

As an analyst in today's world, you'll probably split your time with data visuals in two ways:

1. looking at visuals to understand
2. Concluding data or creating visuals from raw data to tell a story.

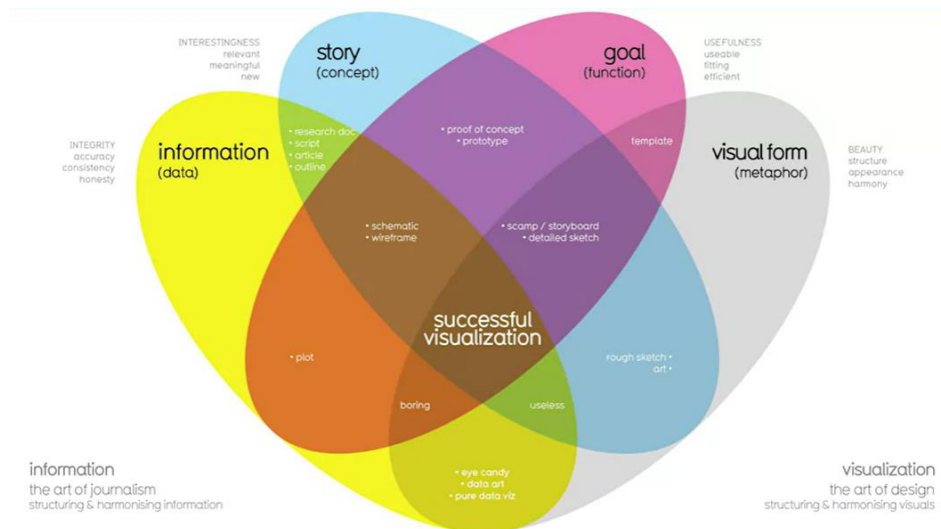
Understanding data viz

Effective data viz

Framework

1) The McCandless Method

1. **Information:** the data you are working with
2. **Story:** a clear and compelling narrative or concept
3. **Goal:** a specific objective or function for the visual
4. **Visual form:** an effective use of metaphor or visual expression



2) Kaiser Fung's Junk Charts Trifecta Checkup

This approach is a useful set of questions that can help consumers of data visualization critique what they are consuming and determine how effective it is. The Checkup has three questions:

1. What is the practical question?
2. What does the data say?
3. What does the visual say?

Pre-attentive attributes: marks and channels

Pre-attentive attributes are the elements of a data visualization that people *recognize automatically* without conscious effort.

Marks

Marks are basic visual objects like points, lines, and shapes. Every mark can be broken down into four qualities:

1. Position - Where a specific mark is in space in relation to a scale or to other marks



2. Size - How big, small, long, or tall a mark is



3. Shape - Whether a specific object is given a shape that communicates something about it



4. Color - What color the mark is

Channels

Channels are visual aspects or variables that represent characteristics of the data. Channels are marks that have been used to visualize data. Channels will vary in terms of how effective they are at communicating data based on three elements:

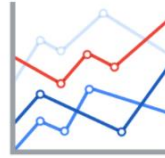
1. Accuracy - Are the channels helpful in accurately estimating the values being represented?

For example, color is very accurate when communicating categorical differences, like apples and oranges. But it is much less effective when distinguishing quantitative data like 5 from 5.5.



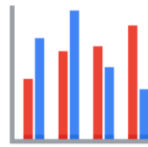
2. **Popout** - How easy is it to distinguish certain values from others?

There are many ways of drawing attention to specific parts of a visual, and many of them leverage pre-attentive attributes like line length, size, line width, shape, enclosure, hue, and intensity.



3. **Grouping** - How good is a channel at communicating groups that exist in the data?

Consider the proximity, similarity, enclosure, connectedness, and continuity of the channel.

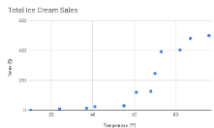
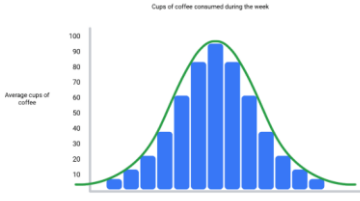


But, remember: The more you emphasize one single thing, the more that counts.

Design principle

- Choose the right visual
- Optimize the data-ink ratio
The data-ink entails focusing on the part that is essential to understanding the point of the chart. Try to minimize non-data ink like boxes around legends or shadows to optimize the data-ink ratio.
- Use orientation effectively
Make sure the written components of the visual, like the labels on a bar chart, are easy to read.
- Color
Use color consciously and meaningfully, staying consistent throughout your visuals, being considerate of what colors mean to different people, and using inclusive color scales that make sense for everyone viewing them.
- Numbers of things
Think about how many elements you include in any visual. If your visualization uses lines, try to plot five or fewer. If that isn't possible, use color or hue to emphasize important lines. Also, when using visuals like pie charts, try to keep the number of segments to less than 07 since too many elements can be distracting.

