
epam
VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES
2017

AGENDA

1. Introduction
2. How do we visualize data?
3. Chart Types
4. Best Practices – What to avoid, what to do
5. UI & UX
6. The Importance of Storytelling
7. Appendix – EPAM visualization standards

VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

1. INTRODUCTION

WHY DO WE NEED THIS COURSE?

Stephen Few

WHAT WILL YOU LEARN?

Get tips how to improve visuals to support decision making	**Learn how can the same information be represented differently**
See Best-In-Class examples from the business cases for story telling	Understand how to implement the What-Why-How concept into analysis
Collect inputs on how to apply data visualization best practices	See the importance of good UI and UX design

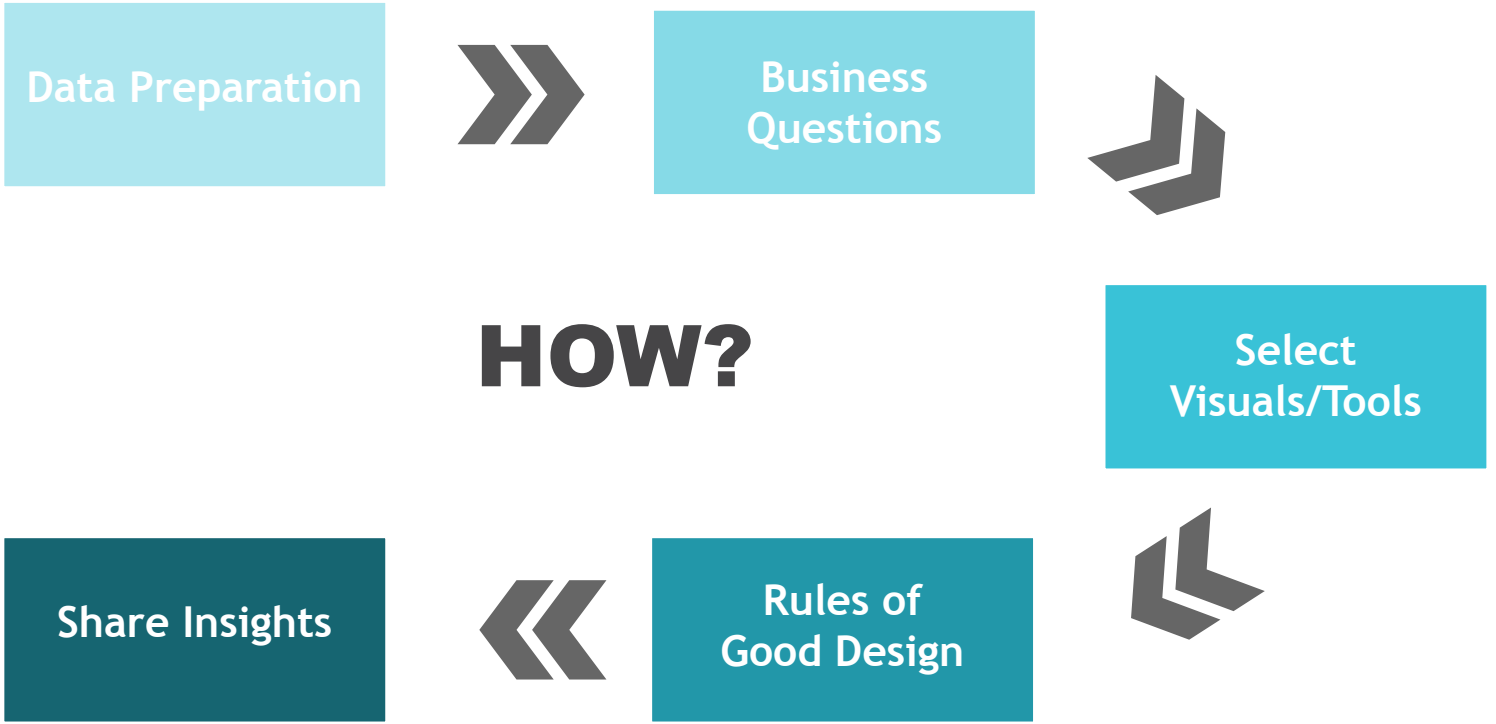
WHAT TO CONSIDER WHEN VISUALIZING DATA

1. Who is the audience?
2. What is the message?
3. Is a visualization the best way to share the data, show the findings, and/or reveal the insight?

Is it worth producing a visualization ?

FLOW OF DATA VISUALIZATION

HOW WE DO IT?



VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

2. HOW DO WE VISUALIZE DATA?

HOW DO WE VISUALIZE DATA?

THE NEXT PART IS ABOUT INTUITION.

Try to think about the questions and visuals shown in the next slides.

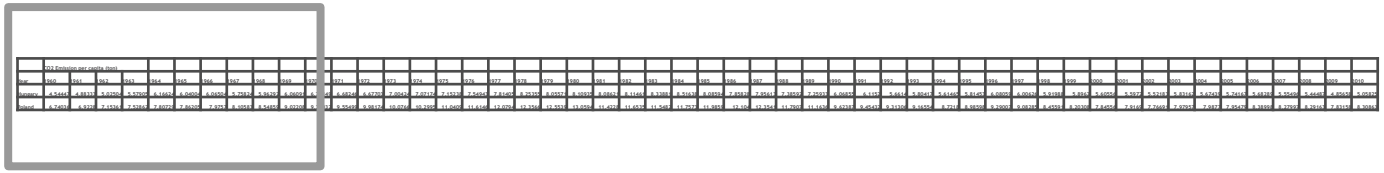
HOW DO WE VISUALIZE DATA?

CO2 Emission per capita (ton)

Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Hungary	4,5	4,9	5	5,6	6,2	6	6,1	5,8	6	6,1	6,8	6,7	6,7
Poland	6,7	6,9	7,2	7,5	7,8	7,9	8	8,1	8,5	9	9,3	9,6	10

This is a way of representing data. In fact, a pretty good way.
This is just a part of a larger table by the way, (next slide)

HOW DO WE VISUALIZE DATA?



...but I am just showing you a fraction of it for visibility.

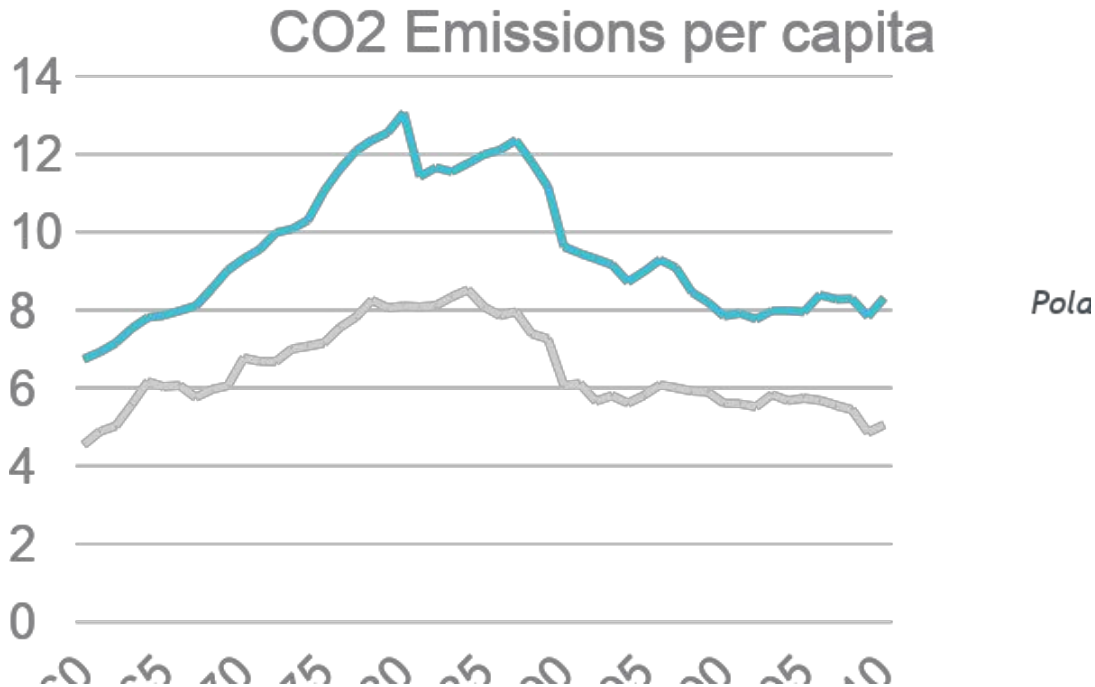
HOW DO WE VISUALIZE DATA?

CO2 Emission per capita (ton)

Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Hungary	4,5	4,9	5	5,6	6,2	6	6,1	5,8	6	6,1	6,8	6,7	6,7
Poland	6,7	6,9	7,2	7,5	7,8	7,9	8	8,1	8,5	9	9,3	9,6	10

So are there any problems with this type of data representation?

HOW DO WE VISUALIZE DATA?



Or this one? Which one is better?

WHICH ONE IS BETTER?

TABLE

- Perfect for representing precise values.
- Perfect for accurate data comparison
- Few values vs. *set* of data?

CHART VISUALIZATIONS

- Visual processing part of the brain
- Large set of data simultaneously
- Patterns
- Trends
- Irregularities

As said, tables are pretty good...
...for their limited role.

These types of data is processed by the analytical part of our brain – which is used for math.

However, if you want to show a SET of data as a whole, there is a part of the brain which is much better at the task.

The brains visual processing performs much better when coming to
Pattern recognition
Recognizing trends and irregularities.

So at the end of the day, it turns out that choosing the right type of data representation largely depends on what you want to show.

CONCLUSION

As we see, the same data can be visualized in many different ways.

Therefore, when it comes to the visualization part we need to remember that it is not the data itself which defines visualization, but what we want to achieve with the same data.

Or to put it this way, the STORY you want to tell about the data.

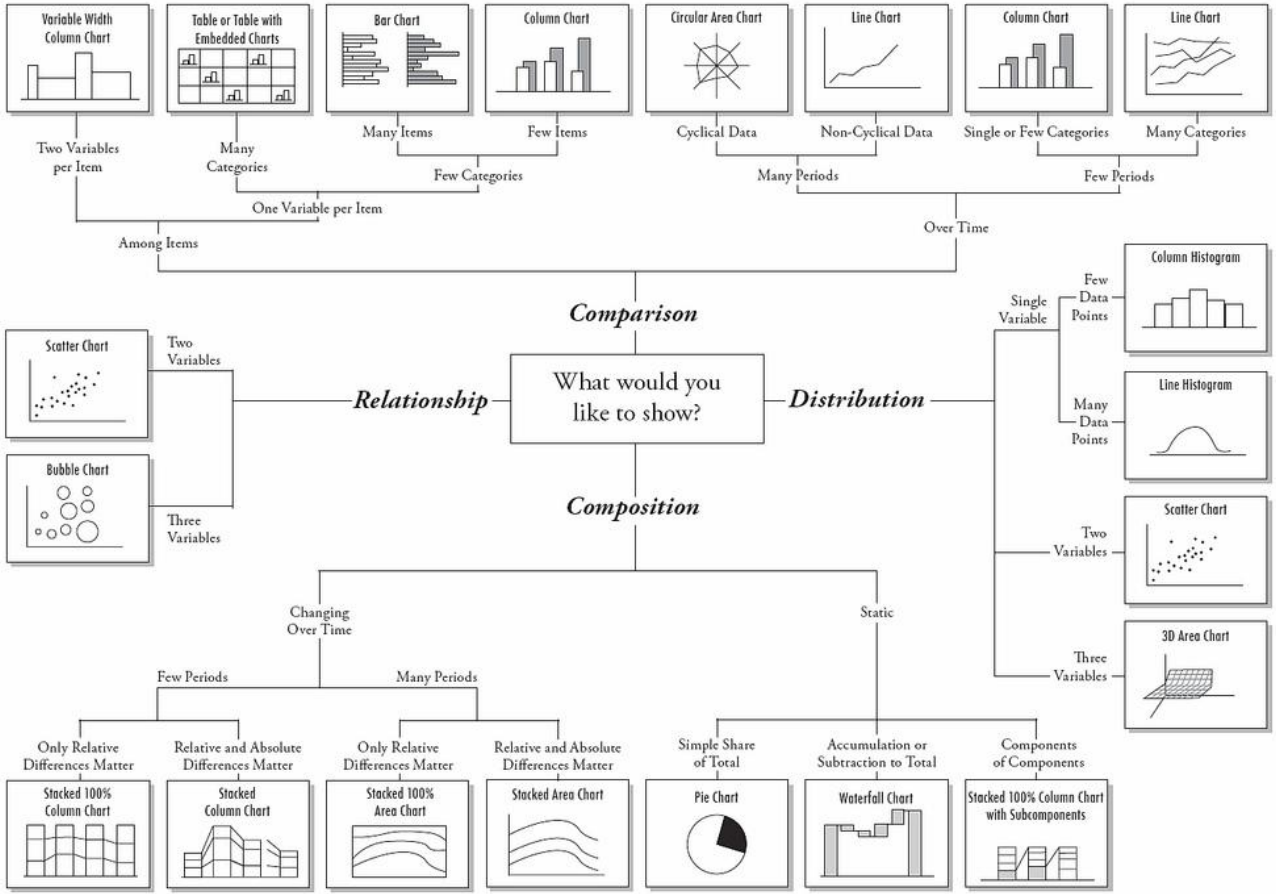
We start with available data and its granularity, but then we move on to business questions.

The decision of choosing a different representation method is **not** based on the data itself, rather than what *we want to show (the story we want to tell).*

VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

3. CHART TYPES

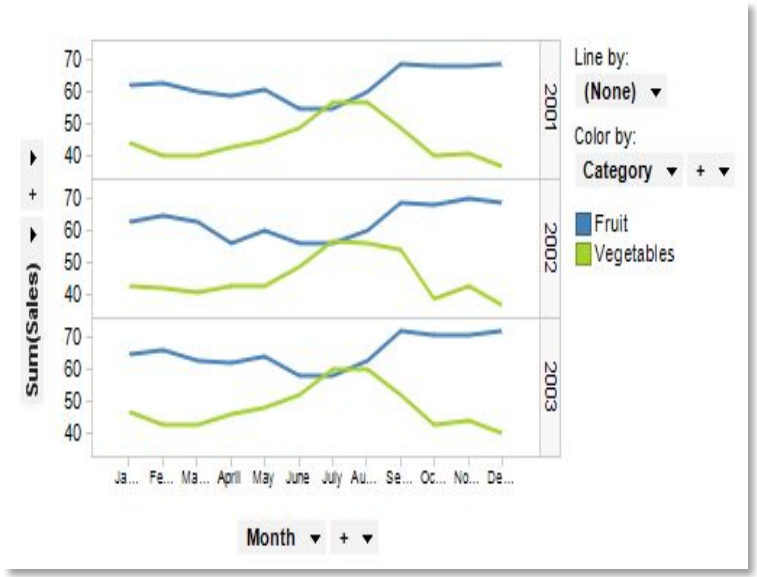
Chart Suggestions—A Thought-Starter



LINE CHART

Is best for:

- Demonstrating trends
- Categorical values for a longer period of time



Tips

- Use colors to differentiate multiple lines
- Do not compare more than 4-5 lines
- A grid can help you to identify exact values
- Avoid dashed/spotted lines

BAR CHART

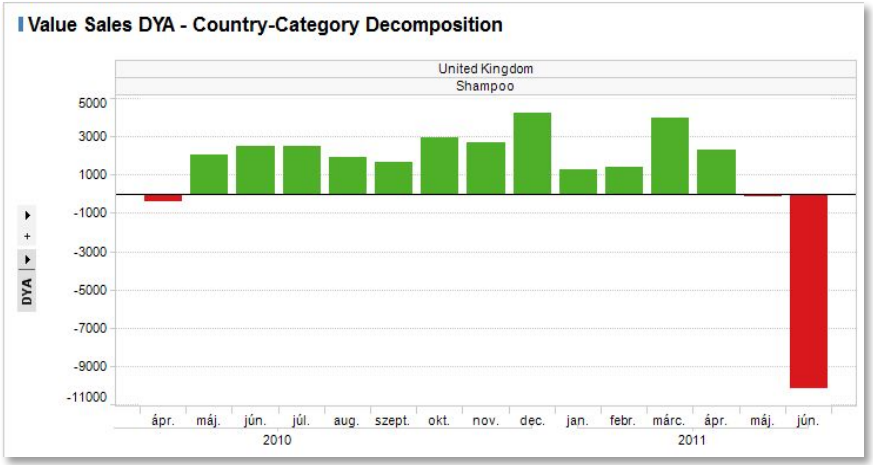
Best for representing individual values graphically

Vertical is best for

- Chronological data
- Negative values are present

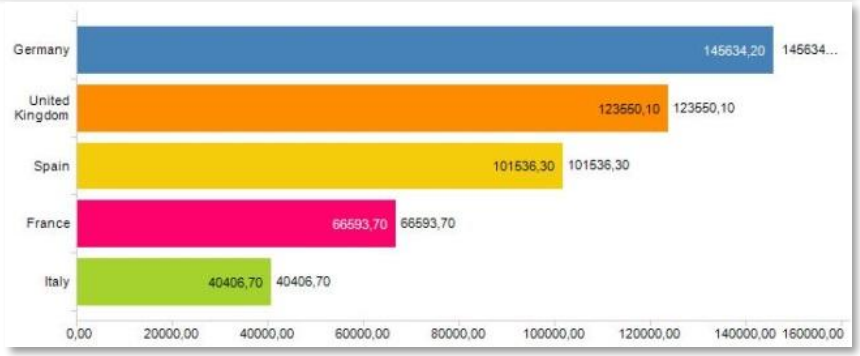
Horizontal is best for:

- Comparison
- Ranking



Tips

- Consider replacing with a line chart if it becomes complex
- Rank chronologically or in ascending / descending order
- Choose color strategically
- Label to support reading
- Use width of bars and spaces



BAR CHART

Stacked is best for:

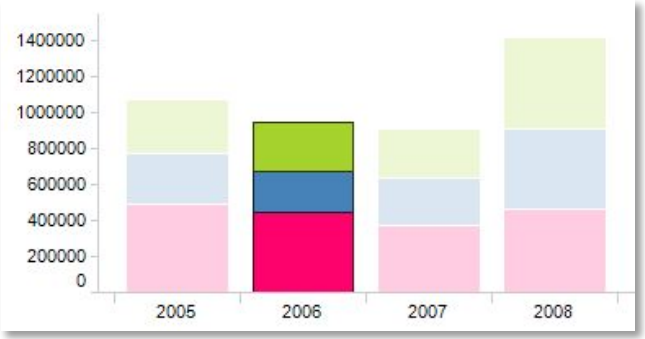
- Comparing multiple part-to-whole relatonships
- Emphasis is on the sums of values

