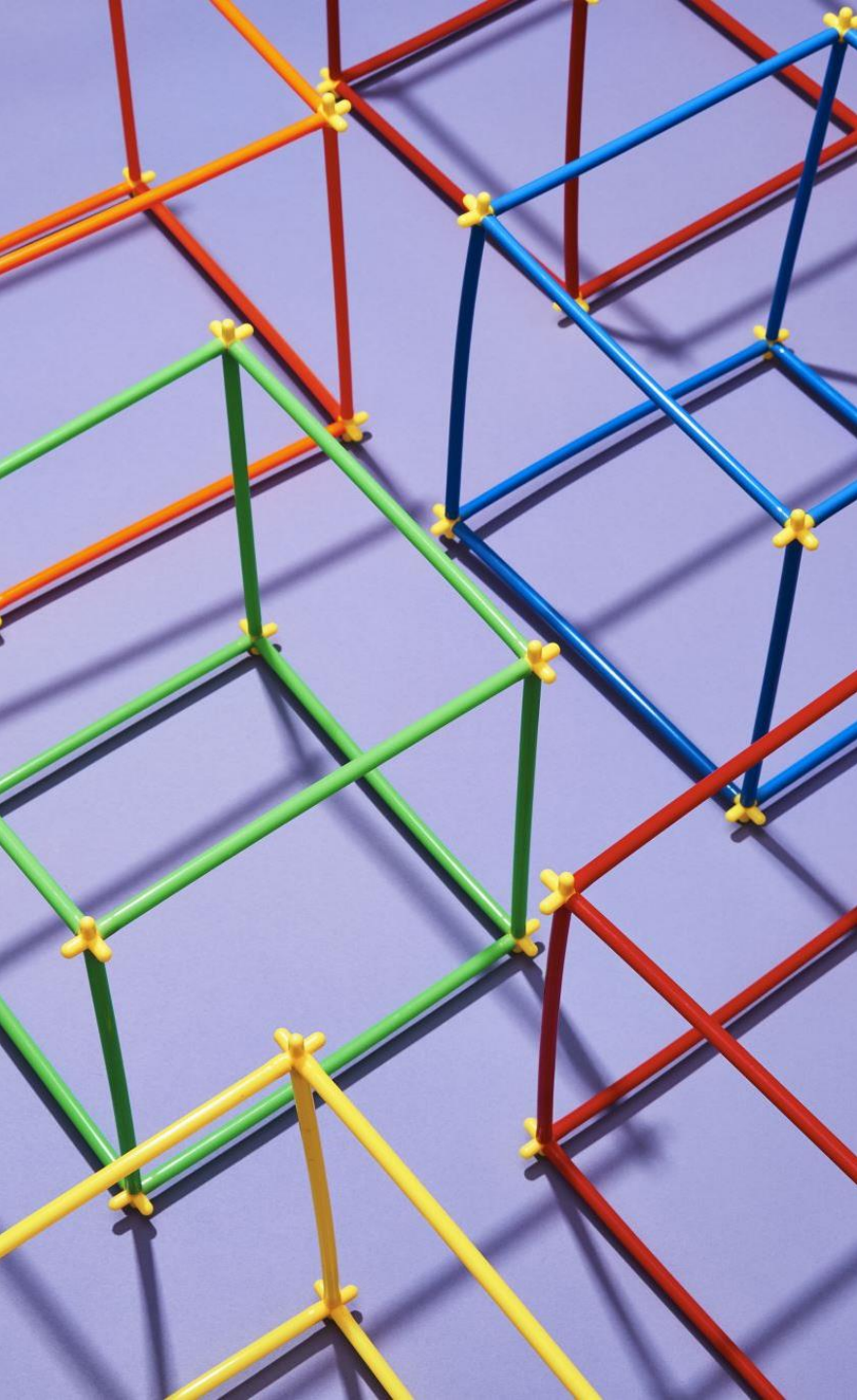La Guardia Community College

DATA 203 DATA VISUALIZATION USING TABLEAU

Class 10

DATA STORYTELLING

"Gartner projects that by 2025, data stories will be the most widespread way of consuming analytics" — Data Trends

"Storytelling is the essential human activity. The harder the situation, the more essential it is." - Tim O'Brien, author
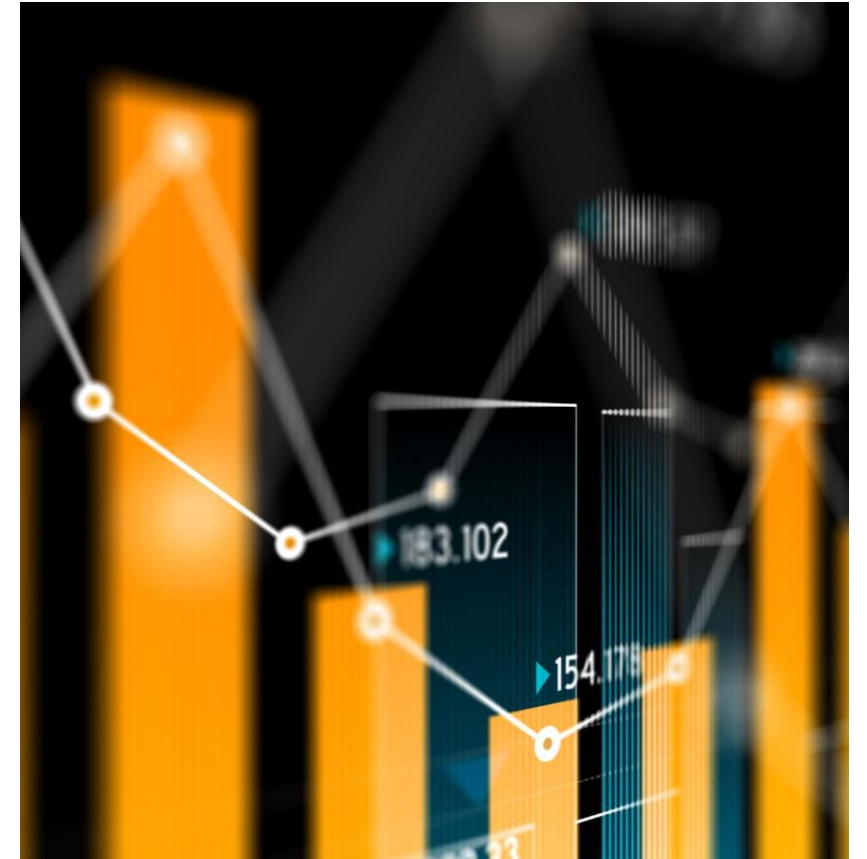
DATA STORYTELLING

1. You have just finished analyzing a dataset at work.

2. You create a deck with standard reports and charts based on your analysis. You send the deck to your users.

3. There is no story, there is no narrative

4. Your users will look at the chart, will be interested in what you presented and then will move to the next thing.

DID YOU MAKE AN IMPACT?

5. Tell a story or a narrative of your analysis. Identify what are the areas of improvement or growth.

6. Tell the user how to act on the areas you have identified in your deck.

   1. Data without story is not always meaningful
   2. Stories help bring the data to life.
   3. Leverage the power of telling a story **every time** you are communicating with data

DATA STORYTELLING

- **Data Visualization** helps us understand "**WHAT**" is happening

- **Data Storytelling** tells us "**WHY**" is that happening

SMALL INSIGHTS can be acted upon by individuals
- If individuals see insights relevant to their role
- They are empowered to act upon it
- You **DO NOT** need Data Stories for that.

 BIG INSIGHTS require communication
- We have to tell individuals what needs to be done

DATA STORYTELLING

FOUR KEY COMMUNICATION OBJECTIVE

1. **Attention**
   - Deliver insights in a way that captures the attention of your audience

2. **Understand**
   - Ensure that your insight is clear and clearly state the action they should act upon.

3. **Remember**
   - Your insights need to resonate with your audience.

4. **Act On It**
   - If your audience is not acting on your insights, you are not adding any value

DATA STORYTELLING

Brent Dyke's Data Storytelling Framework

Three Pillars of Data Storytelling

- Data

- Narrative

- Visuals

When you look at the intersections of these bubbles you understand why Data Storytelling is important

DATA STORYTELLING – WHY DOES IT MATTER?

EXPLAIN: Narrative + Data

- You are not going to provide your audience raw data
- You will lead your audience through the numbers.
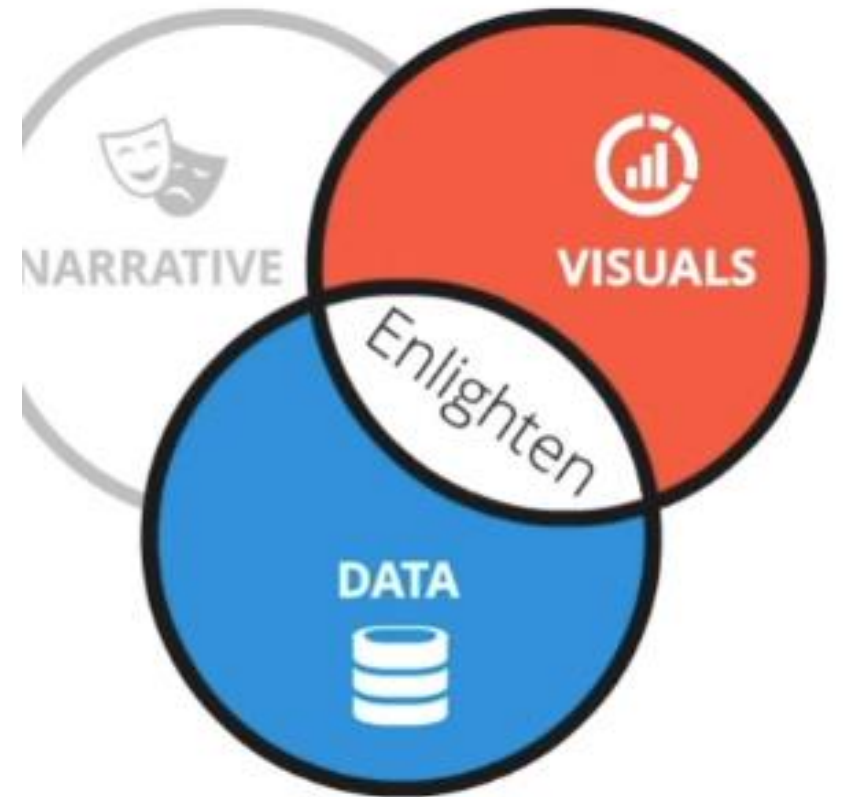- Explain what the numbers mean using narrative.

