-party Payment System	\$5,625	
6	Packaging Costs	\$3,700	
7	Delivery Service Cost	\$7,500	
8			
9	Gross Profit	\$23,175	B2-B3
10			
11	Gross Margin (in \$)	\$0.46	B9/B2
12	Gross margin (in %)	46.35	(B9/B2)*100
13			

If the cost of goods increases, or the revenue declines and the margin begins to decline over time, the company has less money to cover those expenses. So, how do you know if this is a good gross margin? A good gauge is to look at industry standards or financial statements, or reports shared by other top competitors and see whether your gross margin falls below or above the industry standard.

It can tell you a lot about how you're doing in terms of sales or pricing of your product, expenses, and if you need to lower your expenses.

## Udacity AI Explanation

Gross Margin shows how much of each dollar of sales is left over after accounting for the costs directly associated with producing the goods sold (COGS).

### The 46% Gross Margin:

- When it says that "46% of the sales revenue or 46 cents over each sales revenue dollar is available to cover operating expenses," it means that for every dollar earned in sales, 46 cents is left after subtracting the costs of producing the goods.

- This remaining amount can be used to pay for other expenses such as marketing, salaries, rent, and other operational costs.

## Implications for Business Executives:

- A higher gross margin indicates that a company retains more money from each sale, which can be a sign of good pricing strategy or efficient production processes.
- Executives can use this information to make decisions about pricing, cost control, and overall business strategy. If the gross margin is declining, it could signal potential issues that need to be addressed, such as rising production costs or decreasing sales prices.

## Monitoring Gross Margin:

- It's important for businesses to monitor their gross margin over time and compare it to industry standards. This helps them understand their competitive position and whether they need to adjust their strategies.

### Quiz

Use the the **Smoothie Rocks Margin Quizzes** file in the Resources at the end of the page to answer the Quiz question. Once you have downloaded the Excel spreadsheet, calculate the appropriate metrics and then respond to the quiz question below.

#### Question 1 of 2

Select all the TRUE statements about the Gross Margin.

- Gross Margin indicates the break even point for each unit produced.
- Gross Margin is an indicator of whether the generated revenues will cover operating expenses after accounting for COGS. ✓
- Gross Margin is equal to Gross Profit.

#### Question 2 of 2

Use the SmoothieRock\_Margin quizzes data available in the resources. Calculate the Gross Margin in dollars and select the correct response below.

- \$0.36
- \$0.33 ✓
- \$1.04
- Cannot be calculated

	A	B	C	D	E
1			COGs	\$335,534	
2	Total Revenue	\$500,000	Gross Profit	\$164,466	
3	Salary of staff	\$27,500	Gross Margin (\$)	\$ 0.33	
4	Cost of cash machine	\$534	Gross Margin (%)	33%	
5	Cost of sales and marketing	\$7,243			
6	Cost of fruits and vegetables	\$325,000			
7	Cost of laptop	\$790			
8	Cost of smoothie cups and straws	\$10,000			
9	Cost of furniture	\$5,783			
10	Rent	\$10,500			
11	Utilities	\$2,000			
12					
13	Number of units sold	60895			

## Recap:

- **Gross Margin** =  $(\text{Total Sales Revenue} - \text{Cost of Goods Sold}) / \text{Total Sales Revenue}$
- Can also be represented in percentage by multiplying it by 100
  - **Gross Margin (in %)** =  $[(\text{Total Sales Revenue} - \text{Cost of Goods Sold}) / \text{Total Sales Revenue}] * 100$
- Gross Margin tells business executives what percentage of each revenue dollar is available to cover operating expenses after the COGS have been accounted for.

## Contribution Margin

Costs to a company can be split into two major groups; fixed costs and variable costs.

- Fixed costs are expenses that you will incur on a regular, perhaps monthly basis, such as rent, utilities, and employee salaries.
- Variable costs are expenses that move up and down in response to production output.

This interpretation is particularly helpful for companies to determine the pricing of the product.