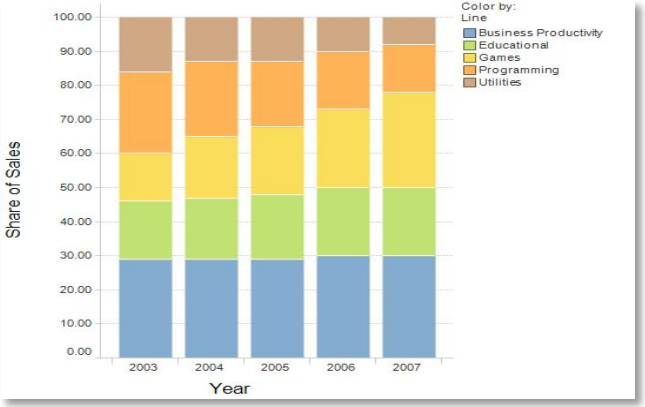
100% Stacked when:

- Parts-to-wholes, value shares
- Exact values are not important

Tips

- Avoid 3D and color complications
- Start the axis from 0
- Create clear and readable explanation for values & colors

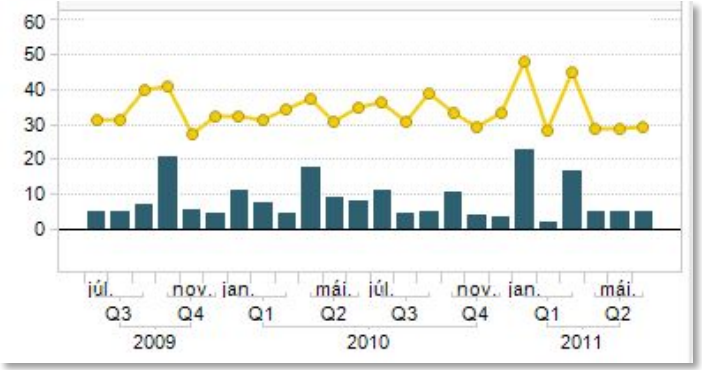




COMBINATION CHART

Is best for:

- Comparing trends for different types of values
- Actual vs. Target
- Spotting relationships between values



Tips

- Avoid any further complication
- Choose minimum colors
- Axis values should clearly correspond for bars and line

DATA TABLE

Is best for:

- Comparing precise data
- Presenting background details
- Where exact values are important, to show data sets with more properties

Tips

- Avoid long tables
- Ensure readable values and gentle lines
- Use colors wisely: avoid saturated backgrounds, distracting cells, prefer cell icons

BUBBLE CHART / SCATTER PLOT

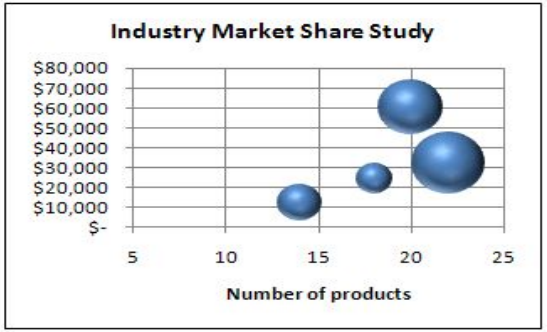
Is best for:

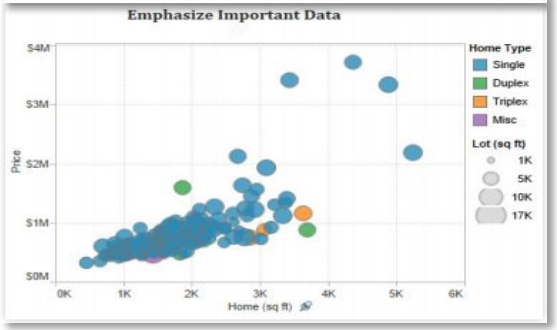
- Comparing more than 2 values
- Presenting ranking and relationship

Tips

- Choose proper scale
- Sizing of bubbles is crucial
- Don’t not overload the viewer’s short term memory with colors/legend items

Number of products	Sales	Market Share %
14	$12,200.00	15%
20	$60,000.00	33%
18	$24,400.00	10%
22	$32,000.00	42%

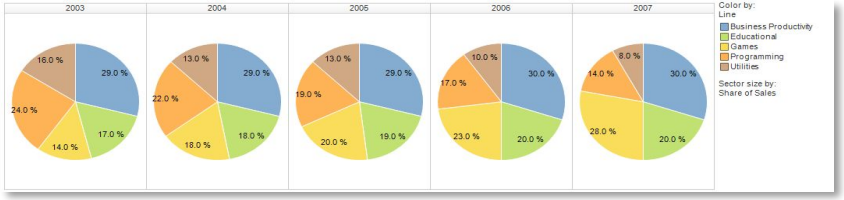




PIE CHART

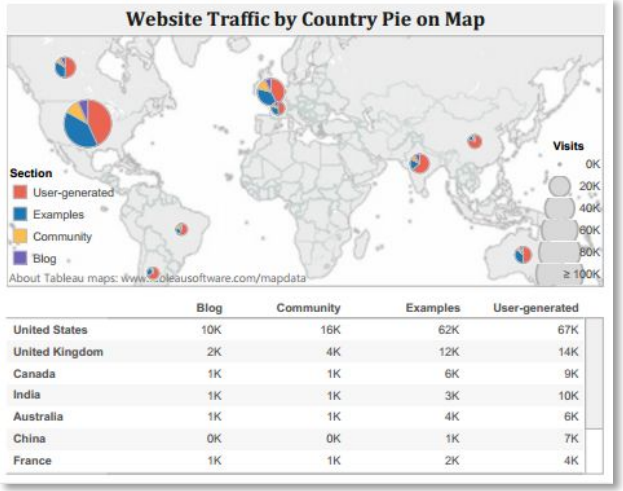
Is best for:

- Part-to-whole comparison for small data set
- Presenting values on



Tips

- In general it is better to avoid using pie charts: use 100% stacked bar charts
- Do not use more than 5 slices of a pie
- Do not use for similar or close values to present
- If possible, use labels instead of a legend
- Colors should be easily distinguishable (e.g. primary colors)

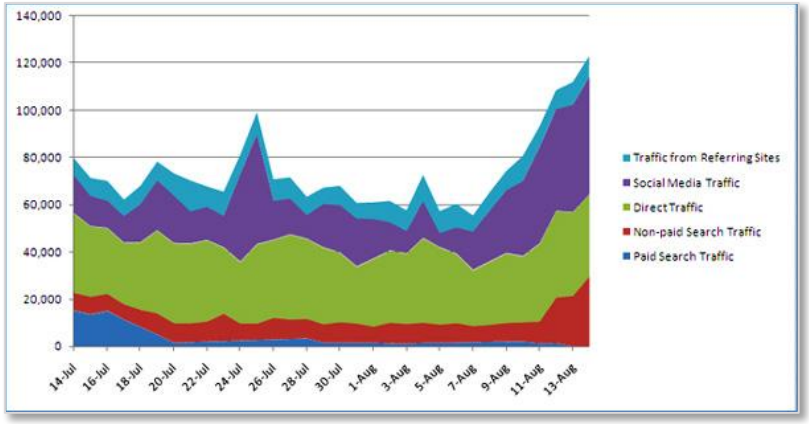


	Blog	Community	Examples	User-generated
United States	10K	16K	62K	67K
United Kingdom	2K	4K	12K	14K
Canada	1K	1K	6K	9K
India	1K	1K	3K	10K
Australia	1K	1K	4K	6K
China	0K	0K	1K	7K
France	1K	1K	2K	4K

AREA CHART

Is best for:

- Simple comparison of quantitative progression over time
- Stacked part-to-whole relationship
- 100% stacked distribution of



Tips

- Put data with high variability on top, with low variability on the bottom
- Start axis at zero
- Do not use more than 4 categories
- Use transparent colors

TREEMAP

Is best for:

- Presenting catalog with further drill down
- Showing distributions per different categories: sub-categories, brands, sub-brands, etc.
- Time periods for dynamic selections

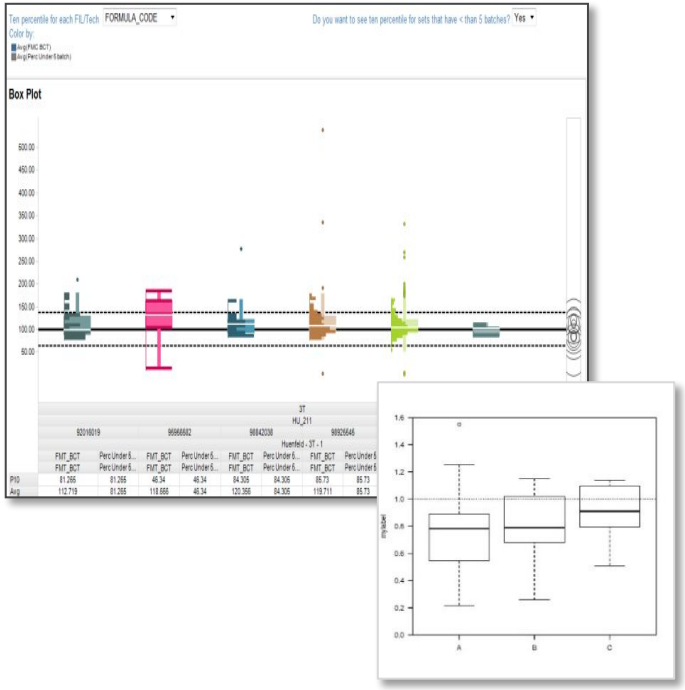
Tips

- Use easily distinguishable colors to different data types
- Use similar shades for similar data types
- Try to scale in a way even the smallest level is labeled in a readable way

BOX PLOT

Is best for:

- Showing several simultaneous comparisons
- Showing the location and degree of dispersion (spread or range) at the same time



Tips

- Do not use different colors for the data sets: it will confuse the user and harden comparison
- Sizes of lines, boxes, and spaces are crucial
- Make labels and values readable

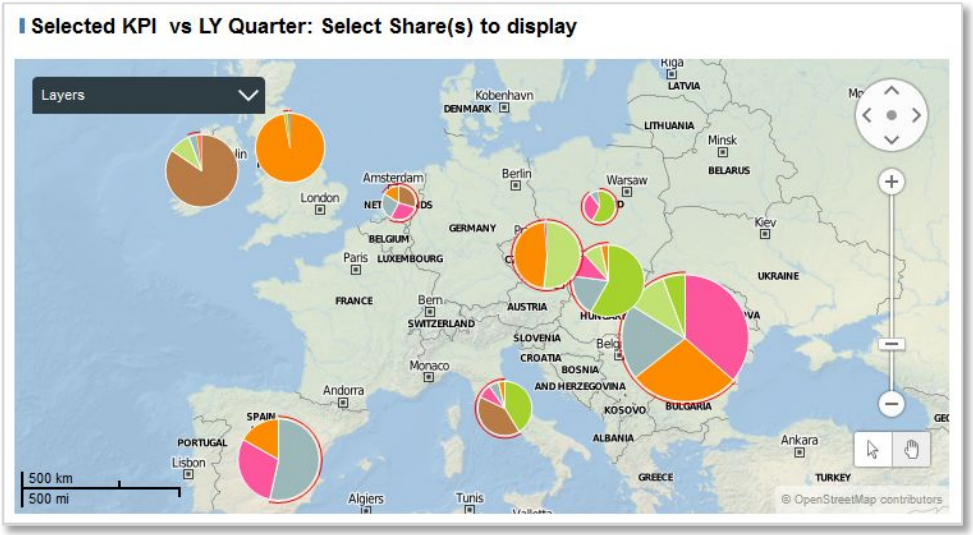
MAPS

Is best for:

- Representing data on geographical levels
- Selecting specific countries for further market drill down

Tips

- Zoom properly
- Color should be used smartly
- Consider what to represent on what layers



VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

4. CHECKLIST FOR GOOD VISUALIZATION

GUIDELINES

LET'S SEE A TYPICAL WAY OF DATA VISUALIZATION GUIDELINES.

1. Clearly indicates how the values relate to one another (part-to whole, etc.)
2. Represents the quantities accurately.
3. Makes it easy to compare the quantities.
4. Makes it easy to see the ranked order of values.
5. Makes obvious how people should use the information - what they should use it to accomplish - and encourages them to do this.

This is ONE approach for a checklist.
This is neither a full, nor a perfect list, but it's easy to remember and apply.

Now, too much text, let's shorten it.

GUIDELINES

---SPEND A FEW SECONDS DESCRIBING THE LIST---

1. How the values relate
2. Quantities accurately
3. Compare the quantities
4. Ranked order
5. Importance of chart

Notice that the list can be divided to two main parts.

GUIDELINES

1. How the values relate
2. Quantities accurately
3. Compare the quantities

} Accuracy

4. Ranked order
5. Importance of chart

} Ease of use

This concludes that we have two main, general goals when dealing with data visualization.

GUIDELINES

AVOID MISLEADING VISUALIZATIONS

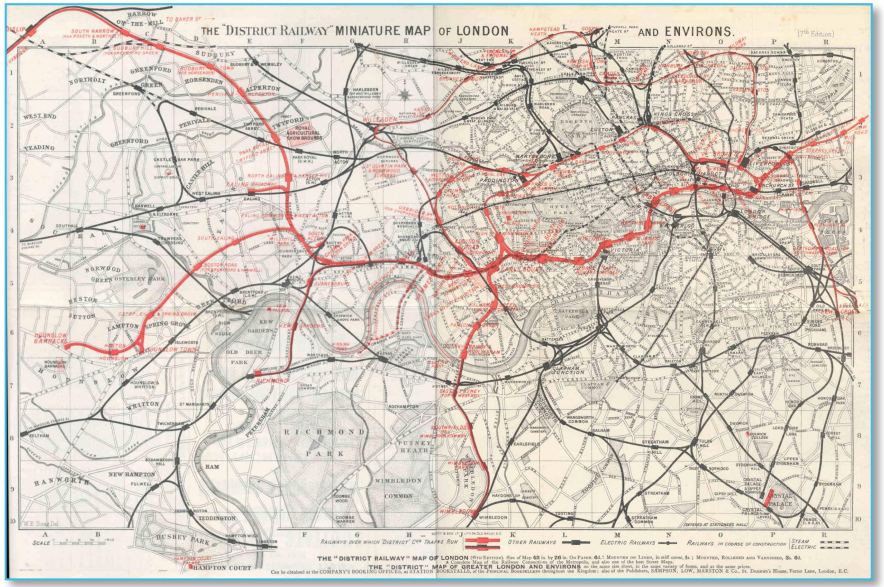
AVOID MISLEADING VISUALS

HOW COULD THE DESIGN SUPPORT THE PURPOSE?

Exercise: Can You identify the metro lines?

It could be hard because the lack of:

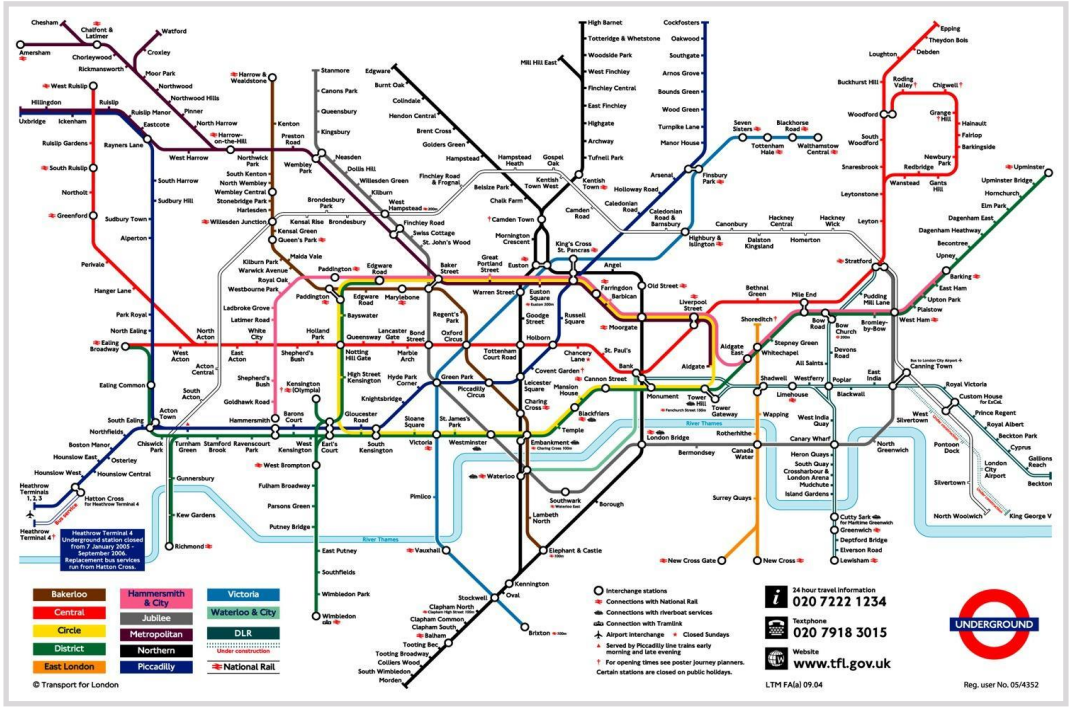
- Simplicity
- Consistency
- Categorization
- Terminology



AVOID MISLEADING VISUALS

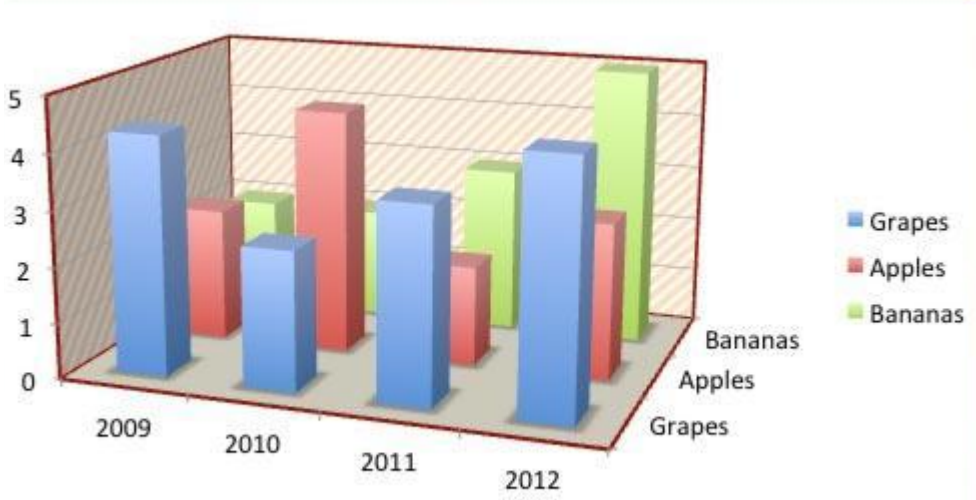
SOLUTION:

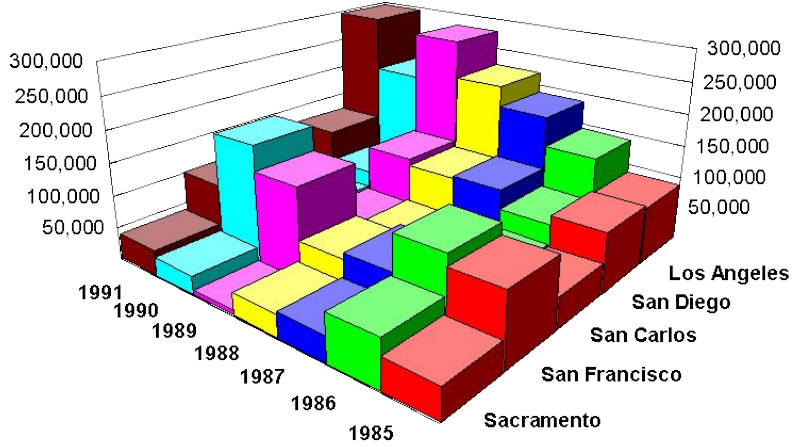
Even a ‘busy chart’ can be **understandable** with smart coloring, consistent structuring and symmetry



AVOIDING MISLEADING VISUALS – 3D

3D VISUALS – AVOID THEM AT ALL COSTS! WHY?