Options:

Line chart	Track changes over short and long periods. When smaller changes exist, line charts are better to use than bar graphs.
Column chart	Use size to contrast and compare two or more values, using height or lengths to represent the specific values.
Heat map	Used to show relationships between two variables and use a system of color-coding to represent different values.
Pie chart	when dealing with parts of a whole
Scatter plot	Used for two variables for a set of data, although additional variables can be displayed. <ul style="list-style-type: none"> show relationships between different variables. 
Distribution graph	displays the spread of various outcomes in a dataset. Eg: measure how many cups of coffee their customers consume, and they want to know if that information is dependent on the days and times of the week. 

Sum up:

- **Change:** This is a trend or instance of observations that become different over time. A great way to measure change in data is through a **line** or **column chart**.
- **Clustering (Phân cụm):** A collection of data points with similar or different values. This is best represented through a **distribution graph**.
- **Relativity:** These are observations considered in relation or proportion to something else. You have probably seen examples of relativity data in a **pie chart**.
- **Ranking:** This is a position on a scale of achievement or status. Data that requires ranking is best represented by a **column chart**.
- **Correlation:** This shows a mutual relationship or connection between two or more things. A **scatterplot** is an excellent way to represent this type of data pattern.

Check out: [How to choose a data viz](#)

Find out what to use by a decision tree:

A **decision tree** is a decision-making tool that allows you, the data analyst, to make decisions based on key questions that you can ask yourself.

Below here is just an example, many different types of decision trees vary in complexity, and can provide more in-depth decisions.

Decision tree example



Additional resources: [From data to visualization](#), [Selecting the best chart](#) + [Part 2](#)

Avoiding misleading or deceptive charts

What to avoid

- Cutting off the y-axis
- Misleading use of a dual y-axis
- Artificially limiting the scope of the data

If you only consider the part of the data that confirms your analysis, your visualizations will be misleading because they don't take all of the data into account.

- Problematic choices in how data is binned or grouped

It is important to make sure that the way you are grouping data isn't misleading or misrepresenting your data and disguising important trends and insights.

- Using part-to-whole visuals when the totals do not sum up appropriately

If you are using a part-to-whole visual like a pie chart to explain your data, the individual parts should add up to equal 100%. If they don't, your data visualization will be misleading.

- Hiding trends in cumulative charts

Creating a cumulative chart can disguise more insightful trends by making the scale of the visualization too large to track any changes over time.

- Artificially smoothing trends

Adding smooth trend lines between points in a scatterplot can make it easier to read that plot, but replacing the points with just the line can actually make it appear that the point is more connected over time than it actually was.

Further reading

- [The beauty of data visualization](#): In this video, David McCandless explains the need for design to not just be beautiful, but for it to be meaningful as well. Data visualization must be able to balance function and form for it to be relevant to your audience.
- [‘The McCandless Method’ of data presentation](#): At first glance, this blog appears to be written by a David McCandless fan, and it is. However, it contains very useful information and provides an in-depth look at the 5-step process that McCandless uses to present his data.
- [Information is beautiful](#): Founded by McCandless himself, this site serves as a hub of sample visualizations that make use of the McCandless method. Explore data from the news, science, the economy, and so much more and learn how to make visual decisions based on facts from all kinds of sources.
- [Beautiful daily news](#): In this McCandless collection, explore uplifting trends and statistics that are beautifully visualized for your creative enjoyment. A new chart is released every day so be sure to visit often to absorb the amazing things happening all over the world.
- [The Wall Street Journal Guide to Information Graphics: The Dos and Don'ts of Presenting Data, Facts, and Figures](#): This is a comprehensive guide to data visualization, including chapters on basic data visualization principles and how to create useful data visualizations even when you find yourself in a tricky situation. This is a useful book to add to your data visualization library, and you can reference it over and over again.
- [The data visualization catalogue](#): Not sure where to start with data visualization? This catalogue features a range of different diagrams, charts, and graphs to help you find the best fit for your project. As you navigate each category, you will get a detailed description of each visualization as well as its function and a list of similar visuals.
- [The 25 best data visualizations](#): In this collection of images, explore the best examples of data that gets made into a stunning visual. Simply click on the link below each image to get an in-depth view of each project, and learn why making data visually appealing is so important.
- [10 data visualization blogs](#): Each link will lead you to a blog that is a fountain of information on everything from data storytelling to graphic data. Get your next great idea or just browse through some visual inspiration.
- [Information is beautiful](#): Founded by David McCandless, this gallery is dedicated to helping you make clearer, more informed visual decisions based on facts and data.

These projects are made by students, designers, and even data analysts to help you gain insight into how they have taken their own data and turned it into visual storytelling.

- [Data studio gallery](#): Information is vital, but information presented in a digestible way is even more useful. Browse through this interactive gallery and find examples of different types of data communicated visually. You can even use the data studio tool to create your own data-driven visual.

Correlation and causation

Correlation: two variables move in relationship to each other (doesn't mean that one event causes another, they just have a pattern with or a relationship to each other.)

