

# DATA REPRESENTATION 101: HOW TO MAKE **KILLER** DATA VISUALS

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# C O N T E N T

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 *Total reading time 06:47*

1 INTRODUCTION

2 DATA

3 BASICS

4 ADVANCED

5 EXAMPLES

6 HIGHLIGHTING

7 CHECKLIST



# 1 INTRODUCTION

*War is ninety  
percent  
information*

- NAPOLEON BONAPARTE

# Why data visualization matters

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Reading time 01:17

If there's one thing I learned from my time in the consulting and private equity industries, it's that it doesn't matter how brilliant your analysis is; if it isn't presented in an accessible, understandable way, your message won't hit home.

In our last [ebook](#), we mentioned that demand for data visualization skills has increased by over 2500% in the last five years. This is no accident.

Big Data might be big news in business right now, but **if your audience is unable to make sense of it and draw quick conclusions then it remains just that - a buzz word.**

In today's fast-paced world, you must get the right message across as quickly as possible. The last thing you want to be doing is losing valuable time explaining your findings because your data visualization wasn't up to scratch.

When presenting your findings, **visualization is a vital tool to help decision makers to reach the right conclusion, as quickly as possible.**

In my view, the quality of your graphs and charts can be measured by how fast the audience reaches the conclusion you intended, and how well they understood the information you presented.

Your aim, with any presentation, should be to **save the audience's time and help them make the right decisions.** You want to reinforce the right data, draw their eye to the right section of the page and do every bit of the analysis for them, without creating a bias.

If it sounds difficult, that's because it is. Well, it can be.

But if something is worth doing, it is always worth doing well.

In this ebook, we will show you how to take your data visuals from average to amazing.

My hope is that you will find it useful and share it with anyone else you feel would find it relevant.

Happy visualizing!

*Anders Haugbølle Thomsen*

CEO & Founder of SlideHub



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# 2

# DATA

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*If we have data, let's  
look at data. If all  
we have are  
opinions, let's go  
with mine*

-JIM BARKSDALE

# It all starts with data

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Reading time 00:47

Why do you need data?

The short answer to that question is obvious: **to find answers.**

But in truth, it is more complex than that.

Data is - or at the very least it should be - at the heart of everything we do in business. When making business decisions, you should be basing them on objective evidence, rather than guesstimates and emotions.

**Everybody knows this, but it can be difficult in practice, because it requires prioritization ahead of other important tasks.**

So, what does the word ‘data’ actually mean?

The Oxford English Dictionary defines it as “*Facts and statistics collected together for reference or analysis.*”

Collecting data can be a time-consuming process, with a good set of data often taking days or even weeks to gather and organize.

If it wasn’t time-consuming to gather the data, analyze, validate and design a 120-page slide deck, then nobody would ever cut corners and every presentation would be perfect.

The fact is, creating a bottom-up market description - with trends, issues and key drivers - requires effort and sweat; that is, if you want to do it properly.



*Correct interpretation of data might win a battle, but access to an extraordinary dataset that yields new insights wins the war.*

Lasse Petersen,  
COO and MSc in Business Intelligence

A high-angle, black and white photograph of a person's hands tying the laces of a dark, polished leather dress shoe. The person is wearing dark trousers and a dark long-sleeved shirt. The shoe is on a wooden deck made of vertical planks. The background is slightly blurred, showing more of the deck and the person's legs. The overall mood is focused and professional.

# 3 THE BASICS

*The goal is to turn  
data into information,  
and information into  
insight*

-CARLY FIORINA

# Presenting data: The basics

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Reading time 00:42

Think of visualization as the tool that will bring your data to life.

You've spent hours gathering information, describing your data, analyzing and inferring. You (or maybe somebody else) put in the hard work; **now it's time to deliver your point - in seconds.**

Decision makers are busy and eager to discuss conclusions and actions rather than methodology and academics. In general, they don't care about your process or how many hours you put in; if your slides don't illustrate your point, the hours don't matter. This is why it is so important that the presentation of your data is simple.

**Begin with your conclusion.** Support it with data-based arguments and proper visualization; it comes back to the hygiene of slides - a necessary evil. The question of when to use what can be difficult to answer, but the rules of thumb in this ebook will help you to avoid the most common pitfalls.

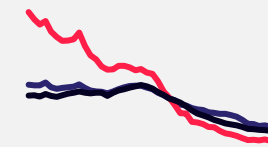
Let's start out with the basics; the fundamentals you need to know before you level-up to advanced data visualization.



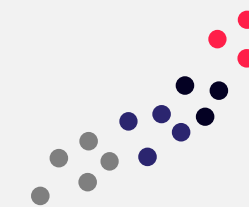
Bar chart



Pie chart



Line Chart



Scatter



Bubble



Venn diagram

# The basics 1/7

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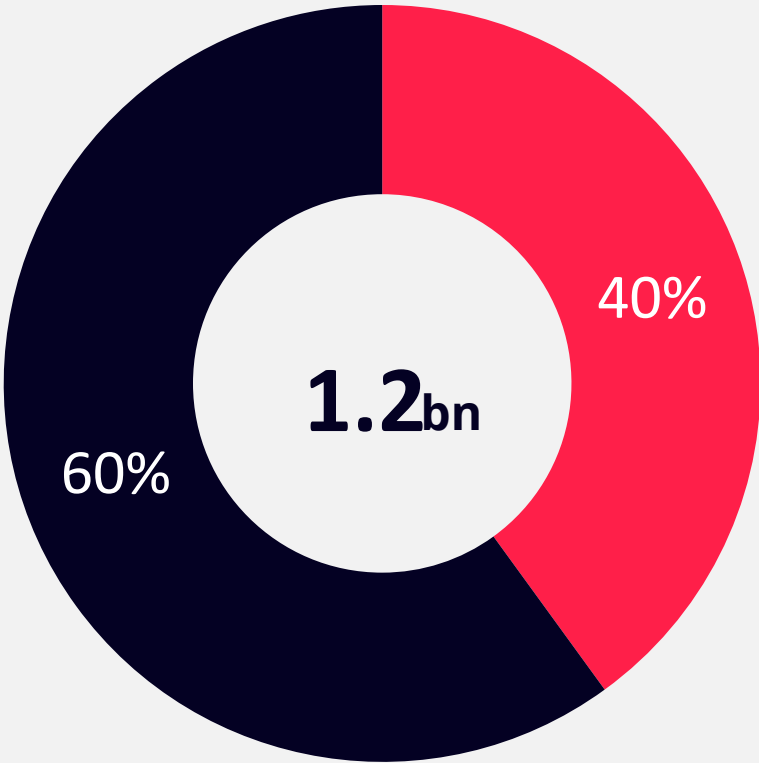


Reading time 00:10

**Pie charts** are best used when you need to compare how much different fractions **make up of a whole**. For example, you might use it to compare the distribution of product sales, such as soft drinks making up 40% of total sales.

Sales, USD

- 1st Qtr
- 2nd Qtr



## The basics 2/7

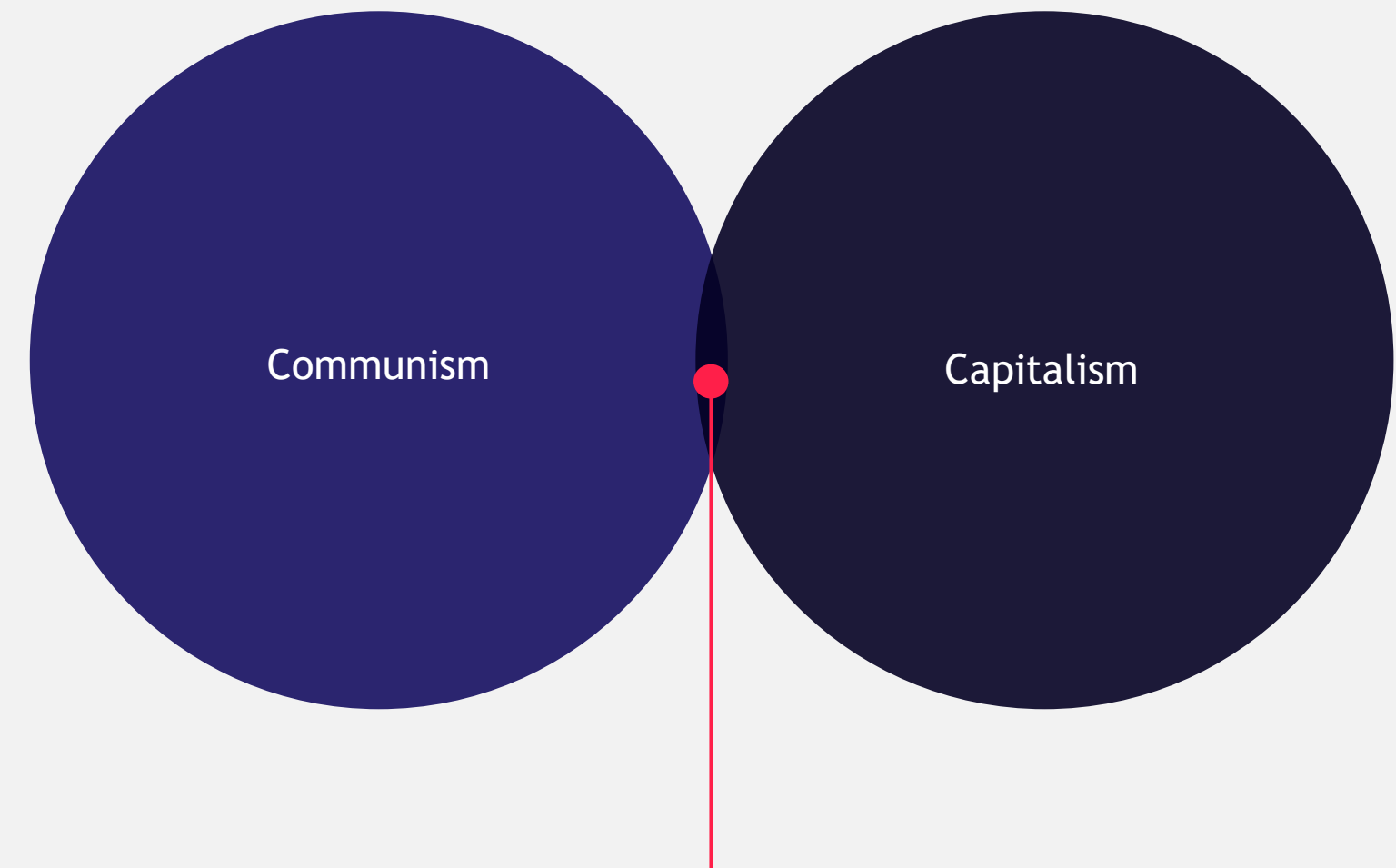
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Reading time 00:09

A **Venn diagram** shows the **relationship or overlap** between two or more variables or datasets. The datasets might be drawn to scale or a fixed size (like the example here), and can overlap or be mutually exclusive.