Why to avoid them? See the next slide for an example.

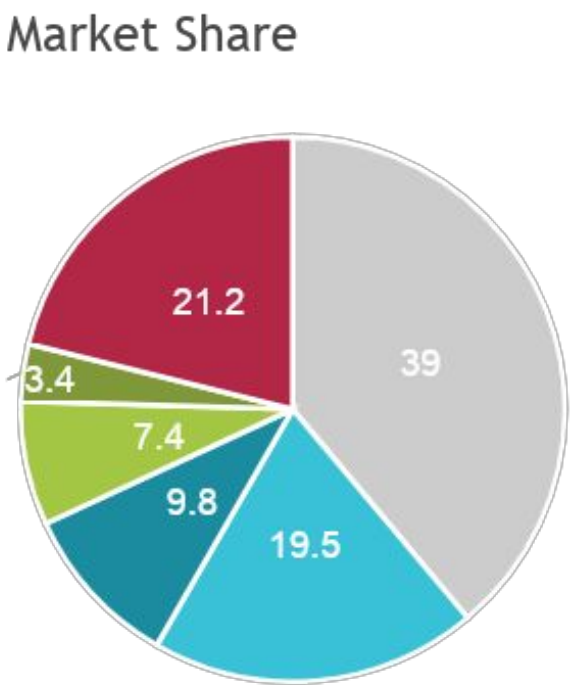
AVOIDING MISLEADING VISUALS – 3D

HERE'S AN EXAMPLE. WHAT'S THE PROBLEM WITH THIS CHART?

„Represents data accurately"

Representation:
- Length
- Distance
- Area
- Angle

3D = Distortion!



AVOIDING MISLEADING VISUALS – 3D

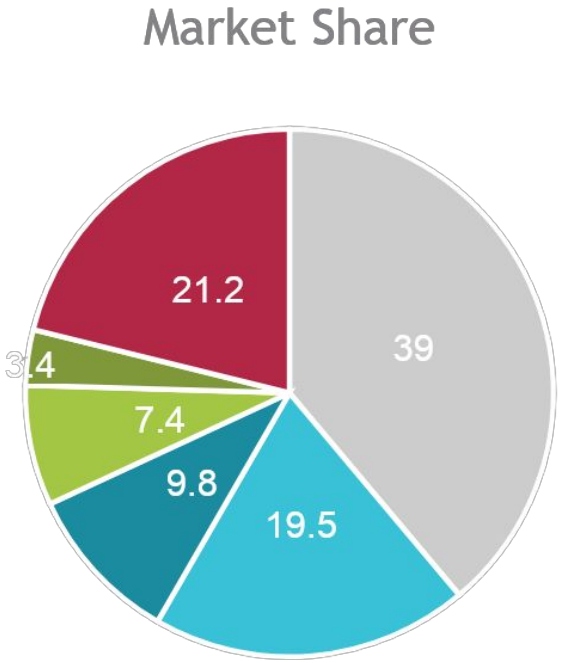
HERE'S AN EXAMPLE. WHAT'S THE PROBLEM WITH THIS CHART?

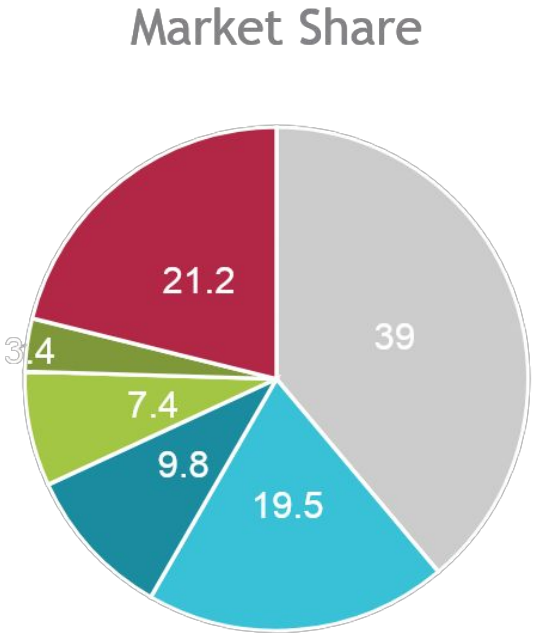
Angle distortion!

Area distortion!

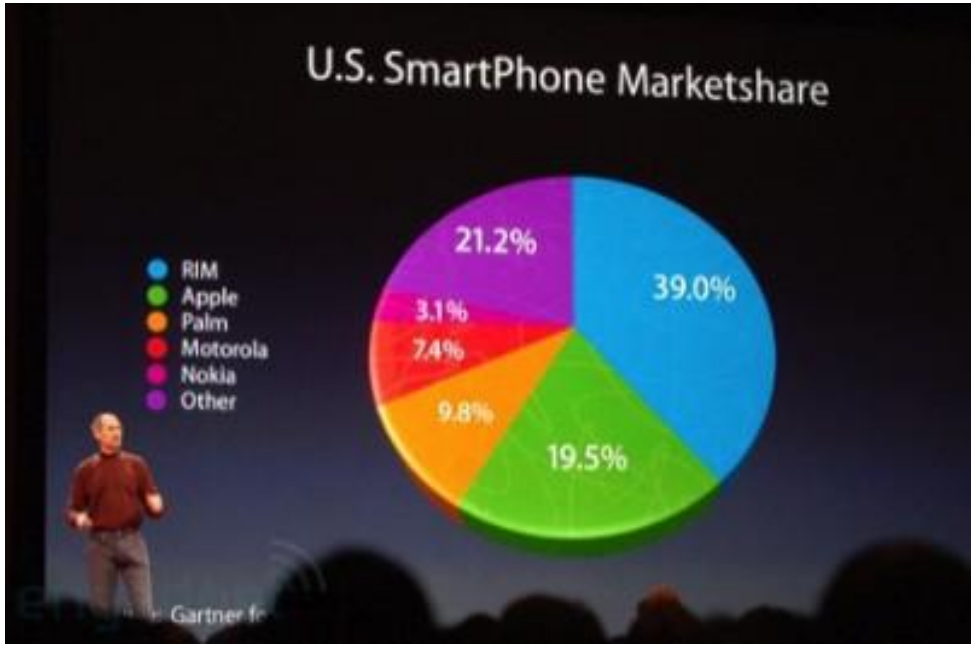
Limitations of the pie chart:

☺ How the values relate
☹ **Quantities accurately**
☹ **Compare the quantities**
? Ranked order
? Importance of chart





AVOIDING MISLEADING VISUALS – 3D

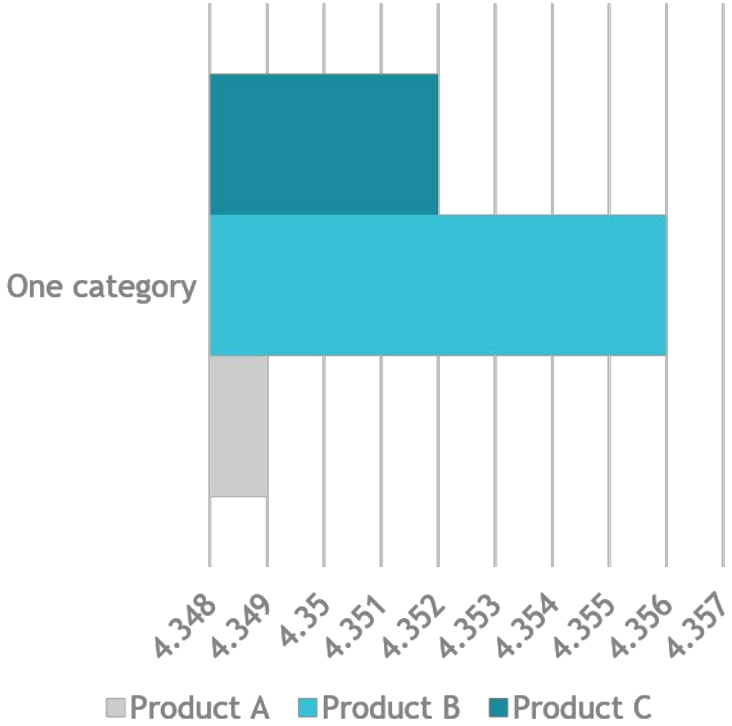


...Unless you want distortion. You may have seen this image.

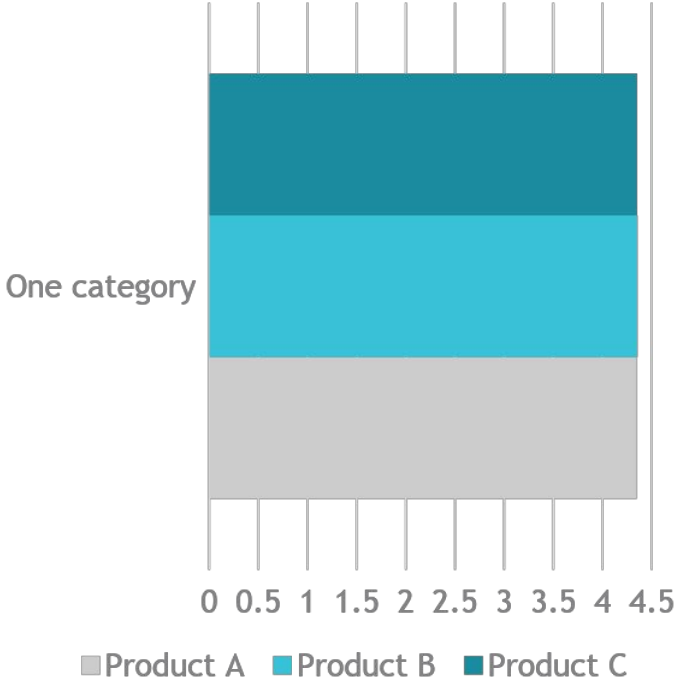
This is not decision support. This is a marketing session.

AVOIDING MISLEADING VISUALS – BAR CHART

Let’s take a look here. Do you see any issues?



AVOIDING MISLEADING VISUALS – BAR CHART



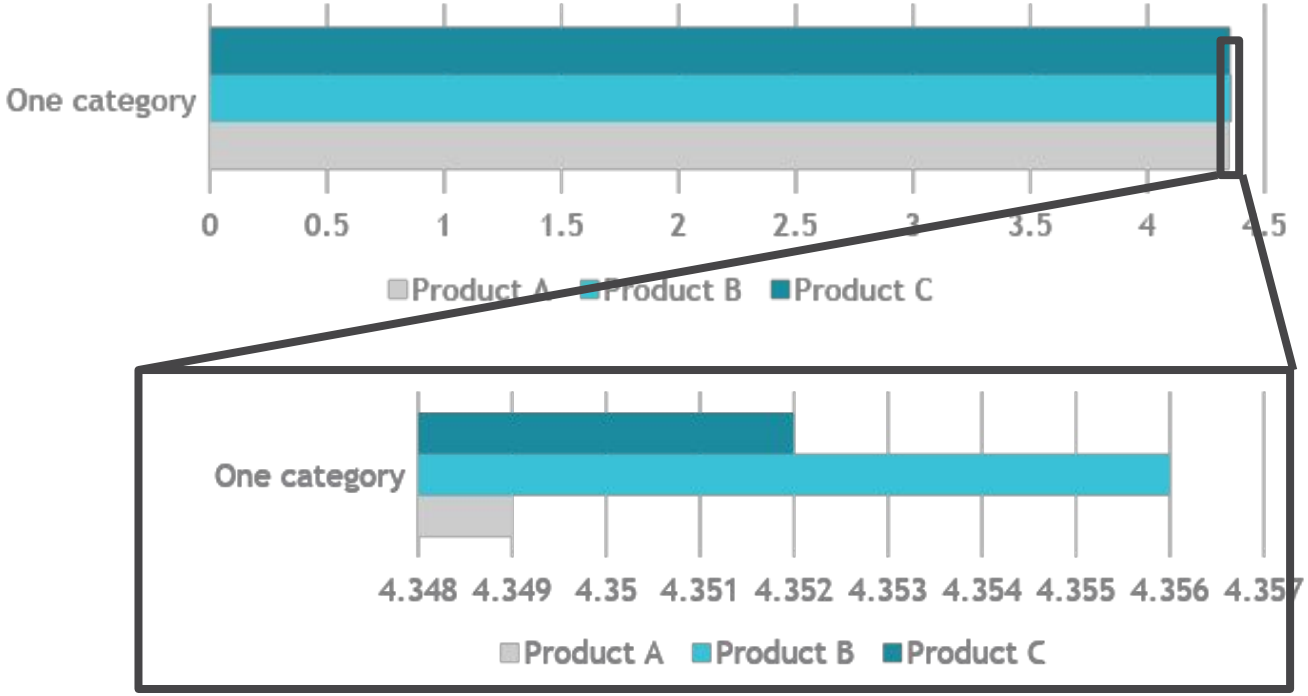
...and if we extend to zero?

AVOIDING MISLEADING VISUALS – BAR CHART

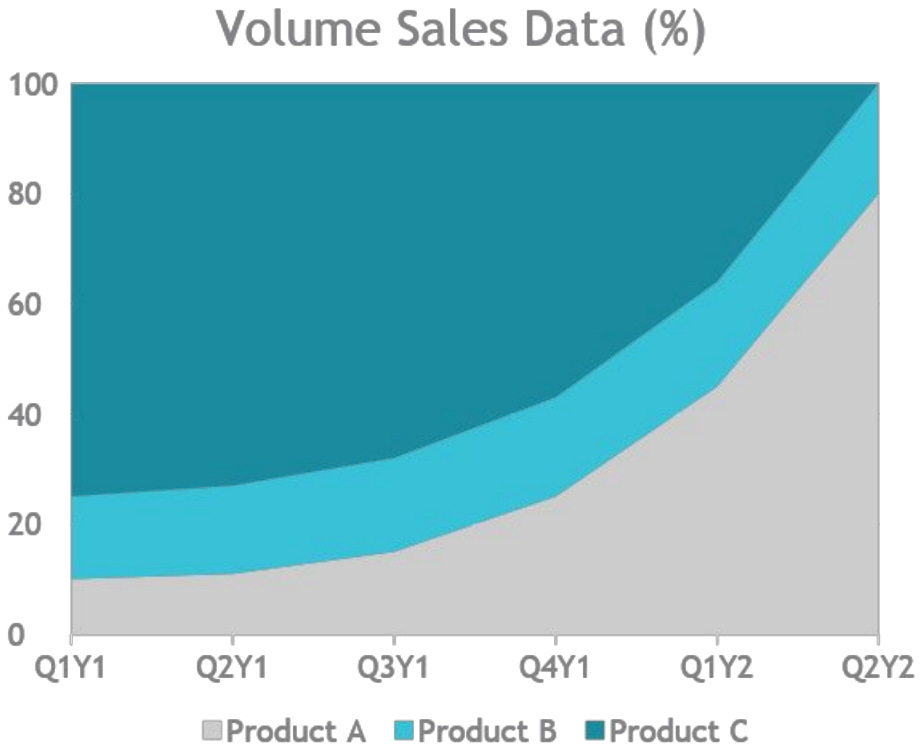
So if we check our list, this does not perform well.

Possible solutions

- Use zoom slider
  - Preferably set to no zoom by default
- Show a zoomed and an un-zoomed
  - Emphasize that the second one is zoomed



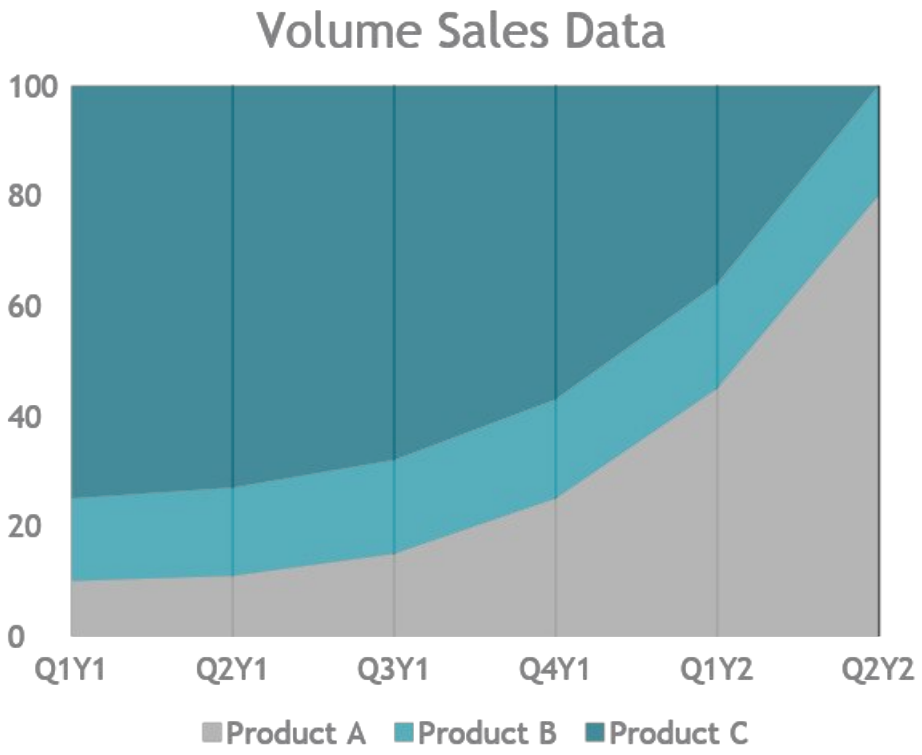
AVOIDING MISLEADING VISUALS – AREA CHARTS



How do Product B (orange) perform over time?