Causation: event leads to a specific outcome

Note: Knowing the difference between correlation and causation is important when you make conclusions from your data since the stakes could be high

- Critically analyze any correlations that you find
- Examine the data's context to determine if a causation makes sense (and can be supported by all of the data)
- Understand the limitations of the tools that you use for analysis

Further explain

- **[Correlation is not causation](#)**: This article describes the impact to a business when correlation and causation are confused.
- **[Correlation and causation](#) (Khan Academy lesson)**: This lesson describes correlation and causation along with a working example. Follow the examples of the analysis and notice if there is a positive correlation between frostbite and sledding accidents.

Static or dynamic viz

Static visualizations do not change over time unless they're edited.

Dynamic visualizations are interactive or change over time. -> use Tableau

Design data viz

The element of art

- Line

- Shape
- Color

Hue: name of the color

Intensity: how bright a color is

Value: how much light is being reflected (like a heatmap)

- Space: use to point out the graph and the story you want to tell
- Movement

The principle of design



Balance



Emphasis



Movement



Pattern



Repetition



Proportion



Rhythm



Variety



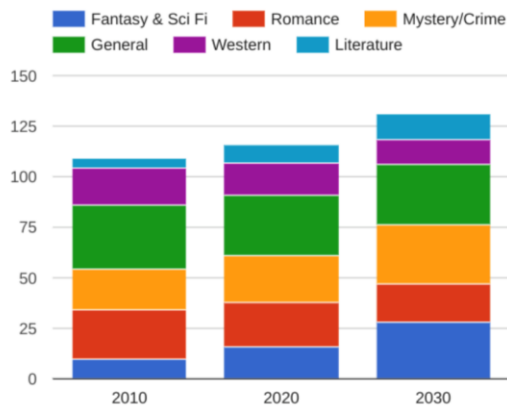
Unity

1. Balance: The design of a data visualization is balanced when the key visual elements, like color and shape, are distributed evenly, to make sure one thing doesn't distract from the other.

2. Emphasis: emphasize the most important data so that users recognize it first (rcm: use color and value)

3. Movement: should mimic the way people usually read (line and color, etc.)

4. Pattern: You can use similar shapes and colors to create patterns in your data visualization.



5. Repetition

6. Proportion: If you make one chart in a dashboard larger than the others, then you are calling attention to it.

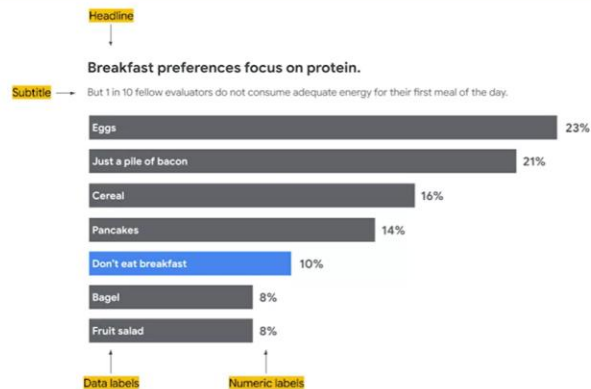
Design thinking process

- **Emphasize:** think about the emotions and needs of the target audience (what the end user actually needs?)
- **Define:** find your audience's needs, their problems, and your insights.
How a new functionality or solution to leverage and visualize big data would add value to them?
- **Ideate:**
- **Prototype**
- **Test:** create as many examples as possible and ask for comment

Note: Adopt a holistic view and avoid tunnel vision: earlier the team is able to identify an issue, the easier and less costly it is to change direction

---- Prototype

Headlines, subtitles, and labels



Headlines: use clear, concise language, explaining all information as plainly as possible. Make your audience want to read more

Make it bold or a few sizes larger than the rest of the text and place it directly above the chart, aligned to the left.

Subtitle: adding more context and description. Use a font style that matches the rest of the charts elements and place the subtitle directly underneath the headline.

Use label: Direct labeling like this keeps your audience's attention fixed on your graphic and helps them identify data quickly. (should not use legend next to the graph, since the eyes of observer must look 2 places)

Annotations: used to draw attention to certain data, placed immediately next to data annotated

Alternative text ensures that users who need to access your data visualizations in different ways will still absorb the information.

Visualization consideration

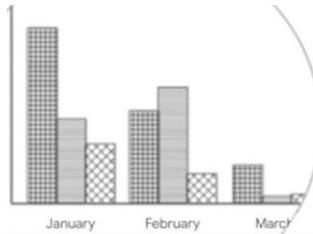
You should make the data accessible to everybody.

- Careful with color

Avoid placing green on red or red on green in your visualizations. (for people with Red-green color blindness)

Avoid using blue and green, or yellow and red on top of or next to each other.