**Nerdy insight:** Venn diagrams are often used in mathematical set theory.



\$20 Che Guevara t-shirts<sup>1</sup>

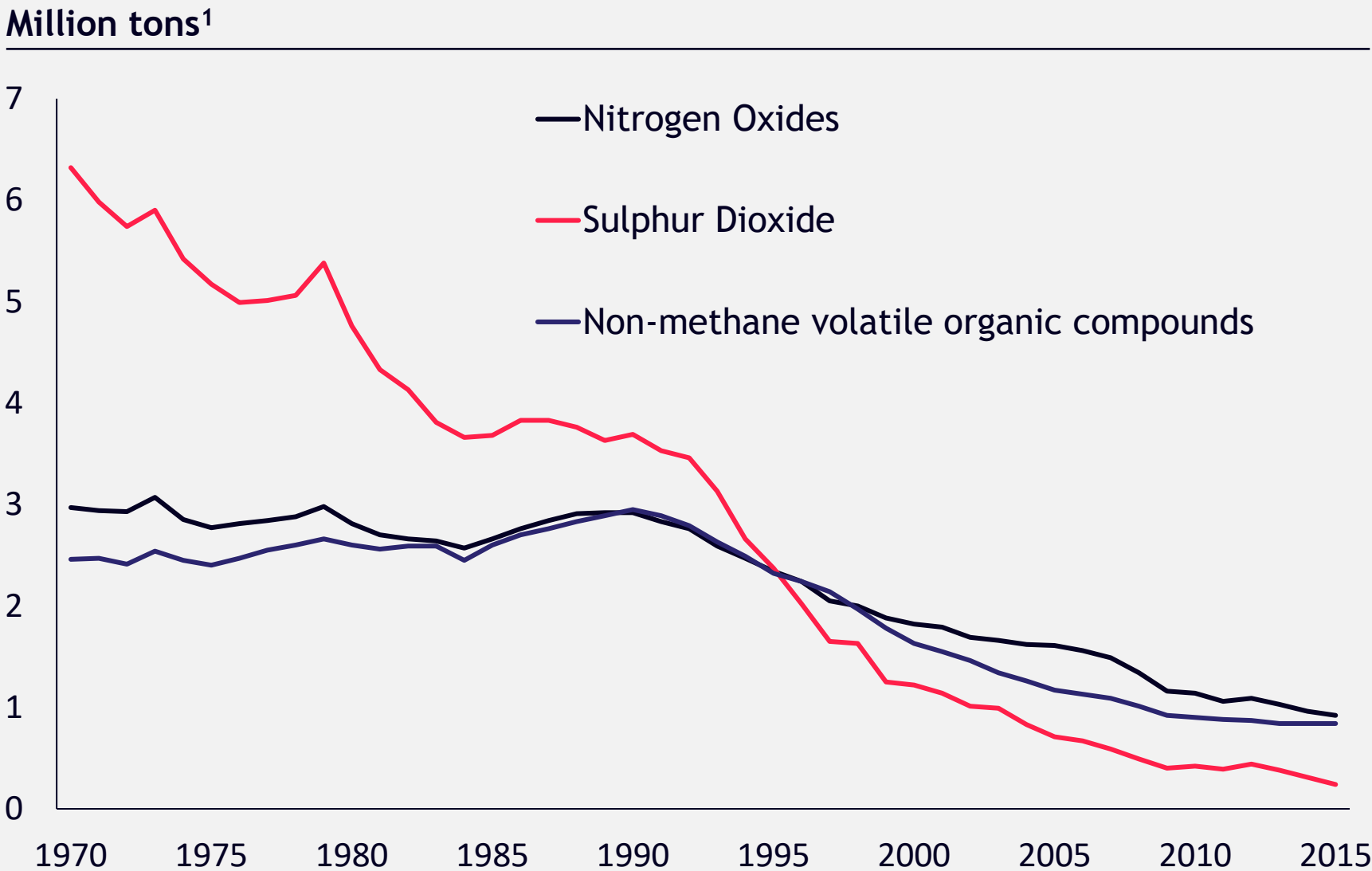
<sup>1</sup>Source: CollegeHumor

# The basics 3/7



Reading time 00:12

**Line graphs** are a great way to show how data changes **over time**, especially if you have more than 10 data points. The continuous line makes it easy to show **volatility, stagnation or trends**. As a default, SlideHub does not use gridlines because we show the numbers. However, for line charts, one might consider including gridlines if a specific number is of high importance.

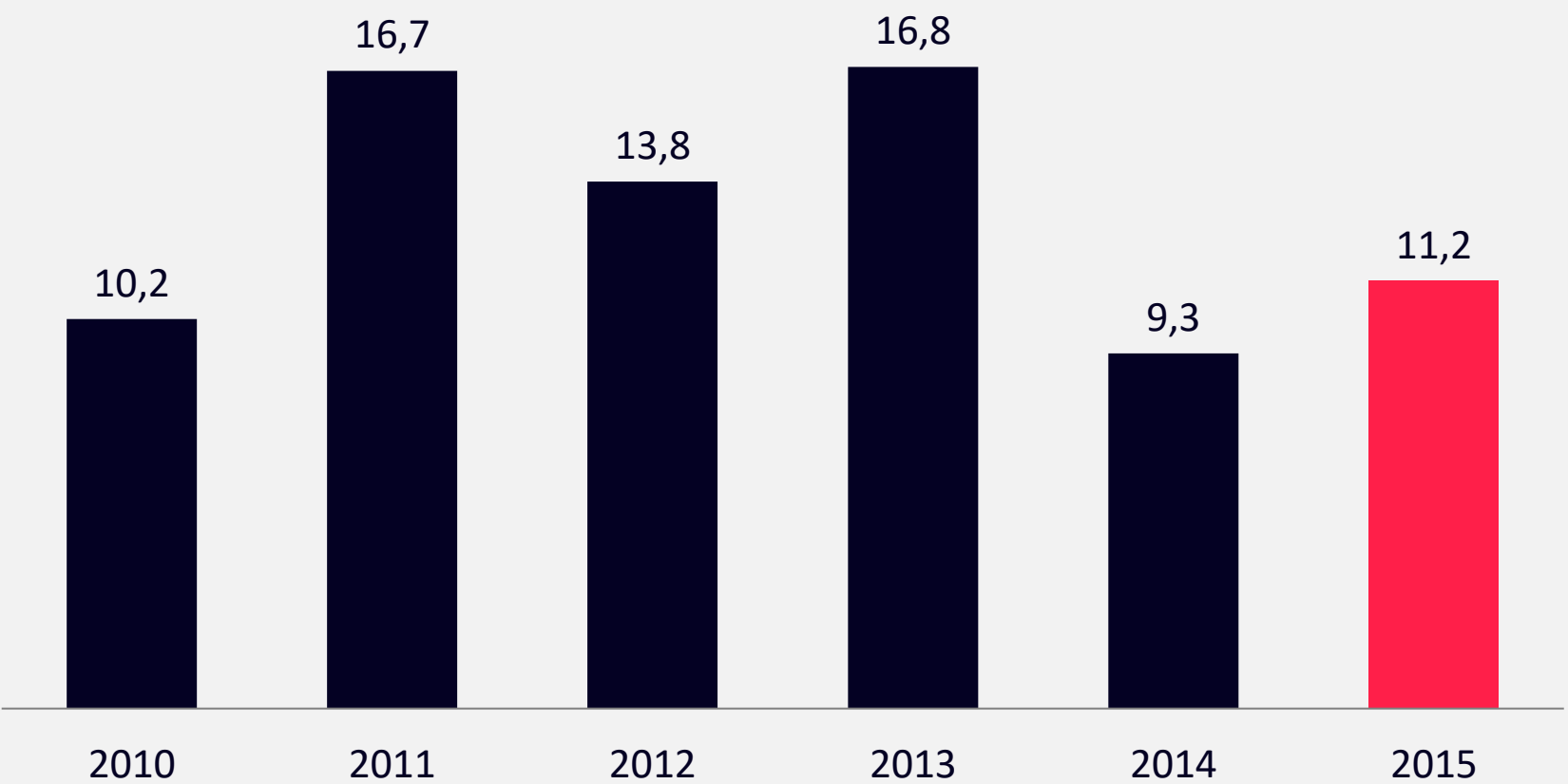


<sup>1</sup>Source: GOV.UK



Bar charts are best used to **compare 1 - 3 quantitative variables across categories** - companies, time etc. As a rule of thumb, you should only use a bar graph if you have 10 data points or less. If you have more than 10 data points, consider using a line graph instead.

Rural Average number of days of Moderate or higher air pollution per site<sup>1</sup>



<sup>1</sup>Source: GOV.UK

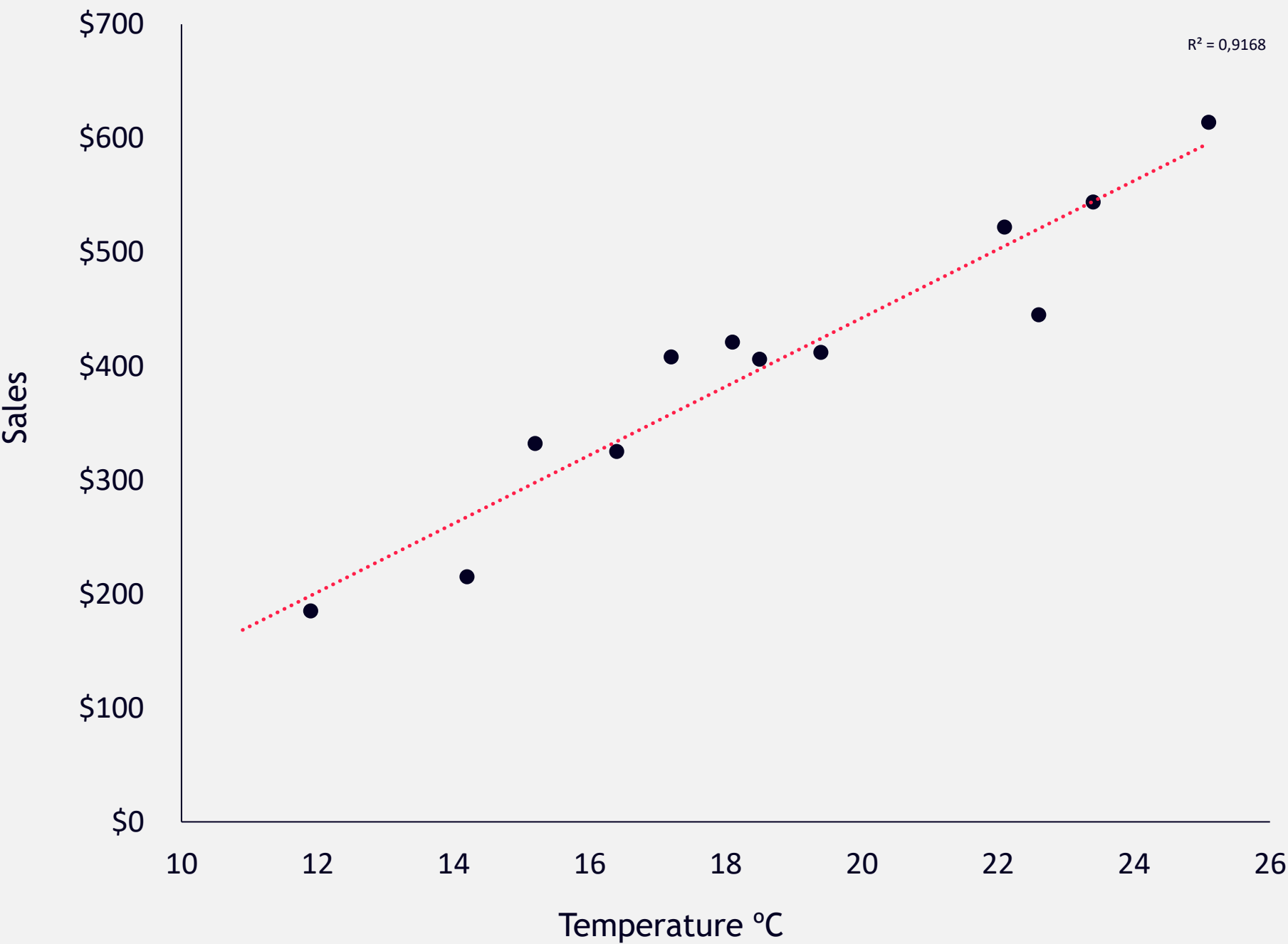
# The basics 5/7

Scatter plots show the **correlation between two variables**; they can be used to see if data follows a pattern and show a relationship. For example, you might assume that people who put in more hours at work are - on average - likely to receive higher bonuses. A scatter plot can show how strong that correlation is - or isn't.