DATA STORYTELLING – WHY DOES IT MATTER?

ENLIGHTEN: Data + Visuals

- If you use data in tabular format
- Your audience will miss the trends, the patterns, the anomalies,
- When you visualize the numbers, you will **enlighten** your audience
  - to what is happening in the data
  - understand the insights you are sharing.

DATA STORYTELLING – WHY DOES IT MATTER?

ENGAGE: Narrative + Visuals

- Humans love the combination of narrative and visuals.
- We engage with YouTube videos and TikTok.

DATA STORYTELLING – WHY DOES IT MATTER?

- When we combine all these three attributes

    Right Data + Right Narrative + Right Visuals

- You have something powerful that **can influence** and **drive change**.

DATA STORYTELLING - NARRATIVE

Using Freytag's Model for Data Storytelling

DATA STORYTELLING ARC

3 **Aha Moment**
Major finding or
central insight

2 **Rising Insights**
Supporting details
that reveal deeper
insights into the
problem or
opportunity

4 **Solution & Next Steps**
Potential options
& recommendation

1 **Setting & Hook**
Background on
current situation,
character(s) &
hook

DATA STORYTELLING - NARRATIVE

Step 1: SETTING THE HOOK

- Establish context for your analysis
- Know the characters
- **State the Hook - the twist or interesting fact you discovered in the data.**
- Do not state anything non interesting to your audience

Step 2: RISING INSIGHTS

- Supporting Details that reveal deeper insights into the opportunity or problem
- You are providing more insights and observations

Step 3: AHA MOMENTS

- Talk about your Major Finding/ Central Insight.

  - An Issue or problem that needs to be addressed
  - Is there an opportunity for growth.

Step 4: SOLUTION & NEXT STEPS

- **Call to Action - What do you want your audience to do?**

  - If your audience disagrees, it opens up a channel for conversation
  - That conversation may not happen if you simply just show the data

DATA STORYTELLING - NARRATIVE

PIXAR – Use this format for all their stories

- Once Upon a Time there was ….
- Every day, …………..
- But, one day …………….
- Because of that ………..
- Because of that …………..
- Because of that …………
- Until finally ………..
- And, ever since there …………..

DATA STORYTELLING - NARRATIVE

If applied Data Storytelling to Pixar Story Format

Step1: Setting & Hook

- Once Upon a Time there was …. SETTING
- Every day, ….......... THE CONTEXT
- But, one day …............. HOOK

Interesting observation that we want to capture

Step 2: Rising Insights

- Because of that …..........
- Because of that …..............
- Because of that …..........

Showing a little more detail into what's going on

Step 3 - Aha Moment

- Until Finally …..

Step 4 - Solutions & Next Steps

And, ever since there …............
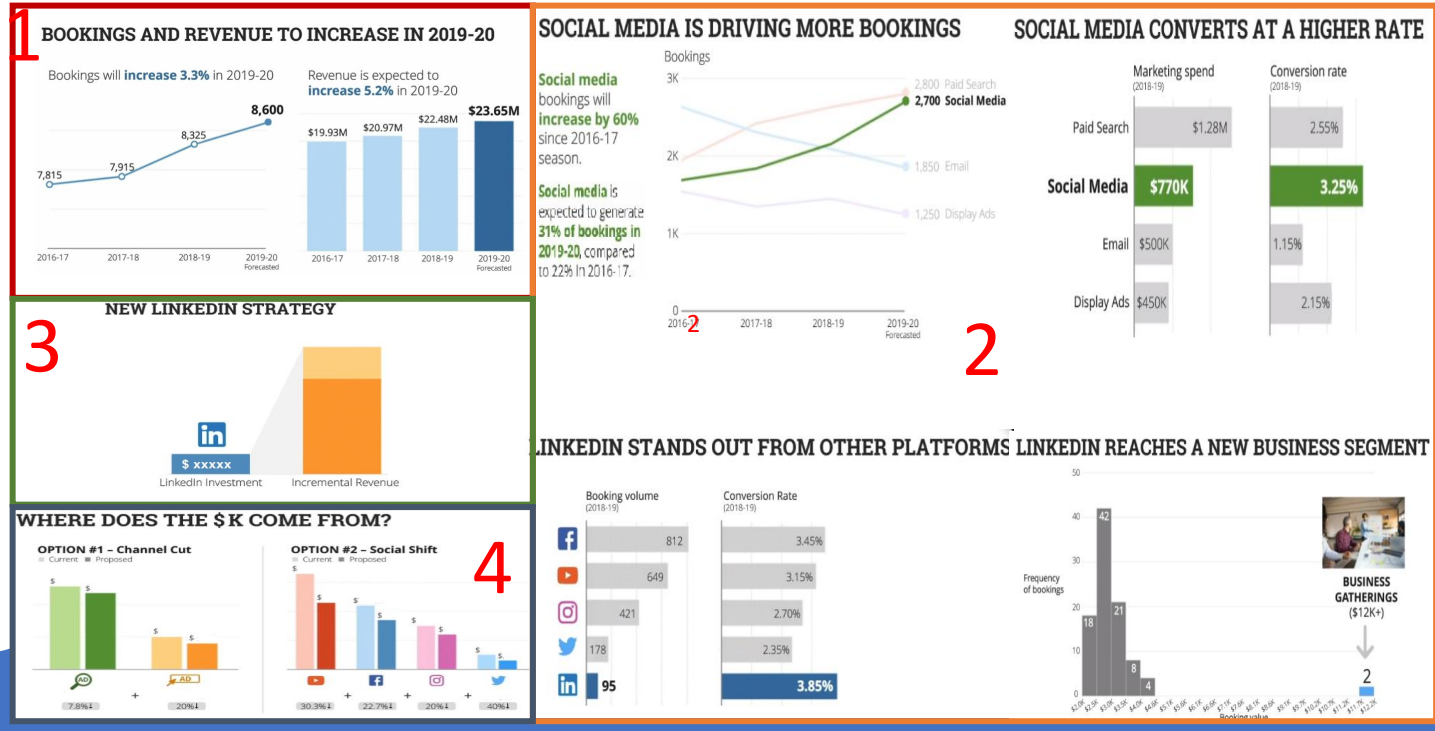
DATA STORYTELLING
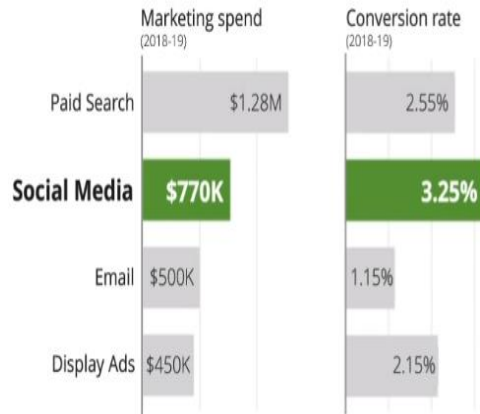
SOCIAL MEDIA IS DRIVING MORE BOOKINGS

Social media bookings will **increase by 60%** since 2016-17 season.

Social media is expected to generate **31% of bookings in 2019-20**, compared to 22% in 2016-17.

Bookings

- 2,800 Paid Search
- **2,700 Social Media**
- 1,850 Email
- 1,250 Display Ads

3K
2K
1K
0

2016-17 · 2017-18 · 2018-19 · 2019-20 Forecasted

2

SOCIAL MEDIA CONVERTS AT A HIGHER RATE

	Marketing spend (2018-19)	Conversion rate (2018-19)
Paid Search	$1.28M	2.55%
Social Media	**$770K**	**3.25%**
Email	$500K	1.15%
Display Ads	$450K	2.15%

NEW LINKEDIN STRATEGY

3

$ xxxxx

LinkedIn Investment · Incremental Revenue

BOOKINGS AND REVENUE TO INCREASE IN 2019-20

1

Bookings will **increase 3.3%** in 2019-20

- 7,815
- 7,915
- 8,325
- **8,600**

2016-17 · 2017-18 · 2018-19 · 2019-20 Forecasted

Revenue is expected to **increase 5.2%** in 2019-20

- $19.93M
- $20.97M
- $22.48M
- **$23.65M**

2016-17 · 2017-18 · 2018-19 · 2019-20 Forecasted

WHERE DOES THE $K COME FROM?

