Prezi

Presenting Data People Can't Ignore:

How to Communicate Effectively Using Data

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What makes an effective presentation?

No matter who you are or what you do, chances are, there will be times when you'll need to use and present data to an audience to inform and influence business decisions for your team or your company.

Being able to effectively identify and present compelling data is critical to the success of not only your career but also the success of any business. As a professional, you have to be able analyze data and use it to help you and other leaders make decisions, spot trends in what's going well, and what's not.

Simply put, your data is only as good as your ability to understand and communicate it to others.

Filling out a table with a set of numbers and putting it on a frame or slide won't do you or your team much good. You need to be able to understand and effectively communicate the story behind those numbers.

While data has a huge impact on our ability to make decisions, presenting data isn't something that most people find intuitive.

In fact, learning how to find and tell a story with your data is a learned skill -- one that HubSpot, Prezi, and Infogram are here to help you with today.. The key to learning how to present with data effectively? Learn what types of visuals tell the best story about the information you're trying to convey.

It's critical that you choose the right method of visualizing your data for any given data set. You would never choose a pie chart to show trends over time, for example; and you would never choose a line graph to show parts of a whole.

But presenting compelling data is more than that: **If your data is misrepresented or presented ineffectively, you and your team will lose out on key insights and understandings** – which could hurt both your message and the business.

The good news is that you don't need a PhD in statistics to present data effectively This guide will walk through the best ways to present different types of data, why data visualization is important, and tips on telling a story with your data in a presentation.

What is data visualization?

Data visualization refers to showcasing data, numbers, and statistics through images and charts.

When you display data visually, you'll be able to more easily tease out meaningful patterns from a set of otherwise indecipherable numbers, and it makes it easier to draw conclusions and make informed decisions.

Here's a simple example of using data visualization to show a trend over time. Below is a chart from Google Trends that shows how many people searched for the term "data visualization" in Google over a five-year period:

Interest over time

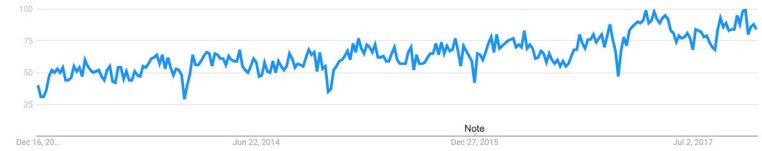


Chart from Google Trends that shows how many people searched for the term "data visualization" in Google over a five-year period

> "If your data is misrepresented or presented ineffectively, you and your team will lose out on key insights and understandings"

The numbers may go up and down and up and down over short periods of time, but if you look at the larger picture, you'll see that search volume is trending steadily upward.

Data visualization is especially helpful when you're presenting data to others. It's much easier for people to understand data when it's presented visually – which makes it easier to make your point or persuade someone, too.

Marketers can use data visualization to showcase the results of a campaign; scientists can use it to predict illness outbreaks; farmers can use it to map out agricultural trends.

You can also use data visualization to display part-to-whole data, ranking, correlation, geographical distribution, deviation, timelines, and scale. The purpose of data visualization can be to simplify and showcase results or to explore trends and try to discover something new within a set of data.

Why is data visualization important?

Data visualization is important in identifying trends, answering questions, proving theories, and -- if you're creating them for a business -- in showcasing your brand. When visualizing data, it's easier to see numbers in context and understand how they relate to one another.

When it comes to processing information, we are wired to comprehend images much faster and more easily than text. According to SH!FT Disruptive Learning, **we process visuals 60,000 times faster than text.** What's more, visuals are far more memorable than text is. The same research study found that **after three days, test subjects retained 10-20% of written or spoken information and a whopping 65% of visual information.**

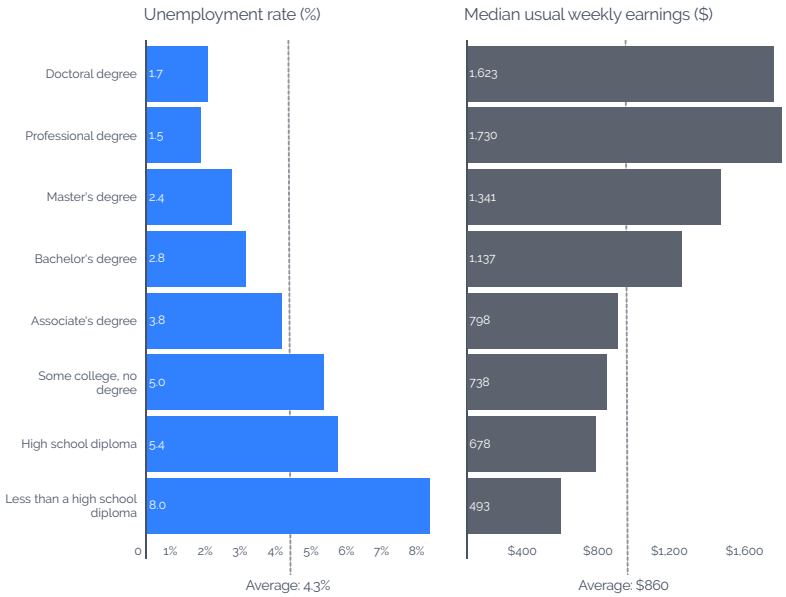
Take a look at the two images below. Both images represent the exact same number, but one of them is displayed in a data table, and the other is a visualization of that data in a bar chart. Which is easier to interpret? Which is a better way to communicate your findings to your team?

EARNINGS AND UNEMPLOYMENT RATES BY EDUCATION LEVEL, 2015.

Education level	Unemployment rate in 2015 (%)	Median weekly earnings in 2015 ($)
Doctoral degree	1.7	1,623
Professional degree	1.5	1,730
Master's degree	2.4	1,341
Bachelor's degree	2.8	1,137
Associate's degree	3.8	798
Some college, no degree	5.0	738
High school diploma	5.4	678
Less than a high school diploma	8.0	493
All workers	4.3	860

Source: Current Population Survey, U.S. Bureau of Labor Statistics

Earnings and unemployment rates by education level, 2015



Source: Current Population Survey, U.S. Bureau of Labor Statistics.

The answer, of course, is the bar chart. While having the raw data in a table format is handy, when you're trying to present to or persuade others, visualizing your data is a good way to present an argument, tell a story, and inspire people.

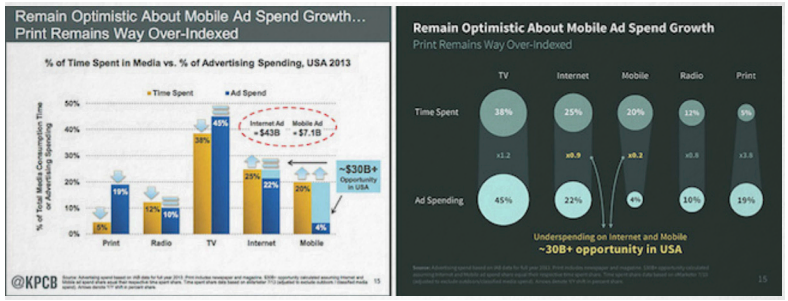
Why data visualization is important to showcase metrics and reports

Data visualization improves the impact and recall of your message or argument. Have you ever attended a presentation where someone else's presentation stood out to you thanks to its clear representation of data? We're willing to bet many of you have.