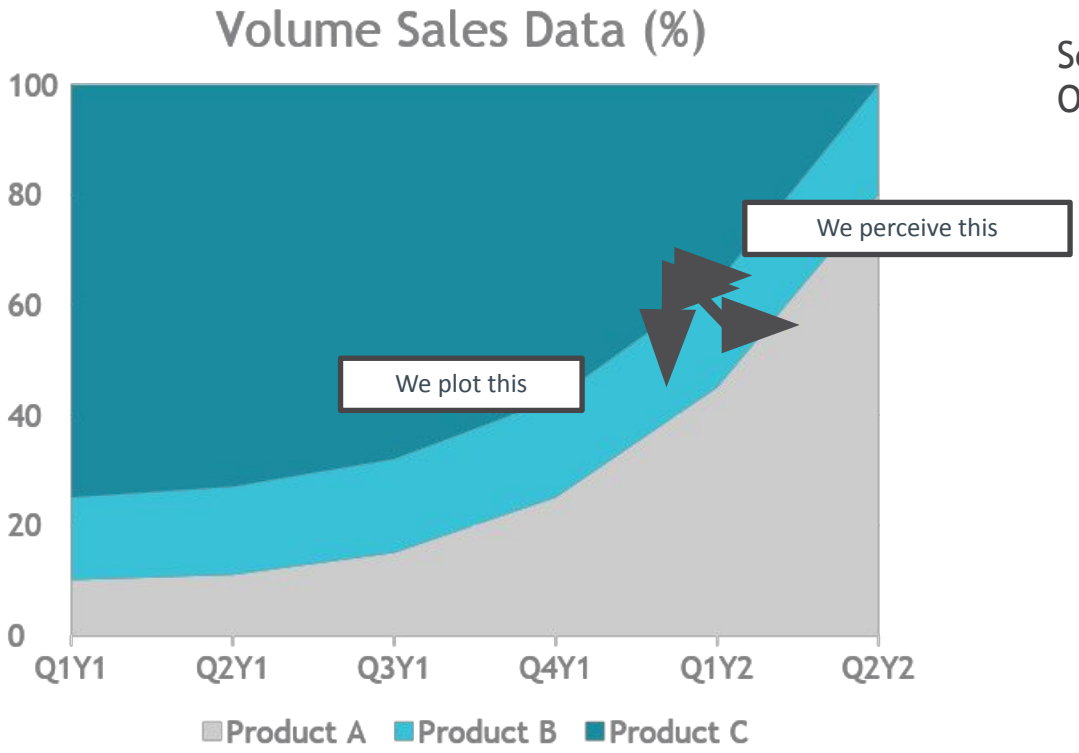
Curious if you find the trick. Let's give you a little help.

AVOIDING MISLEADING VISUALS – AREA CHARTS



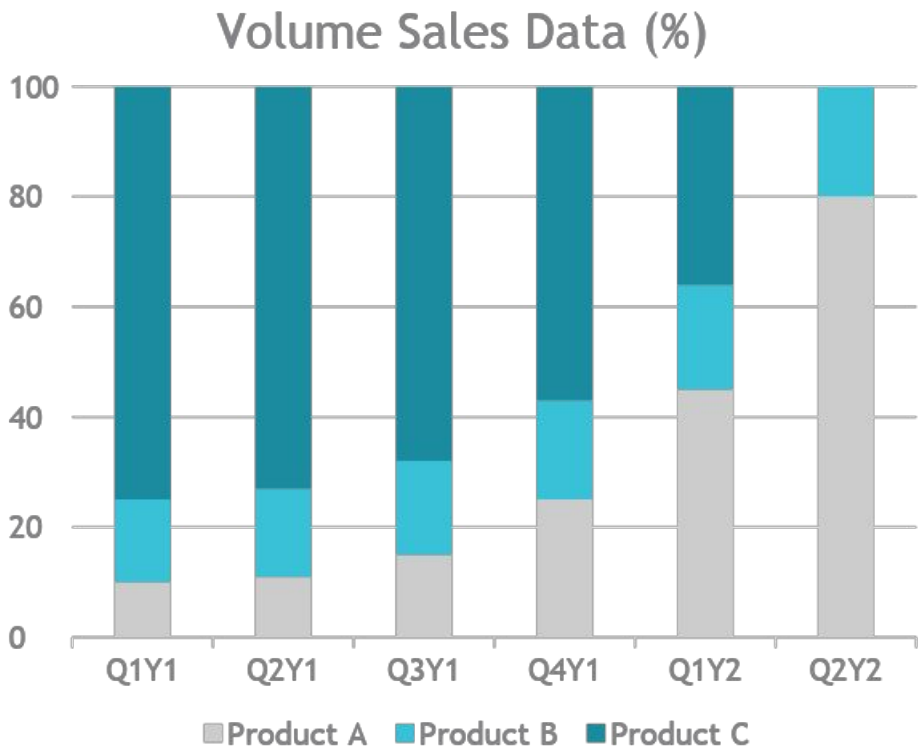
If not, here's the trick:

AVOIDING MISLEADING VISUALS – AREA CHARTS



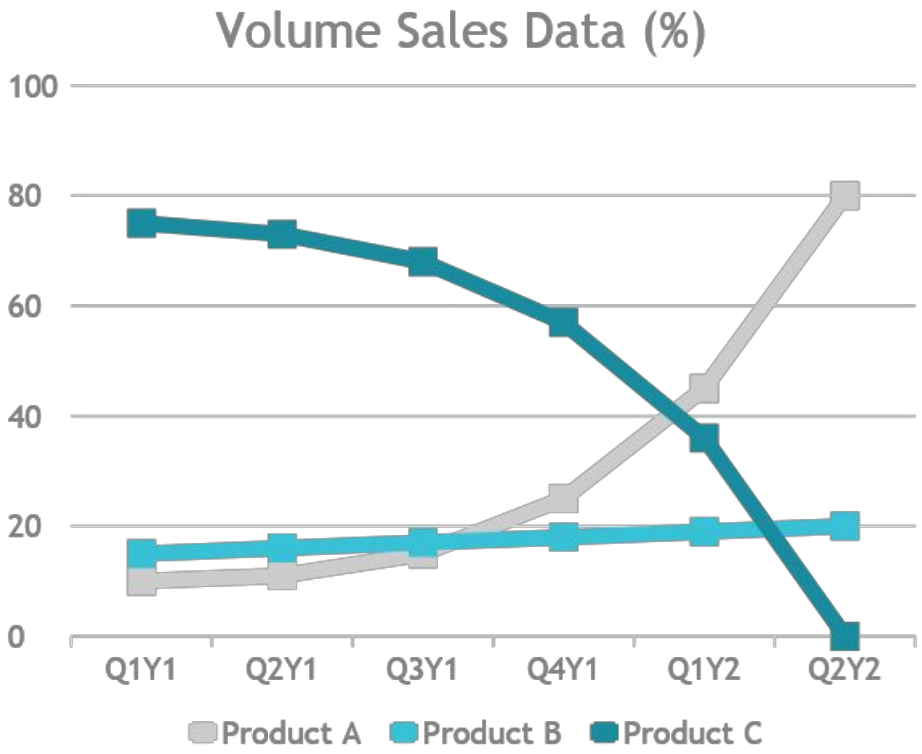
See?
Our perception simply works this way.

AVOIDING MISLEADING VISUALS – AREA CHARTS



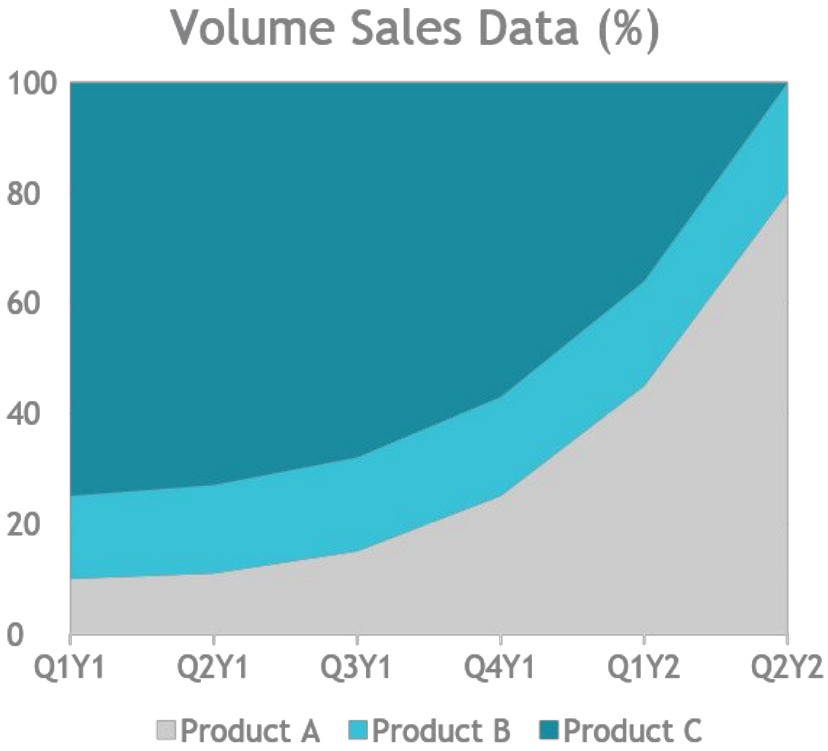
No, still not optimal...

AVOIDING MISLEADING VISUALS – AREA CHARTS



Consider that „Product B” share is not shrinking as the area chart suggested. In fact, it is slightly going in an upward direction.

AVOIDING MISLEADING VISUALS – AREA CHARTS



See our good old checklist.

Not performing good? Before using an area chart, consider other options.

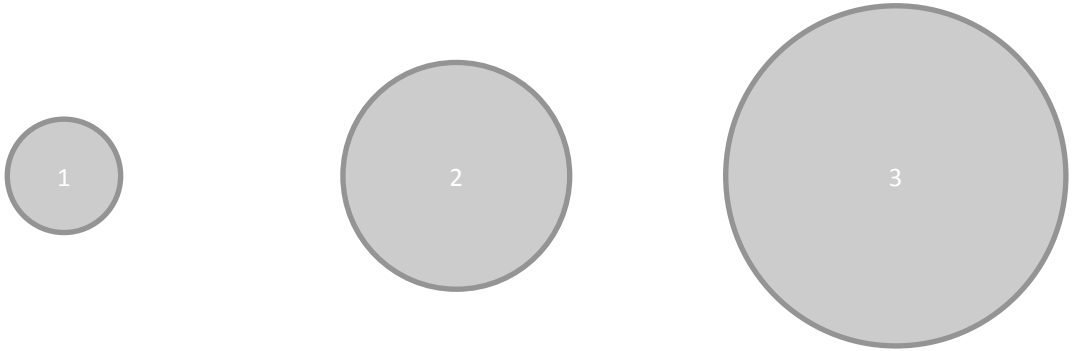
☺ How the values relate
☹ **Quantities accurately**
☹ **Compare the quantities**
☺ Ranked order
? Importance of chart

AVOIDING MISLEADING VISUALS – SCATTER PLOT MARKERS

In any type of scatterplot, there is an option to parametrize their size.

So you have a data you want to plot, but how does that relate to the size of the scatter? What is proportional to the data? Usually radius, like shown here, right?

Radius might be misleading – it tricks your eyes into thinking 3 is a MUCH larger number than 1...

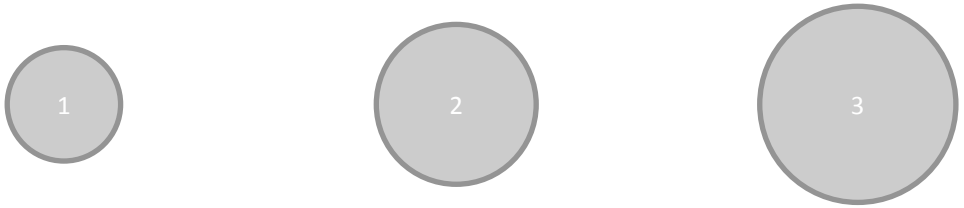


$r \approx value$

AVOIDING MISLEADING VISUALS – SCATTER PLOT MARKERS

Let’s try area.

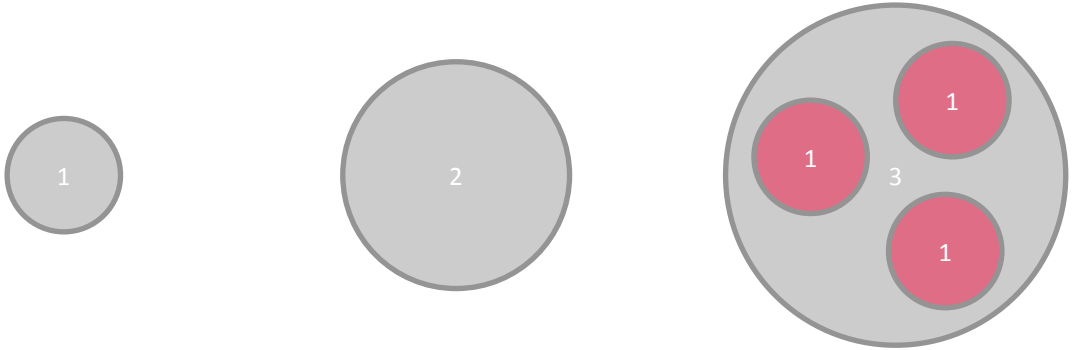
Area proportional with the value, thus radius proportinal to the square root of value. Easy!



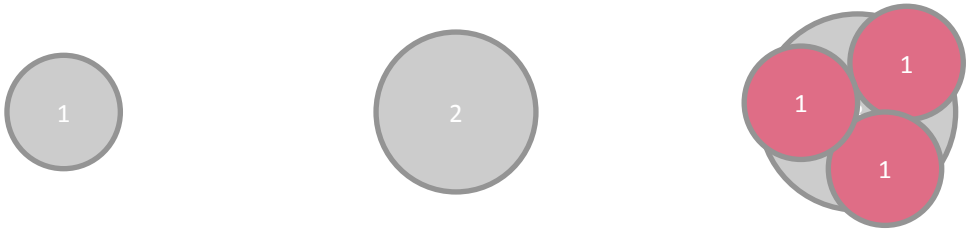
$$A \approx value$$
$$r^2\pi \approx value$$
$$r \approx sqrt(value)$$

AVOIDING MISLEADING VISUALS – SCATTER PLOT MARKERS

See that when radius is proportial to the represented value, it's sort of misleading.



AVOIDING MISLEADING VISUALS – SCATTER PLOT MARKERS



Much better, right?

IMPROVE EASE OF UNDERSTANDING

THE FUNDAMENTAL PRINCIPLES

IMPROVE EASE OF UNDERSTANDING – VISUAL HIERARCHY

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

IMPROVE EASE OF UNDERSTANDING – VISUAL HIERARCHY

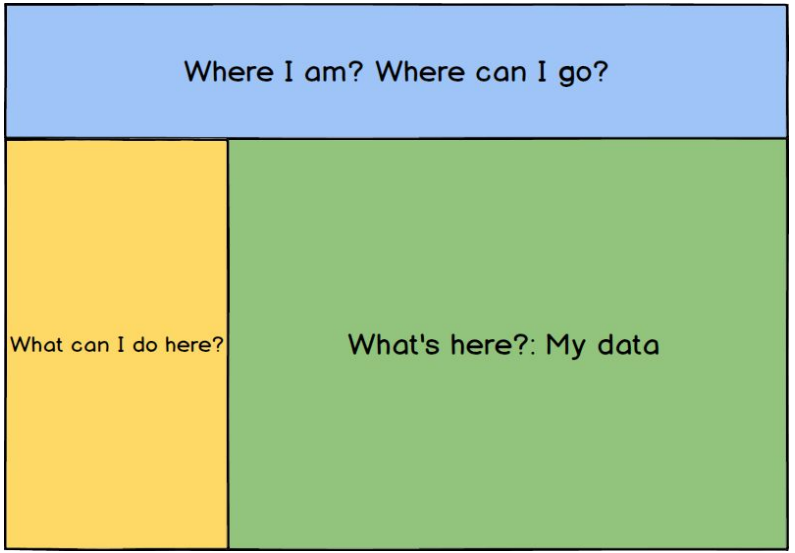
‘Where I am?’ And ‘Where can I go?’ The first area should answer these question.

Place here the company/brans logo, the title of the application, the main navigation panel that also provides feedback to the user on where she is at the given moment: in one word, anything that helps the user identify where she is and what is she seeing.

‘What can I do here?’ The second area should answer this question by any necessary means.
In the case of Spotfire/any other web applications, this is the place where we provide the tools to modify the actual data seen at the third area. In other words, this is the place to provide all kinds of filtering options at one place.

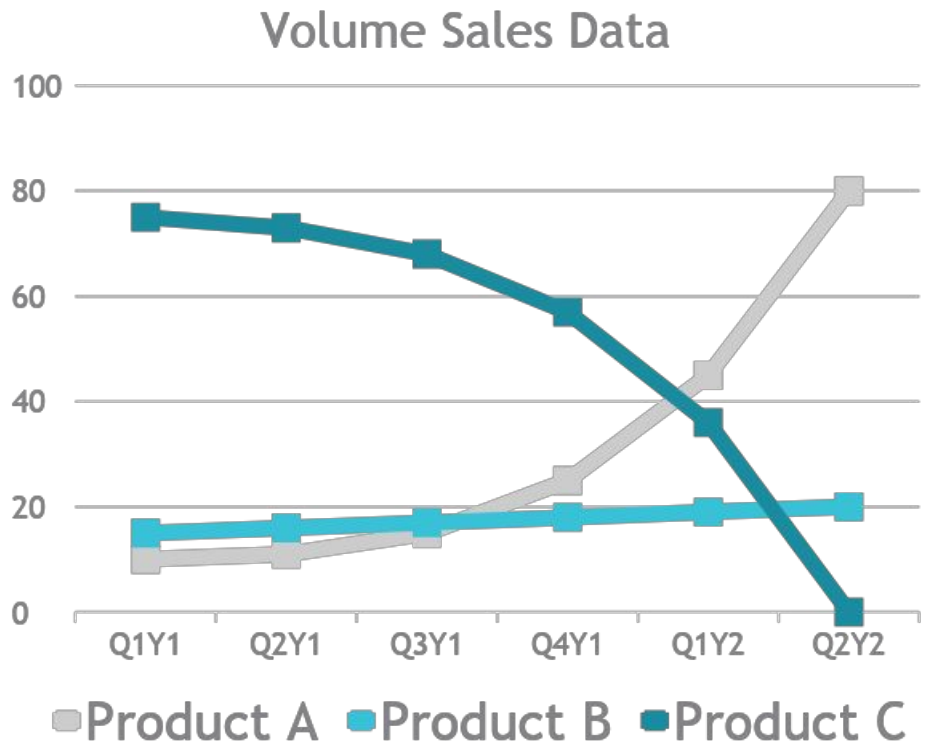
‘What’s here?’ The third area should provide the content of the actual page.
It is important here that preferably this area takes the biggest part of the screen, and preferably covers the center of the page.