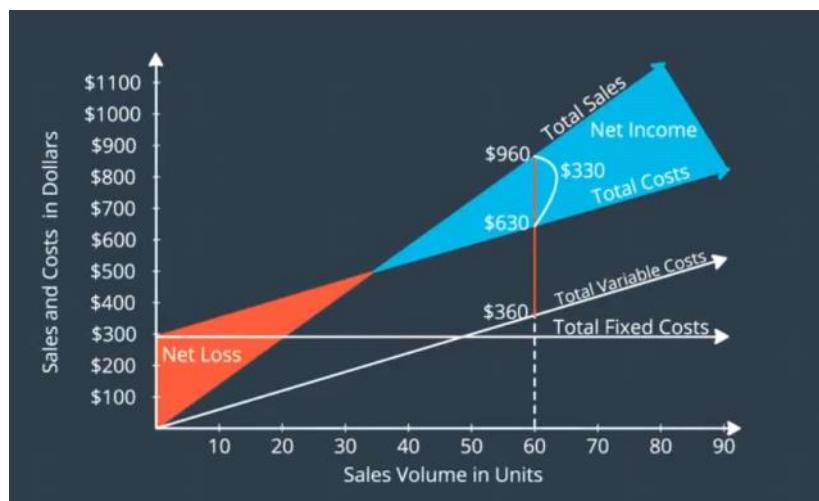
In other words, it helps them find the breakeven point where the pricing will cover fixed overhead costs for sure. Contribution margin has one more important use. It is a useful tool to dive into the P&L statement. While the typical P&L statement line items tells us the overall profitability of our business, contribution margin can be used to identify which product or product line is contributing the most to our profit margin.

## Contribution Margin Per Unit

- $= (\text{Sales Revenue} - \text{Variable cost}) / \text{Total units sold}$

### Calculation

If we want to perform this more detailed dive, we want to compute the contribution margin per unit. First of all, we want to calculate the overall contribution margin, the difference between the sales revenue and variable cost.



Recall that variable costs are expenses that move up and down in response to production output, such as cost

of materials. Once you get the difference for the total contribution margin, you divide it by the unit sold and that gives you the contribution margin per unit.

You can think of the contribution margin as a percentage of your revenue that'll cover your fixed costs, which you have little control over and have to incur.

Any money left after fixed costs are taken from the contribution margin is your profit. If the contribution margin per unit is less than the fixed cost, this means you're making a loss on each sale. So in other words, if you want to make a profit, you have to sell your product with at least your contribution margin covered for each unit sale.

## Contribution Margin

Contribution Margin tells us the amount of revenue that covers the variable costs and is now available to cover the fixed costs and generate profits. Companies use it to identify which product or product line is contributing the most to the profit margin. It also helps determine the breakeven point where the pricing will cover fixed overhead costs and leave enough for profits too.

Fixed costs are also called **sunk costs**. A good caution to keep in mind is that fixed or sunk costs can increase (for e.g., unexpected rent increases, machinery replacement costs), which is why operational managers prefer the term sunk costs. These sunk costs can prove tricky, because a small increment when taken in bulk, can turn out to be catastrophic for companies, especially start-ups.

Citation for graph depicting [Contribution Margin\(opens in a new tab\)](#).

In the graph depicted in the video Total Contribution Margin is indicated by the red line.

## Terminology

- **Fixed costs:** Expenses incurred on a regular basis, such as monthly rent, utilities, and employee salaries.
- **Variable costs:** Expenses that move up and down in response to production output.
- **Contribution Margin:** The amount of revenue that covers the variable costs and is able to cover the fixed costs.

## Calculation

- **Total Contribution Margin** = Total Sales Revenue - Total Variable Cost
- **Contribution Margin Per Unit:** Total Contribution Margin / Number of Units Sold

Contribution margin allows us to calculate the profitability of our product even at the unit level. It is based on the number of units that are being sold. Remember, not the number of orders.

- To calculate the contribution margin, we take the difference between the revenue and the variable costs.
- If you want the contribution margin at the unit level, you just divide that difference by the number of goods sold.