We've said it before, and we'll say it again: **Accurate visualization of data can make or break a business presentation.**

Let's take a look at an example. Below, you'll see two versions of the same slide from a presentation deck. The first, with the white background, is the actual presentation slide; the second is a re-imagining of that slide from Professional Presentation Designer Emiland de Cubber.

> "Data visualization improves the impact and recall of your message or argument."



Take a close look at that first slide. Can you tell where the story in the data starts and ends? There's so much going on in her slide that it's quite difficult to tell. De Cubber turned the bar chart into a bubble chart because it "seems more appropriate and visually convincing," he said. "It's easy to compare and the conclusion in yellow is very clear."

In addition to revamping the chart itself, de Cubber also altered the color scheme. As he explains it, using two different colors on the same slide (like the blue and yellow on the original slide) creates a good-bad dichotomy that could confuse people. In the redesign, he chose a monochromatic color scheme, which often ends up looking more clean and polished than using two completely different colors. (Learn more about color theory here.)

De Cubber's redesign highlights some really common data visualization flaws that show up in presentation decks all the time. Comparing data is useless if your viewer can't easily figure out the takeaways.

"Take a close look at that first slide. Can you tell where the story in the data starts and ends?"

CHAPTER ONE

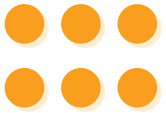
Data types, relationships, and visualization formats

4 data types

Before we go into best practices for visual representation of data through charts and graphs, let's first get to know all the different types of data, the different data relationships, and the different chart types.

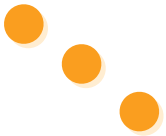
1. Quantitative

Quantitative data can be counted or measured, and all values are numerical.



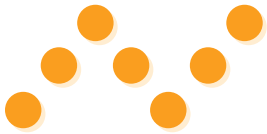
2. Discrete

Discrete data is numerical data with a finite number of possible values. (For example, the number of employees in an office.)



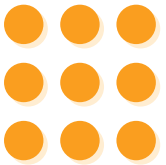
3. Continuous

Continuous data is measured and has a value that lies within a range. (For example, rainfall in a year.)



4. Categorical

Categorical data can be sorted according to group or category. (For example, types of products sold.)



Illustrations made with Infogram

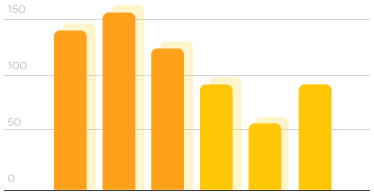
7 data relationships

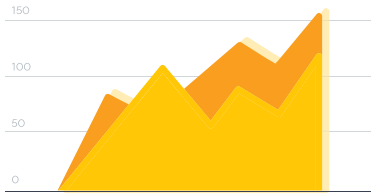
A data relationship is a relationship between one or more points of data. It can be as simple as tracking the same metric over time, like blog post views over a 30-day period. It can also get much more complex than that. Knowing how to accurately compare relationships in your data is a critical business skill.

Here are seven data relationships you should know:

1. Nominal comparison

A nominal comparison is a simple comparison of the quantitative values of subcategories. Example: number of visitors to various websites.





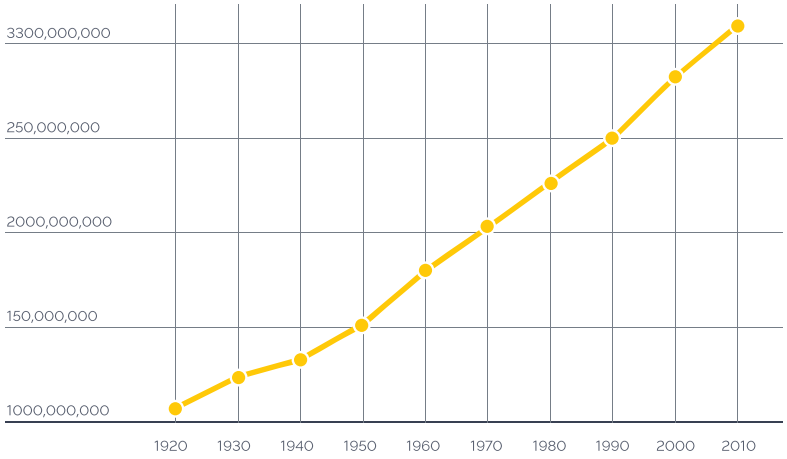
2. Time-series

A time-series shows the changes in values of the same metric over time.

They're a great way to demonstrate things like trends over time, revenue quarter-by-quarter, or new leads generated in a current month or year. They're also a great choice for predictive modeling. When your boss says, "We want revenue to go up and to the right," she's referring to this type of chart.

Here's an example of a time-series showing an increase in U.S. population between 1920 and present day.

U.S Population



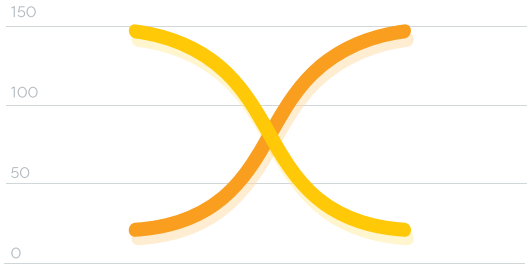
Source: U.S. Census Bureau

3. Correlation

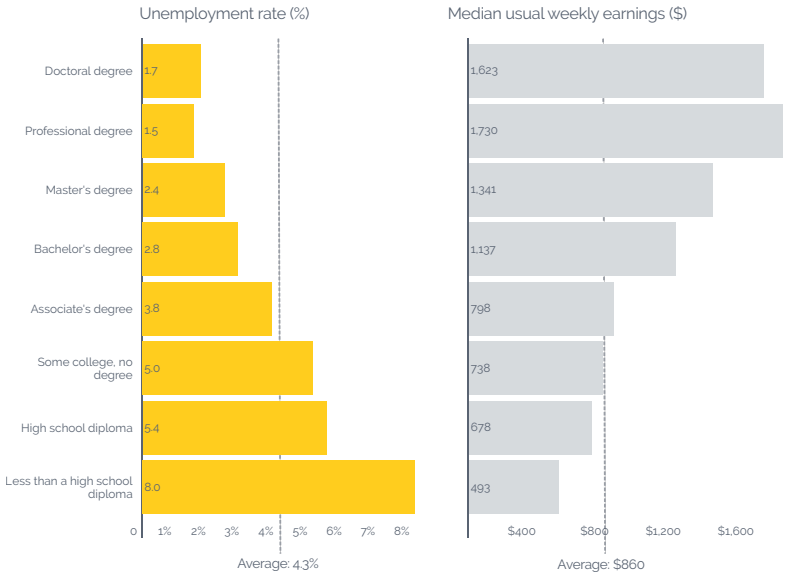
This data has two or more variables that may demonstrate a positive or negative correlation with each other.