- Consider depending on shape to represent



- Avoid overcomplicating data visualizations

Breaking down data into simple visualizations is key (including too much information in a single piece, or including long chunks, of text or too much information and graphs and charts)

You're making this to move the hearts and minds of other people to convince someone else that this data is meaningful to them and they should take an action on it. Or they should know this and they should use this for the organization or for their lives or for whatever the thing may be. And so, by focusing on accessibility, by focusing on the audience, by making it more inclusive, you're making your data clear and more impactful for everyone.

Designing a chart in 60 minutes

Prep (5 min): allowing yourself room to brainstorm how you want your data to appear while considering the amount and type of data that you have.

Talk and listen (15 min): Identify the object of your work by getting to the “ask behind the ask” and establishing expectations. Ask questions and really concentrate on feedback from stakeholders regarding your projects to help you hone how to lay out your data.

Sketch and design (20 min): Draft your approach to the problem.

Prototype and improve (20 min): Generate a visual solution and gauge its effectiveness at accurately communicating your data. Take your time and repeat the process until a final visual is produced. It is alright if you go through several visuals until you find the perfect fit.



Module 2: Design with tableau

5 sec rules: try to make your audience understand what are you trying to tell them in 5 secs.

Conventions and expectations: Visuals and their organization should align with audience expectations and cultural conventions. Eg: green with a positive concept and red with a negative one

Minimal labels: Titles, axes, and annotations should use as **few labels** as it takes to make sense

Color contrast: Graphs and charts should use a **diverging color palette** to show contrast between elements.



Tableau resources

As you continue to explore Tableau and prepare to make your own dynamic dashboards, here are a few useful links within Tableau Public:

- **Tableau Public Channels:** Explore data visualizations created by others across a variety of different topics.
- **[Viz of the Day](#):** Tableau Public features a new data viz every day; check back for new visualizations daily or [subscribe](#) to receive updates directly to your inbox
- **[Google Career Certificates page on Tableau Public](#):** This gallery contains all the visualizations created in the video lessons so you can explore these examples more in-depth.
- **[Tableau Public resources page](#):** This links to the resources page, including some how-to videos and sample data.
- **[Tableau Accessibility FAQ](#):** Access resources about accessibility in Tableau visualizations using the FAQ; it includes links to blog posts, community forums, and tips for new users.
- **[Tableau community forum](#):** Search for answers and connect with other users in the community on the forum page.
- **[Data Literacy Course](#):** Build your data literacy skills in order to interpret, explore, and communicate effectively with data.

Viz in Tableau

Tableau provides most of the basic chart and graph, and also some distinct charts.

Diverging color palette in Tableau displays a value's magnitude by color intensity and a value's range by color hue.

- [Which chart or graph is right for you?](#) This presentation covers 13 of the most popular charts in Tableau.
- [The Ultimate Cheat Sheet on Tableau Charts](#). This blog describes 24 chart variations in Tableau and guidelines for use.

Types of visualizations in Tableau

In addition to more traditional charts, Tableau also offers some more specific visualizations that you can use in your dashboard design:

- **Highlight tables** appear like tables with conditional formatting. Review the [steps to build a highlight table](#).
- **Heat maps** show intensity or concentrations in the data. Review the [steps to build a heat map](#).
- **Density maps** illustrate concentrations (such as a population density map). Refer to [instructions to create a heat map for density](#).
- **Gantt charts** demonstrate the duration of events or activities on a timeline. Review the [steps to build a Gantt chart](#).
- **Symbol maps** display a mark over a given longitude and latitude. Learn more from this [example of a symbol map](#).
- **Filled maps** are maps with areas colored based on a measurement or dimension. Explore an [example of a filled map](#).
- **Circle views** show comparative strength in data. Learn more from this [example of a circle view](#).
- **Box plots**, also known as **box and whisker charts**, illustrate the distribution of values along a chart axis. Refer to the [steps to build a box plot](#).
- **Bullet graphs** compare a primary measure with another and can be used instead of dial gauge charts. Review the [steps to build a bullet graph](#).
- **Packed bubble charts** display data in clustered circles. Review the [steps to build a packed bubble chart](#).

Work with multiple data sources in Tableau

Remember to: Change the data type (if there are any data that is not in an appropriate type)

<https://www.coursera.org/learn/visualize-data/quiz/ePEB4/hands-on-activity-practice-linking-data-in-tableau/attempt>

Resource

[Set up data sources](#)

Description

This page links to other resources explaining how to **set up your data sources** and prepare them for analysis once you have connected them to your Tableau account. It specifically includes

Resource	Description
Join your data	articles explaining how to join or blend data, and what a union is and how they work. This is a great starting point as you get ready to begin using and combining data sources. Joining refers to the process of combining data sources based on common fields. This article gives a more detailed explanation of the different joins, how to use them in Tableau, and an example join with a step-by-step guide.
Don't be scared of relationships	Relationships allow you to combine multiple data sources in Tableau. This is a more flexible alternative to joins, and doesn't force you to create one single table with your multiple data sources. This article will give you more insight into how relationships work.
How relationships differ from joins	This article goes into more detail about the differences between using relationships and joins , and guides you through the process of using relationships to combine data.
Blend your data	Data blending is another method you can use to combine multiple data sources. Instead of truly combining the data, blends allow you to query and aggregate data from multiple sources. This resource goes into more detail about blending and includes a tutorial.
Combining multiple date fields	This resource provides examples that explain how to combine date fields when using four different methods of data combination in Tableau

Tools: Pan: Horizontally and vertically change the perspective, but not the object

A vertical layout adjusts the height. A horizontal layout resizes the width of the views and objects it contains

Data storytelling

What makes up a good data story?