4

OPTION #1 – Channel Cut
Current ■ Proposed

7.8%↓ · 20%↓

OPTION #2 – Social Shift
Current ■ Proposed

30.3%↓ · 22.7%↓ · 20%↓ · 40%↓

LINKEDIN STANDS OUT FROM OTHER PLATFORMS

	Booking volume (2018-19)	Conversion Rate (2018-19)
Facebook	812	3.45%
YouTube	649	3.15%
Instagram	421	2.70%
Twitter	178	2.35%
LinkedIn	95	**3.85%**

2

LINKEDIN REACHES A NEW BUSINESS SEGMENT

Frequency of bookings

50
42
30
18 · 21
10
8
4
2

Booking value

BUSINESS GATHERINGS ($12K+)

EXECUTIVE REPORT FOR SALES
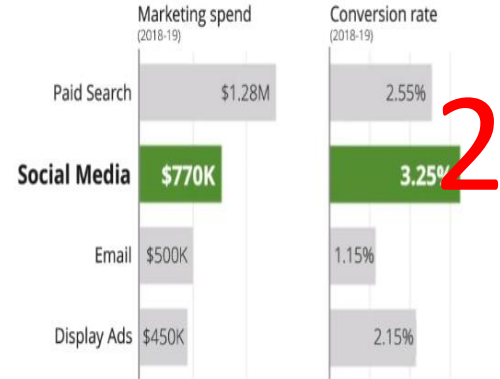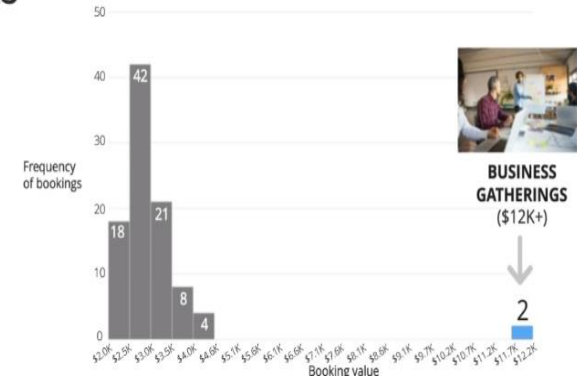
Provide some Analysis of the findings and Impact Statement

BOOKINGS AND REVENUE TO INCREASE IN 2019-20

Bookings will **increase 3.3%** in 2019-20

8,600
8,325
7,915
7,815

2016-17 2017-18 2018-19 2019-20 Forecasted

Revenue is expected to **increase 5.2%** in 2019-20

$23.65M
$22.48M
$20.97M
$19.93M

2016-17 2017-18 2018-19 2019-20 Forecasted

SOCIAL MEDIA IS DRIVING MORE BOOKINGS

Bookings

Social media bookings will increase by 60% since 2016-17 season.

Social media is expected to generate 31% of bookings in 2019-20, compared to 22% in 2016-17.

2,800 Paid Search
2,700 Social Media
1,850 Email
1,250 Display Ads

2016-17 2017-18 2018-19 2019-20 Forecasted

SOCIAL MEDIA CONVERTS AT A HIGHER RATE

Marketing spend (2018-19)

Paid Search $1.28M
Social Media $770K
Email $500K
Display Ads $450K

Conversion rate (2018-19)

2.55%
3.25%
1.15%
2.15%

LINKEDIN STANDS OUT FROM OTHER PLATFORMS

Booking volume (2018-19)

Facebook 812
YouTube 649
Instagram 421
Twitter 178
LinkedIn 95

Conversion Rate (2018-19)

3.45%
3.15%
2.70%
2.35%
3.85%

LINKEDIN REACHES A NEW BUSINESS SEGMENT

Frequency of bookings

18 42 21 8 4

BUSINESS GATHERINGS ($12K+)

2

Booking value

NEW LINKEDIN STRATEGY

$ xxxxx
LinkedIn Investment   Incremental Revenue

Number of resort guests

2.4K
1.8K
1.2K
600

April 17 was the peak of the snow depth, but we only had about 300 guests.

180"
Snow depth (inches)
31"

25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15 20 25 1 5 10 15 20 25
Dec 2018 Jan 2019 Feb 2019 Mar 2019 Apr 2019 May 2019 Jun 2019

WHERE DOES THE $K COME FROM?

OPTION #1 – Channel Cut
Current Proposed

$ $ $ $

AD AD
7.8%↓ 20%↓

OPTION #2 – Social Shift
Current Proposed

$ $ $ $ $ $

30.3%↓ 22.7%↓ 20%↓ 40%↓
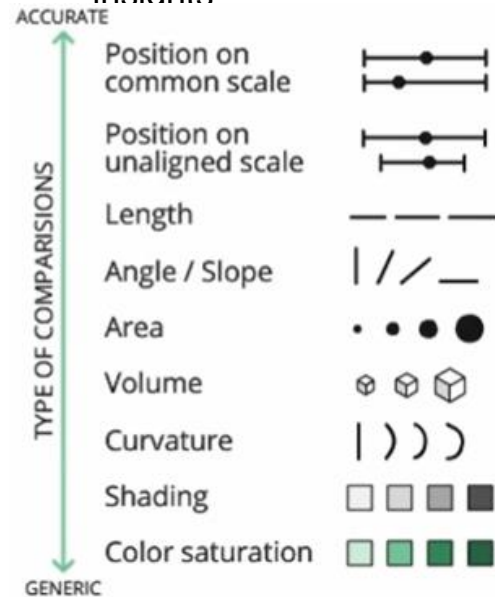
DATA STORYTELLING –

SOLUTION & NEXT STEP

What Happens Next?

Your audience will engage in discussion regarding solution and next steps.

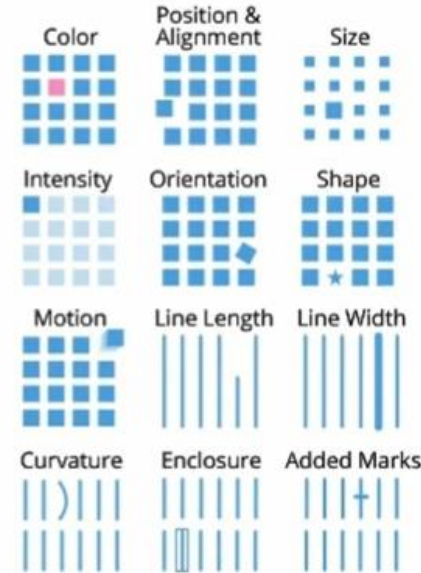Using Brent Dyke's Data Storytelling framework

CLEVELAND & McGILL

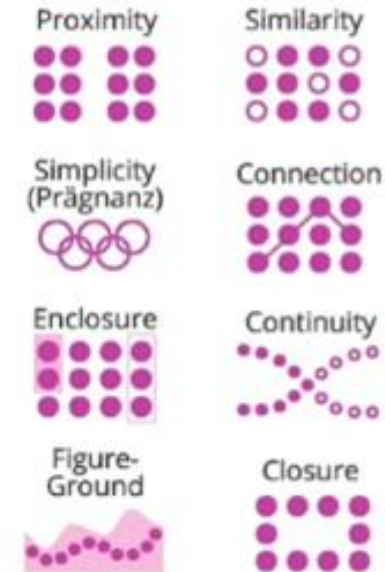Clarity – Select the right chart to share your insights

PREATTENTIVE ATTRIBUTES

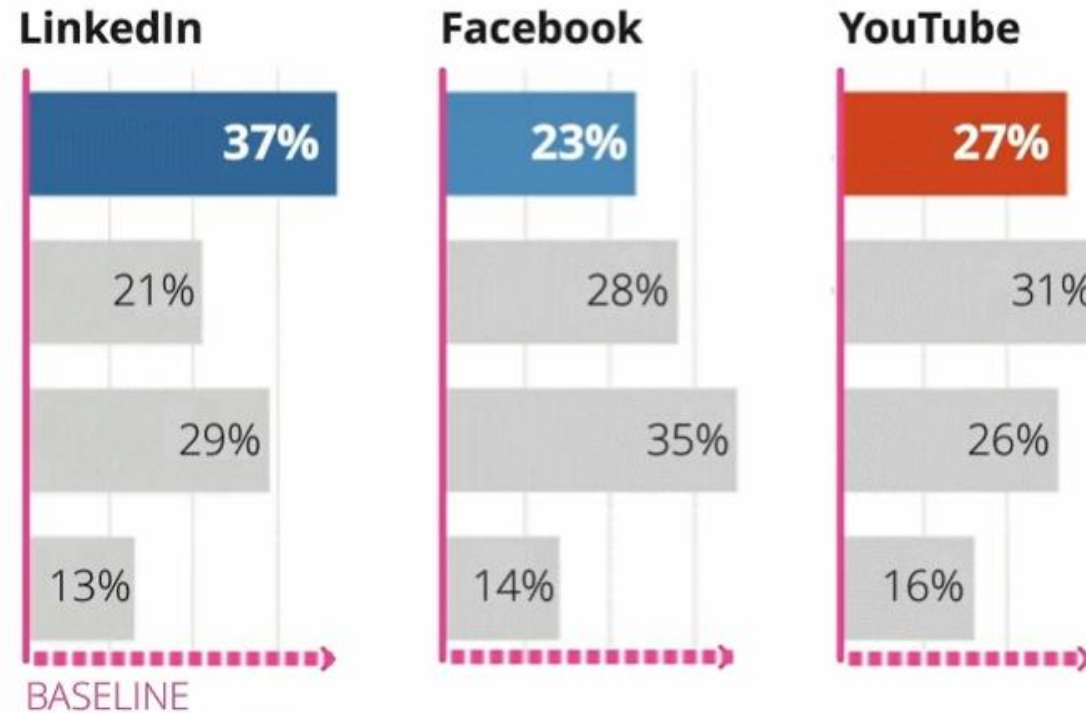Attention - apply design principles to highlight key elements