Reading time 00:14

Ice cream sales at Nytorv<sup>1</sup>



<sup>1</sup>Random unscientific observations through the windows at the no-more HQ

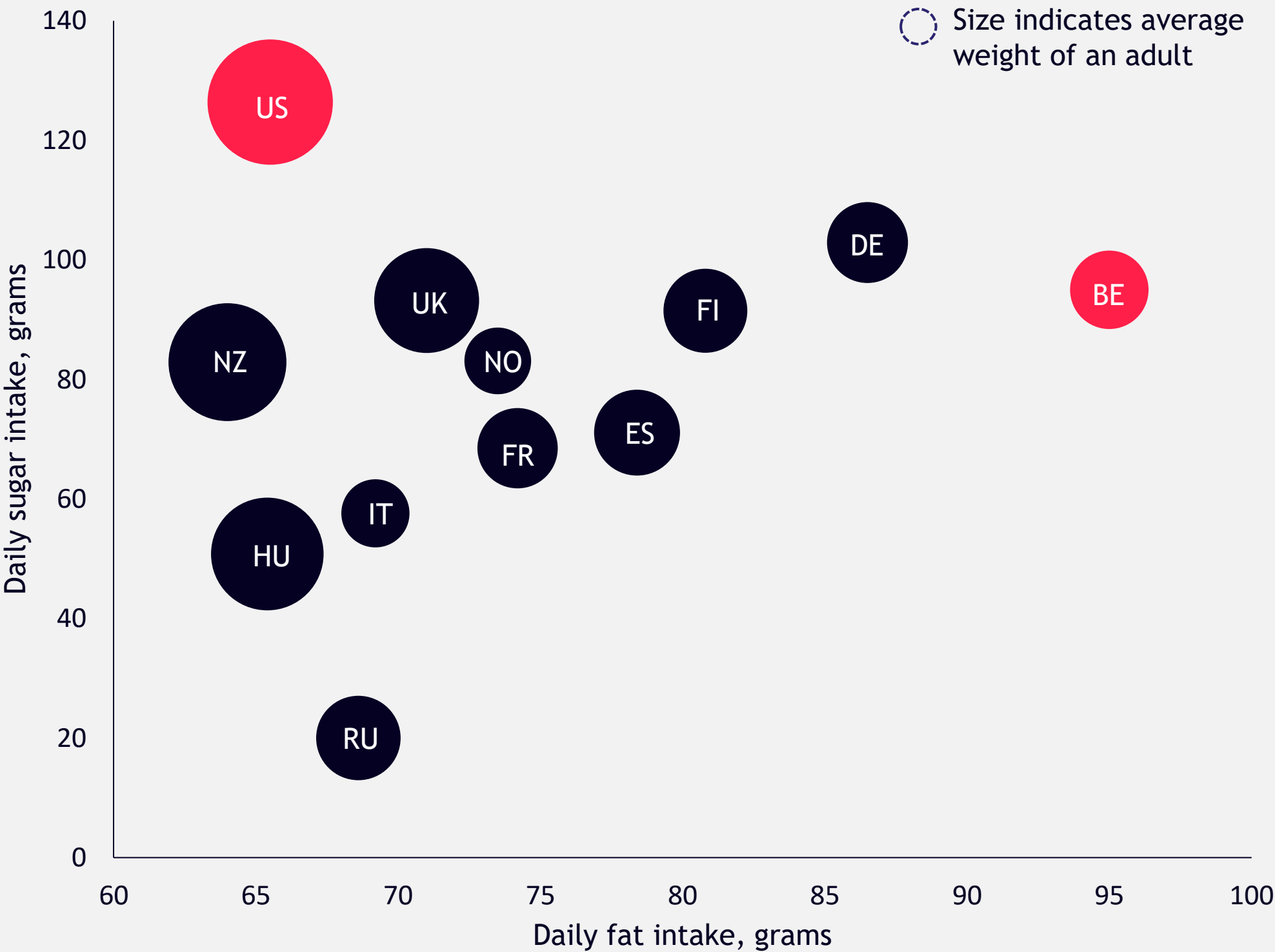
# The basics 6/7

A bubble chart is a scatter plot with an additional **quantitative variable**. The additional variable is represented by the size of each dot and aids the reader in understanding context. For example, the size of the bubble could represent sales of a specific product, while the x-axis represents time and the y-axis represents revenue.



Reading time 00:08

Sugar and fat intake per country<sup>1</sup>



<sup>1</sup>Euromonitor and OECD

# The basics 7/7

This type of bar chart is great for comparison of **multiple variables** for a group of countries, people, business units etc. The **strength** of this type of bar chart is that the variables can be both **quantitative and qualitative** and do not need to use the same scale e.g. millions, percentages or grams - it doesn't matter. In the example on the right, we are comparing six companies on four criteria.

 Reading time 00:09

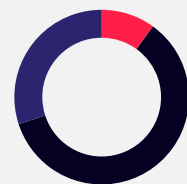
Screened list based on the clients' criteria

Target company	EV / EBITDA	Client criteria 1	Client criteria 2	Client criteria 3
Warburtons LTD		1	5	✗
LA Croissantorie SA		2	3	✓
Almond Holding AB		5	1	✓
Krispy Kreme LTD		2	4	✗
Finsbury Food LTD		3	4	✓
George West LTD		5	1	✓

# When to use what; basics

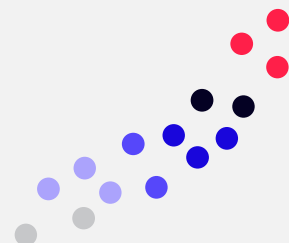
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Pie



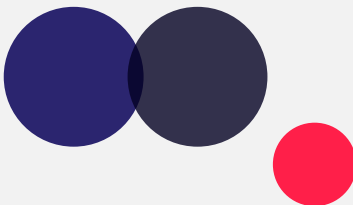
**When:** you want to show how much a fraction makes up of a whole

Scatter



**When:** you want to show correlation between two quantitative variables, or highlight outliers

Venn



**When:** you want to show a relationship or potential overlap between two or more datasets

Bar



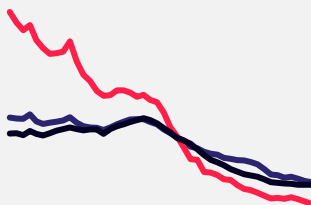
**When:** you want to compare one to three variables across categories. It is also possible to add qualitative variables

Bubble



**When:** you want to show the relationships between three quantitative variables

Line



**When:** you want to illustrate changes in data over time and have many data points

# 4

## ADVANCED

*He uses statistics as a  
drunken man uses lamp  
posts*

*- for support rather  
than for illumination*

- ANDREW LANG

# Advanced

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 Reading time 00:33

OK - that's the basics out of the way. Now, it's time to move on and **impress your peers** and clients - and hopefully have some fun while doing it!

You can't escape the fact that people get bored of seeing the same thing all the time so sometimes, you have to mix it up a little. Sticking to the color scheme and using the correct typeface will take you far, but some audiences and data types may benefit from more advanced visualization.

**The secret is tailoring the visualization to the audience.**

CFOs love numbers - yes, all of them - and more importantly, they are **comfortable with graphs**, so avoid using too much text. On the other hand, if your audience consists only of creatives, you might want to reduce the number of charts and increase graphic visual enhancement.

**//** *It doesn't matter whether you're presenting for your mom or the IMF; if your audience doesn't understand your point, you lost.*

Anders Haugbølle Thomsen,  
CEO and MSc in Finance

# When to use advanced graphs

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 Reading time 00:29

The world of data visualization is ever-growing and it is easy to fall victim to **big-data trends**.

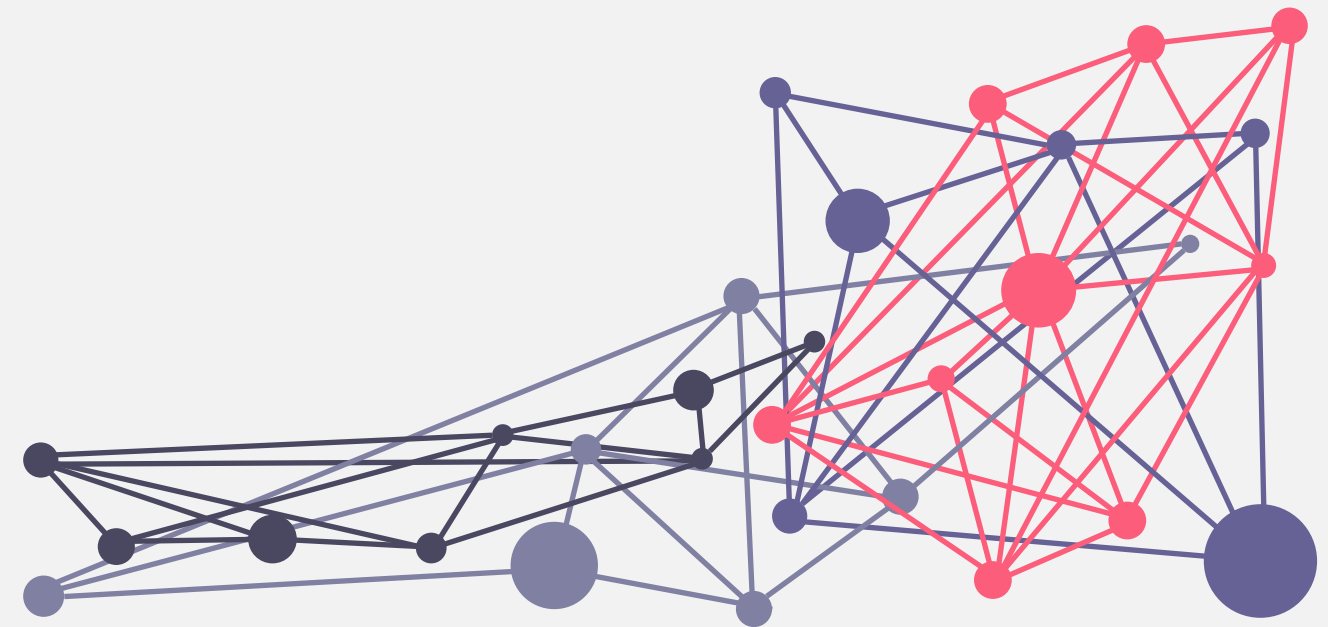
We have all seen the complicated chart with five axes and eight variables; **they look cool and make the presenter look clever but - at least sometimes - that's all they do.**

The illustration on the right looks visually appealing and interesting, yet, alone, it makes no sense; it lacks context.