'Let's take another look at the example from earlier showing the correlation between salary/ unemployment rate and education level.'

A word of caution: There's a common phrase in statistics that says "correlation does not imply causation." This chart shows the correlation between the salary and education level. While in this case, the two are directly related, it's important to always take heed and explore other variables that could be affecting the correlation before making any assumptions.



Earnings and unemployment rates by education level, 2015



Source: Current Population Survey, U.S. Bureau of Labor Statistics.

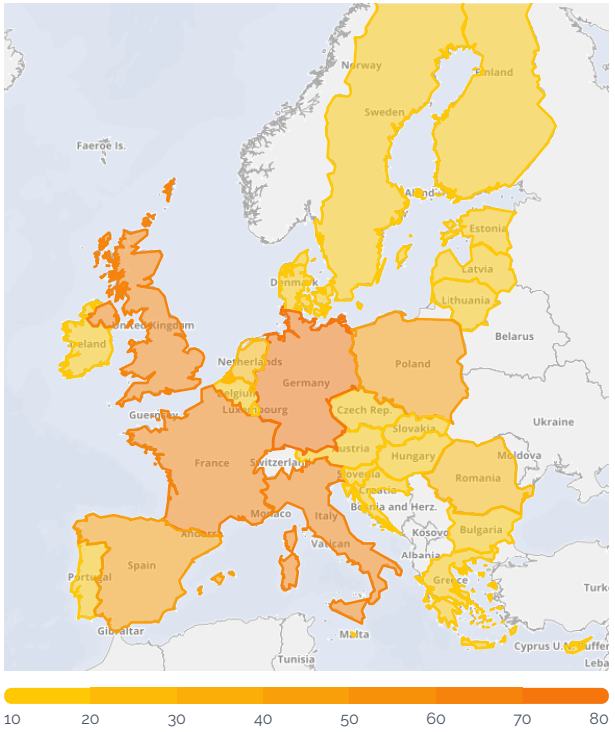
4. Ranking

This shows how two or more values relate to each other in relative magnitude.

> "Heatmaps are a good way to show a popular or highly trafficked area..."

Heatmaps are a common example of a distribution visualization. For example, the heatmap below shows the average population density in Europe. The areas are shaded gradually darker to demonstrate a higher concentration of people living in certain areas, which helps readers quickly identify the areas with high population density.

European Union Population (Millions)



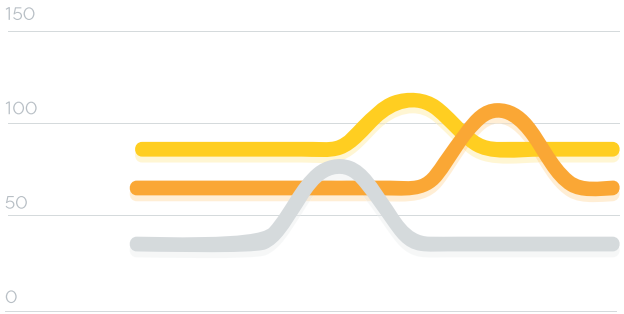
Source: Eurostat

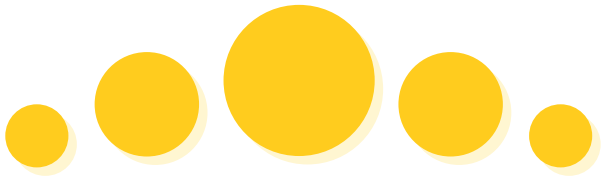
Heatmaps are a good way to show a popular or highly trafficked area, whether that be on a map, on a website (showing where people are clicking the most), or throughout a store.

5. Deviation

Deviation explores how data points relate to each other, and more specifically how far a given data point differs from the mean.

An example of a deviation visualization includes amusement park tickets sold on rainy days versus regular days, or average spending over the holidays versus non-holidays. Visualizing your data in this way will help you identify outliers.





6. Distribution

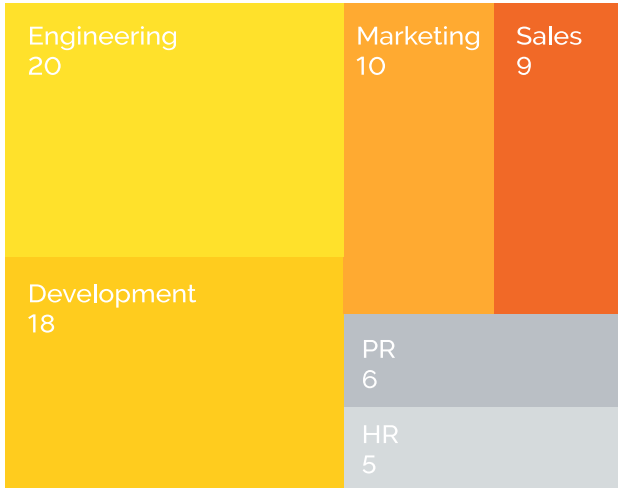
This type of visualization shows data distribution often surrounding a central value.

7. Part-to-whole

This shows a subset of data as compare to the larger whole.

Part-to-whole comparisons like the one below show the makeup of a group. To show this, you can use a treemap (as in the visualization below), a pie chart, a donut chart, or anything that shows the breakdown of a singular whole. It can be a good way of visualizing distribution of ages in a group, sources of revenue, or parts of a balanced diet.

Company breakdown (by department)

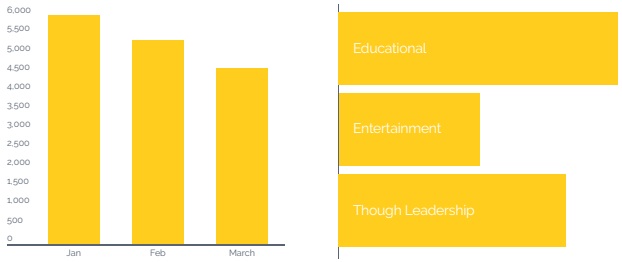


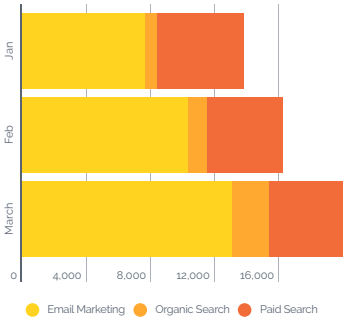
7 chart types

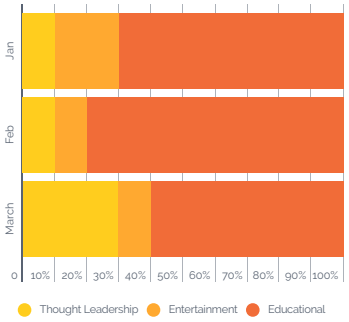
We've touched on a few of these chart types already, but let's dig into them a little bit further with the help of some illustrations.