GESTALT THEORY

Ease of Use – streamline the chart for easy consumption
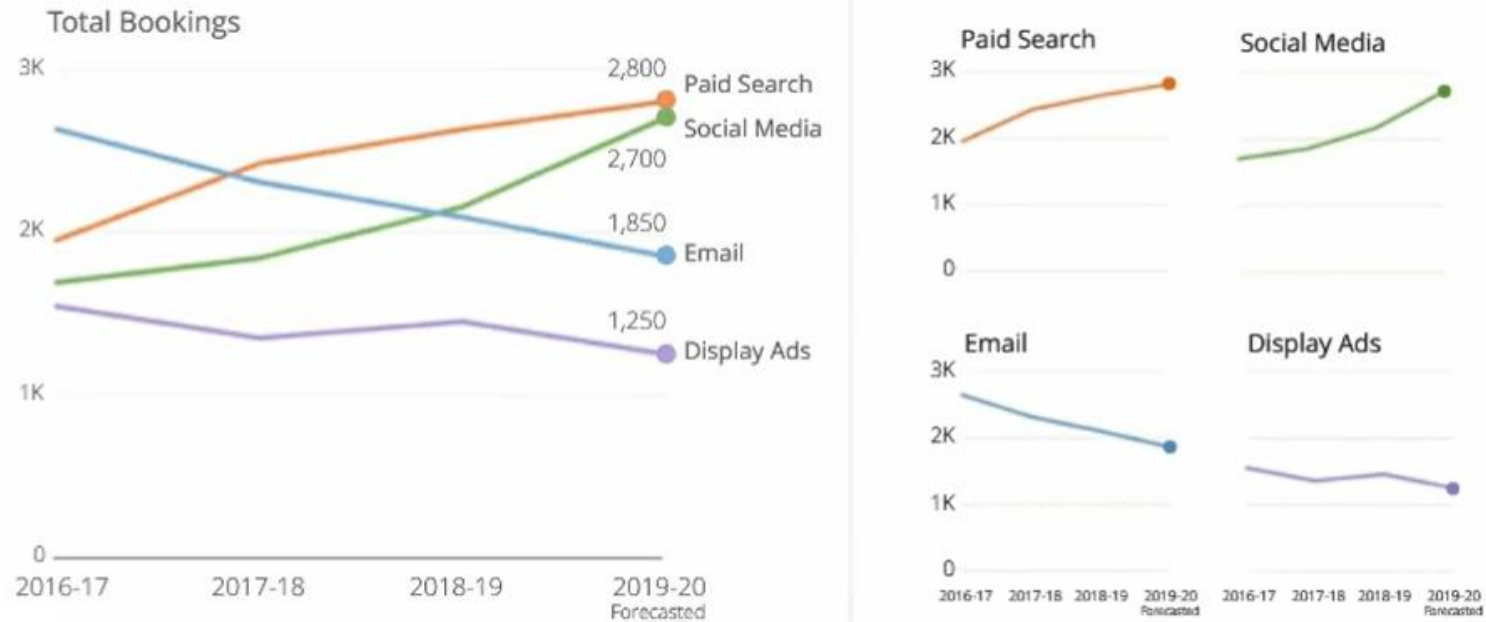

DATA STORYTELLING – VISUALS

BAR CHARTS RELY ON POSITION OR LENGTH

DATA STORYTELLING - CLEVELAND & McGILL MODEL

- All 3 bar charts have a common baseline for easy comparison
- Bar Chart – leverage length and position and easy for interpretation for accuracy

DATA STORYTELLING - CLEVELAND & McGILL MODEL

- Separate out the line charts with multiple lines to reduce noise
- The Y axis of the Small Multiples have the same scale

STACKED BAR CHARTS HAVE SIMILAR ISSUES

Common Baseline

No shared baseline

	37%	21%	29%	13%
f	23%	28%	35%	14%
▶	27%	31%	26%	16%
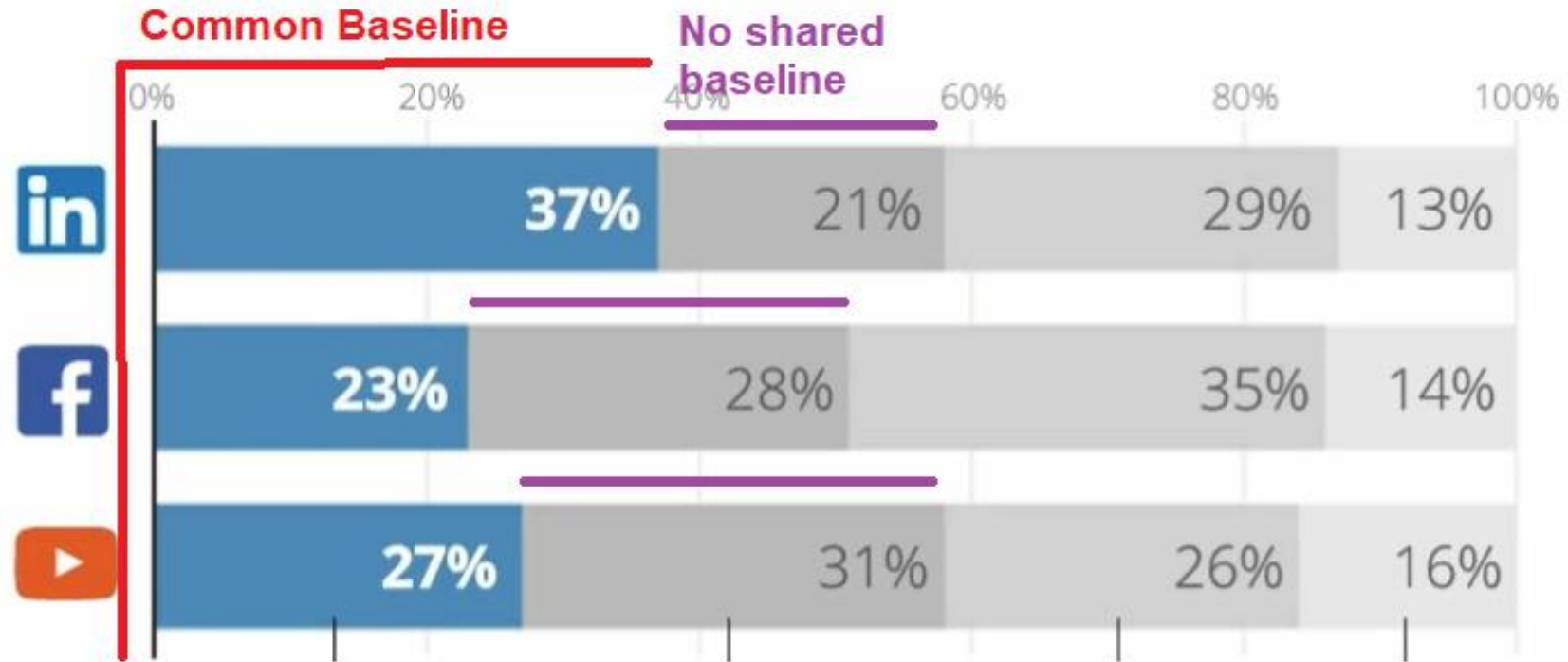
DATA STORYTELLING - CLEVELAND & McGILL MODEL

- We have a common baseline only for the first segment.
- Labels helps but we lose the effectiveness of our communication.
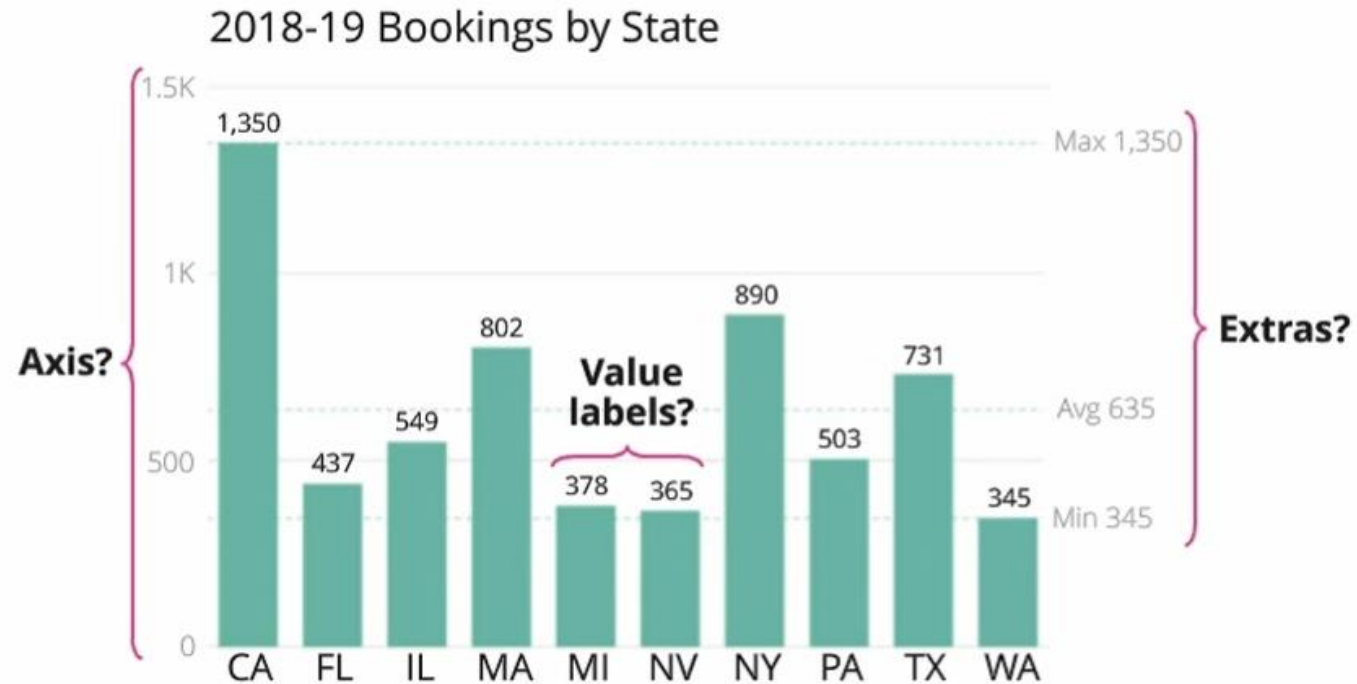
DATA STORYTELLING - GESTALT THEORY