	A	B	C
		2016	Formula
1			
2	Total Revenue	\$70,000	
3	Variable Costs	\$11,200	SUM(B4:B5)
4	Packaging Costs	\$3,700	
5	Delivery Service Cost	\$7,500	
6			
7	Number of goods sold	20,000	
8			
9	Contribution Margin	\$58,800	B2-B3
10	Contribution Margin Per Unit	\$2.94	(B2-B3)/B7

So this tells you per unit sold how much is the contribution margin. In this example, we can see that the contribution margin is less than three dollars. To pay for overhead costs, we need to get as close as possible to this to \$2.94 magic number to break even.

This can even help in making decisions about allocating limited resources, directing the funds to more profitable product lines.

For example, a grocery store like Target would typically have a low contribution margin because it works with large quantity of types of products. So they can make up their profits for the share quantity of their sales across a wide range of products. In other words, if one product has low contribution margin, another has a higher contribution margin, and that way they can make up for any loss on the item with the low contribution margin. On the other hand, imagine an online store that only sells very high-end fashion products. They, on the other hand, will have a high contribution margin per item as they have fewer sales in comparison to the products being sold at Target. So this online fashion store needs to make sure each sale counts. So that is the broad idea of contribution margin.

## Quiz

Match the expense with whether it is a fixed or variable cost.

These are the correct matches.	
Line item	Fixed vs. Variable Costs
Engineering and Hosting Costs	Fixed Costs
Shipping Costs	Variable Costs
Charges for Third-Party System	Fixed Costs
Packaging supplies	Variable Costs
Rent for Office	Fixed Costs

### Question 2 of 3

Continue using the SmoothieRocks\_Margin quizzes data from the previous page. Calculate the Contribution Margin per unit in dollars and select the correct response below.

- \$3.02
- \$2.71
- \$1.38
- Cannot be calculated

A	B	C	D	E
1				
2 Total Revenue	\$ 500,000			Variable Costs
3 Salary of staff	\$27,500			Cost of fruits and vegetables
4 Cost of cash machine	\$ 534			Cost of smoothie cups and straws
5 Cost of sales and marketing	\$7,243			
6 Cost of fruits and vegetables	\$325,000			
7 Cost of laptop	\$ 790			
8 Cost of smoothie cups and straws	\$10,000			
9 Cost of furniture	\$ 5,783			
10 Rent	\$ 10,500			
11 Utilities	\$ 2,000			
12				
13 Number of units sold	60895			
14				
15			Formual	
16 Total Variable Costs	\$335,000	B6 + B8		
17 Total Contribution Margin	\$ 165,000	B2 - B16		
18 Contribution Margin Per Unit	\$ 2.71	B17/B13		

### Question 3 of 3

What advice or recommendation would you give the to owners of Smoothie Rocks if their lowest sale price for a small smoothie is \$2.10.

- Price is too low
- Price is too high
- Price is fine as it is



That's right! The contribution margin for each unit, that is the smallest smoothie, is \$2.71. The store needs to make at least \$2.71 per sale to stay profitable and cover its fixed costs.

### Recap:

- **Contribution Margin** Per Unit =  $(\text{Revenue} - \text{Variable Costs}) / \text{Total units sold}$
- **Total Contribution Margin** =
- Variable costs include costs that change with the number of units produced. For instance, cost of raw materials, cost of services provided.
- It is particularly helpful for companies to determine the pricing of their product, in other words, find the break even point where the pricing will also cover fixed costs and provide profit.

### Additional Resource

- This [interview captured in the Harvard Business Review](#) provides a thorough but easy read about Contribution Margin.
- Check out this link for [Contribution Margin](#) that provides an excellent explanation for how Contribution Margin is derived. It also explains other ways to calculate contribution margin.

### Check For Understanding: Finance and Growth Metrics

## Question 1 of 5

Which of the following ways is the correct way to calculate **churn rate**?

- Churn rate is a measure of how many new customers a business acquired at the end of the month.
- Churn rate is a ratio of the number of customers a business who left at the end of the month compared to the count at the beginning of the month. ✓
- Churn rate is the count of customers at the end of the month.

✓ These are the correct matches.