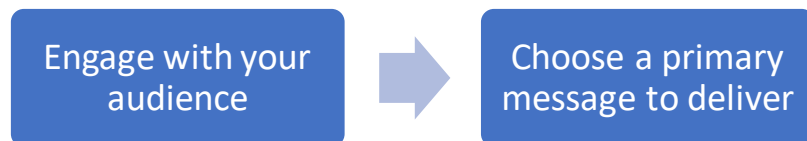
A good data story leverages three major components:

(accurate) Data, (simple) narrative, and (easy to read) visuals.

Remember to focus on the audience's engagement. (think about *who* they are, *what* are their problem (role) and *how* they can solve their problem with your insight delivered from your viz)

Commented [NL1]: understand the tools that are available to you and know how they work, but never to let those tools overwhelm your story

How to Create Data Stories?



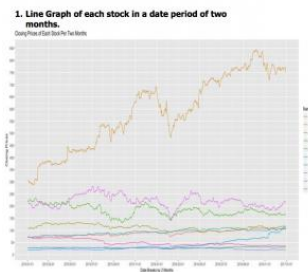
1. Begin with a Pen-paper Approach

Scripting down your ideas and flow before you start structuring your story is very essential to your final product. The single most important thing you can do to dramatically improve your analytics is to have a story to tell. A flow that you can generate can have a lot of friction in your end result.

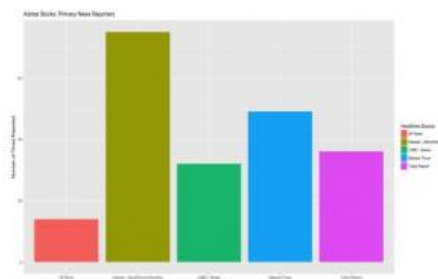
Aristotle's classic five-point plan that helps deliver strong impacts is:

1. Deliver a story or statement that arouses the audience's interest.
2. Pose a problem or question that has to be solved or answered.
3. Offer a solution to the problem you raised.
4. Describe specific benefits for adopting the course of action set forth in your solution.
5. State a call to action.

The way I structured my report was by involving plots that would give me a better understanding of my data. First idea that I had was, how can I make better business decisions of stocks by using the data that I have? => Involving a line graph would help me analyze trend lines of specific stock prices.



As I can see, February 2016 has been a drop for all stocks. This would help me scrape news articles only from that period to identify what caused the drop. Now, how do I select which news source to scrape from?



By identifying which news source reported most about a particular stock, we would have reason to believe that this is a good source for the specific stock.

2. Dig Deeper to Identify the Sole Purpose of Your Story

- Identify closely, what the idea of your story is. Ask yourself, “What am I really giving with this story?” It’s never the story alone, but what the story can do to make decision-making better. What you’re displaying is the idea of better decision making or analytics.
- Develop a personal “*passion statement*.” In one sentence, tell your prospects and why you are genuinely excited about working with them. Your passion statement will be remembered long.

TOP TAKEAWAYS FROM THIS SECTION:

1. We found that Amazon is an outperforming stock, so we must analyse all companies independently to delve deeper and stronger.
2. Lower priced stocks are traded in bulk, while higher priced stocks are traded in lesser volumes.
3. The candlestick chart depicts all columns of each day independently very informatively, thus making it our choice for the plot we will use for trend and market analysis of stocks. It even tells us which date was prominent in the context to help us understand what dates we will be looking at, to scrape webpages.
4. The bar-plot tells us the prominent news sources for each company, thereby helping us select the right news sources to scrape from.

3. Use Powerful Headings

- Create your heading, a one-sentence statement for your story, visual, or analysis. The most effective headlines are concise, specific, and offer a personal benefit.
- Remember, your heading is a statement that offers your audience a vision of a better understanding. It’s not about you. It’s about them.

4. Design a Road-Map

- Create a list of all the **key points** you want your audience to know about your story, visual, or analysis.
- **Categorize the list** until you are left with only three major message points. This group of three will provide the verbal road map for your story.
- Under each of your three key messages, **add supporting evidence** to enhance the narrative. These could include some or all of the following: personal stories, facts, examples, analogies etc.

5. Conclude with brevity

Now that you have put forward all points of your story, your conclusion should be short and powerful. In my report, I mentioned small 3-4 liner summaries to conclude why to buy a particular stock.