It's not helping sell your idea if you are the only person in the room who intuitively understands it. **Your charts, whether advanced or basic, should help aid decisions without becoming too theoretical.**

You should only use these advanced graphs if they help make your message easier to deliver and understand.

Remember: if in doubt, leave it out.





# 5

## EXAMPLES

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*Juking the stats.  
Making robberies  
into larcenies.  
You juke the stats,  
and majors become  
colonels*

- 'PREZ' PRYZBYLEWSKI

# TREEMAP

## WHAT

A tree map shows how different fractions or components rank; it is a good alternative to the pie and bar chart.

## WHEN

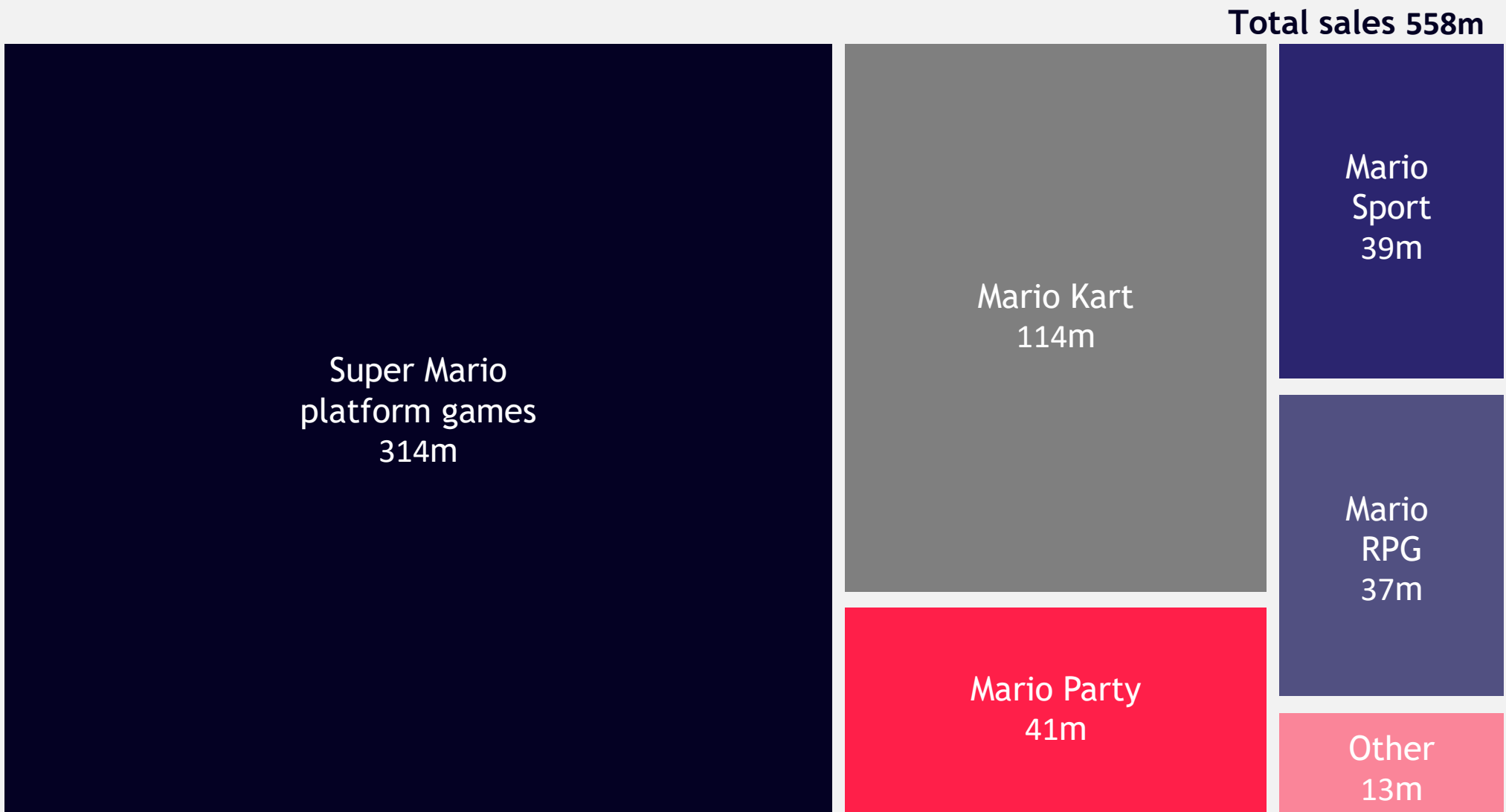
When you want to show how different components make up a total, like in the example on the left. It can also be used to break down categories and display hierarchy.

## HOW

Figure out which variables are the most important and enter them into PowerPoint.

## Super Mario<sup>1</sup>

Nintendo's Mario franchise games sales, units



<sup>1</sup>Source: VGChartz

# PIE BAR

## WHAT

A piechart that allows more granularity and explanation.

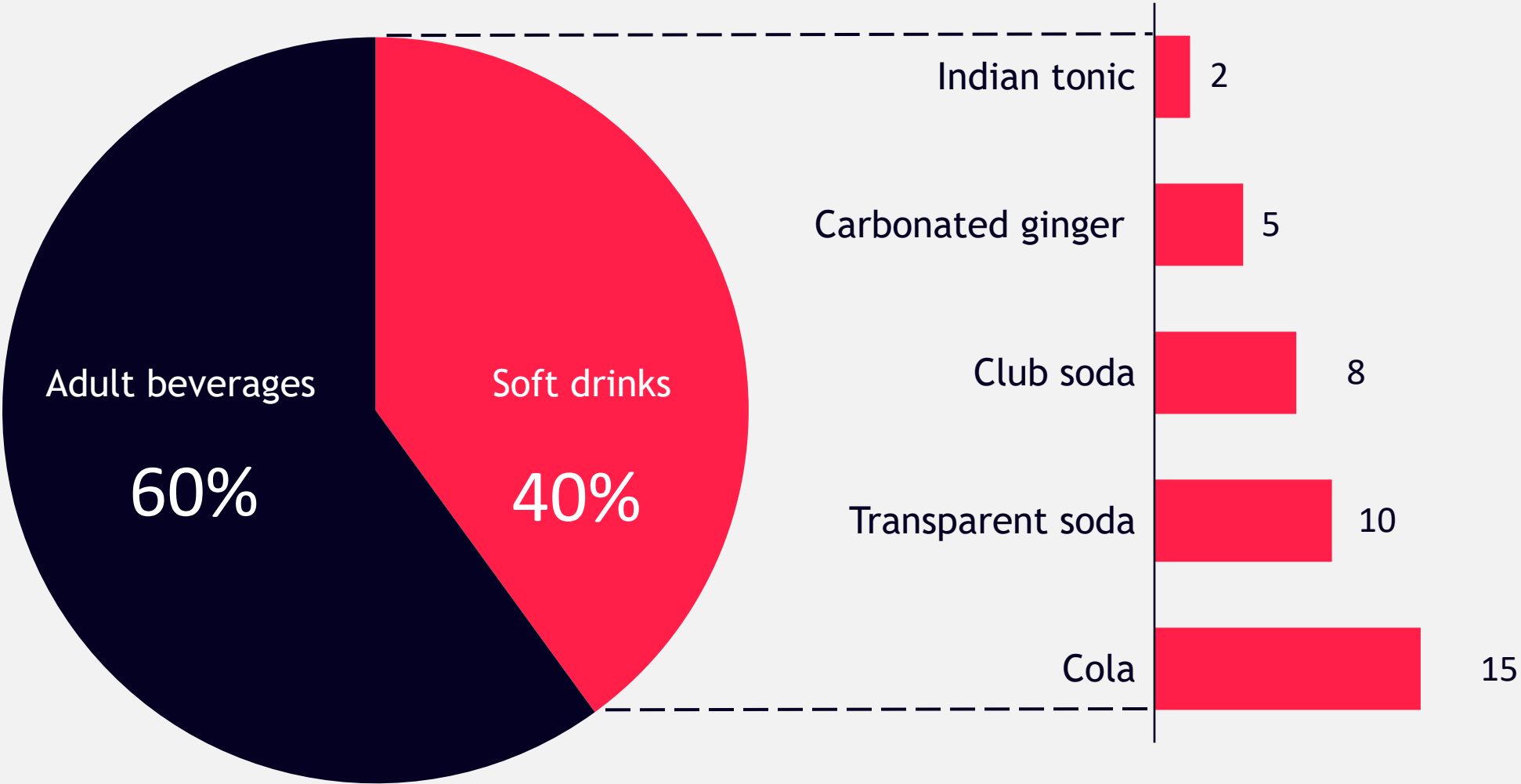
## WHEN

When you want to provide a detailed look at the components that make up the aggregate.

## HOW

Figure out which variables are most important and extract them from the pie.

Sales from beverage company



# BUBBLE TREND

## WHAT

A scatter plot incorporating more than three variables and a trendline.