1. Bar charts

Bar charts (or column charts when vertical) are very versatile. They're best used to show change over time or comparisons.



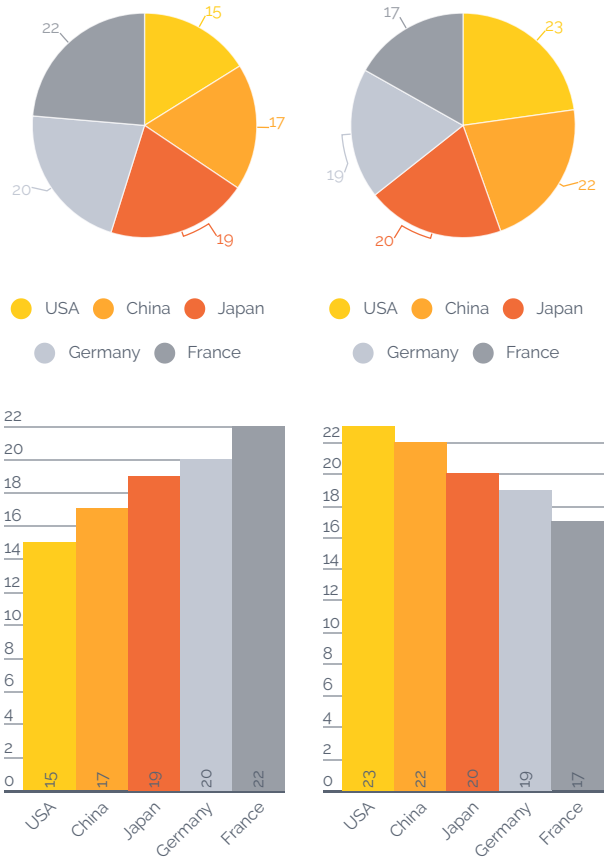




2. Pie charts

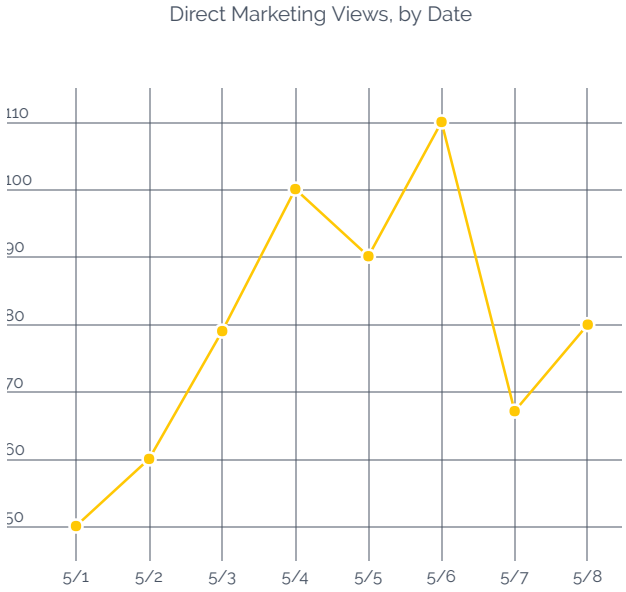
Pie charts are best used for making part-to-whole comparisons with discrete or continuous data. They are most impactful with a small data set.

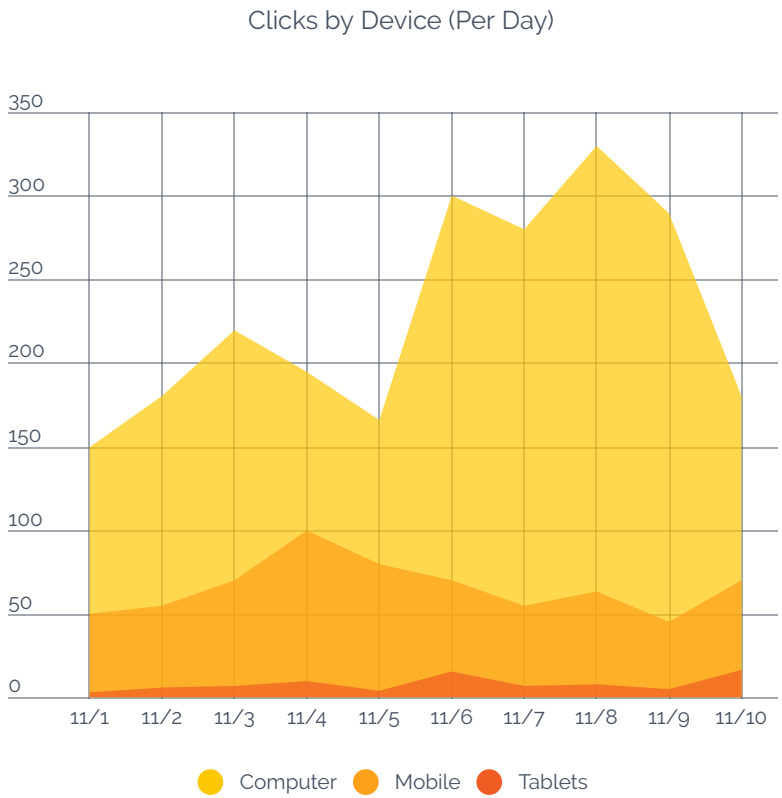
Be careful with how you use pie charts, as they can sometimes be misleading because of their shape. For example, here's an illustration of the same data set displayed as a pie graph and a bar graph:



3. Line charts

Line charts are used to show time-series relationships with continuous data. They help show trend, acceleration, deceleration, and volatility.





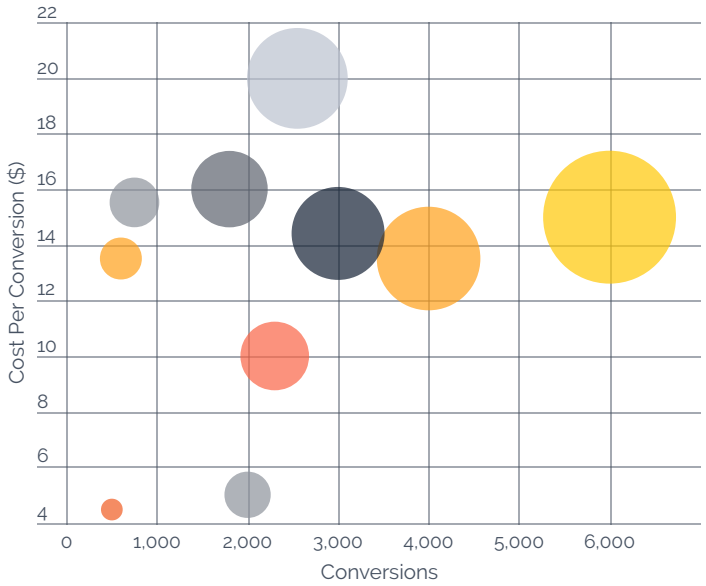
4. Area charts

Area charts depict a time-series relationship, but they are different than line charts in that they can represent volume.