Based on The Jeffrey Veen Model



IMPROVE EASE OF UNDERSTANDING – DIRECT LABELING

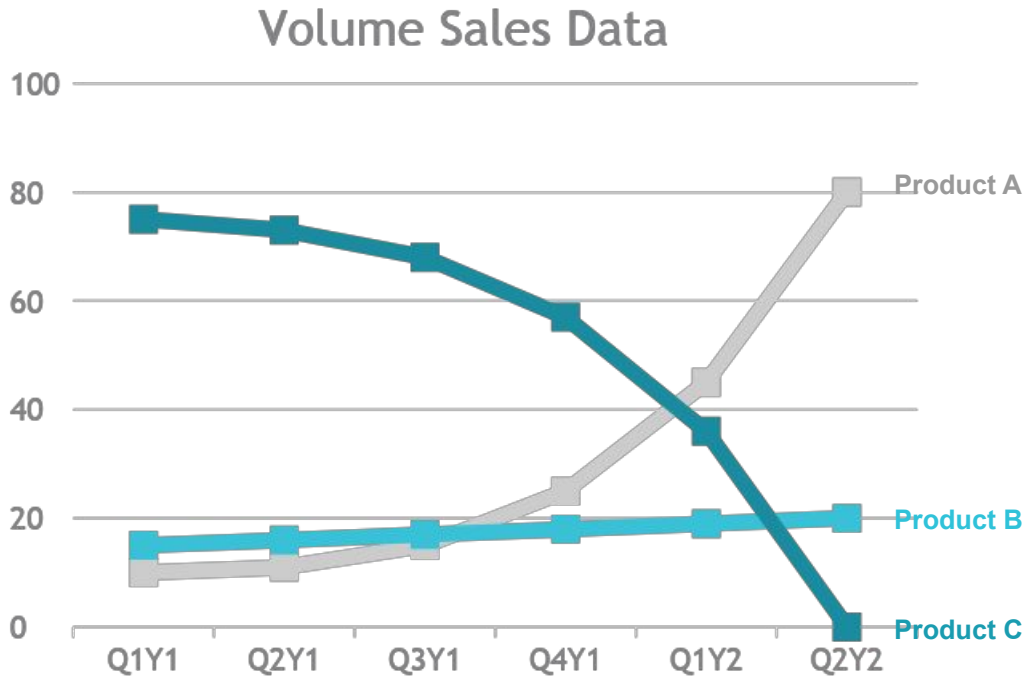
Our previous chart...



IMPROVE EASE OF UNDERSTANDING – DIRECT LABELING

With direct labels.

No need for that step of abstraction when you try to pair the labels to the lines.



IMPROVE EASE OF UNDERSTANDING – DATA-INK RATIO

Now what is data-ink?

Imagine „ink” as if you printed the chart. If an area is black, that means much ink. Grey, some ink, white, no ink.

No need for precise definition of data-ink („okay, grey means some ink, but what’s up with colors?”), this is a general idea, not a scientific rule.

DATA-INK RATIO:

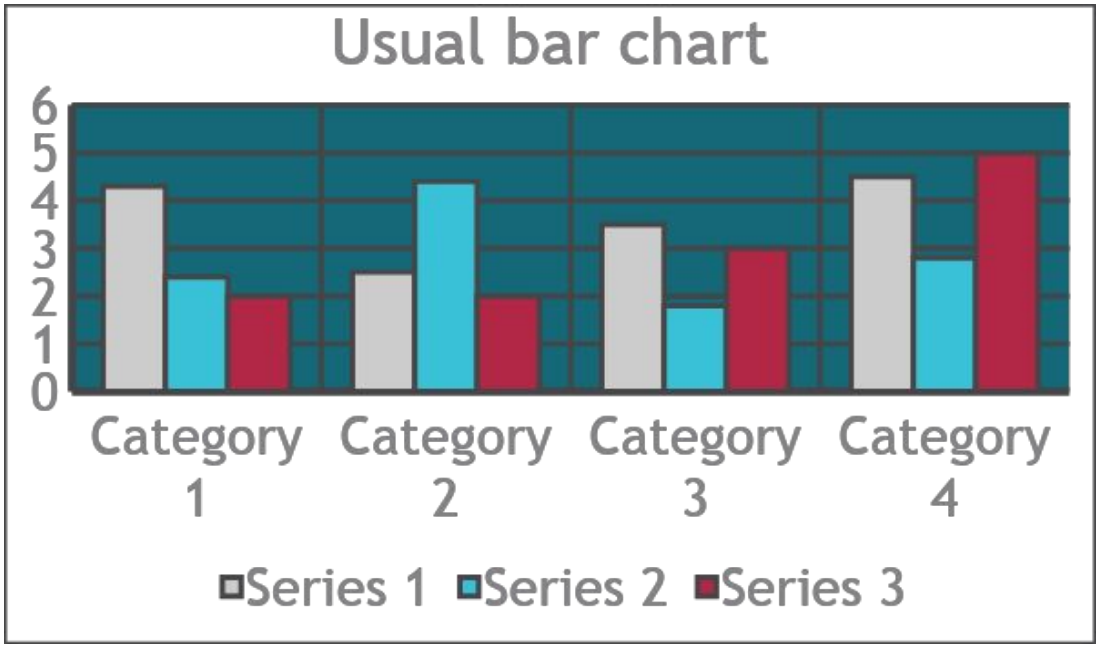
- Try to improve it
- Remove everything ***unnecessary***
- Wisely use ink of necessary elements

IMPROVE EASE OF UNDERSTANDING – DATA-INK RATIO

You will get the concept in a moment.

See that the actual data is overwhelmed by all the random colors, grids, and other elements?

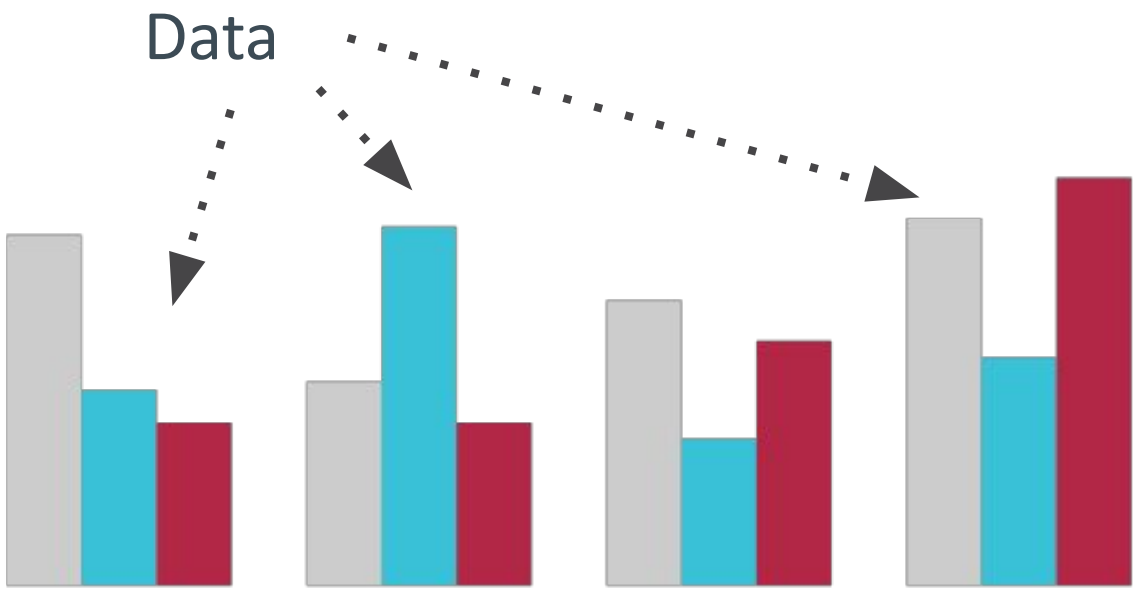
What's data ink here?



IMPROVE EASE OF UNDERSTANDING – DATA-INK RATIO

This. This is the part of the chart that ACTUALLY represents data.

Other elements are there for understanding, or sometimes even without any reason.

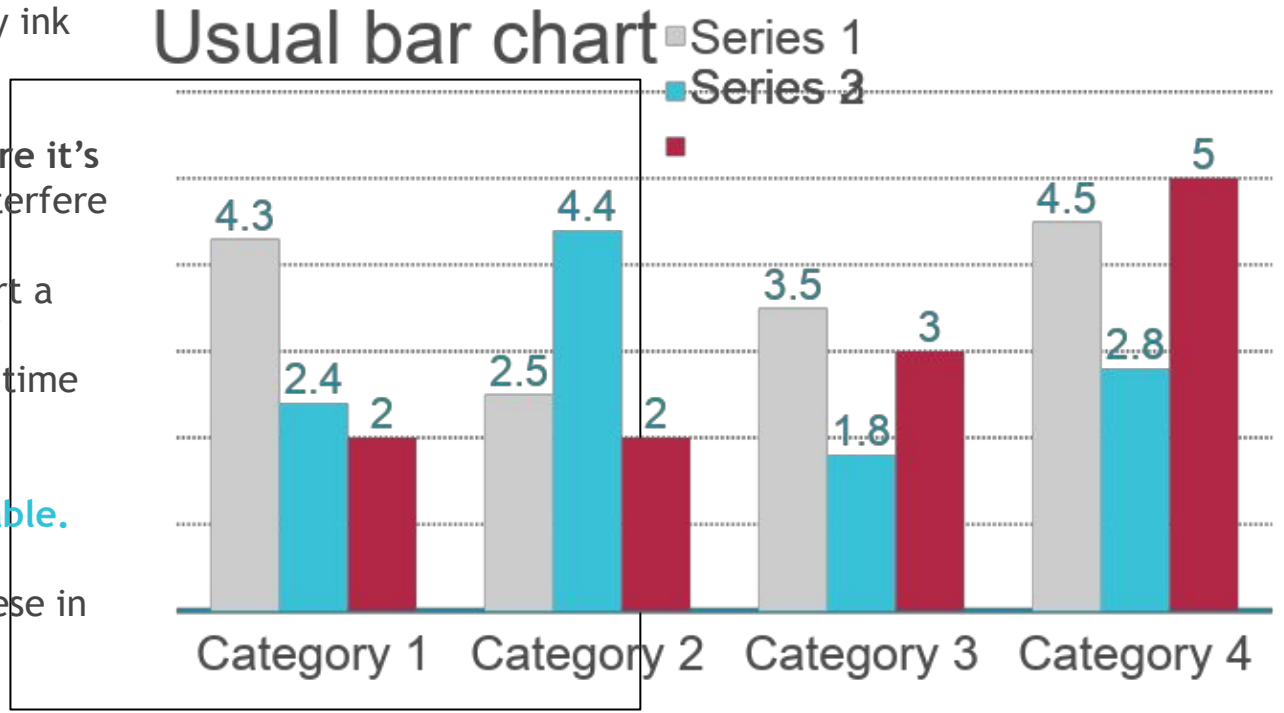


IMPROVE EASE OF UNDERSTANDING – DATA-INK RATIO

1. Let's start by removing every ink that's not necessary.
2. And then reducing necessary **non-data ink to a level where it's still legible**, but does not interfere with the data.
3. We can even modify the chart a little bit to remove a step of abstraction and at the same time increase accuracy.

Again, this is not always applicable. This is a general concept.

As usual with concepts, apply these in alignnment with common sense.



IMPROVE EASE OF UNDERSTANDING – COLORS

- Use **soft colors**
- Use **intense colors** only **to draw attention**
- Use the **same color**, except when color differences are needed to indicate differences in the data or encode a dimension
- Use a single, **neutral background** color (if needed at all)
- Use **colors standards** for brands/regions/ manufacturers

The goal is to:

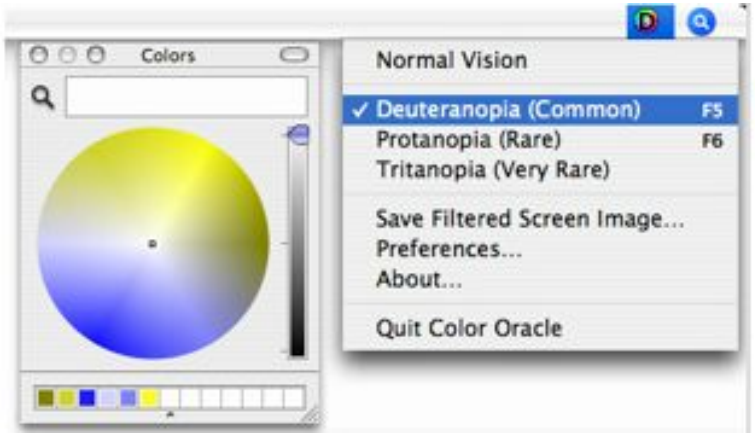
- Standardize
- Understand
- Compare
- NOT to overwhelm

IMPROVE EASE OF UNDERSTANDING – COLORS

SOMETHING TO KEEP IN MIND

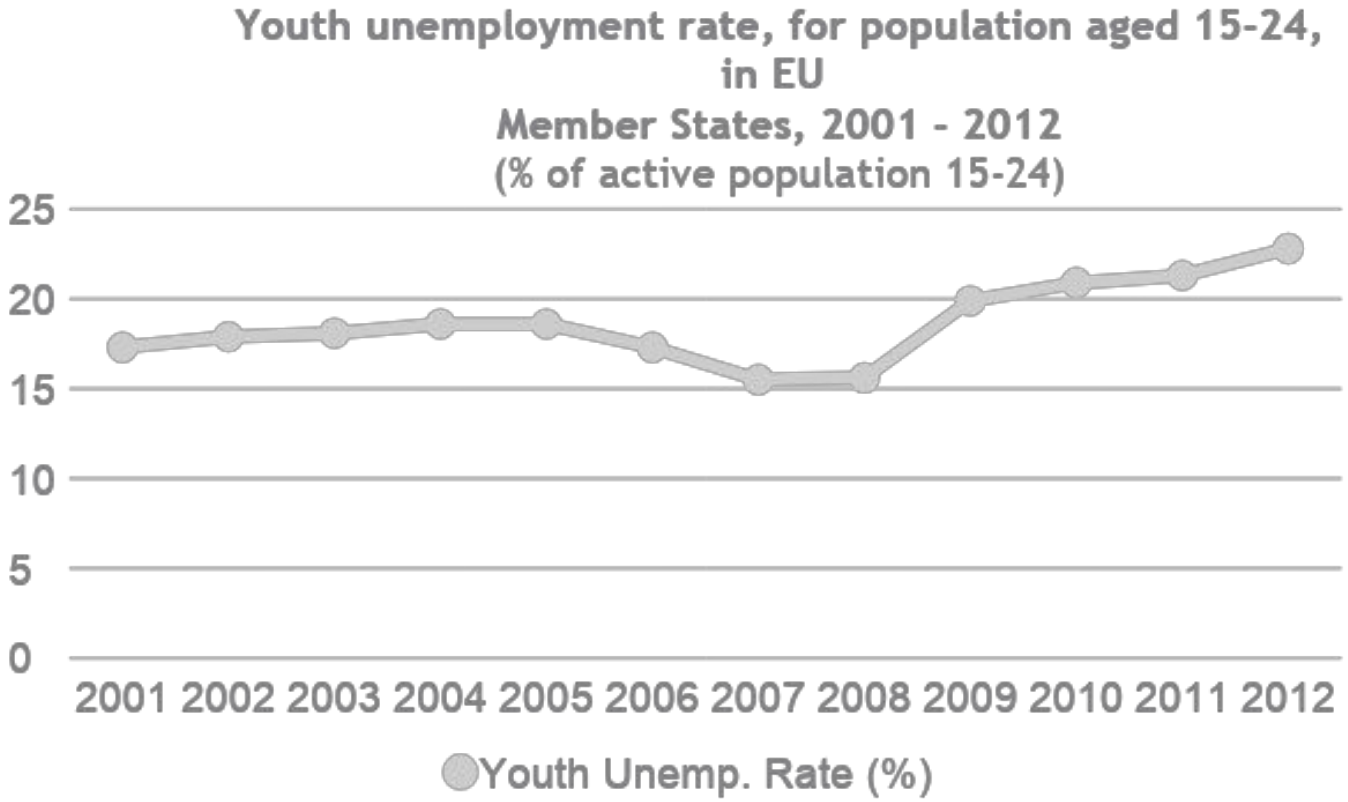
Color blindness (in some form) affects
8% of male population. Ladies are luckier with
0,5%

Tools to check:
http://colororacle.org/
http://colorbrewer2.org/



IMPROVE EASE OF UNDERSTANDING – TITLES

See this.
Tell your users
why they should
be interested.

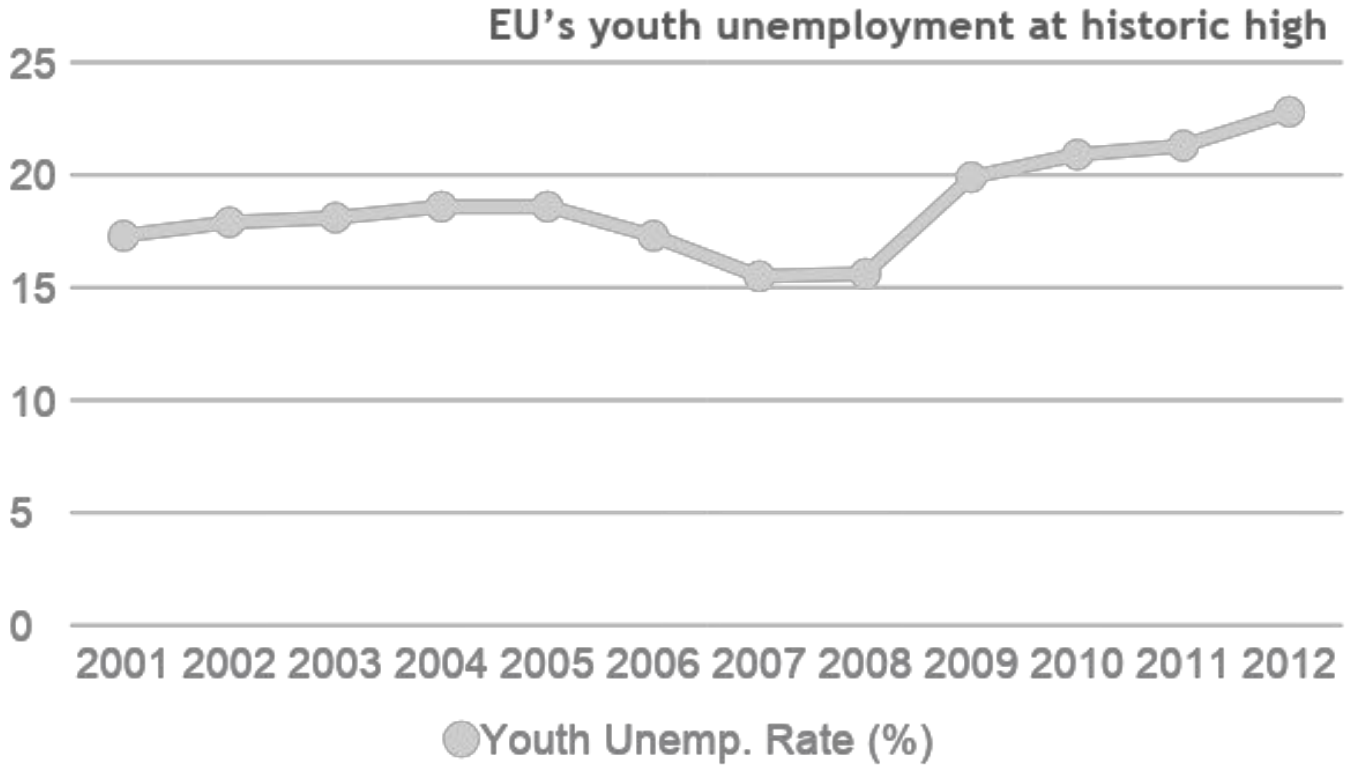


IMPROVE EASE OF UNDERSTANDING – TITLES

Getting there.

You can even „abuse it”, so, again, use this guideline only when APPLICABLE, and use in a responsible way.