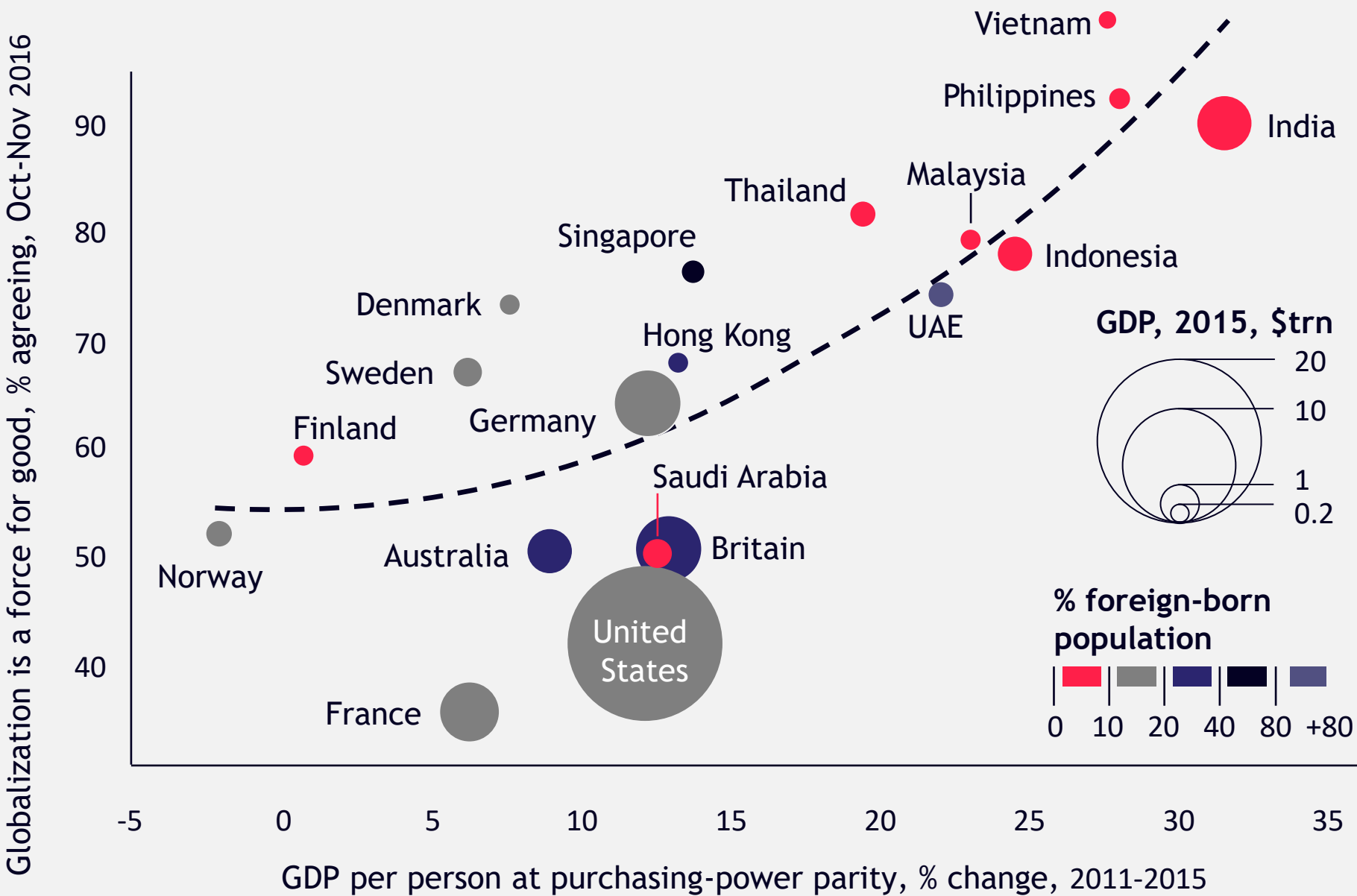
## WHEN

When you have more than three variables and trends to demonstrate.

## HOW

Use the XY scatter in PPT, select bubble and manually change the colors of the dots.

Attitudes towards globalization against change in GDP per person<sup>1</sup>



<sup>1</sup>Source: YouGov/The Economist; World Bank; UN

# RADAR

## WHAT

A comparison of two or more series against three or more quantitative parameters.

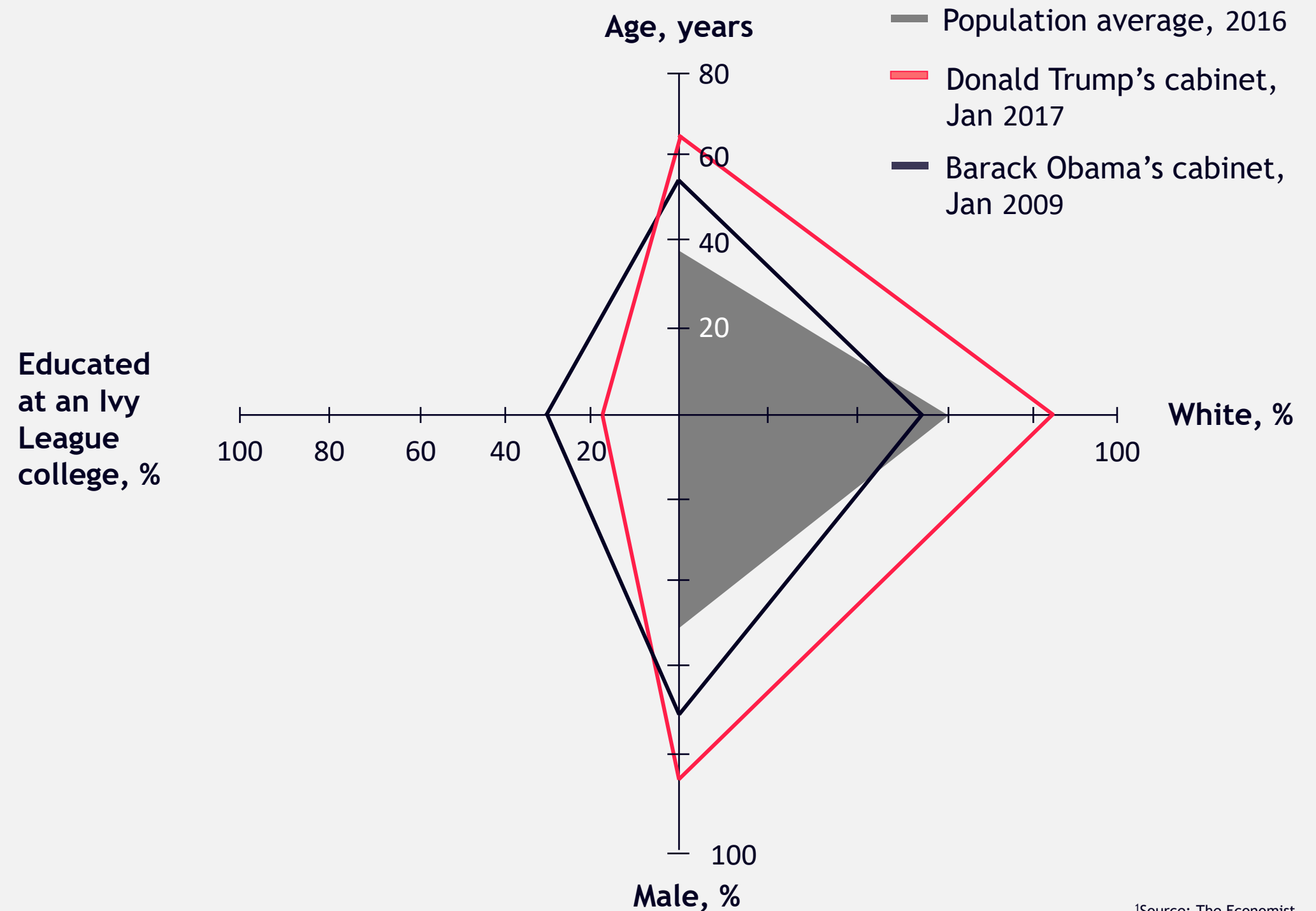
## WHEN

Often used to summarize survey respondents or relative performance against a set of criteria.

## HOW

Structure the data in a simple matrix and let PowerPoint do the rest.

## American presidential cabinets<sup>1</sup>



<sup>1</sup>Source: The Economist

# TIME MOVE

## WHAT

An illustration of performance (measured on two or more variables) over time.

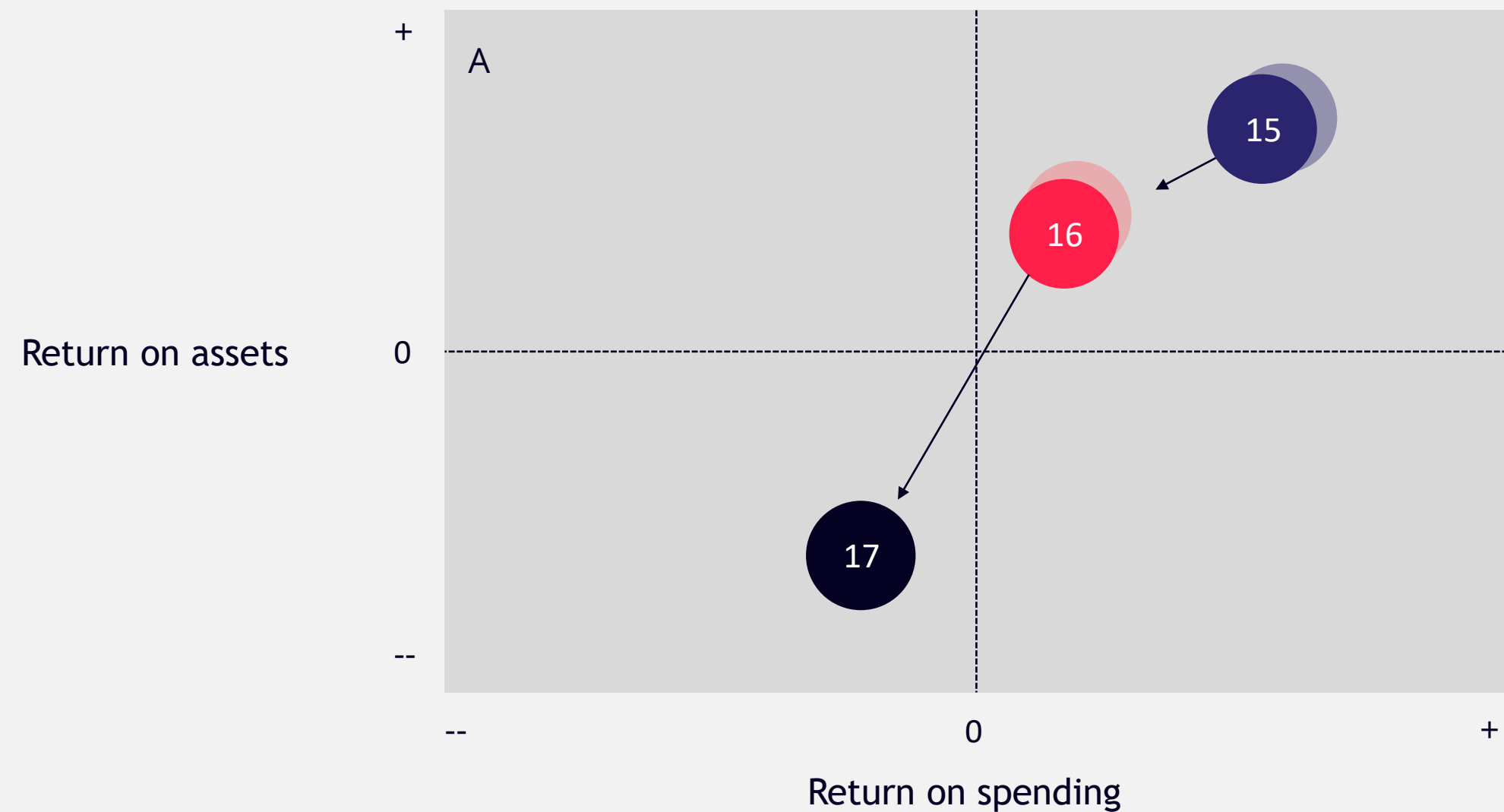
## WHEN

The object of analysis can be illustrated in a matrix (two to three dimensions) and changes over time.