ADOBE SYSTEMS, INC. [BUY]

STOCK:

- Adobe dropped by -29.73% in the last two years from \$102.95 to \$72.34 and has had a brisk growth rate. The stock grew an average of +2.093% in after-hours trade, showing its capability to reverse and narrow losses.

VOLUME:

- Volume has dropped in the last week of 2016 by 0.428 million shares along with the price dropping by -\$2.56. Overall trading volume in the two-year period dropped by -11.05%. The signs don't look so appealing as the trend of volume is dropping sharply with price. In total, 263.28 million shares traded in Q4 2016 for approximately \$22.062 Billion.

TREND:

- Adobe lies in the upper part of a weak rising trend in the short term, and this will normally pose a very good selling opportunity for the short-term trader with 90% probability to be traded between \$107.661 and \$100.162 as in the Bollinger Bands.

EVALUATION:

- This stock is usually traded at 2.803 Million/Day volume and at minor daily changes the risk is considered to be low. **A great buying opportunity during this period.**

HOT PICKS FOR THE PERIOD (JAN-MAR 2017)

• Amazon

Considering that Amazon has been bleeding money in the Asian Subcontinental areas like India due to Flipkart being funded heavily and being pushed out of China due to Alibaba, they're looking to expand widely in areas ranging from Pharmaceuticals to Groceries.

• Adobe

Adobe doesn't look to back down as everybody is wishing to move to the digital market and cut down on costs.

• NVIDIA

NVIDIA has romped up its sales in competition with AMD, and is releasing Volta GPU's soon which are considered to be next gen. NVIDIA holds an extremely bullish trend as well as high risks, as seen in the wide interval of the Bollinger Bands.

Tableau dashboard

In Tableau, tiled items can't be layered over other objects. They are part of a single-layer grid that automatically resizes based on the overall dashboard size. You can layer floating items over other objects.

Live and static insights

	Static data: providing screenshots or snapshots in presentations or building dashboards using snapshots of data	Live data: connected to automatically updated data
PROS	<ul style="list-style-type: none">• Can tightly control a point-in-time narrative of the data and insight• Allows for complex analysis to be explained in-depth to a larger audience	<ul style="list-style-type: none">• Dashboards can be built to be more dynamic and scalable• Gives the most up-to-date data to the people who need it at the time when they need it• Allows for up-to-date curated views into data with the ability to build a scalable “single source of truth” for various use cases• Allows for immediate action to be taken on data that changes frequently• Alleviates time/resources spent on processes for every analysis
CONS	<ul style="list-style-type: none">• Insight immediately begins to lose value and continues to do so the longer the data remains in a static state• Snapshots can't keep up with the pace of data change	<ul style="list-style-type: none">• Can take engineering resources to keep pipelines live and scalable, which may be outside the scope of some companies' data resource allocation• Without the ability to interpret data, you can lose control of the narrative, which can cause data chaos (i.e. teams coming to conflicting conclusions based on the same data)• Can potentially cause a lack of trust if the data isn't handled properly

Filter

Applying styles

Change the fill color of the chart to one of the blue hues recommended for use on white backgrounds for accessibility.

Directions on how to create additional dashboard types with Tableau are [here](#)

Presentation

Components of a good narrative:

- Characters: people affected by your story. (your stakeholders, customers, clients, and others.) => Include a personal account and bring more human context to the facts that the data has revealed—think about why they care.
- A setting: describes what's going on, how often it's happening, what tasks are involved, and other background information about the data project that describes the current situation.
- A plot (conflict): what creates tension in the current situation. (problem)
- Big reveal: solution - how the data has shown that the problem can be solved (becoming more competitive, improving a process, inventing a new system, or whatever the ultimate goal of your data project may be)
- An "aha moment,": when you share your recommendations and explain why you think they'll help your company be successful.

Checklist for a good presentation:

Watch the video of your presentation. As you watch it, go through the following checklist. Each point is related to a best practice for presentations.

Do you:

- Use an attention-grabbing opening?
- Start with broad ideas and later talk about specific details?
- Speak in short sentences?
- Pause for five seconds after showing a data visualization?
- Pause intentionally at certain points?
- Keep the pitch of your voice level?
- Stand still and move with purpose?
- Maintain good posture?
- Look at your audience (or camera) while speaking?
- Keep your message concise?

Commented [NL2]: The difference between the current color and these accessible colors may seem minimal, but a contrast ratio of 4.5:1 is important for people who cannot see the full color spectrum.

Read through the [Carnegie Museums of Pittsburgh's accessibility guidelines](#) to learn more about web accessibility guidelines.

- #0071bc
- #046b99
- #205493

- End by explaining why the data analysis matters?

Slides

- Slideshow: professional and appealing
Include a title and subtitle; date and last modified date (if have)
A good rule is to keep texts to less than five lines and 25 words per slide
- Visuals: "What's the single most important thing I want my audience to learn from my analysis?"