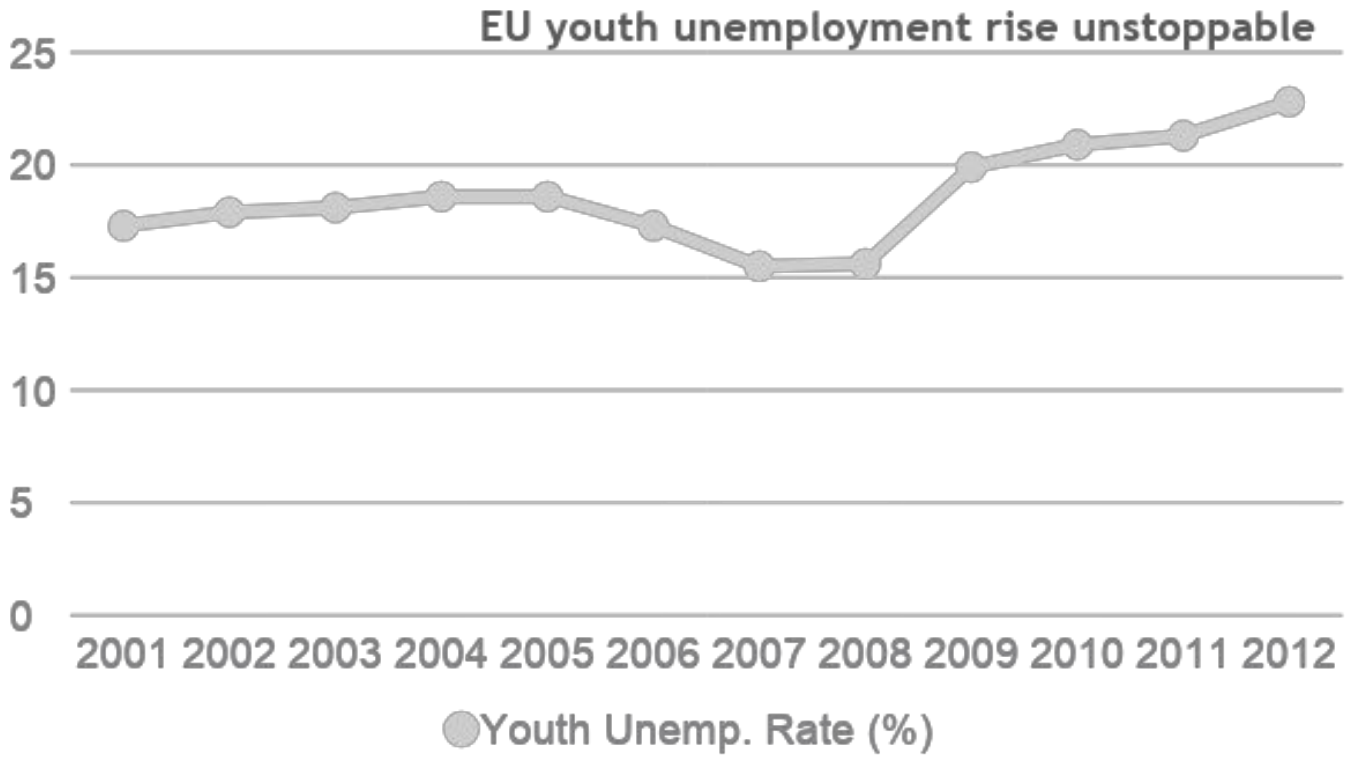
Example when a title is a bit too expressive:



IMPROVE EASE OF UNDERSTANDING – TITLES

This is not good. Why? Because you are suggesting something that's not there.

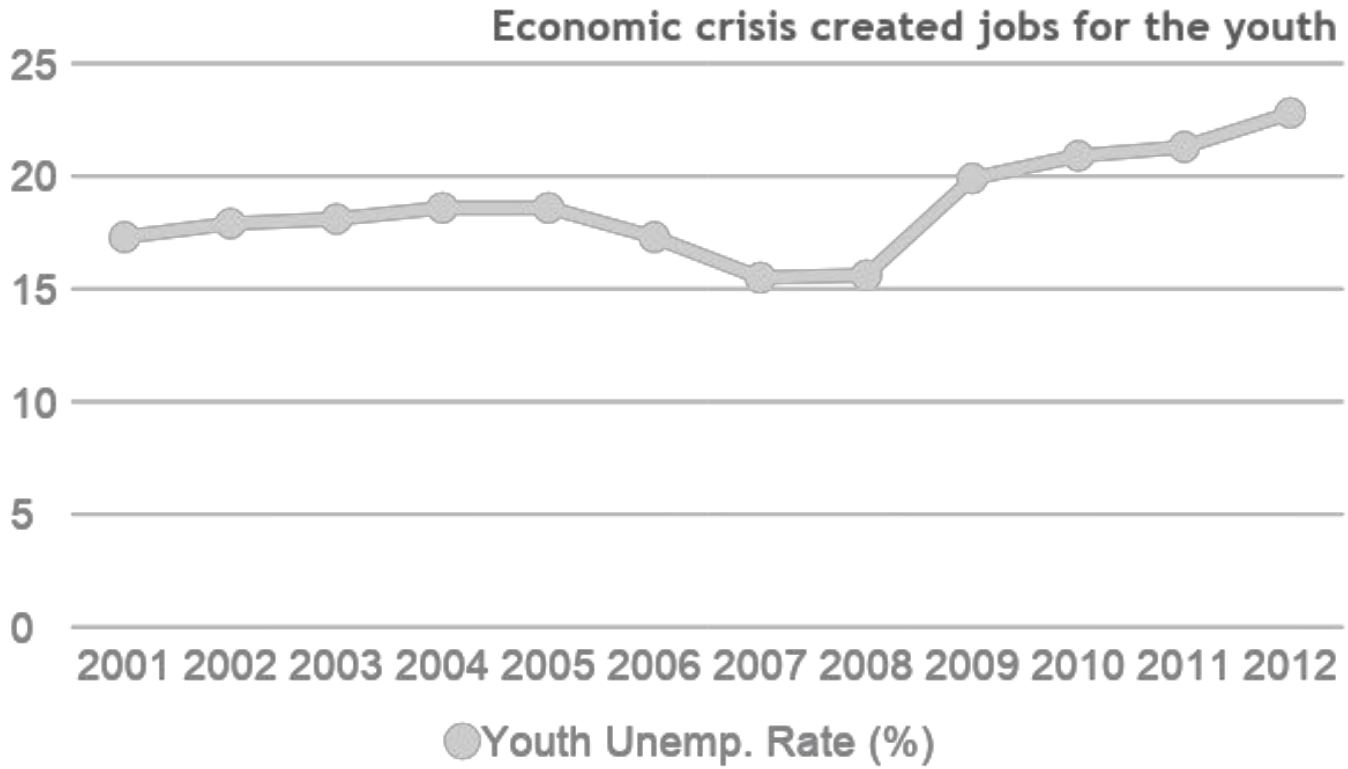
But notice how the story can be totally different: (next slide)



IMPROVE EASE OF UNDERSTANDING – TITLES

Totally different story.

By the way, this statement is obviously not true, just wanted to show an example of how different titles turn your attention toward different aspects of the chart.



IMPROVE EASE OF UNDERSTANDING – CHART JUNK

Everything that is not necessary
„Let's make it more fancy"

Let's be careful with these.

Always double-think before adding anything to „make it more fancy"

VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

5. UX & UI

UNDERSTANDING UI ELEMENTS & PRINCIPLES

- Know your audience
- The essence of interface
- The MAYA principle
- Input controls
- Navigation
- Animations
- Guided Actions

KNOW YOUR AUDIENCE

START WITH THE WHY BEHIND THE HOW

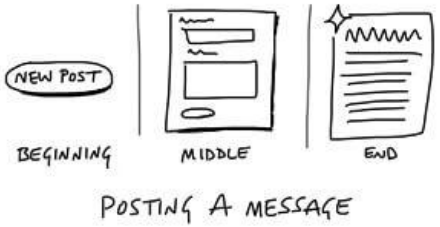
PERSONAS ARE FICTIONAL REPRESENTATIONS OF YOUR TARGET USER BASE

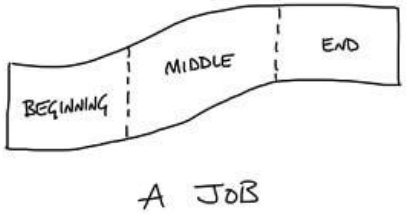
YOU NEED TO UNDERSTAND THE USER'S MINDSET, DESIRES AND THE TASK THEY WILL PERFORM

1. Identify the job, role and the company of the users
2. Include all details possible (age, gender, device usage and psychological aspects, what is it that they want to extract from the analysis)
3. You should use real information, don't make up your personas

THE ESSENCE OF INTERFACE

- Don’t look at interface as just screens and buttons,
- But rather as a collection of **JOBS** – with beginning, middle and an end.
- Ask what are the jobs people want to do with the analysis?





The MAYA Principle

- Your goal when designing the UI of an analysis is to create the greatest, most extremely new and original that goes far beyond the average user's wildest dream, right?
- Not really...
- As instead: (M)ost (A)dvanced (Y)et (A)cceptable
- because the public is naturally resistant to change
- and radical innovations – even if it is a better solution.

UNDERSTANDING VISUAL ELEMENTS OF UI

- Contrast
- Color Theory
- Color Schemes
- Typography

GESTALT PRINCIPLES

„Gestalt is a psychology term which means "unified whole". It refers to theories of visual perception developed by German psychologists in the 1920s."

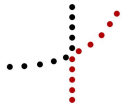
These theories attempt to describe how people tend to organize visual elements into groups or unified wholes when certain principles are applied.

Law of similarity

- We perceive similar items (that match in appearance) as grouped

Law of continuity

- We perceive partially occluded items as whole.

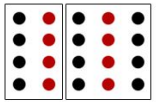


Law of proximity

- We perceive items near to one another as grouped, and items far apart as unrelated.

Law of common region

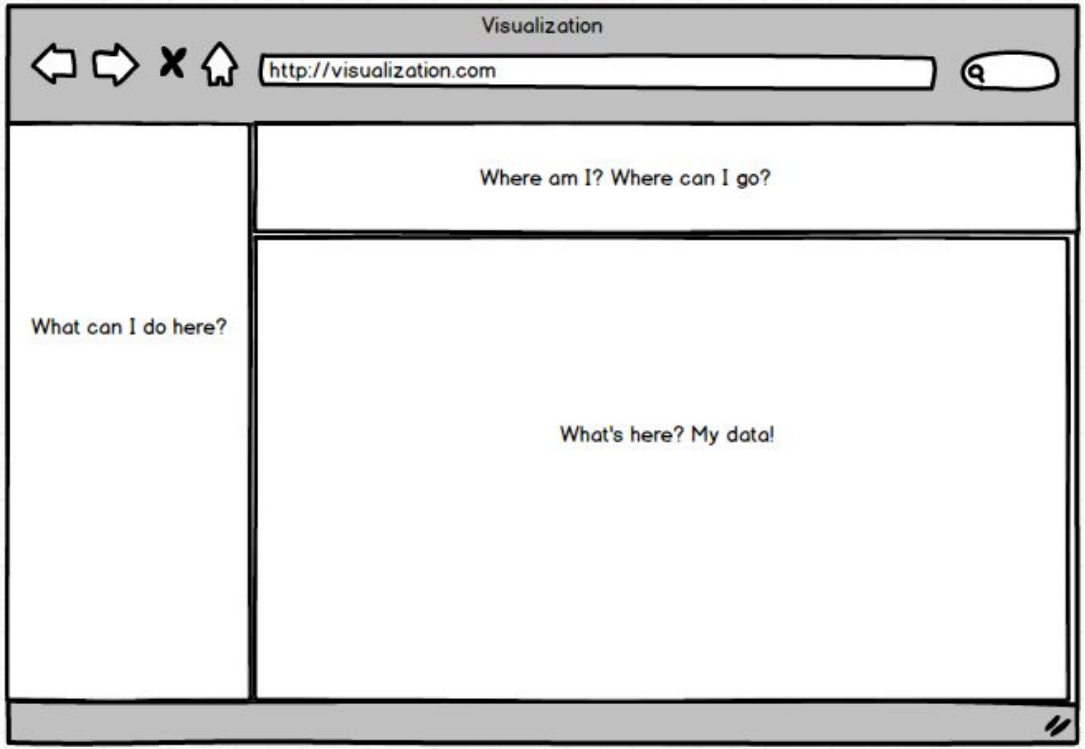
- We perceive items that share an area with defined boundaries as grouped.



Law of closure

- We see whole figures when shapes are incomplete.

LAYOUT


Visualization
http://visualization.com
Where am I? Where can I go?
What can I do here?
What's here? My data!

LAYOUT – KEY PRINCIPLES

LOGICAL

EFFICIENT

INFORMATIVE

USER CENTERED DESIGN

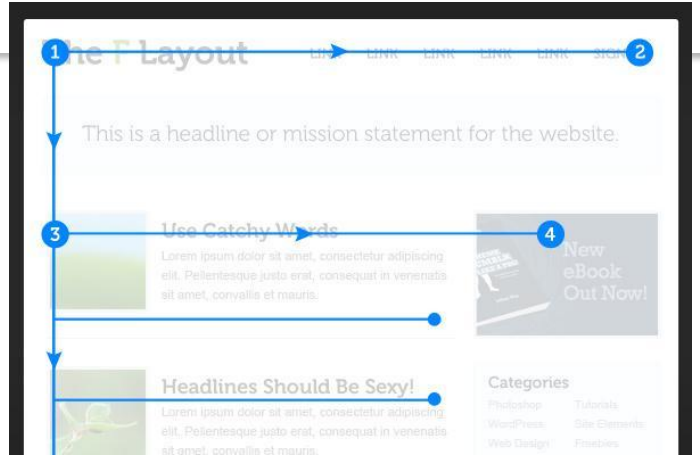
CREATING VISUAL ORGANIZATION

- Scanning patterns
- Contrast: Generating interest
- Color, size and space
- Know your auidence

SCANNING PATTERNS – F-PATTERN

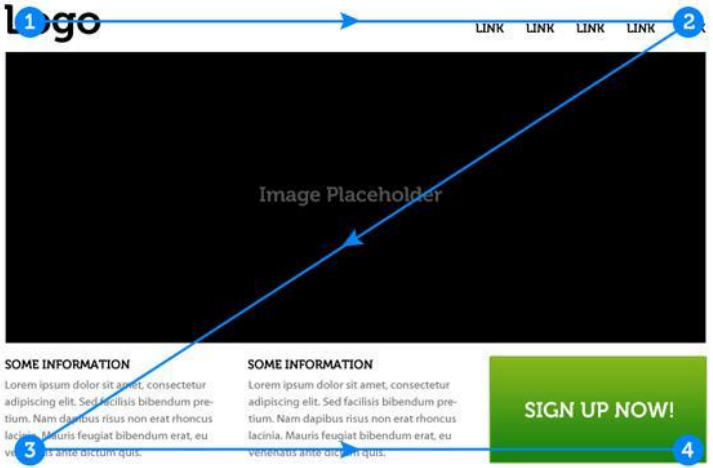
Common scanning pattern for text heavy content.

- Users will rarely read every word of your text
- The first two paragraphs should contain the hook
- Start paragraphs with enticing keywords



SCANNING PATTERNS – Z-PATTERN

- Common scanning pattern for pages that are not centered on text.
- User first scans a horizontal line across the top of the page.
- Perfect for interfaces where simplicity is a priority and the



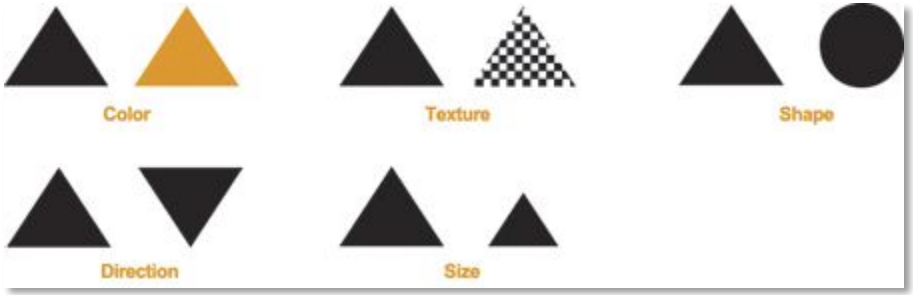
CONTRAST: GENERATING INTEREST

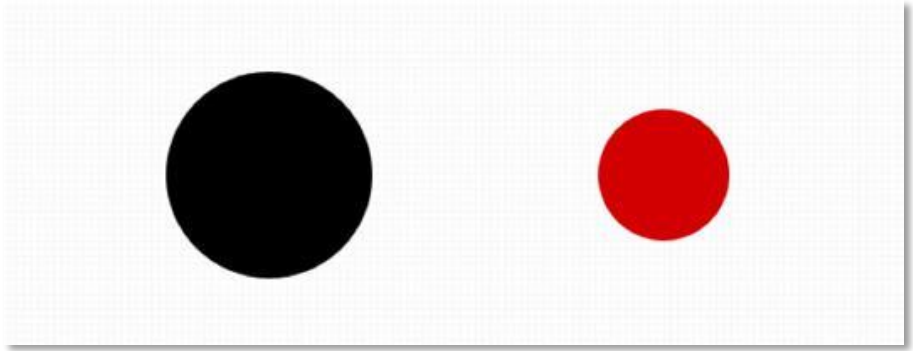
Contrast is the occurance of two different elements positioned close together.

Altennating between different sizes and colors can create an instant hierarchy to your userface.

Not only two circles but:

A black circle and a smaller





COLOR, SIZE AND SPACE

COLOR AND SIZE MANAGE ATTENTION, WHILE SPACING HELPS MANAGE VISUAL RELATIONSHIP.

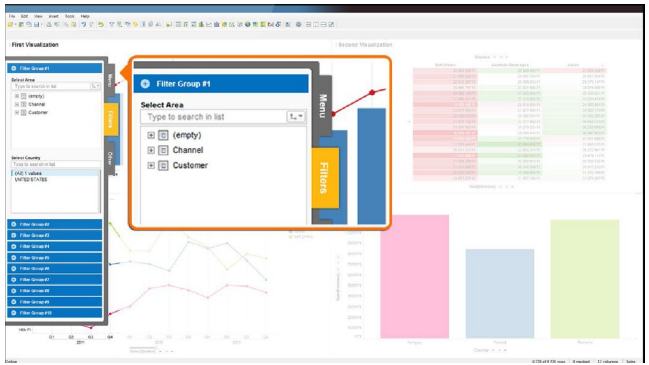
- I. Colors
  - Bright colors stand out from muted colors
  - Certain colors can help set the mood
- II. Size
  - Size can add emphasis to the actual message
- III. Space
  - Do not clutter to much things
  - It’s important to let your interface breathing room
  - Reduce visual noise

INPUT CONTROLS

- Without interaction, an interface would just be a ’face’.

- Users want more options, but every new control complicates the UI and clutters the screen.

- Solution: Have **controls on demand**.
- You don’t lose functionality and free up space.
- Example: Snippet Library’s Sliding Filter Panel



NAVIGATION

- It’s hard to appreciate an analysis if you are lost, which is why having navigation is mandatory.