- Is Axis, Value labels, Max/Min/Ave important to your Data story?
- If these are not critical, then you remove them

SIMPLICITY/PRÄGNANZ: SORT THE VALUES

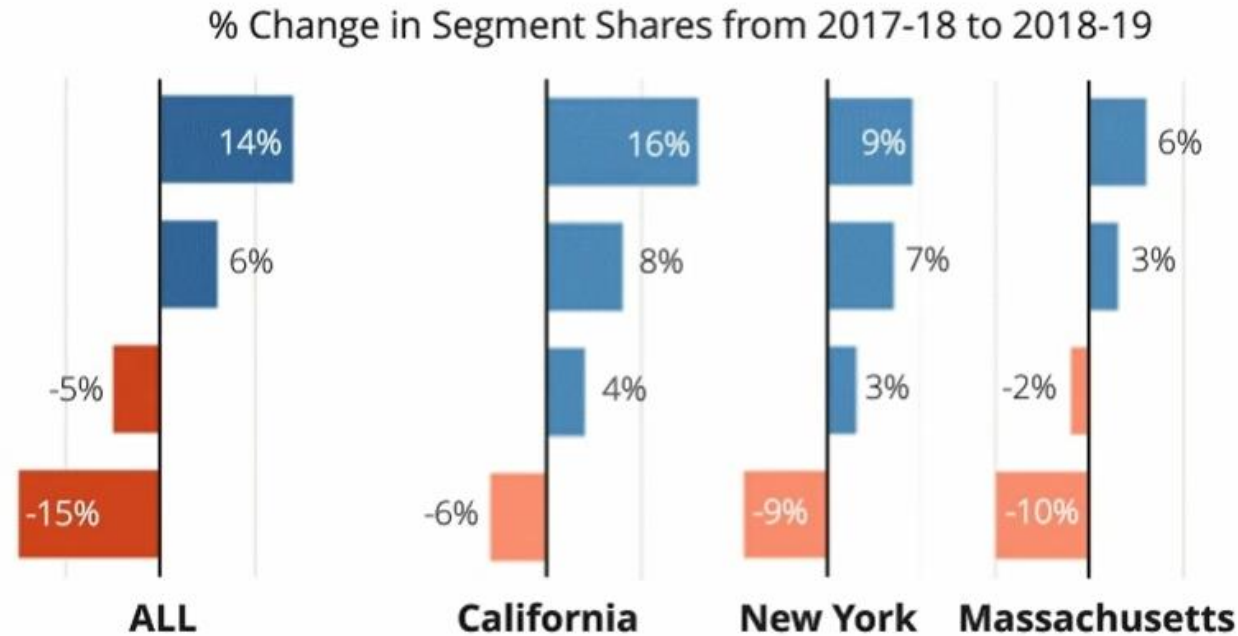# DATA STORYTELLING - GESTALT THEORY

- We can order descending by Revenue it make it easier to read the chart
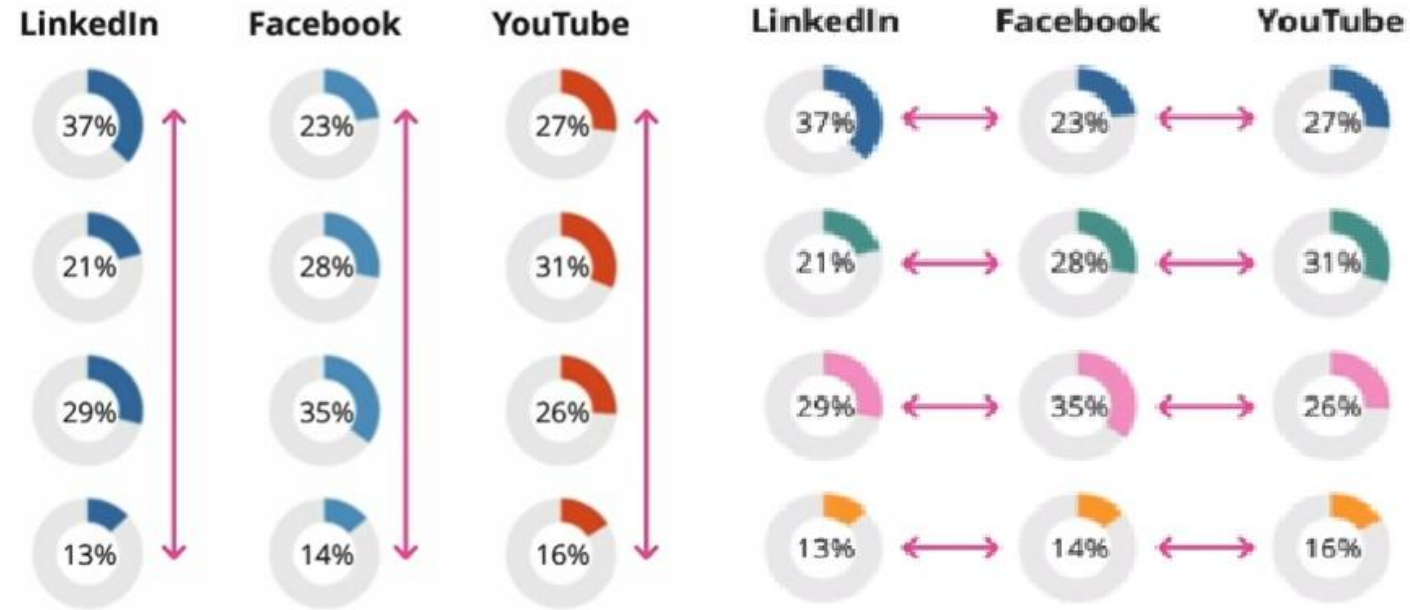
DATA STORYTELLING - GESTALT THEORY

- Using Brent Dyke's Data Storytelling framework

PROXIMITY: ORGANIZE KEY CONTENT

% Change in Segment Shares from 2017-18 to 2018-19

DATA STORYTELLING - GESTALT THEORY

- All could be more inclusive than just the three states.
- We separate ALL out by Space and Color
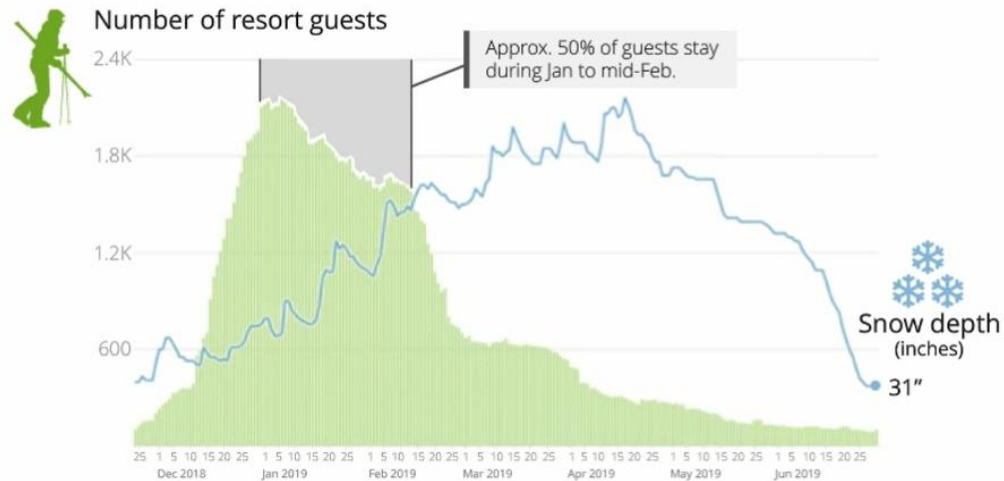
DATA STORYTELLING - GESTALT THEORY