## HOW

Make a row for each time-specific observation, style it according to time and add connectors.

The Danish affiliate has moved into a loss position<sup>1</sup>



<sup>1</sup>Source: Say It With Charts: The Executive's Guide to Visual Communication, Gene Zelazny

# GEO BUBBLE

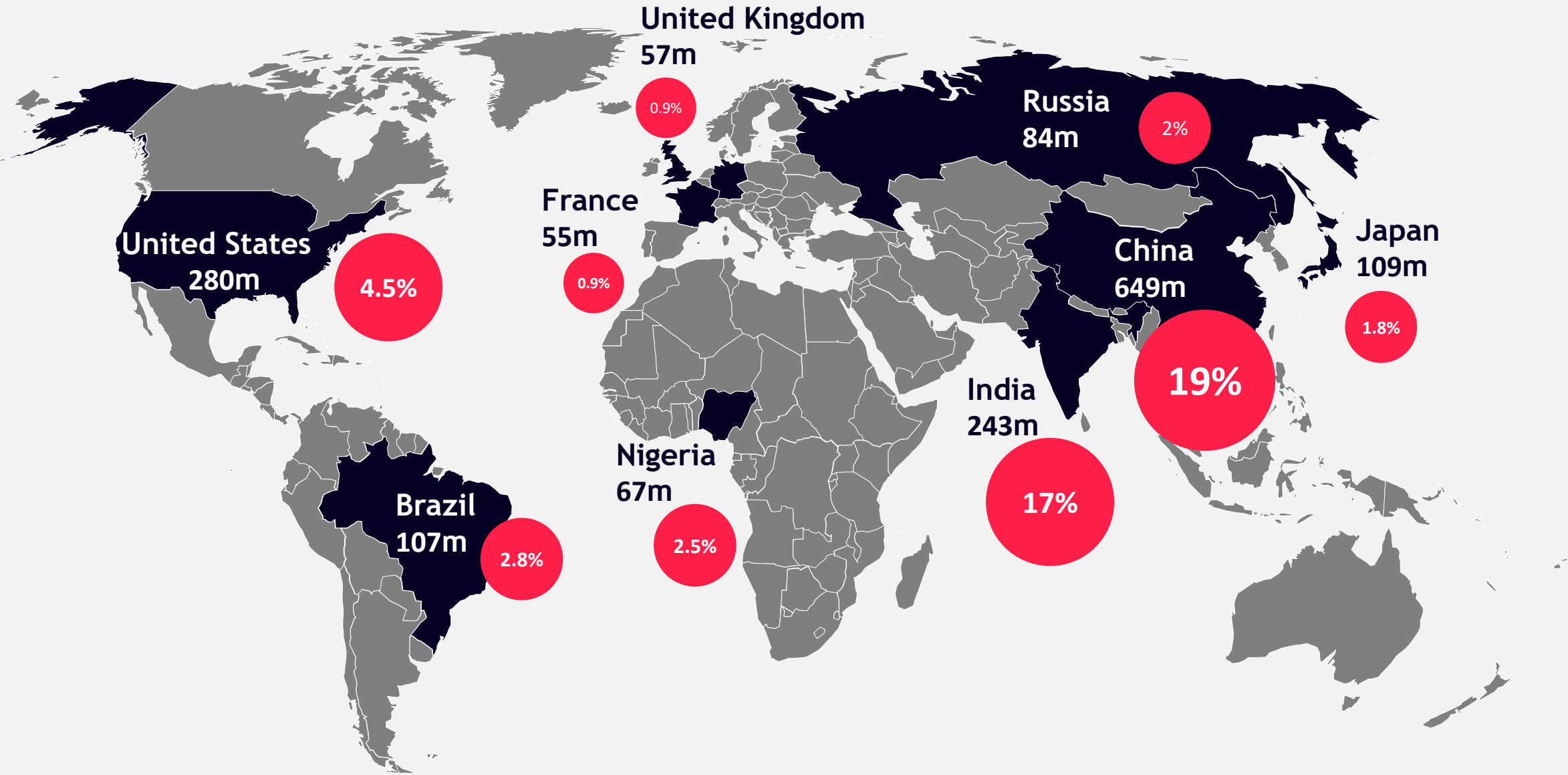
**WHAT**  
Combination of maps  
and multiple  
quantitative variables.

**WHEN**  
To show regional  
differences between  
quantitative variables.

**HOW**  
Map data according to  
regions on grey scale  
map.

Number of Internet users compared to share of population<sup>1</sup>

57m Number of Internet users  
% Share of world population



<sup>1</sup>Source: Internet live stats. All data are estimated.

# THINK-CELL

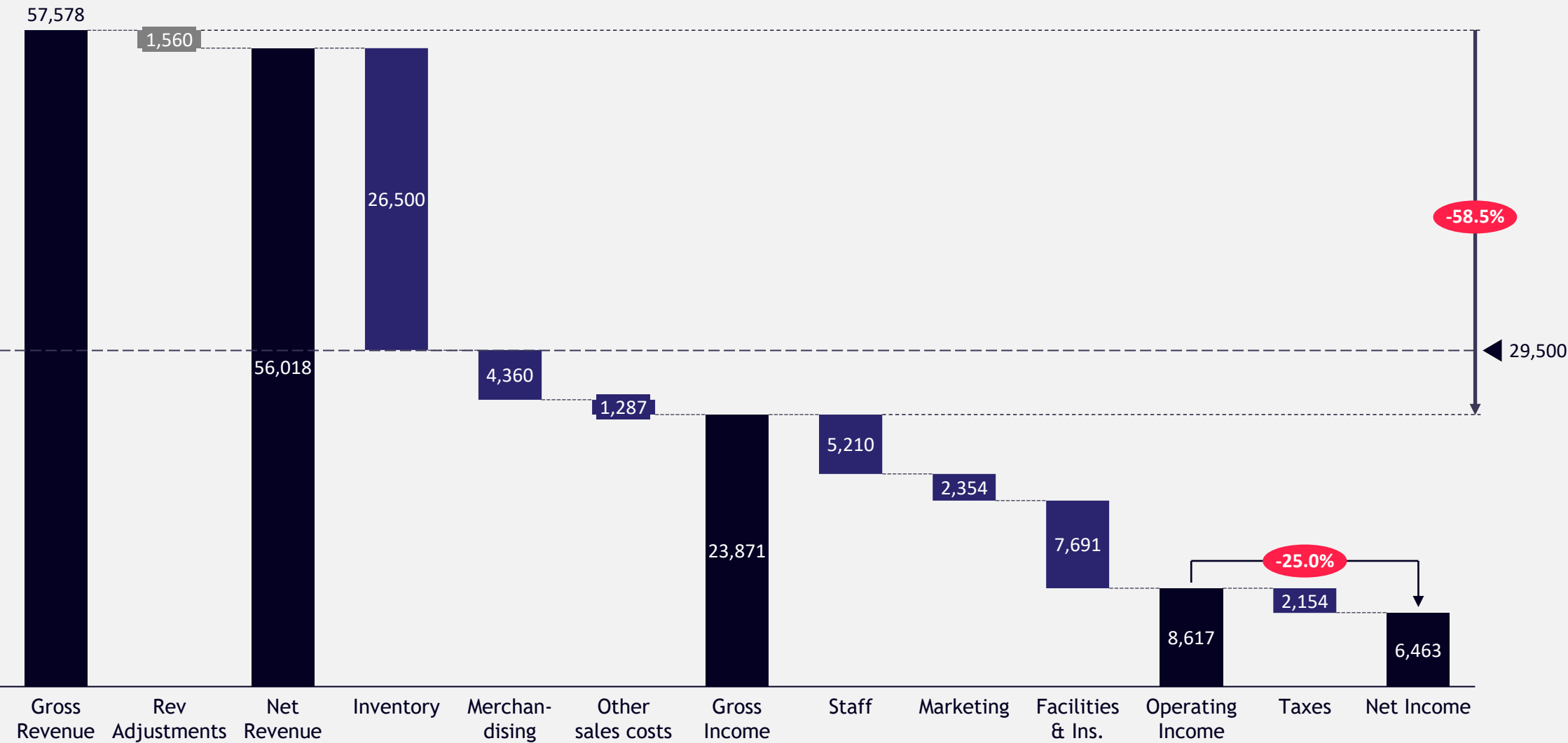
## WHAT

Think-cell is a software plugin that allows greater freedom when creating charts.

## WHEN

Particularly useful for project management, for example waterfall or Gantt charts.

Financials company Y, USDm



# PICTO BAR

**WHAT**  
Creative representation  
of a bar chart. Can be  
shapes or pictograms.

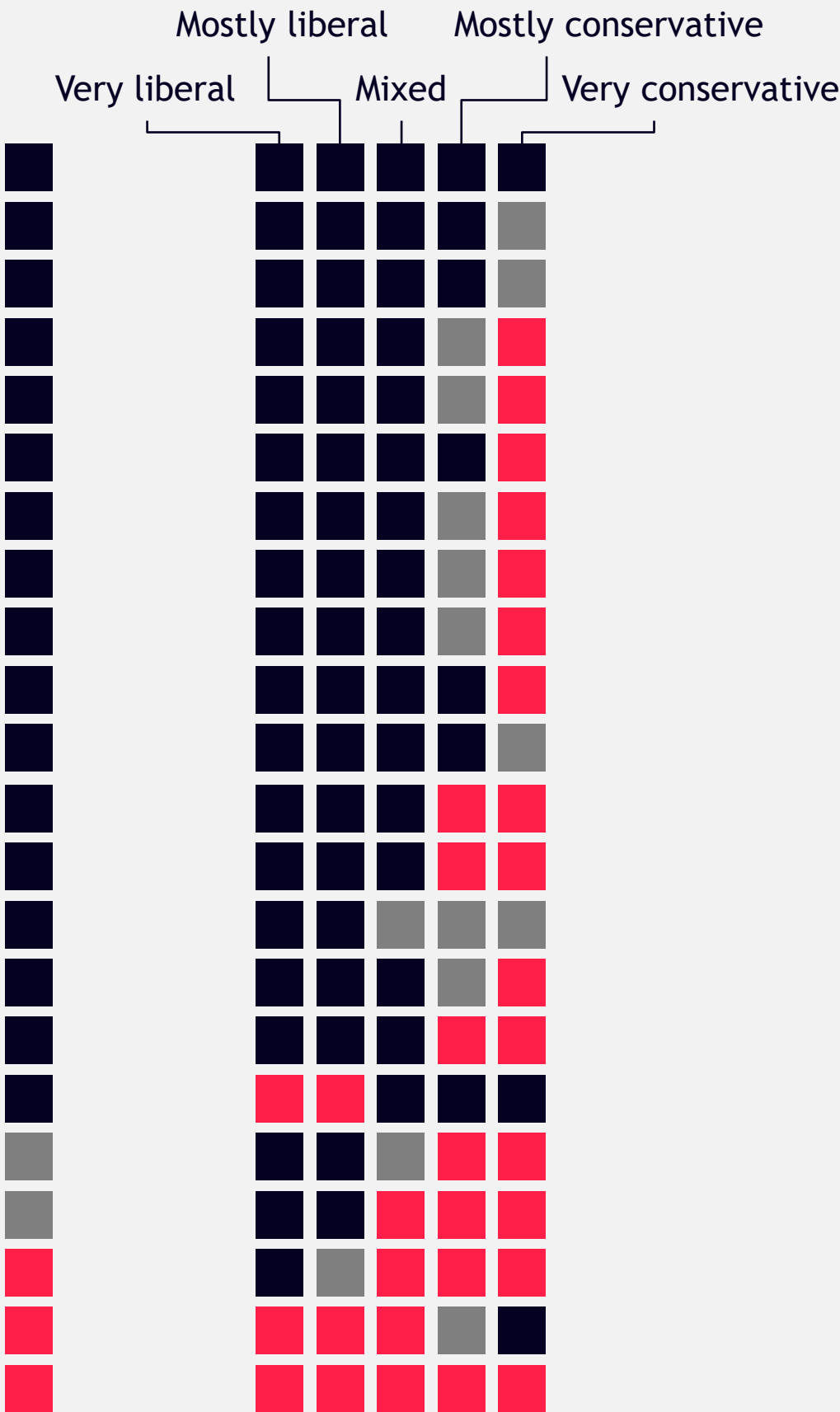
**WHEN**  
When you want to  
display gradual change.