- Users should always know their current place in the analysis
- The navigation system should remain consistent for all pages

- Either use horizontal navigation on the top of the pages
- Or vertical navigation on the left side or hidden into Snippet Library

ANIMATIONS

WHY?

1. The eye is drawn to movement

An animated icon will signal a change to your users more effectively than a static icon.

2. Establishes connections

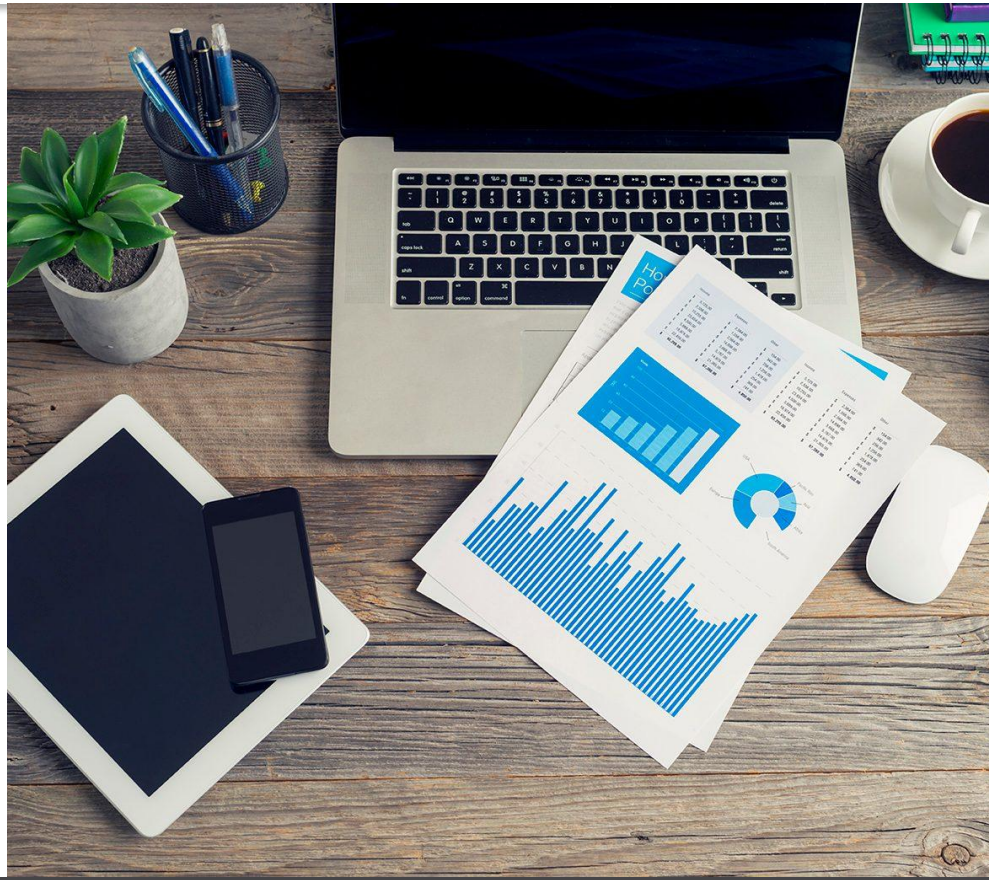
Animations make excellent transitions, and small transitions can enhance emotional connection

3. Cues and Clues

Well-thought animations

GUIDED ACTIONS

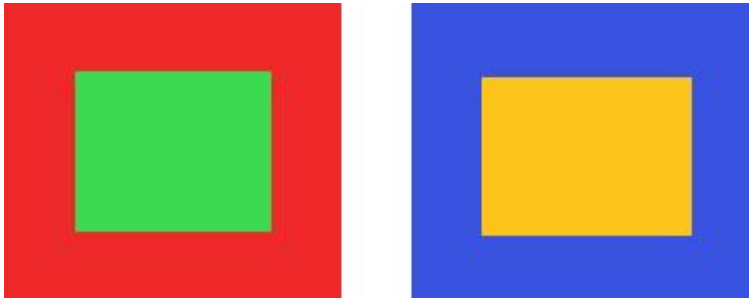
- Guided actions can be used by emphasizing key functions, controls and buttons.
- At EPAM you can also add Guided Tours/ iCoach to the analysis.
- People, as a whole, are open to suggestion.



CONTRAST

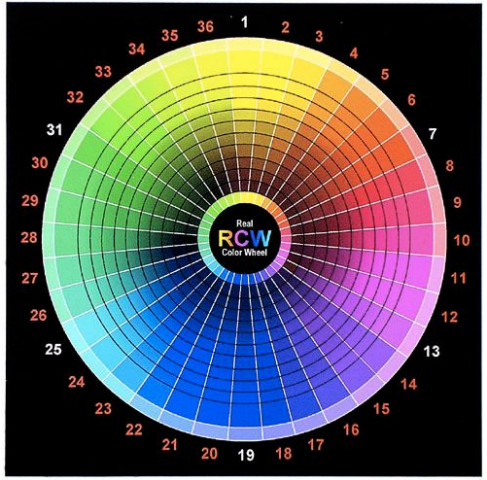
- I. Light vs Dark
- Darker colors for pushed buttons, because it adds depth

- II. Color contrast
- Warm colors Red: danger, Orange: inviting/call to action, Yellow: energy
- Cool colors Green: health/relax, Dark blue: professionalism, Light blue: relaxing, Purple: soothing/luxury
- Warm colors dominate cool colors.



COLOR THEORY

- Color theory is a science of its own.
  Just tweaking the saturation can completely change your interface.
- **Contrast** – within the color wheel use the opposite shade of a given color
- **Complementation** – the shade that accents a given color is next to that color

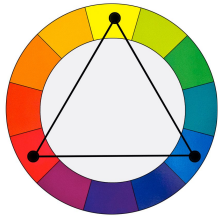


- **Vibrancy** – brighter colors tend to energize while darker ones relax

COLOR SCHEMES

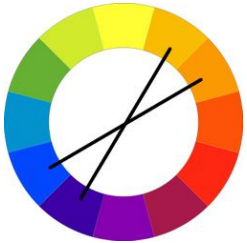
Triadic – the most basic and balanced structure

- HOW: on the 12-step color wheel select any 3 colors located 120 degrees
- from each other



Compound

- HOW: Uses contrasting and complementary colors



Analogous

- HOW: Focuses solely on complementary colors instead of contrast

Measure the Measure - /measure=width of a body type/

- The ideal amound of characters per line is 52-78

- Appropriate size:
- Body and leading – 11px/16.5px
- Main heading – 24px
- Subheadings – 18px
- Navigation – 16px
- All other headed elements – 13px

VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

6. STORYTELLING

THE IMPORTANCE OF STORYTELLING

Most organizations recognize that being a successful, data-driven company requires skilled developers and analysts. Fewer grasp how to use data to tell a meaningful story that resonates both intellectually and emotionally with an audience. We know that data is powerful. But with a good story, it's unforgettable.

-Daniel Waisberg – Analytics advocate at Google

THE IMPORTANCE OF STORYTELLING

Data journalism (and analytics in a broader sense) is a form of curation. There is so much data and so many data types that only experienced analysts can separate the wheat from the chaff. Finding the right information and the right way to display it is like curating an art collection.

Analysis doesn't have to be long and complex. The data collection and analysis process can often be rigorous and time consuming. That said, there are instances when it should be quick, such as when it's in response to a timely event that requires clarification.

Data analysis isn't about graphics and visualizations; it's about telling a story. Look at data the way a detective examines a crime scene. Try to understand what happened and what evidence needs to be collected. The visualization—it can be a chart, map or single number—will come naturally once the mystery is solved. The focus is the story.

Stories, particularly those that are meaningful, are an effective way to convey data. Now let's look at how we can customize them for our audiences.

(Source)

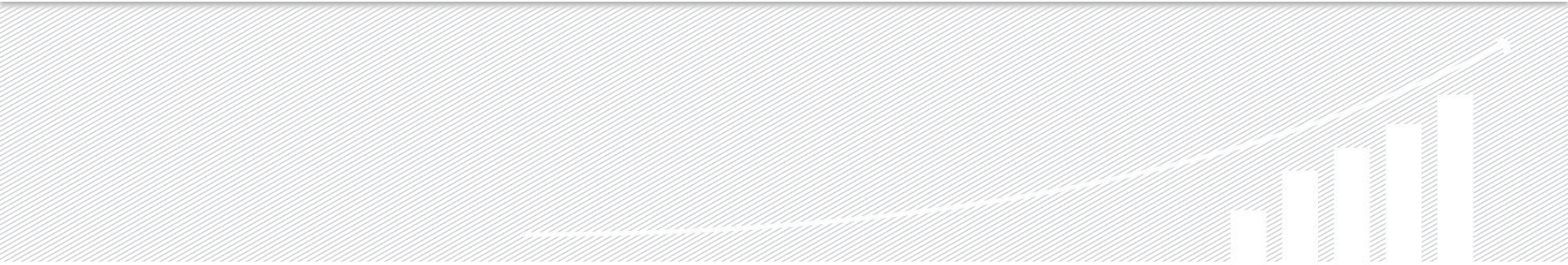
THE IMPORTANCE OF STORYTELLING

Be aware of your audience.

Dell Executive Strategist Jim Stikeleather segments listeners into five main audiences.

Audience	Approach
Novice	new to a subject but doesn't want oversimplification.
Generalist	is aware of a topic but looks for an overview and the story's major themes.
Management	seeks in-depth, actionable understanding of a story's intricacies and interrelationships with access to detail.
Expert	wants more exploration and discovery and less storytelling.
Executive	needs to know the significance and conclusions of weighted probabilities.

HOWEVER



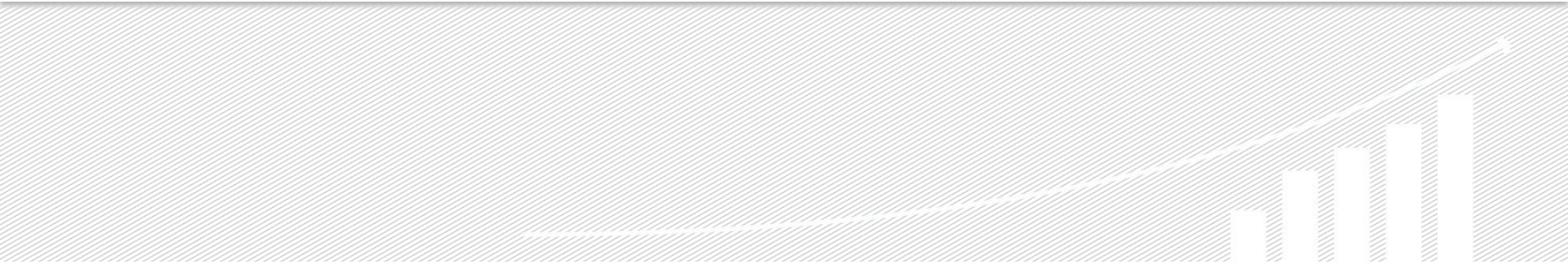
[in terms of Big Data volumes, BI tools…] …choke on integrating, summarizing and drilling massive datasets, thereby performing poorly.

Gartner

Many companies struggle with … business users driving these [self-service reporting] implementations.

Jen Underwood, BI guru

WHY DO WE USE STORIES IN BUSINESS ANALYTICS?



Every important decision is based on **interpreting objective data** in terms of **how it affects the decision maker.**

WHY?

PEOPLE ARE PROGRAMMED TO SEEK OUT VISUAL CONTENT.

Our memory does not store words but images, methaphores, stories.
We remember more the things we explored ourselves.
Learning by experience

THE STORY IN DATA VISUALIZATION

WHAT → State of business, key measures

WHY → Changes vs. previous cycle, competition insights

HOW → Risks & Opportunities

→ Decisions

UNDERSTAND AND GUIDE

WHAT is happening in my business?

- Market trends
- Company performance (shares)

WHY is it happening?

Drivers (and drainers)

Insights

- On competition
- On business
- On customers

HOW do we deliver the goal/fill the gap?

- Actionables
- Business Decisions

STEPS TO TELLING YOUR STORY

1. Understand your Data
2. Identify Your Story – what, why, how
3. Create a Good Structure - flow
4. Guide, but DO NOT PUSH
5. Keep it SIMPLE

UNDERSTAND YOUR DATA

- Who collected it?
- Why did they collect it?
- What audience was this data gathered for?
- What is the best way to present this data?

This insight is crucial in laying the foundation for a story that is both meaningful and human.

IDENTIFY YOUR STORY

You have the hard facts, you need to decide the story you want to tell with it.

Your task:

- Answer: What – Why – How
- Make sure the insights are clearly identified

CREATE A GOOD STRUCTURE

A well-structured visual provides clarification, reveals trends, and highlights your key findings.

YOUR TASK:

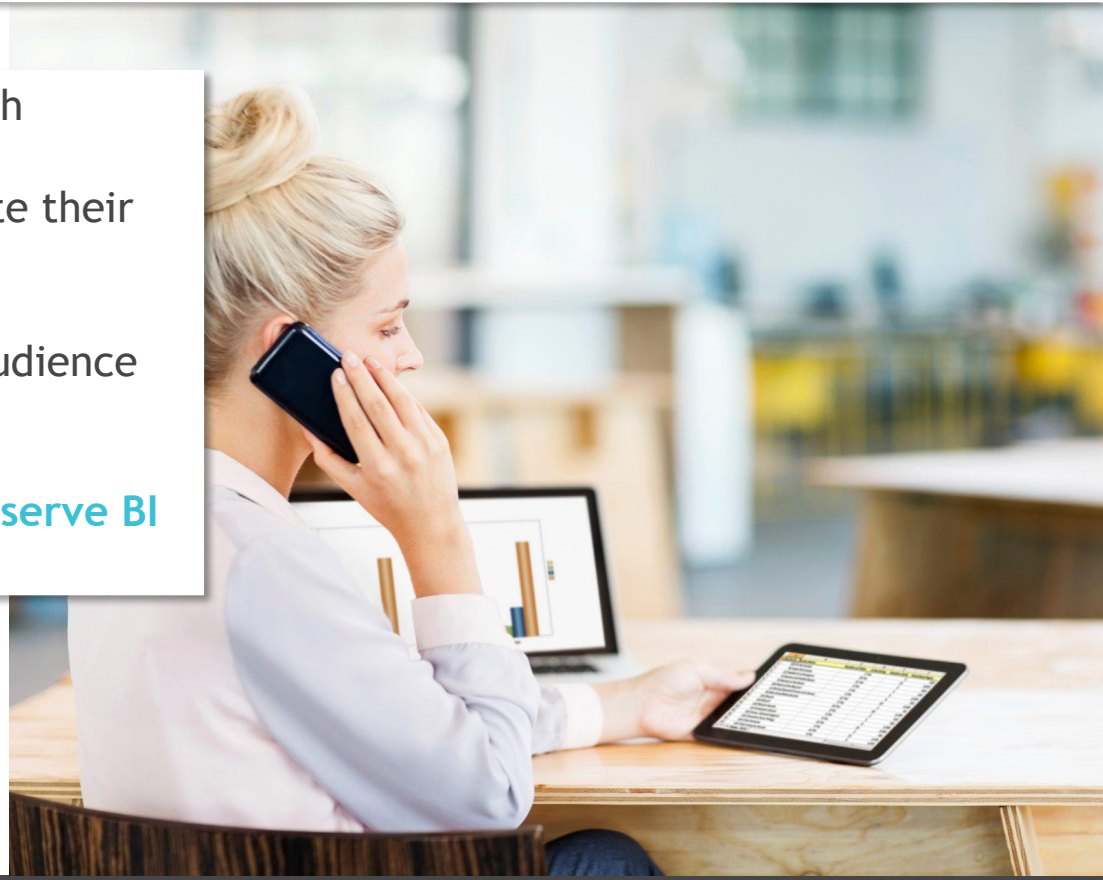
- Focus on KPI
- Identify best-fit visuals
- Create a flow

GUIDE, DO NOT PUSH

The facts should encourage a thorough understanding and learning of your information that allows users to create their own experiences.

Make it as easy as possible for your audience to understand.

Expected result: Self-serve BI



KEEP IS SIMPLE

Simplicity is the ultimate sophistication.

Leonardo da Vinci

If you cannot explain simply, you don't understand well enough.

Albert Einstein

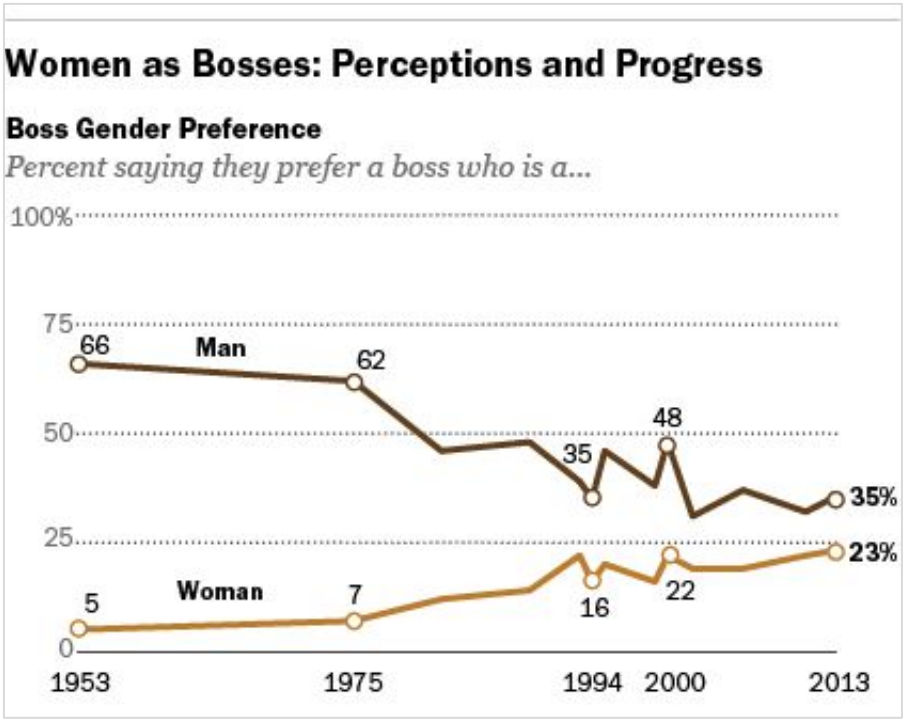
+1 LEARNING BEFORE YOU START
NEVER UNDERESTIMATE THE IMPORTANCE OF USER EXPERIENCE

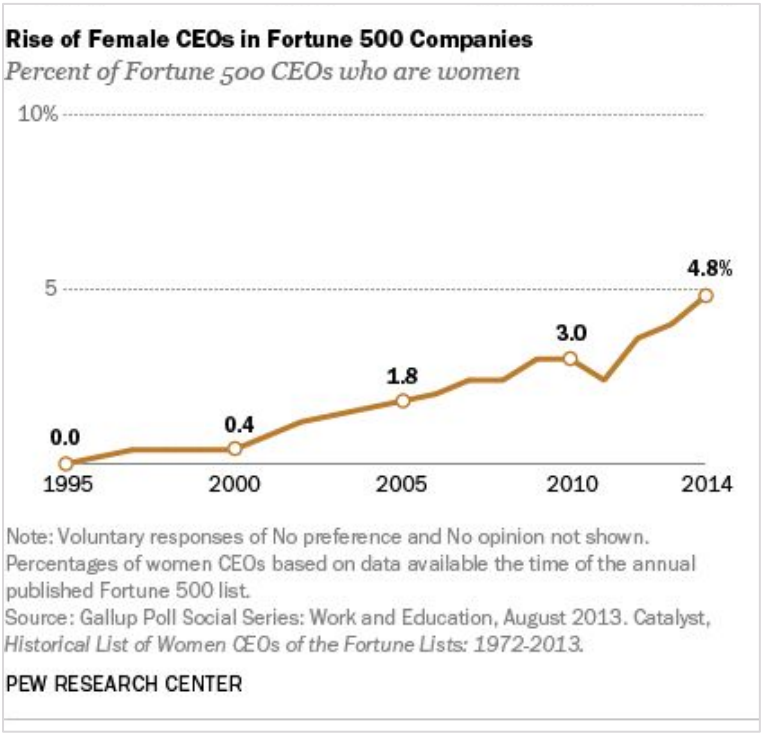
KNOW YOUR AUDIENCE
(=KEY CONSUMERS, USER GROUPS)

- Their experience with BI and tools.
- Their domain (market) knowledge
- Their current goals, roles and daily tasks.
    - Executive overview.
    - Deep-dive options.
    - Monitoring functions.