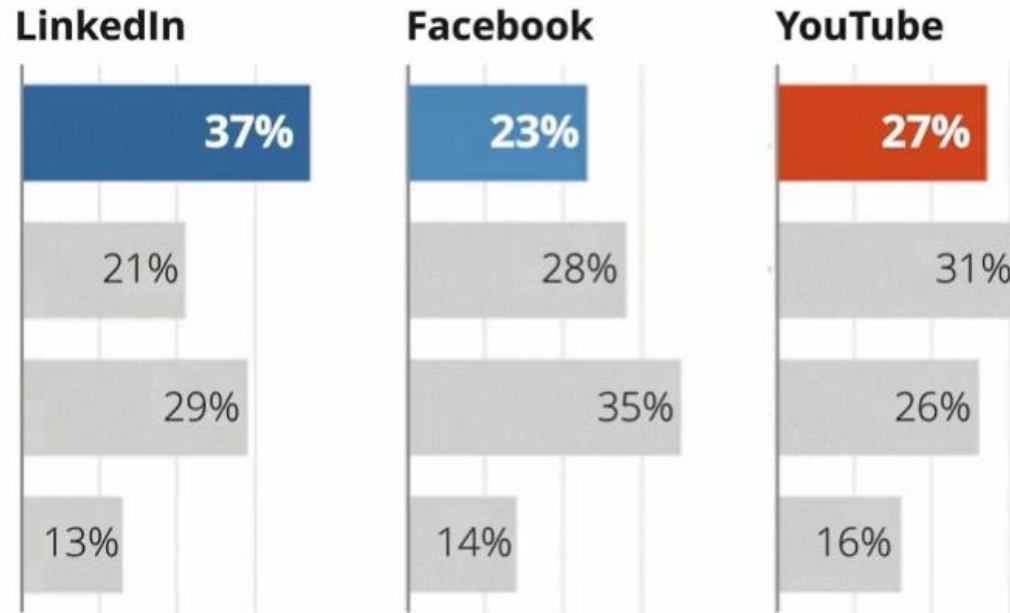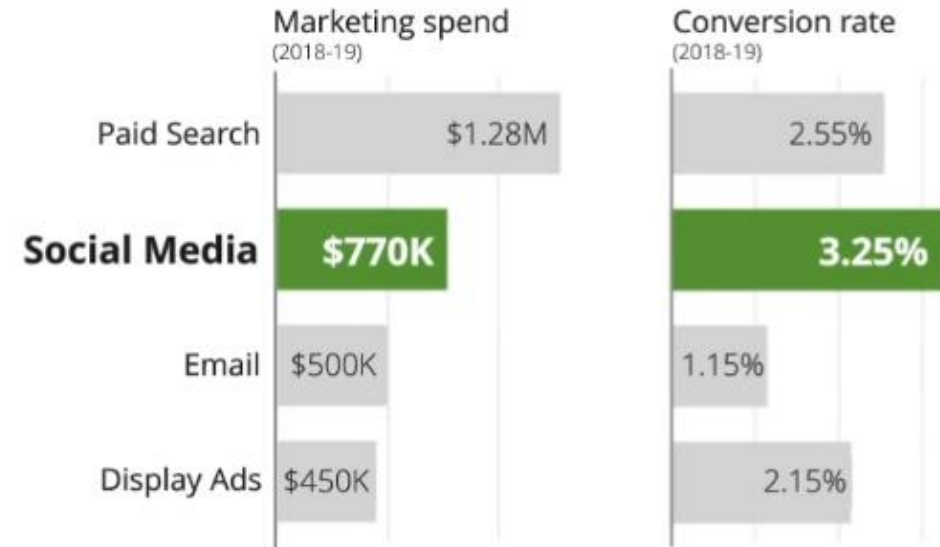- Connected the description to the data point on the chart
- Highlighting a bunch of data points and enclosed it and linked it to an annotation

DATA STORYTELLING – PREATTENTIVE ATTRIBUTES

- Using color and Bold to highlight Social Media
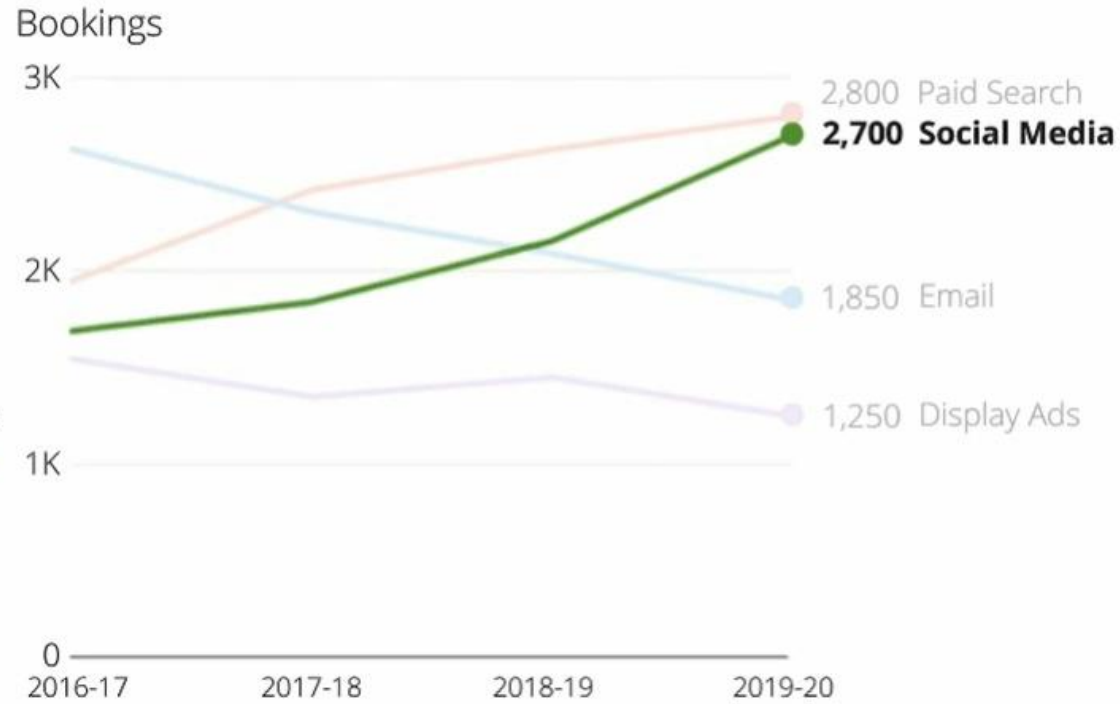
DATA STORYTELLING - PREATTENTIVE ATTRIBUTES

- Use bold and colored text to highlight key points

SHAPES: DRAW ATTENTION TO CHART ELEMENTS

DATA STORYTELLING - PREATTENTIVE ATTRIBUTES

- Use flat icons to improve user experience and make it easier for audiences to comprehend and retain.

DATA STORYTELLING - EXAMPLES

DATA STORYTELLING - Eight Commandments

1. **Begin with a question** - Set up your story. What is your audience going to learn?

2. **End with an insight** - If we can't learn something useful from the data, the story isn't worth telling.

3. **Tell a compelling story -** People remember stories, not data. Take them on your journey.

4. **Explain with visuals, narrate with words**   People understand metrics, trends, and patterns better with visuals. Use words to add your voice to the data.

5. **Be honest and credible -** clients value honesty. Don't sugarcoat the negatives. And don't mislead with fractioned data.

6. **Be clear and concise -** Remove everything that is not part of your story. Save the other bits for another time.

7. **Know and cater to your audience -** What are their interests and goals? Do they want the details, or just the high-level summary?

8. **Provide context -** Compare metrics over time or to industry benchmarks. Numbers are meaningless without context.

QUESTIONS TO ASK

If you're looking to capture attention and drive your insights forward, here are four questions to ask as you visualize your data

1. Who is your audience?

- **Knowing your audience** is a key component of creating a good visualization.

- Make sure you think about **what the viewers already know** about the subject you're presenting and adjust your visualization accordingly.

2. What is the message you need to convey?

- This should be your **guiding light** throughout the creation of your visualization.

- First, **focus on the variables** you need to visualize in order to get your message across — make those variables the focus of your graph.

- **What relationship do they have** and what type of chart should you use for that?

QUESTIONS TO ASK

3.   **What data should you display?**

- More data does not always equal better data.

- Use your judgment to determine what **data points and categories are most important** to convey your message.

- Use the data to determine what type of visualization makes the most sense — make sure that it clearly **shows the relationship between the variables that are most important** to your message.

- Keep it clean and visually appealing for maximum impact.

4.   **Is this visualization intuitive?**

- If your audience cannot **understand your graph within the first 30 seconds** it is displayed, you need to rework your chart.

- Your message should not take too long to resonate with your users.

- **Keep to conventions** that people understand so they don't have to work hard to get your message.

|	January	February	March	April	May	June	July	August	September	October	November	December
Product A	$10,000	$6,500	$5,100	$6,400	$9,000	$7,500	$8,200	$5,400	$6,500	$4,800	$3,100	$2,000
Product B	$1,000	$1,500	$1,200	$1,100	$1,400	$1,200	$1,700	$2,000	$1,700	$1,200	$1,200	$1,100
Product C	$500	$1,000	$1,200	$1,800	$2,200	$3,100	$3,500	$4,000	$4,500	$2,900	$5,200	$8,000
Product D	$3,358	$4,684	$2,753	$1,898	$4,547	$4,518	$3,056	$3,585	$336	$475	$351	$4,035
Total	$14,858	$13,684	$10,253	$11,198	$17,147	$16,318	$16,456	$14,985	$13,036	$9,375	$9,851	$15,135
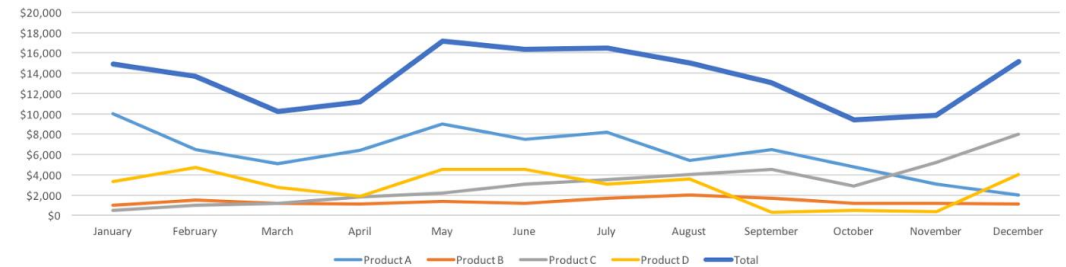
DATA STORYTELLING - How to <u>NOT</u> tell stories

Data for monthly revenue of a company with four products .

DATA STORYTELLING - STORIES THAT LIE

- **Telling a Story about data that is great news but purposefully lying**

- **Revenue is growing quickly**, with December jumping significantly over November.

- This growth was led by a **1,150% jump in revenue for Product D**! We **expect overall revenue to exceed $100,000 in January for the first time**. This growth is a direct result of the strategic decisions I made in June of last year.

- **Why is this Story Good?** It's not, it's a lie.

- **Why is this Story Bad?**

- Manipulating Scale: The length of the bar is used for relative comparison. When Y axis starts at an arbitrary value, it makes the growth look significant, when its not actually significant.