**HOW**  
Create one shape  
and copy it and use  
the alignment tools.

Trust levels of news source by ideological group<sup>1</sup>

- More trusted than distrusted
- ≈ equally trusted as distrusted
- More distrusted than trusted

The Wall Street Journal  
The Economist  
BBC  
PBS  
NPR  
ABC News  
CBS News  
NBC News  
CNN  
USA TODAY  
Google News  
The New York Times  
The Washington Post  
The Guardian  
Bloomberg  
The New Yorker  
Fox News  
The Huffington Post  
The Daily Show  
Al Jazeera America  
The Rush Limbaugh Show  
BuzzFeed



<sup>1</sup>Source: PewResearchCenter, Journalism & Media



# 6 HIGHLIGHTING

*If you torture the data  
long enough,  
it will confess*

-RONALD COASE

# Highlighting provides simplicity

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 Reading time 00:10

Try to limit the need for ‘**on the spot**’ interpretation and calculation.

If your slide requires your audience to interpret the presented data further, or carry out calculations on the spot, you have failed. You will be able to tell if you have done your homework properly by noting their immediate reaction.

*Do they understand the main point right away or do they need clarification?*

If your point is to highlight compound annual growth rate, that should be the focal point of the data visualization. If you want to emphasize additional metrics, use more slides.

*// The probability of getting your point across has an inverse relationship with complexity. In other words, keep it simple.*

Anders Haugbølle Thomsen,  
CEO and MSc in Finance

# Highlighting

 Reading time 00:33

One slide; one message.

You want to help your audience understand. That means they should be able to follow what is going on without having to squint their eyes and search the slide for the key-takeaway.

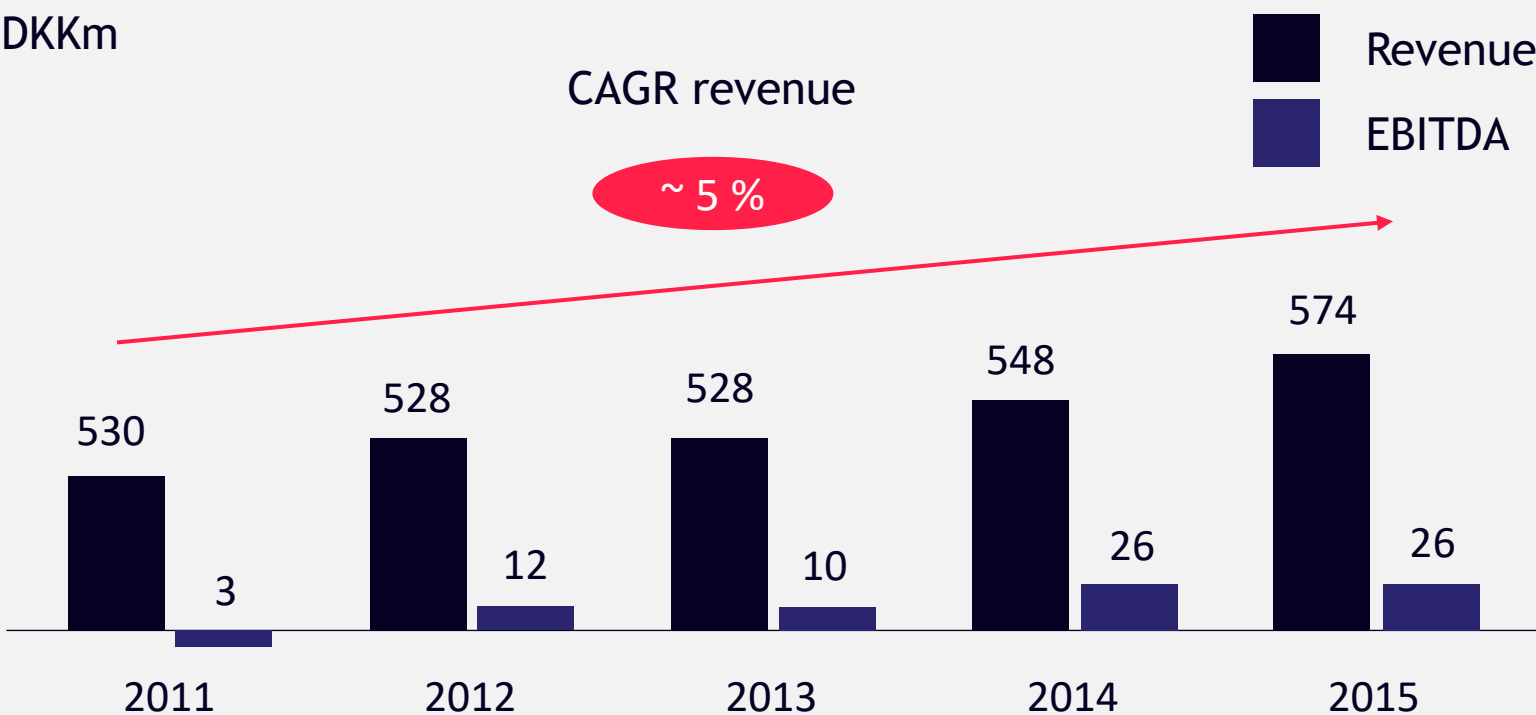
Strive to do more with less. That doesn't mean you should leave out pertinent information or avoid stating your assumptions, but ask yourself:

**Does this piece of information add value or can I leave it out?**

Are gridlines adding any value? They might, they might not. The same goes for text. If you are delivering information based on numeric data, the best thing you can do is let it speak for itself and leave the poetry for the arts majors.

The example on the right shows how you can leave out gridlines, limit text and still illustrate a point that speaks for itself.

## Financials: company X



# Highlighting - scatter plots

 Reading time 00:30

It becomes more difficult to derive meaningful insights as the number of data points in your scatter plot increases.

The key is to use a balanced combination of shapes, lines, numbers and call-outs.

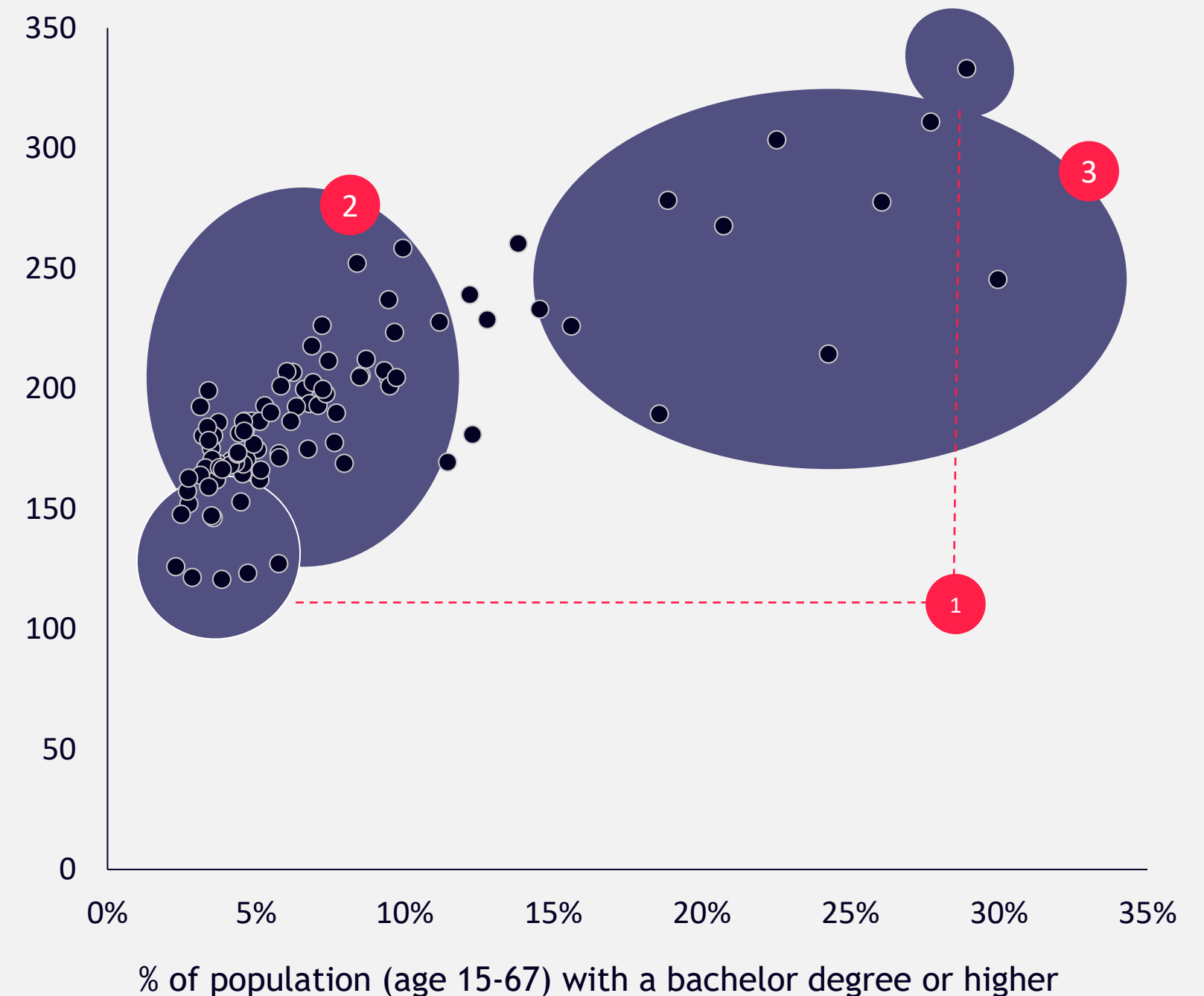
This example shows how certain numbers and shapes can be combined to **highlight** specific patterns and extremes.