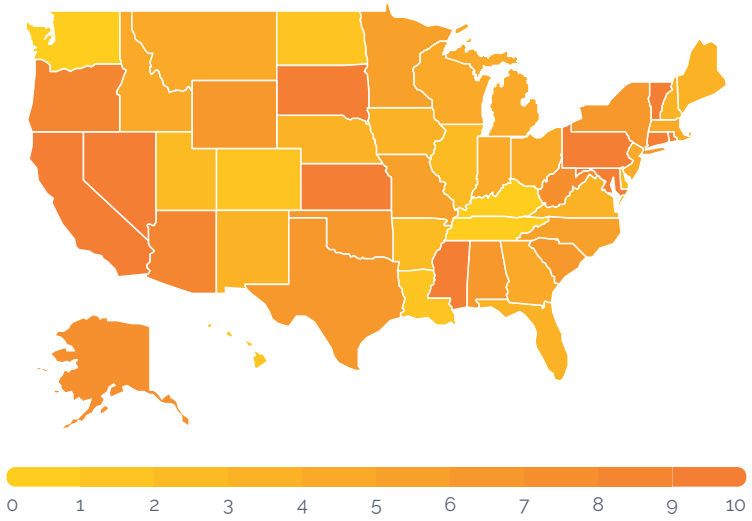
5. Scatter plots

Scatter plots show the relationship between items based on two sets of variables. They are best used to show correlation in a large amount of data.

AdWords Campaign Performance



Social Media Engagement (%)



6. Bubble charts

Bubble charts are good for displaying nominal comparisons or ranking relationships.

7. Heatmaps

Heat maps display categorical data, using intensity of color to represent values of geographic areas or data tables.

CHAPTER TWO

How to visualize data effectively

When getting started with data visualization, it's important to map out a few things first.

Where and how are you getting your data?

If you don't have any data yet, you'll need to think carefully about where you're getting it. Are you gathering yourself, or are you getting it from someone else?

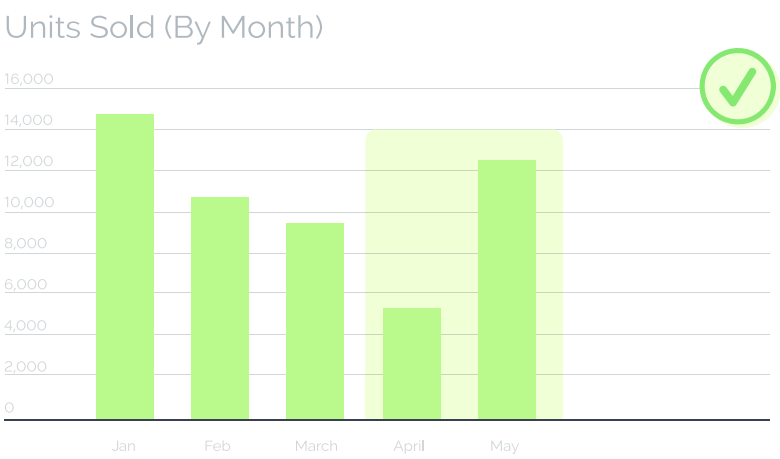
If you're gathering it yourself, be sure you're using the right methodology to write and launch your surveys. **To learn how to use online surveys effectively,** download Hubspot's free ebook, How to Use Online Surveys in Your Marketing.

If you're collecting your own data, you'll need to make sure you collect enough of it for the results to be statistically significant. Here's a refresher on statistical significance from a marketing standpoint if you need one.

If you're sourcing your data from a third party, it's very, very important that it's coming from a reliable source. What makes a good data source? A good data source is:

Original.
It comes from a primary source. If the data you find is on Wikipedia or in a news article, track down the original data so you can spot any potential flaws, low sample sizes, or biased questionnaires.

Comprehensive.
It doesn't leave questions unanswered, and it provides enough information for viewers to get the big picture and any appropriate context. In short, it tells the full story.



Current.
The world changes quickly, so your data needs to be one or two years old at most – unless it's on a topic that hasn't changed in a long time. Use your discretion here.

Reliable.
You've verified that the source you chose was relevant, legitimate, and as unbiased as possible. You've asked yourself who collected the research and whether they have credentials, when it was last updated, and whether the organization hosting the information has a purpose or agenda that could make the data biased.

If you're not sure where to find good data, here's a helpful guide on where to find good data and how to vet it properly.

Once you do have the data aggregated, you can start thinking about how you might present it.

> "The world changes quickly, so your data needs to be one or two years old at most..."

What story does the data tell?

For many people, the hardest part of visualizing data is looking at the raw numbers and figuring out how to use them to tell a story. In order to visualize your data properly, the first thing you need to do is tease out what's significant about your data.

> "What is it that your team, your readers, or your audience is most curious about?"

Oftentimes, it's helpful to start with your goal metric. What is the primary question you're trying to answer? What is it that your team, your readers, or your audience is most curious about?

For example, let's say your goal is to increase the number of subscribers to your business blog. Your primary metric, then, would be number of subscribers over time.

In this case, you'd add subscriber calls-to-action and lead flows to your business' blog, website, social media accounts ... anywhere you'd like to drive subscribers. Then, over a predetermined period of time, you'll track the number of people who subscribe to the blog and the number of people who unsubscribe. You might also measure a number of other metrics like blog traffic, leads, social shares, and time on page, but because the goal is cumulative subscribers, that number is the most important piece of data to put into a visualization.

Let's say you measured blog email subscribers from 2011–2014. During that time, your team employed a number of different tactics to increase email subscribers from the blog – and in the end, this is how your raw subscriber numbers shook out year-over-year:

CUMULATIVE EMAIL SUBSCRIBERS

YEAR	EMAIL SUBSCRIBERS
2011	20,767
2012	95,888
2013	236,382
2014	380,232

From looking at that table, it's obvious that the number of email subscribers from the blog is increasing over time. That's a great start to your story ... but exactly how much are subscribers increasing? From this data set alone, it's hard to see that there was actually quite a big jump in subscribers from 2011–2012. But if you visualized it, you'd be able to ascertain that more easily, and could dig in to why.