- Cherry Picking: selecting a few data points to make my case

- Jumping to conclusion: no clear logic why the decisions last June affect December revenue this year
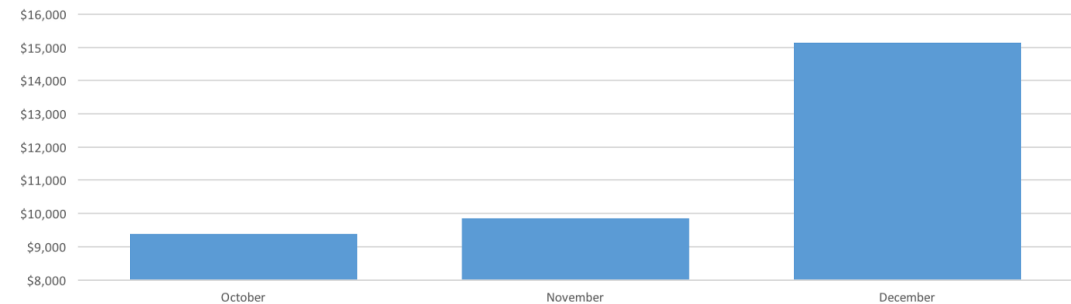
DATA STORYTELLING - STORIES THAT MISLEAD

- **Telling a Story about data that is true but misleading.**

- Overall, revenue for all products has been fairly even. There is a **notable exception of a big jump in revenue** for Product D in December, which jumped over 1,000% month over month.

- A single product's revenue dominates all others - **Product C comprises more than 50% of the total revenue**. This means that the revenue from Product C is larger than all three other products combined.

- **Why is this Story Good?** This story is true

- **Why is this Story Bad?** It is very misleading

- Lack of Clarity: No Axis Labels. Line Chart Y Axis - % growth rate, Pie Chart - Revenue for month of Dev.

- Confusing Chart: Lack of color consistency in using color. Product D is yellow (LC) and gray (PC)

- No Context: A 1000% growth can be a) $1 to $11 or b) $100 to $1100. Avoid using relative measurements
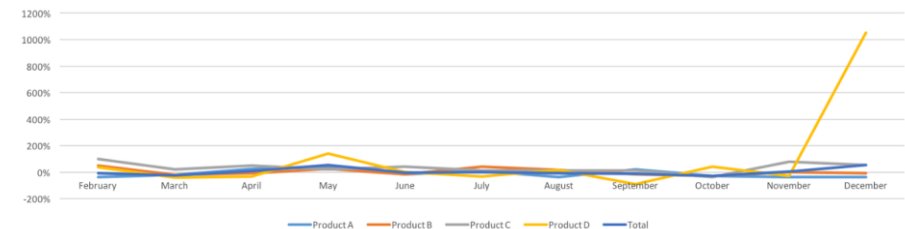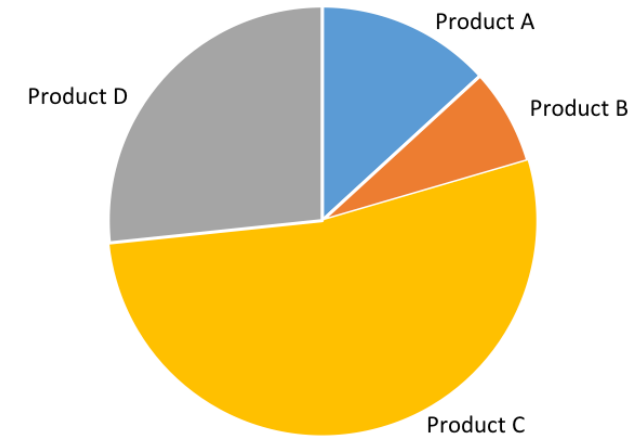
DATA STORYTELLING - STORIES THAT ARE GREAT

- **Telling a Story about data that is actually true**
- Overall, **revenue is trending downwards** over the past year (dotted line). There is **a clear peak in the summer.** Based on the expected range of prior years (green bar) reinforces this as a **seasonal trend**.
- Overall trend is a shift in revenue composition. Product A has been declining over the course of the year, while Product C has been increasing. If this trend continues, we expect to see an increase in revenue next year.
- **Why is this Story Bad ?** It's not,

- **Why is this Story Good?** Follows best practices of data storytelling
- Starts with big picture: Story states that Revenue is trending downwards and looks seasonal.
- Shows Context: Highlighting the expected range and linear trend in first chart helps identify the seasonal trend
- Highlights important drivers: Two important drivers are Product A & C and their relationship, **a hidden insight**
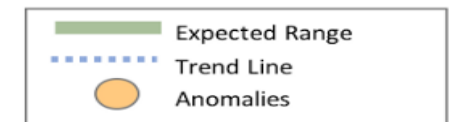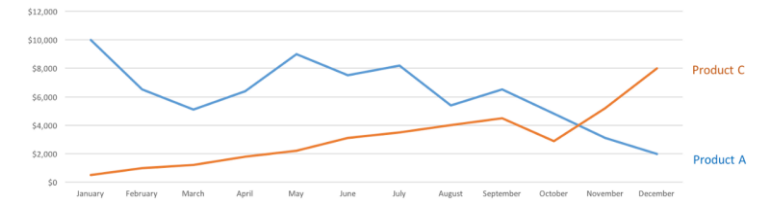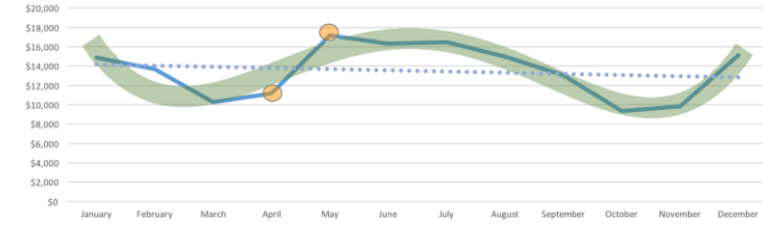
DATA STORYTELLING Checklist – Who: The Data's Audience

WHO IS YOUR AUDIENCE?

WHAT DO THEY WANT?

WHAT DO THEY NEED?

HOW MIGHT THEY BE FEELING?

WHAT ACTION DO THEY NEED TO TAKE?
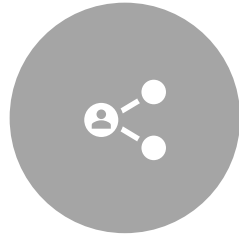
WHAT TYPE OF COMMUNICATION DO THEY PREFER?

HOW WELL DO THEY KNOW THE DATA?

DATA STORYTELLING Checklist – You

HOW WELL DOES THE AUDIENCE KNOW YOU?

DOES THE AUDIENCE TRUST YOU?

DO THEY FIND YOU CREDIBLE?

HOW WELL DO YOU KNOW THE DATA?

DO YOU HAVE ANY PRE-CONCEIVED NOTIONS OR BIAS ABOUT THE DATA?

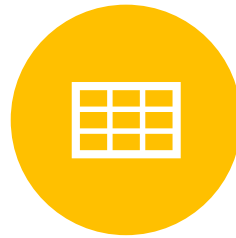# DATA STORYTELLING Checklist – What: The Data's context

WHAT IS THE DATA?

WHAT IS IT ABOUT?

IS THE DATA COMPLETE?

DO YOU HAVE ENOUGH DATA TO TELL A COMPLETE STORY?

IS THE SUBJECT MATTER GENERAL OR SPECIALIZED?

DATA STORYTELLING Checklist – Why: The Goal

WHY ARE YOU TELLING THIS STORY?

WHAT ACTION DO YOU WANT THE AUDIENCE TO TAKE?

DATA STORYTELLING Checklist – How: The Data's Presentation Mode

IS THIS STORY STATIC OR INTERACTIVE?

WILL YOU BE NARRATING THE STORY?

DO YOU WANT TO EXPLORE OR EXPAND THE STORY WHILE NARRATING?

WILL IT BE PRESENTED IN A SMALL GROUP OR A LARGE SETTING?

WILL THE AUDIENCE BE LIVE OR VIRTUAL?

# DATA STORYTELLING – Example – Sustainability Cosmos

This interactive dashboard uses AI and vivid colors to visualize the sustainability performance of countries based on human, health, environmental, economic, and political conditions.