Note: if you link your visual within your presentation, the visual lives within its original file, and the slideshow connects to it with the visual's URL. Because the two files are now linked, when you make changes to the original file, say a spreadsheet, the changes will automatically appear in your presentation. (for data that changes over time)

Checklist:

Do you:

- Include a good title and subtitle that describe what you're about to present?
- Include the date of your presentation or the date when your slideshow was last updated?
- Use a font size that lets the audience easily read your slides?
- Showcase what business metrics you used?
- Include effective visuals (like charts and graphs)?

Module 4: Developing presentations and slideshows

Presenting a framework

Framework to guide your presentation:

1. Your understanding of the business task
2. Presentation outliner
3. Present: data viz, business metrics

a) what data was available during data collection, tell them if any new relevant data has come up, or if you discovered that you need different data. => what question they are expected to answer

b) Hypothesis: a theory you're trying to prove or disprove with data

eg: a trend of annual revenue growth from an increasing number of online sales, a relationship between the holiday season and increased traffic congestion, and an increase of wildlife presence from a record high in annual rainfall.

c) Solutions

McCandless Method

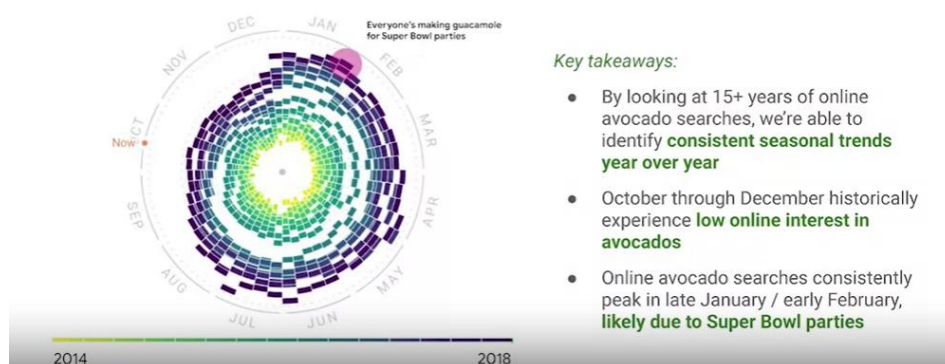
1. Introduce your graphic by name
2. Answer the obvious questions your audience might have before they're asked.

High level -> low level of information (how to read the graphs,...)

3. Some key takeaways and insights
4. Call out data to support that insight
5. Tell your audience why it matters (so what?) -> what they can do considering the data

Self-check: "Does this data point or chart support the point I want people to walk away with?"

Spring, summer, and winter experience the largest seasonal increases in searches



Tips

Make the presentations fun by using quizzes, games, videos, etc.

Have at least an ally in the room (present to them 1st to get feedback, and they also have your back when you have to handle lots of questions at a time)

Wait five seconds after showing a data visualization to let your audience process it, then ask if they understand it. If not, take time to explain it, then give your audience another five seconds to let that sink in before telling them the conclusion you want them to understand.

Preparation is key

focus on what information they need to reach the same conclusion you did.

keep your presentation focused and to the point to keep their minds from wandering

try to be mindful of any nervous habits you have. Maybe you talk faster, tap your toes, or touch your hair when you're nervous. => breath exercise

Practice good posture and make positive eye contact with the people in your audience.

[Connor: Good example of a data presentation](#)

[Demystifying value: The importance of lifetime value](#)
[Airbnb pitch deck from 2008](#)

Guide: Sharing data findings in presentations

Telling your data story

Tip 1: Know your flow

a data story must have a good plot (theme and flow), good dialogue (talking points), and a great ending or big reveal (results and conclusions).

Who is my audience?

- If your intended audience is **executives, board members, directors, or other C-level** (C-Suite) executives, your storytelling should be kept at a high level. This audience will want to hear about your story but might not have time to hear the *entire* story. Executives tend to focus on **endings** that encourage improving, correcting, or inventing things. Keep your presentation brief and spend most of your time on your results and recommendations
- If your intended audience is **stakeholders and managers**, they might have more time to learn about how you performed your analysis and they might ask more data-specific questions. Be prepared with talking points about the **aspects of your analysis** that led you to your final results and conclusions.
- If your intended audience is **other analysts and individual contributors**, you will have the most freedom—and perhaps the most time—to go more deeply into the **data, processes, and results**.

Tip 2: Prepare talking points and limit text on slides

As you create each slide in your presentation, prepare **talking points** (also called **speaker notes**) on what you will say.

Follow the five-second rule. Your audience should not be spending more than five seconds reading any block of text on a slide.

Tip 3: End with your recommendations

- Use one slide for your recommendations at the end. Be clear and concise.
- If you are recommending that something be done, provide the next steps and describe what you would consider a successful outcome.

Tip 4: Allow enough time for the presentation and questions

Your slide deck layout



First slide: Agenda

Here is an example of a 30-minute agenda:

- Introductions (4 minutes)
- Project overview and goals (5 minutes)
- Data and analysis (10 minutes)
- Recommendations (3 minutes)
- Actionable steps (3 minutes)
- Questions (5 minutes)

Second slide: Purpose

Third slide: Data/analysis

- 1 cue from your talking points should let the audience know when you will go on to the next slide.
- Remember not to use too much text on the slides.
- don't want to simply read or say the words on the slides.