P&L Statement Line Item	How To Calculate
Gross Profit	Total Sales Revenue - Cost of Goods Sold
Net Profit	Gross Profit - Total Operating Expenses
Contribution Margin Per Unit	(Total Sales Revenue - Variable Costs) / Number of Goods Sold
Gross Margin	Gross Profit / Total Sales Revenue

## Question 3 of 5

What is the correct way to calculate the **Stickiness Ratio**?

- Monthly Active Users / Daily Active Users
- Daily Active Users/ Monthly Active Users ✓
- Monthly Active Users X Daily Active Users

## Question 4 of 5

What is the correct way to calculate the **Cost Per Acquisition**?

- (Marketing and sales cost)/ Number of impressions
- (Marketing and sales cost)/ Number of acquired customers
- (Marketing and sales cost)/ Number of new leads customers



## Question 5 of 5

We bring in our example of the Smoothie Rocks, the juice bar, for this question. We are interested in knowing the **Life Time Value of a typical customer who frequents Smoothie Rocks at least once in two weeks**. Which of the following interpretations correctly describes the Life Time Value of the customer for Smoothie Rocks.

- The average life span of the customer.
- The net value of the customer to the business over the course of time when the customer purchases smoothies from the business.
- The sale revenue from the customer during one week.



## Distribution of the Data

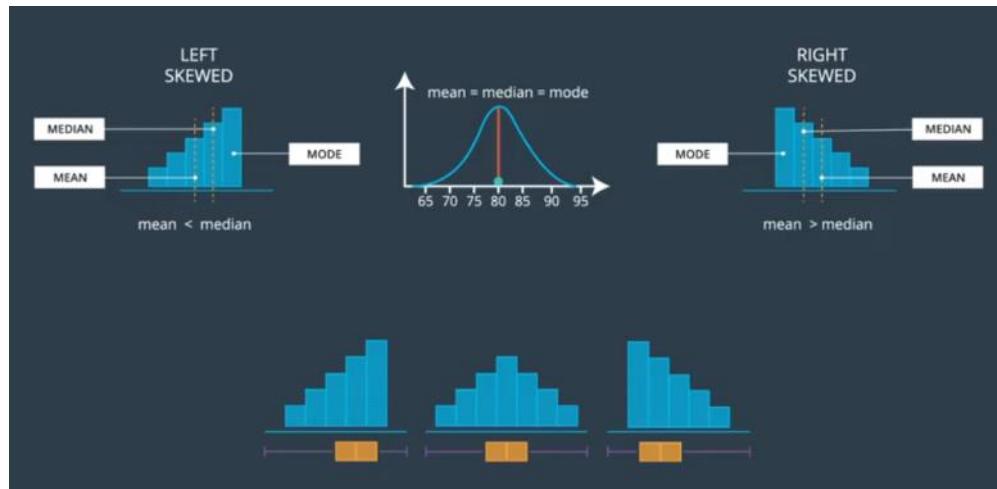
In the earlier lessons, you learned about measures of central tendency and measures of spread. As a business analyst, you should make sure to apply these statistical tools as you generate and examine the data using business metrics.

A business metric is one data point that in itself does not tell much about the larger context. Much like other things in life, data makes more sense and has more value if it is looked at within a context.

So, as a business analyst, your data analysis process should include exploratory checks to examine the spread of the data.