Toggle between different modes to uncover interesting patterns about the current state of our world

https://palminister.github.io/sustainability-cosmos/
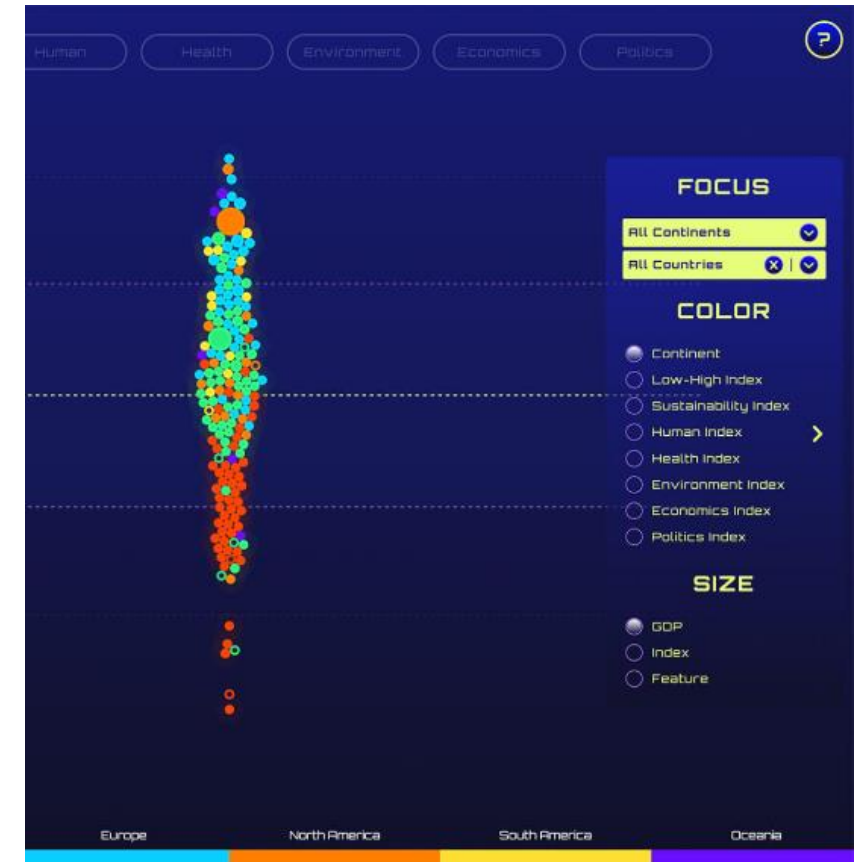
DATA STORYTELLING – Example – What Just Happened
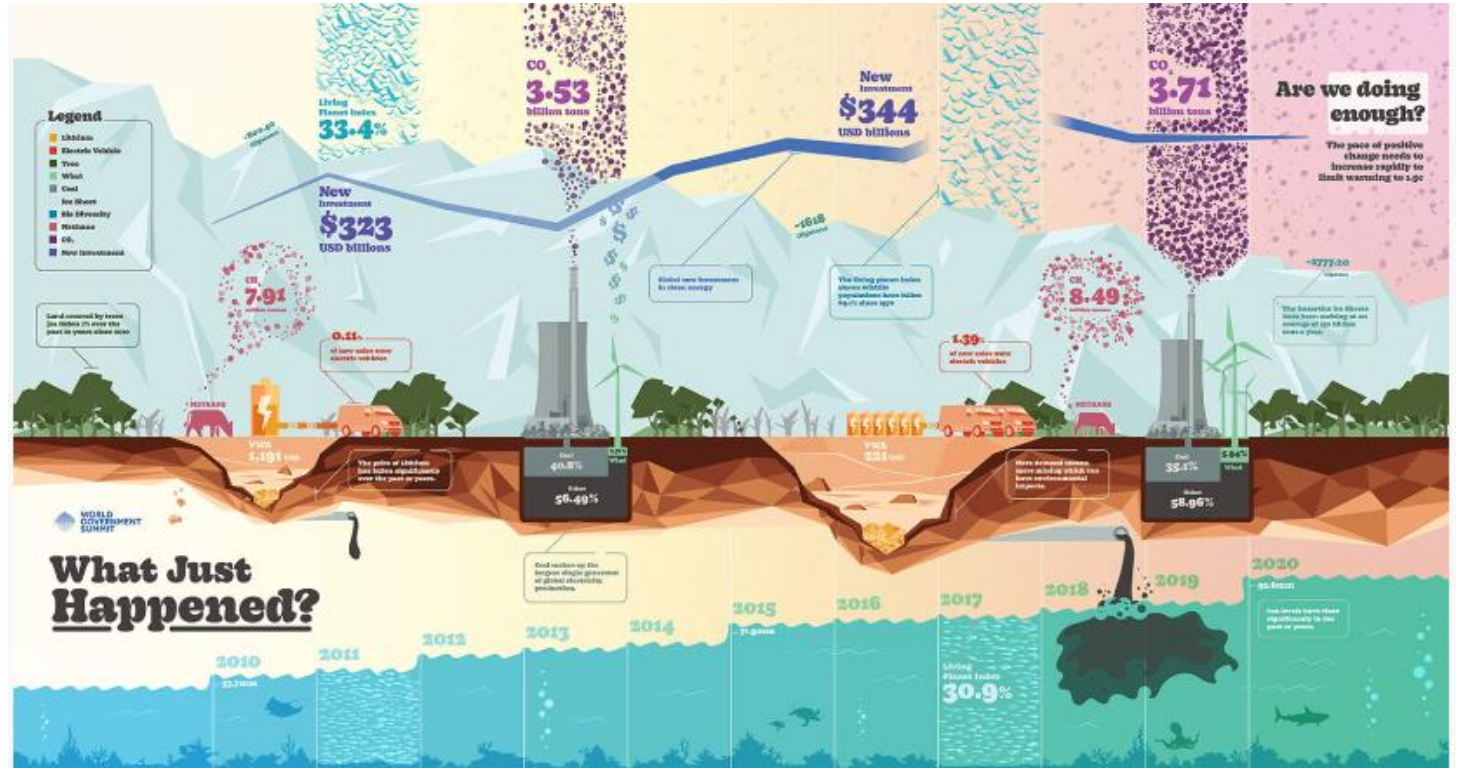
This intriguing, colorful infographic folds in data from NASA, the IPCC, and the World Bank to showcase positive improvements from the last 10-years while also highlighting areas of decline or slow growth.

DATA STORYTELLING – Example - TheShapeofChange

Hooking us with an interactive scrolly-telling guessing game, this playful piece reveals and challenges the assumptions people make around key health, the environment, and education metrics

https://www.theshapeofchange.com/

DATA STORYTELLING – Example – Four Seasons

This beautifully elegant visualization uses the metaphor of a tree in different seasons to spotlight different aspects of progress. Hover over the branches to understand the present, the roots to see the past, and the sky to learn about the future.

www.go4trees.com/four-seasons/
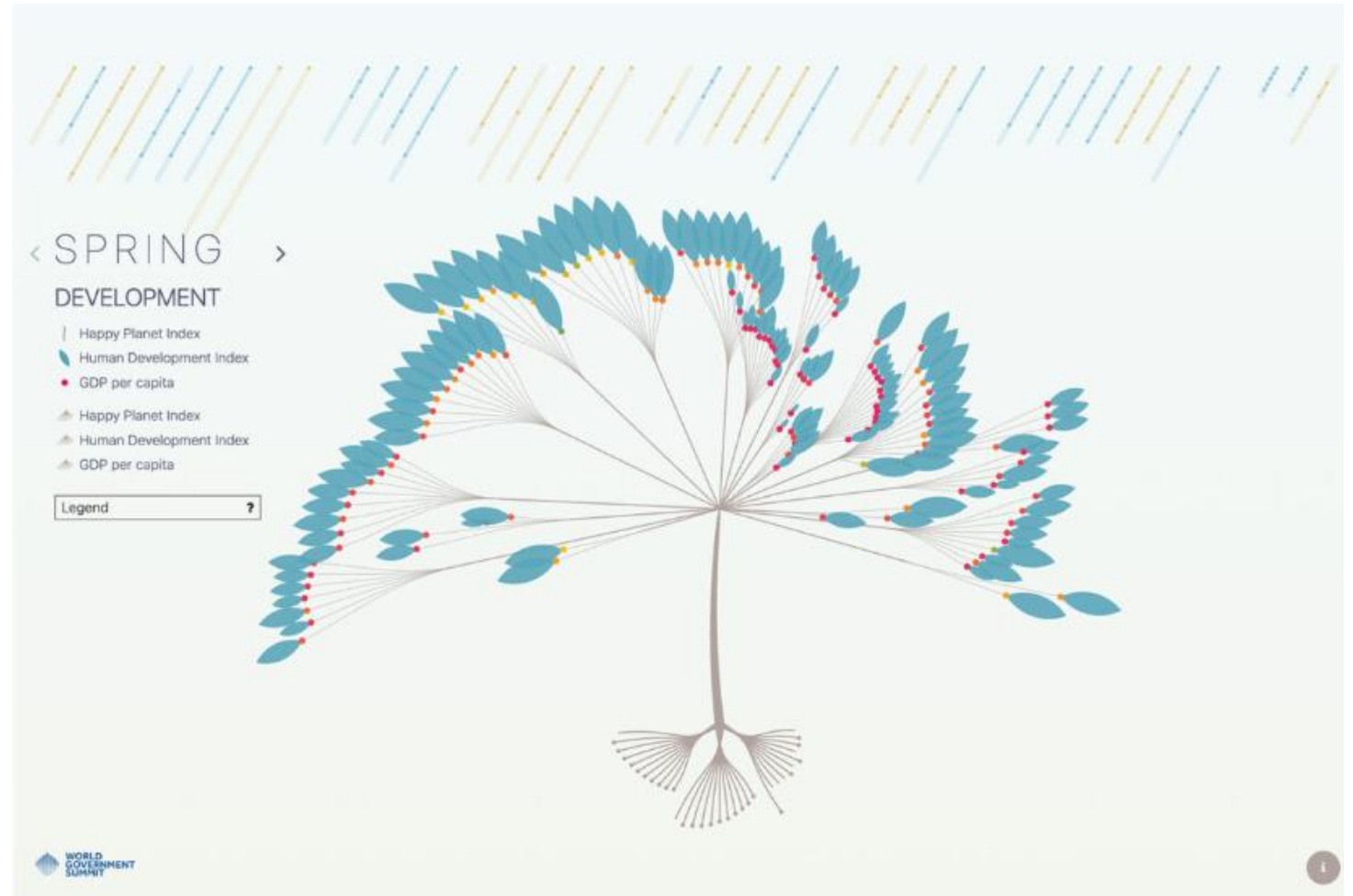
DATA STORYTELLING – Example – How do we Compare

This dynamic, multi-layered interactive dashboard invites users to focus on an area of interest — an income level, region, or country — and see how it compares to its counterparts across a wide range of metrics. You can randomize the data or choose an individual metric to answer specific questions. Fully explorable data!

https://lindseypoulter.com/wdvp/