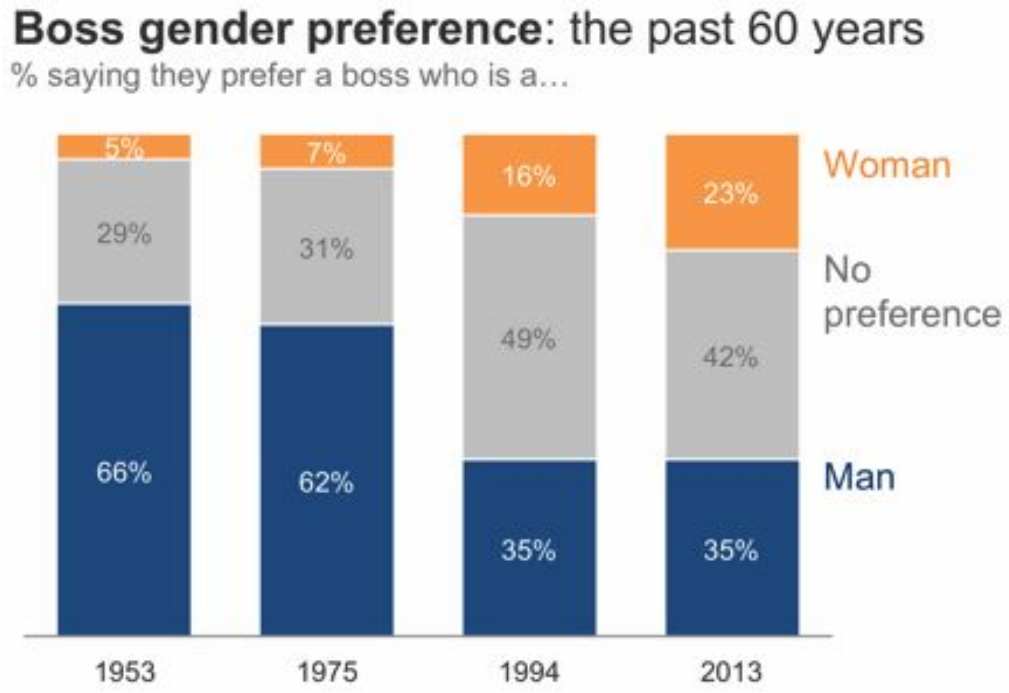
Use pre-defined visualization guides and standards.

WHAT DO WE SEE HERE?





ANOTHER POINT OF VIEW



TAKEAWAYS

1. Understand your Data
2. Identify Your Story – what, why, how
3. Create a Good Structure - flow
4. Guide, but DO NOT PUSH
5. Keep it SIMPLE

+ 1 TAKEAWAY

ALWAYS DESIGN FOR YOUR AUDIENCE.

VISUAL STORYTELLING &DATA VISUALIZATION BEST PRACTICES

7. EPAM VISUALIZATION STANDARDS

VISUALIZATION STANDARDS

COLORS

Use the company standard colors scheme so that we ensure recognition and corporate branding.

PRIMARY COLORS

Sharp Blue
Hex: #39C2D7
RGB: 57, 194, 215
CMYK: 84, 0, 18, 0
PMS: 3125 C

Lime Green
Hex: #A3C644
RGB: 163, 198, 68
CMYK: 46, 0, 90, 0
PMS: 375 C

Graphite
Hex: #464547
RGB: 70, 69, 71
CMYK: 0, 0, 0, 88

White
Hex: #FFFFFF
RGB: 255, 255, 255
CMYK: 0, 0, 0, 0

Primary Colors: The gray and white should generally be used as the base color since they provide strong contrast when paired with the other colors. Blue should be the main accent color, while green is more of highlight or activation color.

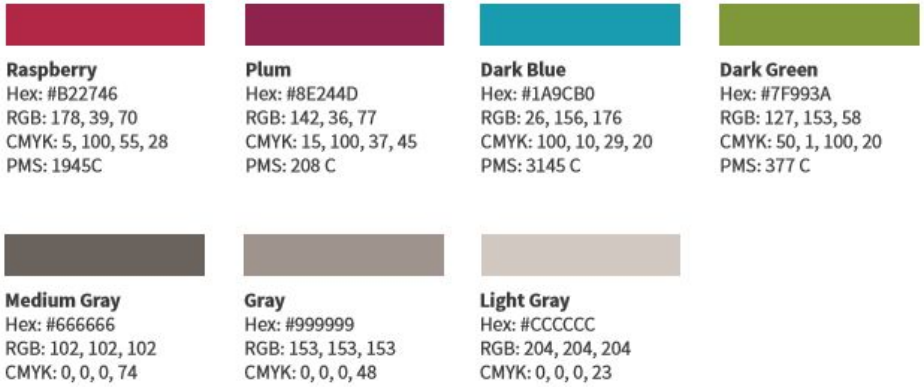
Feel free to contact our team in case you need assistance …. @epam.com

VISUALIZATION STANDARDS

COLORS

Use the company standard colors scheme so that we ensure recognition and corporate branding.

SECONDARY COLORS



Secondary Colors: These secondary colors will provide some warmth and contrast to the primary palette. They should never be the main color, but should be included to support the primary palette.

VISUALIZATION STANDARDS

TYPOGRAPHY

Use the company standard colors scheme so that we ensure recognition and corporate branding.

HEADING: ARIAL BLACK CAPITAL

All templates use Arial Black fonts for headings and page titles.

Visualization font:

Use Arial or the default font of analytics tool

- Filter panel
- Text area
- Legend
- Chart labels

BUTTON FONT: ARIAL BLACK CAPITAL

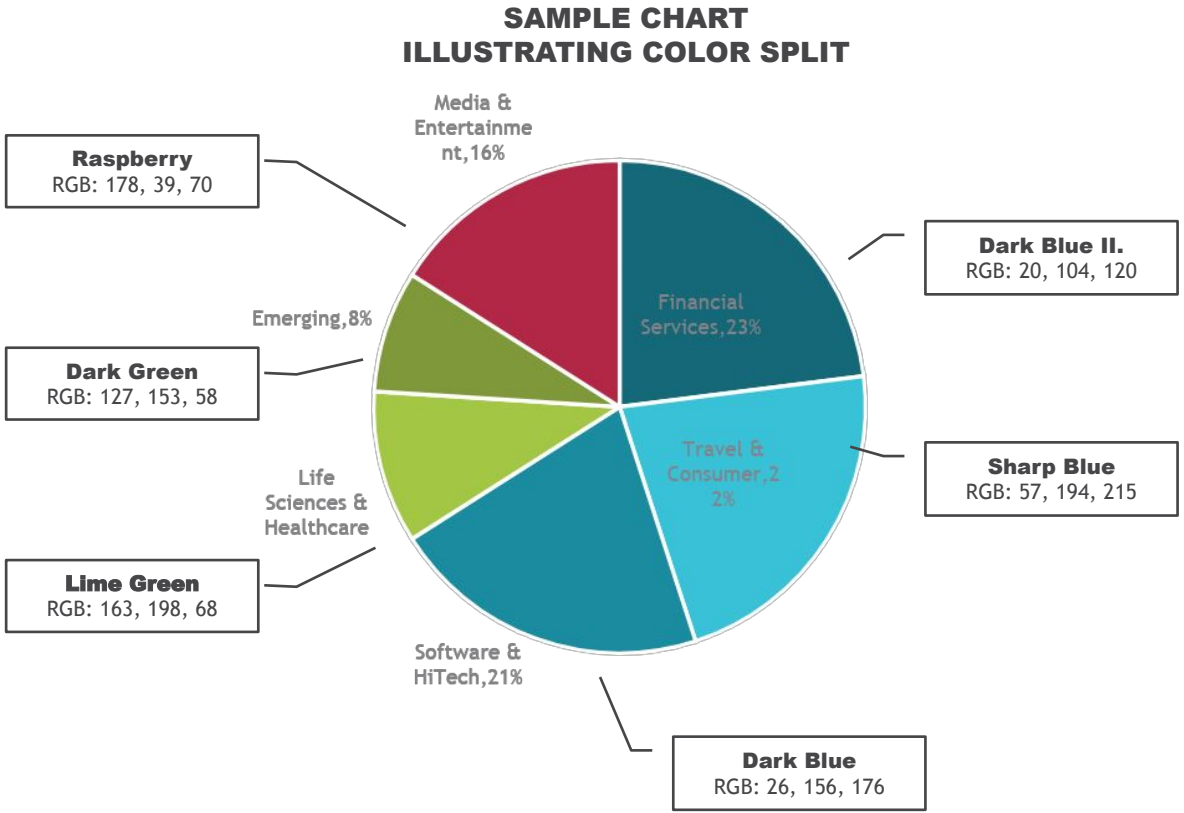
BUTTONS BUTTONS

VISUALIZATION STANDARDS

COLORS USED IN VISUALIZATIONS

Use the company standard colors scheme so that we ensure recognition and corporate branding.

Note:
The ratio and usage of colors matters.
Sharp Blue should represent EPAM if applicable used as the largest segment



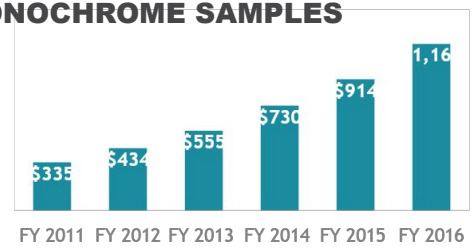
VISUALIZATION STANDARDS

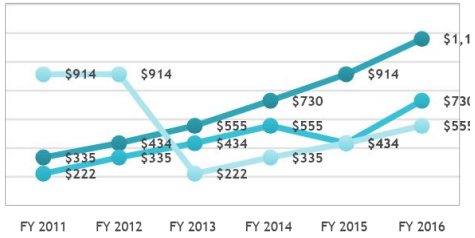
COLORS USED IN VISUALIZATIONS

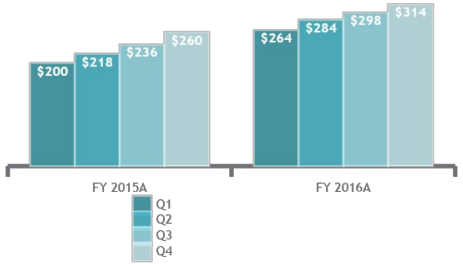
Use the company standard colors scheme so that we ensure recognition and corporate branding.

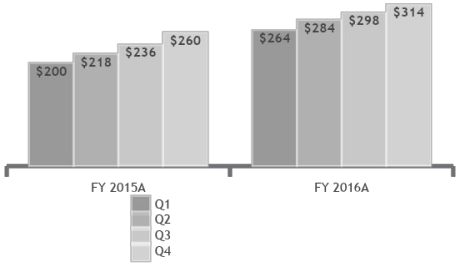
Note:
Raspberry and Plum should be avoided as only colors.

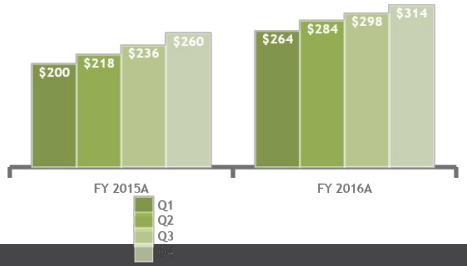
MONOCHROME SAMPLES

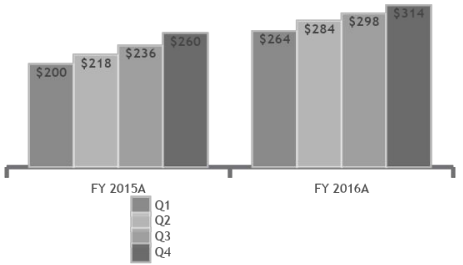












VISUALIZATION STANDARDS

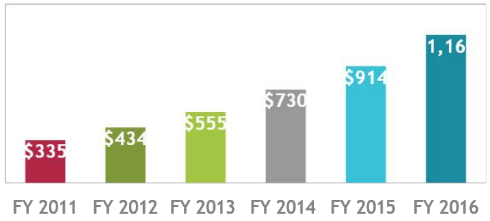
COLORS USED IN VISUALIZATIONS

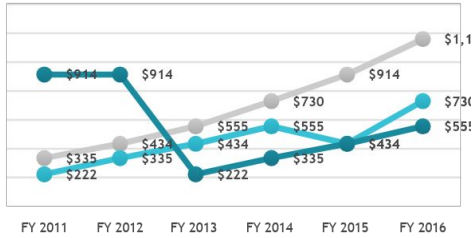
Use the company standard colors scheme so that we ensure recognition and corporate branding.

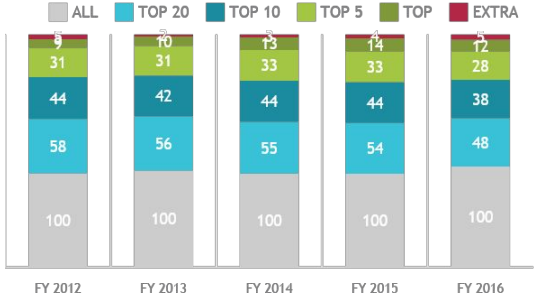
Note:
The ratio and usage of colors matters.
Sharp Blue should

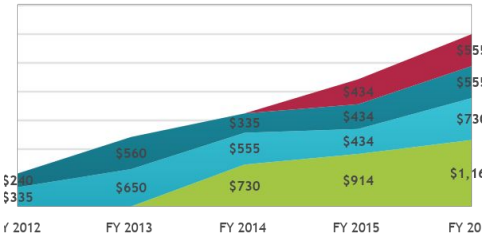
- represent EPAM if applicable
- used as the largest segment

MONOCHROME SAMPLES









VISUALIZATION STANDARDS

VISUALIZATION WIDGETS

The following pages help to set colors of the visualization widgets (aka snippet library).

MONOCHROME SAMPLES

SNIPPET COLORS #1

White: #FFFFFF

Graphite: #464547

Sharp Blue: #39C2D7

SNIPPET COLORS #2

Lime Green: #A3C644

Graphite: #464547

Light Grey: #CCCCCC

VISUALIZATION STANDARDS

VISUALIZATION WIDGETS

BUTTONS:

A button consists of text and/or an image that clearly communicates what action will occur when the user touches it. Use the buttons, because by using buttons we are able to navigate and motivate the users!

BUTTONS

INFORMATION

Sharp Blue
Hex: #39C2D7
RGB: 57, 194, 215
CMYK: 84, 0, 18, 0
PMS: 3125 C

Usage pattern: available choice, navigation

EXPORT

Lime Green
Hex: #A3C644
RGB: 163, 198, 68
CMYK: 46, 0, 90, 0
PMS: 375 C

Usage pattern: active, finish, apply, export

DELETE

Raspberry
Hex: #B22746
RGB: 178, 39, 70
CMYK: 5, 100, 55, 28
PMS: 1945C

Usage pattern: confirmation – no, delete, reset

RESET FILTERS

Graphite
Hex: #464547
RGB: 70, 69, 71
CMYK: 0, 0, 0, 88

Usage pattern: reset, cancel

CANCEL

Light Gray
Hex: #CCCCCC
RGB: 204, 204, 204
CMYK: 0, 0, 0, 23

Usage pattern: secondary functions, cancel

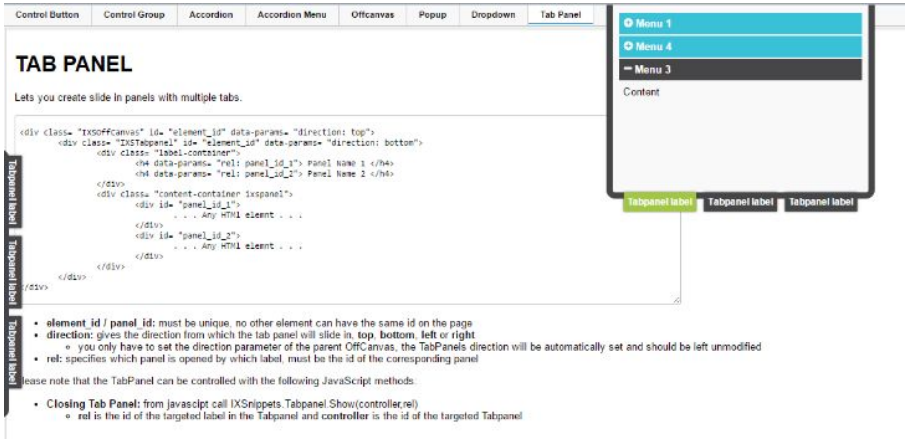
VISUALIZATION STANDARDS

VISUALIZATION WIDGETS

SLIDING PANEL:

The sliding filter panel does not have a fixed area in the template, it slides in and out when the user clicks on any of its tabs. We suggest using the vertical accordion filter type (presented below) when you have more than 8 filter settings or a hierarchical filter type. In case of hierarchical filter, you may organize the filters in groups, leading users step-by-step through the flow. In this way you would ensure that the filtering is easy to understand and user friendly.

SLIDING PANEL



Button

Width:
Height:
Font-family:
Font-color:
Font-size:
Text-shadow:
Border:
Border-radius:
Background-color:

Active tab

Width:
Height:
Min-height:
Font-family:
Font-size:
Color:
Background-color:

Inactive tab

Width:
Height:
Min-height:
Font-family:
Font-size:
Color:
Background-color:

Sliding Panel

Min-width:
Box-shadow:
Background-color:
Border-radius:
Padding:
Height:

Header

Width:
Height:
Background-color:
Font-family:
Font-color:
Font-size:
Margin-left:

Spotfire Filter Element

Width:
Margin-top:
Margin-bottom:
Margin-left:
Margin-right:

VISUALIZATION STANDARDS

TEMPLATE SAMPLE I

Use Case
Extension Demo

VISUALIZATION STANDARDS

TEMPLATE SAMPLE II