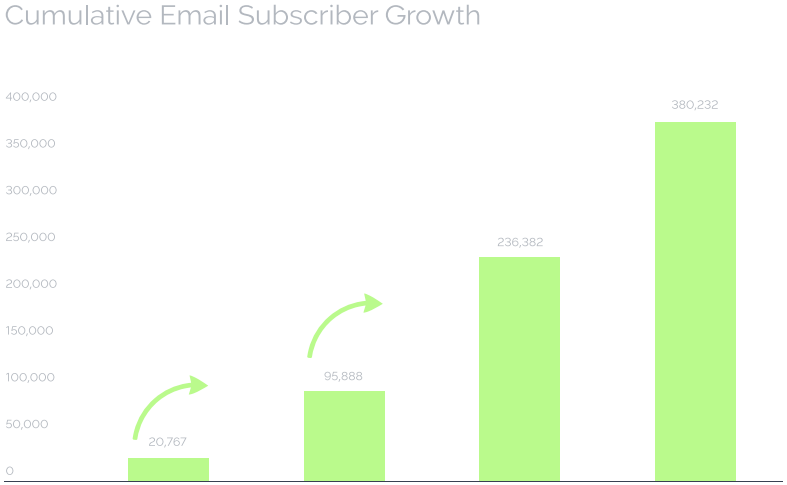
Which leads us to the next question ...

What's the best way to visualize this data to tell this story?

Once you've started teasing out the story your data is telling you, you'll need to choose which type of data visualization will best tell the story.

Luckily, you've already learned all about the different data relationships and visualization formats from the previous chapters. Use that section as a guide when you're trying to figure out which format to use. Bar charts, pie charts, line charts, area charts, scatter plots, bubble charts, and heatmaps all tell different stories about your data -- you need to choose the best one to tell the story you want.

In this example, measuring as change in subscriber numbers each year calls for a time-series visualization. In this case, a line graph or a bar graph. Bar graphs tend to be easier to highlight incremental differences, so they're a good go-to. Here's what the data might look like in a bar graph:



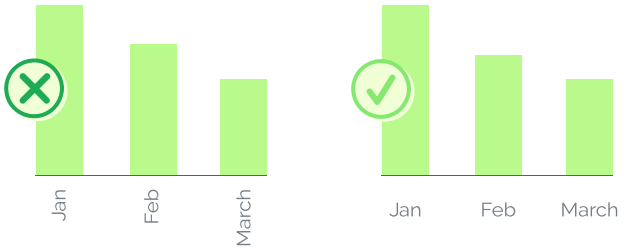
Now that the number of subscribers is visualized by the height of the bars on the chart, it's much easier to recognize how large the jump in subscribers is from 2011–2012.

Is it designed well?

Data visualizations do a great job of showing data in a clear and engaging way. But, designing effective charts can be challenging. Follow these tips to avoid common mistakes:

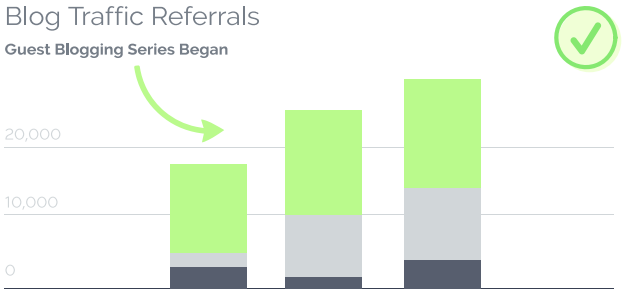
Tip 1: Label your charts and graphs correctly.
Your visualizations won't mean much to you or your audience if they aren't labeled in a way that's easy to read.

On charts that have an x-axis, make sure you use horizontal labels since vertical type can be hard to read.



On line charts, area charts, and pie charts, it's best to label the different parts directly so people don't have to match colors with a legend.

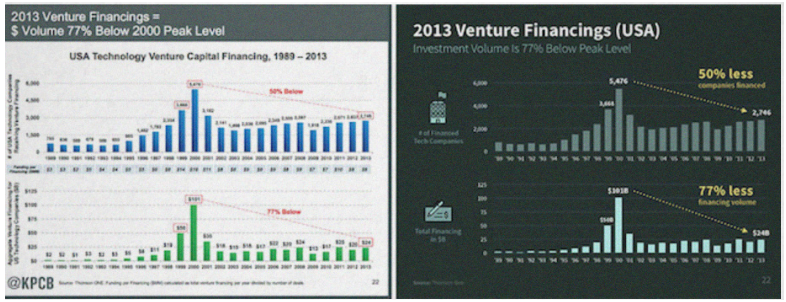
Tip 2: Call out or highlight important information.
When you're presenting your data visualization to an audience, make the analysis easy for them. Call out important information using an arrow and text, using a circle or rectangle, or using a contrasting color.



Tip 3: Use consistent and attractive color schemes.

Remember when the professional presentation designer named Emiland de Cubber redesigned a popular slide deck using design best practices? One of the most obvious differences between de Cubber's deck and the original is the change in color scheme.

Check it out – de Cubber's new design is on the right:



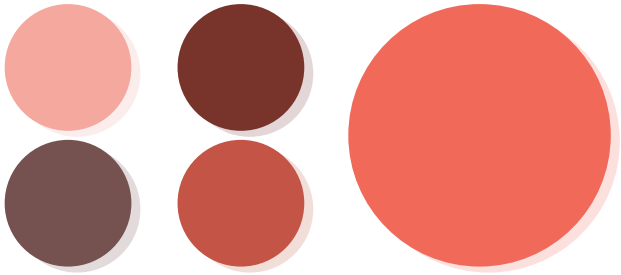
Why the change? De Cubber explained that using two different colors on the same slide creates a good-bad dichotomy that can be confusing.

Color scheme is very important when you're creating data visualizations. Choosing colors with high contrast (like those blue and yellow bars) is easier than choosing colors that actually look good together – but trust us, taking care to choose a great color scheme is worth it.

Luckily, there are logical rules for how to create color schemes that work together. Three common color schemes are:

Analogous: a color scheme formed by pairing one main color with the two colors directly next to it on the color wheel. Typically used to create a softer, less contrasting design. This color scheme is better for an image than for a data visualization.

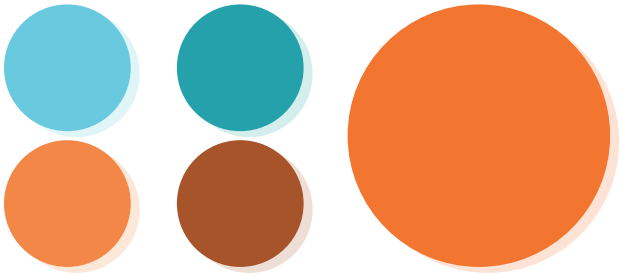
Monochromatic: a color scheme based on various shades and tints of one hue. This is the color scheme de Cubber used in his slide redesign. It tends to look very clean and polished, and allows you to easily change the darkness and lightness of your colors. These are great for data visualizations when you don't need to create high contrast or really grab your audience's attention.