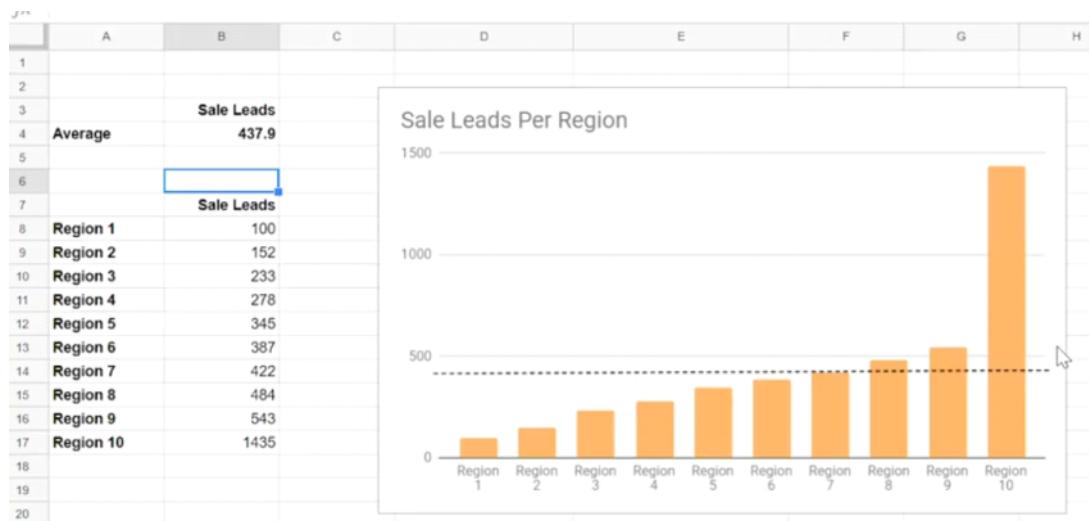
You should always be asking and checking to see if the data is spread out equally in each direction and to see if the shape of the distribution resembles a normal distribution or not. This is important, because you need to know if what you're seeing is expected or out of the ordinary.

In the previous lesson, we talked about skewness and we come back to it in this lesson.



The box plot or histogram as you may remember are useful tools that tell you about skewness. They can alert you to any skewness in the data. Another way to check for skewness is to compare the mean and median values to see if they are more or less the same. Creating visualizations to look at data distributions and computing multiple summary statistics like mean and median should be a reflexive habit of a business analyst.

Let's look at an example to understand why this is important. Let's look at this table for sale leads provided across the 10 regions. We've also provided the average here.



The chart depicts the same information with the average sale leads depicted in the dash line. Now if you simply looked at the average sale leads across the 10 sales regions, you would assume that your sales team got about 430 leads on average. However, that is not the full story. That is the reason why you examine the median and you find out that actually 50% of your regions sell below the average. The median here is depicted in this purple line here.

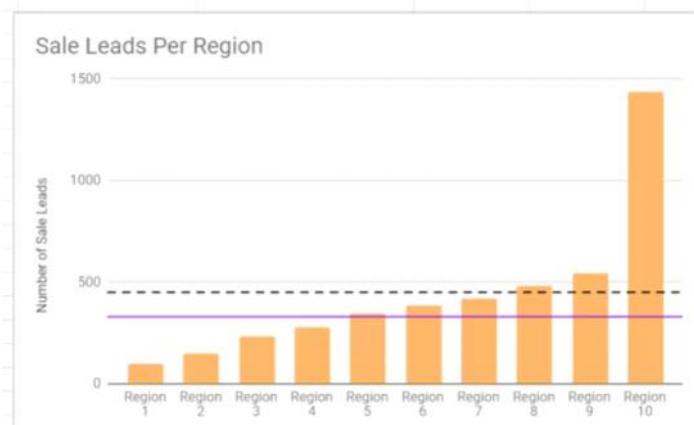


If you are presenting to your company executives, that is not a convincing story as they would wonder, "Well, what is a difference between a 100 leads? That looks like a big difference between the average and the median." That's why it's always important to look at the distribution.

You see when we crafted and compare the mean and the median, you see that the region 10 did exceptionally well. This type of negatively skewed data necessitates the use of measures of central tendency.

Looking at your measure of central tendency mean, median are very important as you are missing vital inflammation if you skip this part in your analysis. In other words, what you're seeing in region 10 was what was pulling the mean up. This revelation can lead to further investigation.

For example, why did region 10 have so many more leads than the other regions? What was unique about it? Is there an untapped market we don't know about or maybe the sales manager in charge of that region did well? You get the drift.