For extra visuals on the slides, use animations. For example, you can:

- Fade in one bullet point at a time as you discuss each on a slide.
- Only display the visual that is relevant to what you are talking about (fade out non-relevant visuals).
- Use arrows or callouts to point to a specific area of a visual that you are using.

Fourth slide: Recommendations

This is when you might get a lot of questions about how your data supports your recommendations. Be ready to communicate how your data backs up your conclusion or recommendations in different ways.

Fifth slide: Call to action

Sometimes the call to action can be combined with the recommendations slide. If there are multiple actions or activities recommended, a separate slide is best.

Wrapping it up: Getting feedback

After you present to your audience, think about how you told your data story and how you can get feedback for improvement.

Q&A session

Be prepared to consider any limitations of your data by:

- Critically analyzing the correlations
- Looking at the context
- Understanding the strengths and weakness of the tools

Before the presentation

1. Assemble and prepare your questions.
 - Make sure you have a clear understanding of the objective and what the stakeholders wanted when they asked you to take on this project.
 - Start with zero assumptions: Don't assume that your audience is already familiar with jargon, acronyms, past events, or other necessary background information.
2. Discuss your presentation with your manager, other analysts, or other friendly contacts in your organization.
3. Ask a manager or other analysts what sort of questions were normally asked by your specific audience in the past.
4. Seek comments, feedback, and questions on the deck or the document of your analysis.
5. At least 24 hours ahead of the presentation, try and brainstorm tricky questions or unclear parts you may come across- this helps avoid surprises.
6. It never hurts to practice what you will be presenting, to account for any missing information or simply to calm your nerves.

During the presentation

1. Be prepared to respond to the things that you find and effectively and accurately explain your findings.
2. Address potential questions that may come up.
3. Avoid having a single question derail a presentation and propose following-up offline.
4. Put supplementary visualizations and content in the appendix to help answer questions.

How to handle objections?

* About the data: where you got the data and what systems that came from, what transformations happened to it before you worked with it, or how fresh and accurate your data is.

-> You can include all this information in the beginning of your presentation to set up the data context.

-> add a more detailed breakdown in your appendix in case there are more questions.

* About your analysis:

- o If your analysis is reproducible

-> Keeping a log is useful to explain about the data's cleanness.

-> create a slide in the appendix section of your presentation explaining these steps, if you think it will be necessary.

-> And it can be useful *to keep a clean version* of your script if you're working with a programming language like SQL or R

- o "Who did you get feedback from during this process?"

➔ Making sure to include lots of perspectives throughout your analysis process will help you back up your findings during your presentation

=> If you receive an objection about the completeness of your analysis, you should politely acknowledge the objection. Then, reiterate each step you took in your analysis and explain why you did each one. Finally, promise to investigate your analysis question further so that the analysis is complete or your presentation is more clear.

* About your findings:

"Do these findings exist in previous time periods, or did you control for the differences in your data?" Your audience wants to be sure that your final results accounted for any possible inconsistencies and that they're accurate and useful.

Commented [NL3]: Eg: Your stakeholders express concern that the results of your analysis are very different from the predictions they made last year.

- Responding:

First, it can be useful to communicate any assumptions about the data, your analysis, or your findings that might help answer their questions. For example, did your team clean and format your data before analysis? Telling your audience that can clear up any doubts they might have.

Second, explain why your analysis might be different than expected. Walk your audience through the variables that change the outcomes to help them understand how you got there.

And third, some objections have merit, especially if they bring up something you hadn't thought of before. If that's true, you can acknowledge that those objections are valid and take steps to investigate further.

Note: Questioning back the stakeholder may seem combative or aggressive. => acknowledging its validity. Then, follow up with details and promise to investigate the matter further.

Responding to the questions

- Listen to the whole question
- Repeat the question if necessary
- Understand the context

Remember the project goals and your stakeholders' interests in them, and try to keep your answers relevant to that specific context, just like you made sure your presentation itself was relevant to your stakeholders. (for eg: If you're presenting to a group of stakeholders who are in the healthcare industry, they're probably going to be more interested in the medical data and the relationship between overall health and happiness.)

- Involve your whole audience

You aren't just having a one-on-one conversation with the person that's asked the question; you're presenting to a group of people who might also have the same question or need to know what that answer is. If there's someone in your audience or team that might have insight, ask them for their thoughts.

- Keep your responses short.

Start with a headline response that gives your stakeholders the basic answer. Then if they have more questions, you can go into more detail.

Note: If it is a tough question that will require additional analysis or research, it's fine to let your audience know that you'll get back to them; just remember to follow up in a timely manner.

If the audience lose interest: you can redirect to a new question or ask a question to your audience to re-engage them.