Triadic: high contrasting color schemes that retain the same tone. It's great if you're looking to create contrast, but it can also be overpowering if all of your colors are chosen on the same point in a line around the color wheel. The triadic color scheme looks great in graphics like bar or pie charts because it offers the contrast you need to create comparisons.

Pro Tip: To subdue some of your colors in a triadic scheme, you can choose one dominant color and use the others sparingly, or simply subdue the other two colors by choosing a softer tint.

Complementary: a color scheme is based on the use of two colors directly across from each other on the color wheel and relevant tints of those colors. It's great for data visualizations because the high contrast helps you highlight important points and takeaways – especially if you use one color predominantly and use the second color as accents in your design.

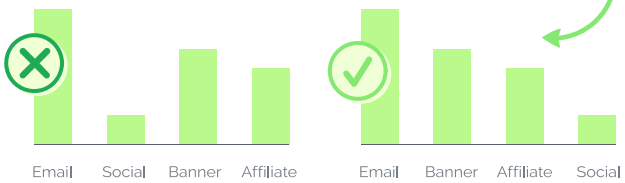


(Read this blog post to learn more about color theory.)

Tip 4: Order your data sets logically.

The way you order your data matters. It's much easier for you and an audience to understand a visualization when the data is ordered intuitively.

If you're creating a bar chart, for example, make sure the larger values are at the top. If you're building a column chart, make sure your larger values read from left-to-right. So don't order your bar graph like this:



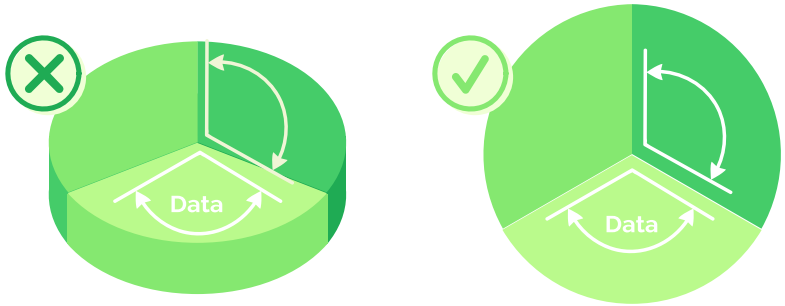
Instead, order it like this:

Tip 5: Stay away from 3D charts.

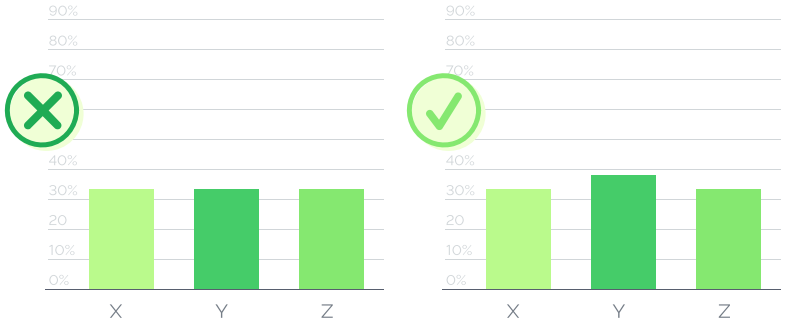
Making charts 3D can make your visualization really hard to read correctly. Because of the way your visualization tilts, it gives the reader a skewed sense of what the data actually means. Since you're using data to tell a broad story, you don't want to weaken your argument due to poor design.

See how different a pie chart looks when it's in 2D versus 3D?

Angle



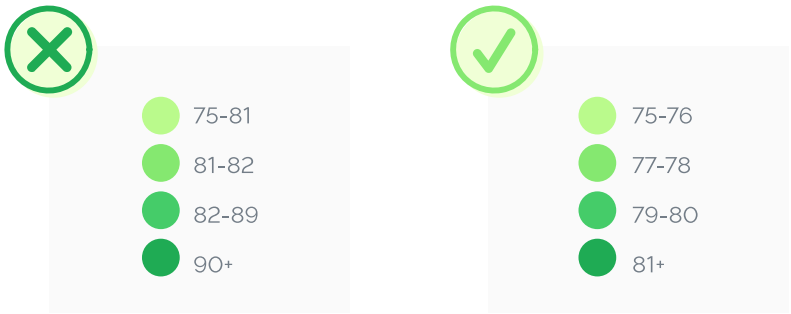
And if you actually look at the area each section takes up on the screen, you'll see why it's easy to misinterpret 3D graphs:



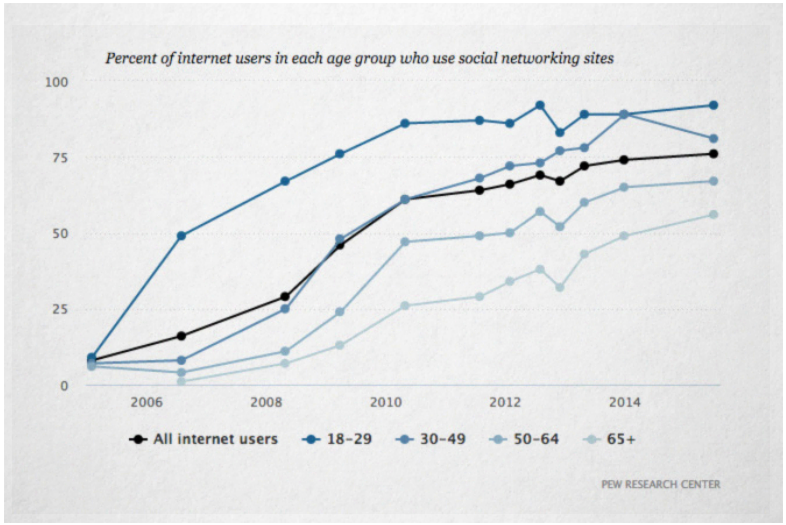
Tip 6: Choose appropriate data ranges.

In a data set, the range is the difference between the lowest and highest values. In a data visualization, you might use data ranges in your legend to consolidate something like age ranges. But the range can make your visualization really misleading if you use inconsistent ranges.

To combat this, select 3-5 numerical ranges that enable fairly even distribution of data between them, and use +/- signs to extend high and low ranges.



Here's an example of consistent data ranges from Pew Research Center:



Check out some other common mistakes to avoid here.