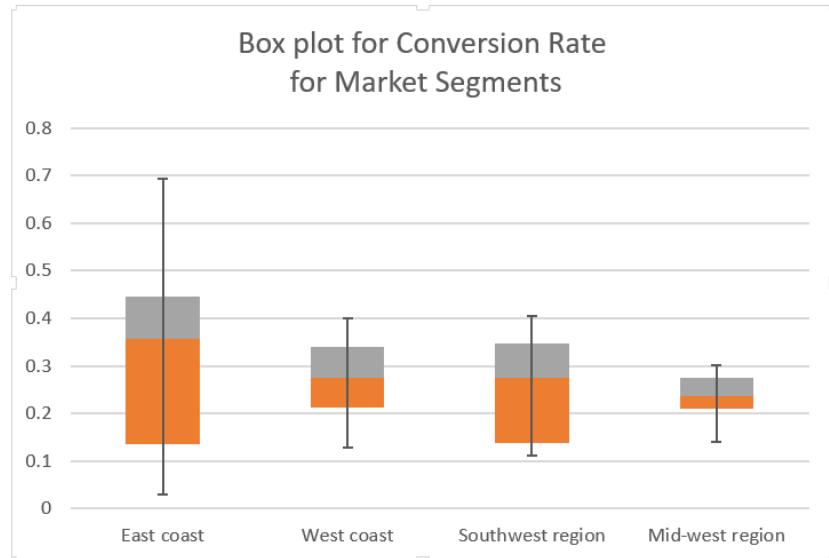


Looking at the larger context and the distribution always gives you more information than you can simply by looking at one number such as the average. These are important pieces of information that you need to bring back to your company and decision makers as a business analyst.

## Quiz

The following box plot shows the data distribution and five number summary for the conversion rates for each of 4 market segments. Looking at the east and southwest regions, we can tell we are working with skewed data, and we should pay attention to the positively skewed distributions for both regions and wide distribution of the east coast data.

If you need a reminder about box plots and how to interpret them, you can visit the "Box Plots" concepts in the previous "Spreadsheets 4: Visualize Data" lesson in this course.



### Question 1 of 3

Looking at the box plot above, which region has the highest conversion rate?

- Southwest region
- Mid-west region
- East coast
- West coast



### Question 2 of 3

Looking at the box plot above, which region has the lowest conversion rate?

- Mid-west region
- East coast
- West coast
- Southwest region



### Question 3 of 3

Looking at the box plot again, please identify the *true* statements about the conversion rates for the four regions.

- All four regions have the same median.
- Fifty percent of the monthly conversion rates for the East coast were above 0.35. ✓
- The highest conversion rate for the mid-west region was more than 0.30.

### Recap:

- Critical to look at the measures of central tendency to talk more about the nuances in the data, compare specific segments and slices in the data to the average or median.
- Without looking at the distribution, we can make the mistake of examining and making conclusions based only on the average.

## Grouping the Data

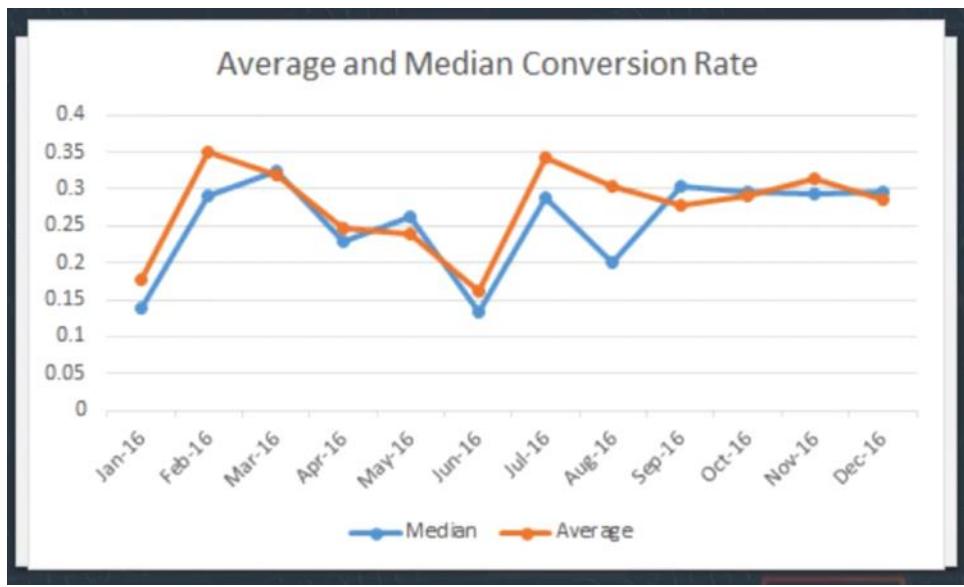
A very important role of a business analyst is to look at the data from normally one perspective, but to look at the numbers after dividing the data between subgroups.