In this case, we highlight the take-aways on the relationship between income and education across Danish municipalities:

- 1 The avg. income is over 3x higher for the richest municipalities compared to the poorest
- 2 In 80% of all municipalities, less than 10% of the population has at least a bachelors degree - strong correlation between income and education exists within this segment
- 3 The correlation between income and education decreases as the education level exceeds 20% of the population


## Income and education across Danish municipalities, 2016<sup>1</sup>

Avg. annual income, '000 DKK



<sup>1</sup>Source: Statistics Denmark: Statbank

# Highlighting - time series

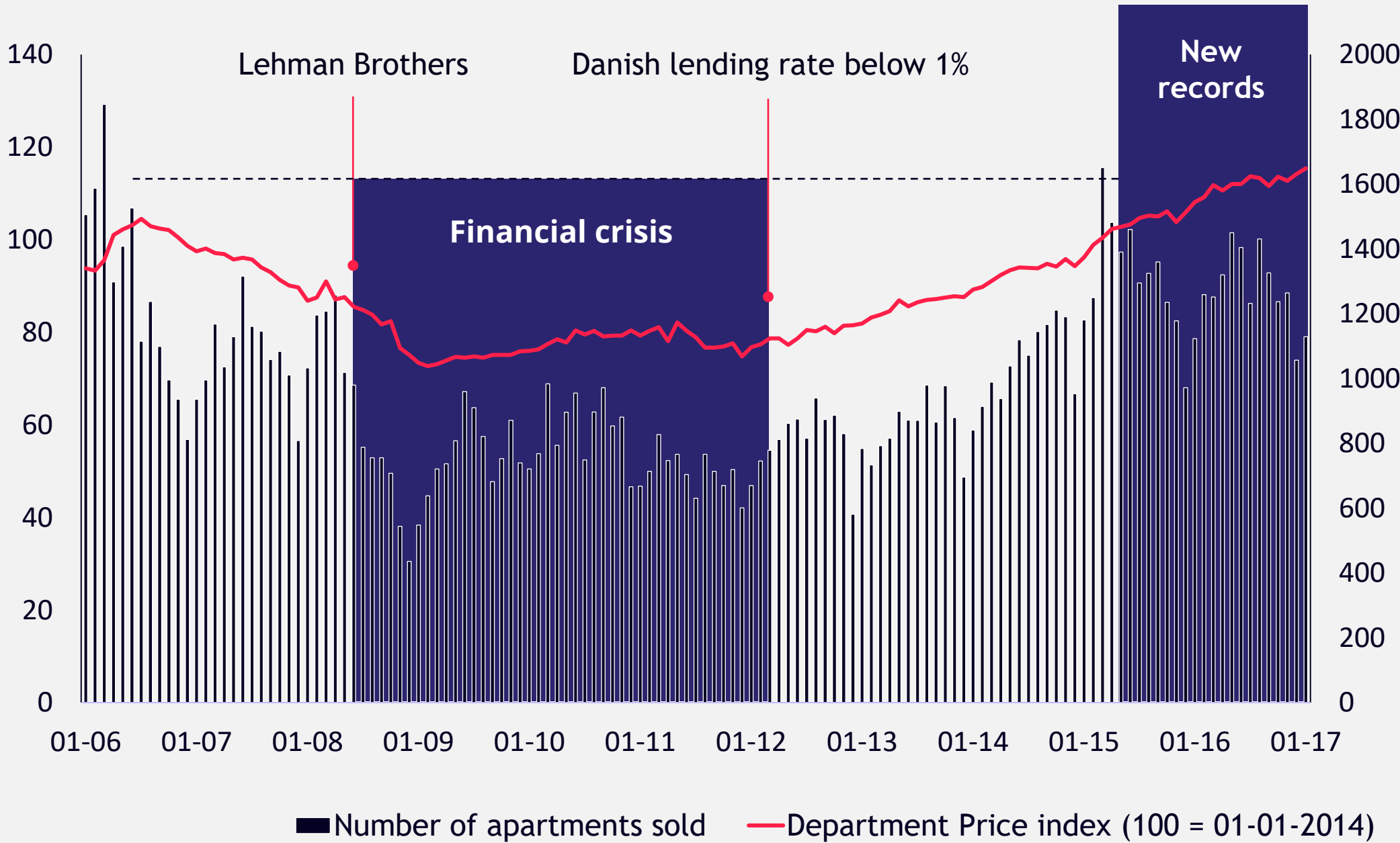
 Reading time 00:10

Several highlights can be created when presenting a time series.

In addition to highlighting certain highs and lows, reminding the reader about historical events can help them to understand the message of historical development quicker.

A combination of transparent overlays and call-outs is a good start.

Historical development in Danish apartment sales and prices<sup>1</sup>



<sup>1</sup>Source: Statistics Denmark: Statbank

# Highlighting - Pareto Charts

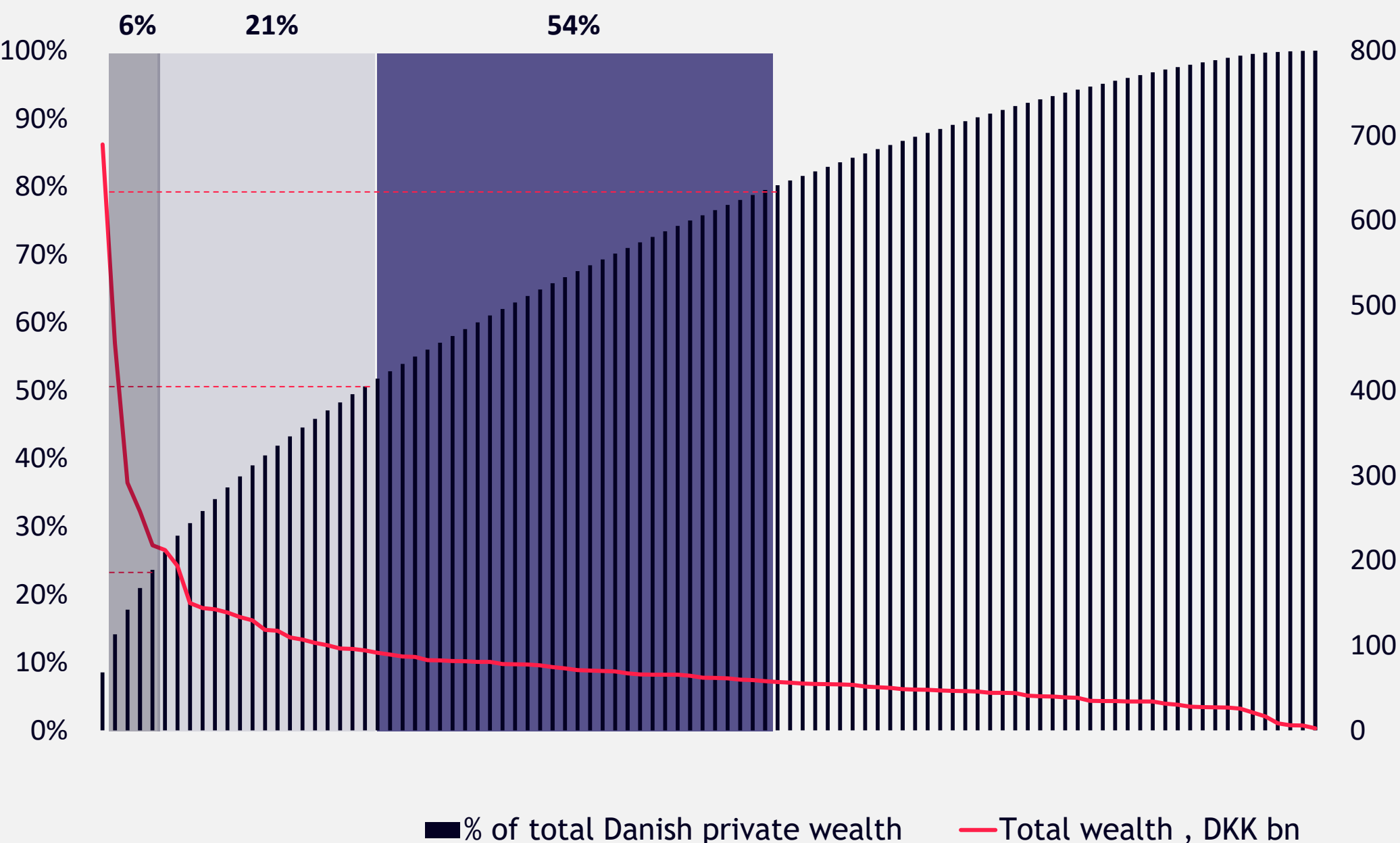
 Reading time 00:13

While very popular, the Pareto Chart can take a bit of time to grasp - it is therefore wise to help the reader by using highlights.

As a starting point, look for large jumps in the accumulated percentage curve and highlight the value of this point.

Also, look for common numbers that are often of interest e.g. 50% or 80%.

Concentration of wealth across municipalities in Denmark<sup>1</sup>



<sup>1</sup>Source: Statistics Denmark: Statbank

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8


# CHECKLIST

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# CHECKLIST

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 *Reading time 00:10*

The checklist on the next page is not exhaustive.

It shows the minimum you need to check before delivering your deck to a client or presenting internally.

Are there exceptions? Yes. There is no ‘one size fits all’ when it comes to data visualization. However, we hope the list will help you or your colleagues to avoid the most obvious mistakes.

*Feel free to print out the checklist and use it for quality assurance.*

# CHECKLIST

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- Is the correct graphical presentation being used? Is there a more illustrative way to present the data?
- Does the title clearly state the content presented?
- Are all assumptions fully stated e.g. in footnotes or similar?
- Are all variables properly described - with no room for misinterpretation?
- Is the graph properly “sourced”?
- Are the units of measure clear and easy to understand?
- Does it leave any room for interpretation? (it should not)
- Is it consistent with the rest of the presentation e.g. USDm vs. MUSD?
- Are % clearly stated where relevant?
- Can the year be left out?
- Is the x-axis values written as simple as possible?
- Do I need to show all tick labels?
- Can the legends be left out or “shared” across similar graphs on a slide?
- Can certain standard elements be left out?
- Can the y-axis be replaced by data labels?
- Are the most important parts of the graph highlighted?
- Are key outliers explained?
- Are the object of analysis quick to grasp?  
E.g. the company / product / unit of discussion
- Have take-aways been properly summarized along with the graph?
- Is there a clear link between the take-aways and the presented data?
- Can the take-aways be understood directly from the graph without extensive calculations?
- Does the graph follow the same visual guidelines as the rest of the presentation? (see our ebook on how to make killer PowerPoint slides for more on this topic)
- Are gridlines adding any value?

# C R E D I T S

The content of this ebook was produced by research specialists at no-more. The ebook was designed in PowerPoint by non-designers with help from SlideHub's designers

Want somebody else to do the  
graphs?

Send task

# Build better presentations, faster

Source: xxx