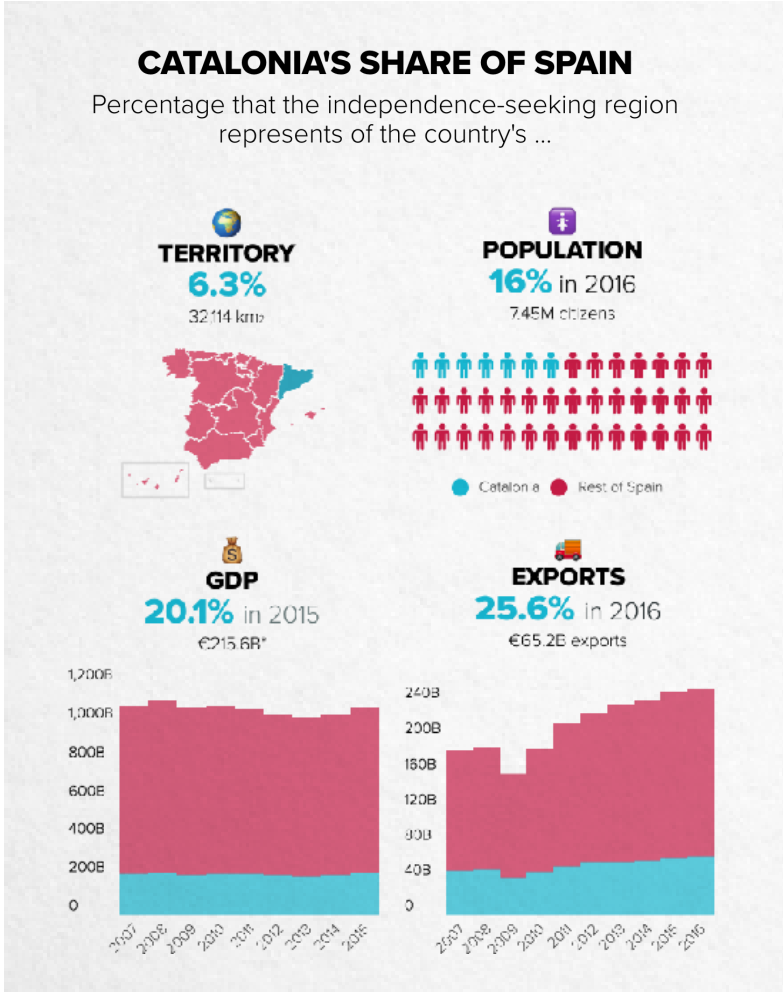
CHAPTER THREE

Effective data storytelling in real life

Global political news leader Politico wrote a series of articles about the Catalan independence movement. In this article they shared stats about Catalonia's contribution to Spain, highlighting what Spain would lose if Catalan secessionists succeed.

While Catalonia only makes up 6 percent of the country's territory, it accounts for a fifth of the economic output, a quarter of exports, and nearly a third of Spain's Rio Olympic medalists.

Because Politico had a lot of data to publish, they used Infogram to visualize the numbers. Through the use of pictorial charts, icons, emoji, area charts, stacked bars, and maps, they were able to give a quick visual understanding of the bigger picture. The contrasting red and blue color scheme make it memorable and easy to read.



CHAPTER FOUR

How to present your data effectively

You have the basics of data visualization down, but now the main question still lingers: how do you put together the final presentation?.

The truth is, when giving a data-backed presentation, it's not enough just to throw some well-design data visuals on a slide. To truly communicate effectively, you have to use the data to deliver the story you're trying to tell. Data illustrates your message, but the story you're trying to tell is what motivates your audience to take your desired action. According to Stanford University, "stories are remembered up to 22 times more than facts alone." In other words, you need both.

Think about a film you watched recently. You probably remember the overall storyline and the impact it had on you, but you may not remember all of the scene-by-scene storyline. That's because the emotional impact affects your brain more so than the actual details of the story.

When an emotionally-charged event occurs, your brain releases dopamine in your system, making it easier to remember the event with greater accuracy. Due to process called neural coupling, the story activates parts in the brain that allow the listener to turn that story into their own ideas and experience.

Neural Coupling

A story activates parts in the brain that allows the listener to turn the story in to their own ideas and experience thanks to a process called neural coupling.

Dopamine

The brain releases dopamine into the system when it experiences an emotionally-charged event, making it easier to remember and with greater accuracy.

Knowing that emotional connection helps people remember more accurately, it's important to deliver an emotional connection through your presentation that goes beyond the raw facts you're presenting through data.

> "Good data + a motivating story = a successful presentation."

How do you actually build a story around the data you're delivering?

First, define what the central message you want to get across during your presentation should be. From there, plan out your presentation using the "Why, How, What" model:

Why / Illustrate 20%
If you've ever watched Simon Sinek's "Start with Why" TEDTalk, you'll understand how important the "Why" is to the presentation. Setting up the story behind why you're saying what you're saying matters for getting people to pay attention.

We recommend spending 20% of your time setting up the "Why" part of your presentation. Don't assume people know why you want to convey what you're trying to convey.

> "Don't assume people know why you want to convey what you're trying to convey."

How
Once you've told your story, it's time to move onto how you want to accomplish the action you're speaking to in the presentation. Are you trying to persuade your colleagues to make a specific decision? Spend 50% of your presentation telling your audience how you believe you should get to your goal. Don't give a buffet of options. Take a stance on what should happen.

What / Impact: 20%
Finish your presentation by showing the impact of your message. What could happen should your audience take your desired action?

Where should you fit data into your final presentation?

Once you've organized your thoughts into the three parts of your presentation, you might be asking yourself, where should I use data? The answer: all three sections. Data should be used to support your message and to help you tell your story at every step of the presentation — but don't go overboard. Here are some quick and easy tips to keep in mind:

Tip 1: Don't use two figures to represent the same number

In order to avoid confusion you should try to be very straight forward with your stats. Don't offer multiple figures to represent the same number. Chances are your audience will only remember one key fact - so pick the most important one.

Tip 2: Avoid back-to-back charts

Be sure to switch up the variety of your visuals to keep people engaged and curious. You wouldn't have multiple slides with bullet points back to back, so you shouldn't do it with charts. You risk losing the audience's attention. Feel free to break up your data heavy slides with icons and pictures. Doing so forces your audience to pause and regroup.

Along that same vein, you should try to only show one chart at a time. You don't want your audience spending time in their head trying to decipher your slides. The more data you put on a slide, the harder your audience has to work to comprehend your message, and the more distracted they will become. The last thing you want is your audience to tune you out.

Tip 3: Leave your visual up for a few minutes and tell a story

Don't flip through your data too quickly. When you pull up a chart or visual, leave it up for a few minutes. This gives your audience a chance to really let the data message sink in. Explain what the chart says, then explain what it means for your audience. The longer you have your message up, the better chance you have of getting your audience to remember what you're saying.

All in all, it's important to remember not to lean on data to tell a story for itself. Instead, guide your audience through the message you're trying to convey by illustrating with your newfound data visualization skills.

Using Data to Tell Your Brand's Story

We've covered all the ways to create and present data effectively, but what do you do with those presentation skills you've learned? Use them to market your brand more effectively, of course!

Prezi, Infogram, and HubSpot all offer products to help you present and sell your brand better. Use your data to create awesome blog articles, website content, or social media posts, then turn those content visitors into customers with HubSpot's full growth stack.

Need to put together an interactive presentation for you brand? Give Prezi a try.

Finally, if you want a simple way to put these data visualization tips into practice, Infogram is the tool for you.

Happy presenting!