A common mistake people make is to look at the mean and base their decisions on that alone. More informed recommendations are based on detailed analysis of the data distribution. Then, what is captured in the mean? The phrase, devil is in the detail, is handy here.

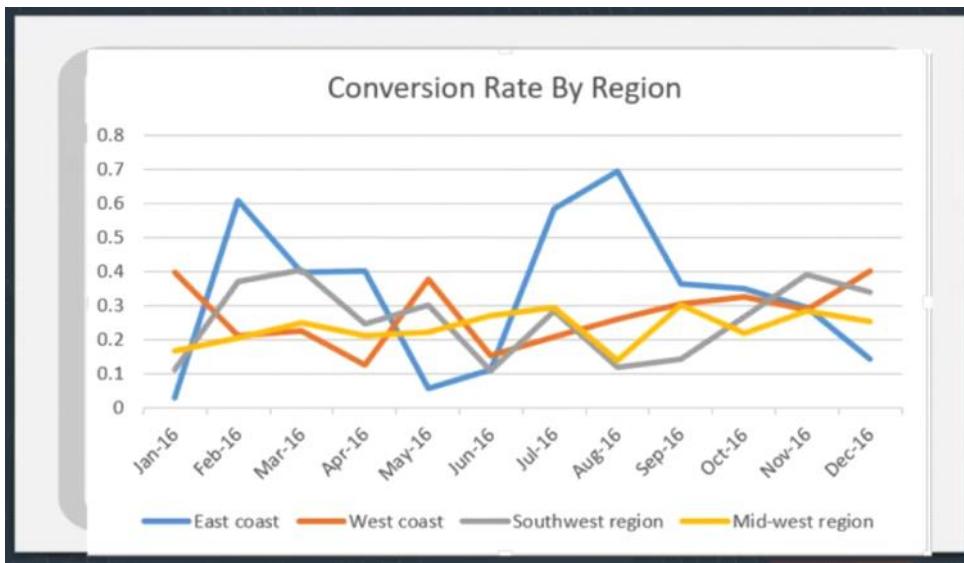
For example, your market segments may be split across states, regions, or even countries. Always look at the data across these groups or other categories to let the data tell you what is working for one group and not the other. This type of grouping will affect how you interpret all of the metrics we have covered so far.

Let's look at an example next.

Here is a line chart showing the average and median conversion rate across the year of 2016. As you can see from this line chart, the average conversion rate didn't seem to go above 0.35.



That is 35% of our sales lead turned into sales acquisitions on average. However, if you slice the data by regions, you see that the story is much more interesting.



In fact, the East coast region was able to demonstrate a higher conversion rate than 0.35, close to 0.6. You may even choose to try and compare the strategies used by the sales team in the East coast region and apply those lessons to the other regions.

Perhaps, they did some AB test that worked better, and they can be adopted in other regions, such as the Southwest region. Or you may find that it is a matter of cities within the eastern coast region, and the urban locations or high density of grocery stores in urban locations, food preferences of customers. All of these factors may be contributing to these differences. But you can only arrive at these decisions if you slice the data and look at the details.

## Udacity AI

Analyzing the strategies used by the sales team in the East Coast region could provide valuable insights that can be applied to improve performance in other regions. By identifying what worked well—whether it's a specific marketing campaign, customer engagement approach, or product offering—you can replicate those successful tactics elsewhere.

Additionally, if the East Coast team conducted A/B tests, it would be beneficial to review the results of those

tests to understand which variations led to the higher conversion rates. This kind of experimentation can help you fine-tune your strategies based on data-driven decisions.

## Recap:

- Always slice your data on groups that your data is split into. Depending on your company's market segments, product line and business model, it is important to look at the data split across each of these levels.
- Looking at the distribution allows you to see when and explore why certain spikes happen. For example, it is possible that you have your earliest group or cohort of customers who experienced a new website feature or roll out of specific online app feature. Without keeping an eye on such events, it is hard to make sense of data and explain why you have certain spikes in the data.
- Another benefit of grouping the data is that it allows you to identify more successful cases within your business, marketing and product strategy. This reflection allows you to apply that learning to other segments and groups.

## Summary

You learned a great deal in this lesson, and we hope you feel you have a better sense of how analytics can be used to make better business decisions.

Let's take a moment to summarize the key take-away's from this lesson.

### Overarching Themes

- Businesses use **Key Performance Indicators** to track how they are performing on key goals or objectives.
- The **Marketing Funnel** captures the various stages in the customer's journey. At the top of the funnel, it captures the impressions, clicks, leads and conversions at the bottom of the funnel.
- **Optimizing the funnel** refers to maximizing the conversion rate at each level of the funnel.
- The **Sales Funnel** captures the various stages in the sales cycle. At the top of the funnel, it captures the prospects, then the leads and qualified leads, and ends with bookings or closed deals at the bottom of the funnel.
- It is important to look at the **distribution of the data** to understand if the measures of central tendency represent a normal distribution. Looking at the distribution and measures of central tendency is a critical step of the data analysis process.
- Data should be examined split across cohorts, business cycles, time, product lines, regions and other **grouping** criteria to fully understand the data. It is critical to slice the data across various factors to make sense of the data and make recommendations.

## Metrics

### Marketing

- **Click through rate (CTR)** is an indication of whether the ad campaign is generating enough interest in potential customers. When the CTR increases, it is an indicator of an effective and interesting content in your ad campaign and that maybe you should increase the number of impressions for that ad.
- **Cost Per Click (CPC)** is an indicator of the cost effectiveness of the ad platform and a useful tool to compare and strategize about which marketing platforms is yielding higher impression and reach and resulting in potential leads.
- **Cost Per Lead (CPL)** is an indicator of the cost effectiveness of the ad platform and a useful tool to compare and strategize about which marketing platforms yielded more leads.
- **Customer Acquisition Cost (CAC)** is a useful metric used to get an estimate of how much it cost us to acquire the customer in the period the money was spent to reach out to them.

## Marketing and Financial

- **Cost Per Acquisition (CPA)** allows a business to gauge whether the marketing campaign is generating enough potential leads.
- **Life Time Value (LTV)** allows you to focus on audiences and potential customers that will generate higher LTVs with minimum customer acquisition cost. There are several ways to calculate the Life Time Value and it is best to calculate the LTV using different ways to arrive at the average LTV for a customer.

## Growth

- **Stickiness** indicates whether the customers are staying and returning to the website frequently enough. It is a good measure of potential growth of the business.
- **Churn rate** is a measure of declining growth and business aim to have a higher growth rate than churn rate. It is a measure of whether the business is retaining the acquired customers.

## Financial

- The **Profit and Loss Statement**, also called income statement, is one type of financial statement that shows a company's performance and financial position. needed to create the P&L statement are:
- **Revenue** is the money that your company makes from the sales of your products and services
- **Cost of Goods Sold OR Cost of Sales** are the direct costs the company incurs to develop and product the product or service being sold
- **Gross Profit** is the difference between the revenue and COGS
- **Selling, General and Administrative expenses** capture a wide range of expenses, from administrative, sales commissions, supplies, legal fees, rent, utilities, taxes, and interests. It is used synonymously with **Operating expenses**. SG&A typically exclude research and development expenses.

- **Operating Profit** is the difference between gross profit and total operating expenses.
- **Net Income** is operating profit minus interest and tax expenses.
- **Gross Margin** tells business executives what percentage of each revenue dollar is available to cover operating expenses after the COGS have been accounted for.
- **Contribution Margin** provides the breakeven point where the pricing of a product will cover fixed overhead costs.

## Supporting Materials

- [Business Metrics Lesson Terminology And Formulas](#)