

How to Choose the Right Business Chart

A 3-step Tutorial





SUMMARY

There are **3 fundamental rules** that you should always follow when deciding which chart to use. If you learn these 3 rules, there is a good chance that you will get it right no matter what the context of your data is.

1. Orientation

Will I display time-related data?

2. Task

What message do I want to deliver?

3. Shape

What type of data am I trying to visualize?

In this tutorial, we will explain each of these three steps in detail and illustrate them with practical examples.



1

Display time horizontally,
category items vertically

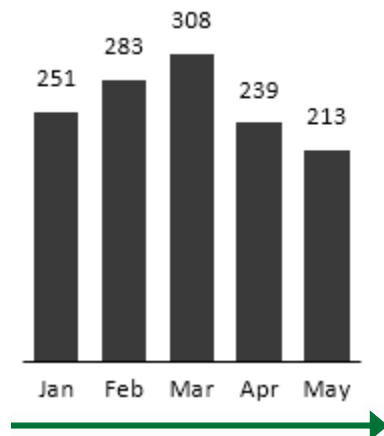
Most business charts can be either horizontally or vertically oriented. Your first decision when creating a chart should always be whether to display data categories **horizontally or vertically.**



Let's focus on most frequent business charts, such as column and bar charts, line and area charts, dot plots or pin charts, waterfalls, variance charts, etc. Here's how you should make your decision:

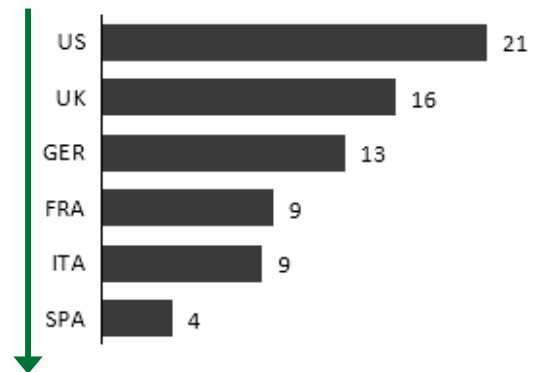
TIME - horizontal

Use horizontal charts for time series



STRUCTURE - vertical

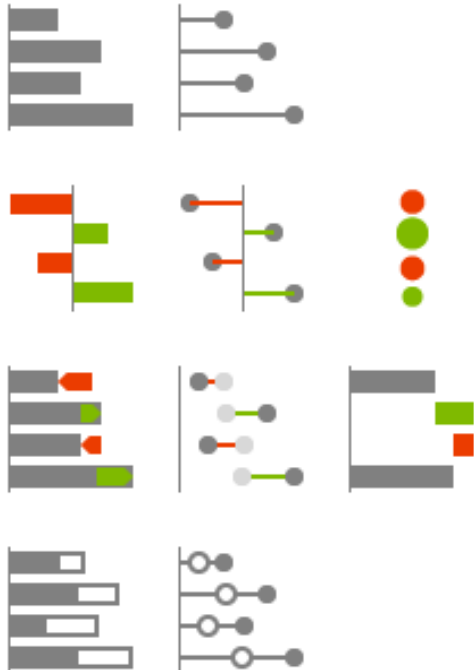
Use vertical charts in all other cases



TIME – horizontal charts

This means that your data categories are years, quarters, months, weeks, days or date/time values. That's it. In charts, **time should always run from left to right**, never from top to bottom. It's a simple convention that everybody understands.

Of course you *can* visualize other types of data categories with horizontal charts. But you will probably run into problems with labelling, category spacing, etc. If you *really* want to make an exception to this rule, do it only when the number of data categories is very small and their labels (names) are very short.



STRUCTURE – vertical charts

When you have discrete items (categories or structure data like products, customers, accounts,...), **use vertically oriented charts**, such as vertical Bar chart, vertical Dot chart, vertical Waterfall chart or vertical Circle (Bubble) chart.

Vertical charts have two advantages over horizontal charts:

1. It is easier to display category labels
2. You can insert them into tables thus creating combined table-chart reports

Other chart orientations

Charts can also have **circular (polar)** orientation, such as pie chart or “spider” (radar) chart. On top of that we also have **2- or even 3-dimensional charts** orthogonally oriented in two-dimensional space, for example scatter plots (XY charts) or bubble charts.

Here is a summary of all possible chart orientations and when to use them:

Orientation	When do I use it?
1. Horizontal	Use only when your data represents time series (years, quarters, months, weeks, days or date/time values)
2. Vertical	Use if you have discrete items (categories or structure data, such as products, customers, accounts,)
3. Circular	Avoid circular (polar) charts like pie-chart or radar (spider) chart whenever possible. Use pie-chart only when the number of categories is very small (2 or 3 categories)
4. 2D	Use when you have 2 or 3 variables in your data, such as in bubble charts or scatter plots



2

Choose the right chart for your message

Most BI/reporting/visualization tools offer a large set of chart types to choose from. So it is utterly important that you understand and predict the nature of the **analytical task** that your readers will perform when observing your charts. Ask yourself: **What message am I trying to convey?**

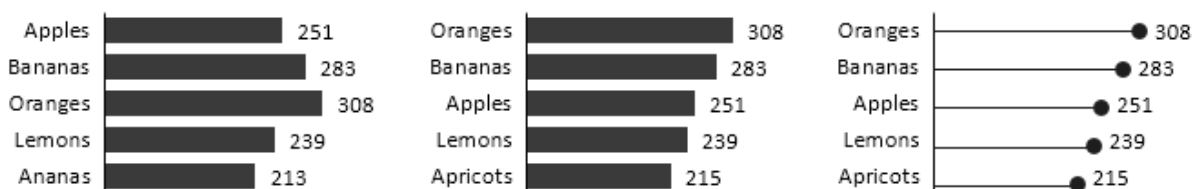


For example, you might simply want to show an interesting trend over time. Or enable your readers to compare sales values of different products. Yet another time your readers will need to understand the variance to budget, growth from previous year values, contribution of specific products' variance to the total variance, etc.

Here is our cheat sheet that will help you select the right chart for most common tasks that business users typically perform:

STRUCTURE ANALYSIS (CATEGORY COMPARISON)

Structure analysis is the most basic analytic task where the reader observes the displayed values and visually compares data categories to each other.



These comparisons are usually of the following nature:

1. **Looking up** a specific value (e.g. finding the sales value of a specific product)
2. **Comparing** two values between each other
3. **Ranking** (trying to establish the sequential order of one or more data categories)
4. **Recognizing patterns** in the data (outliers or subsets of values with a specific pattern)

Whenever you display categories like this, think about the **order of categories**. For ranking, sort categories by value. In other cases order categories by their importance or perhaps a natural order like geography. Do **not** use alphabetical order – it works for phone books only ...

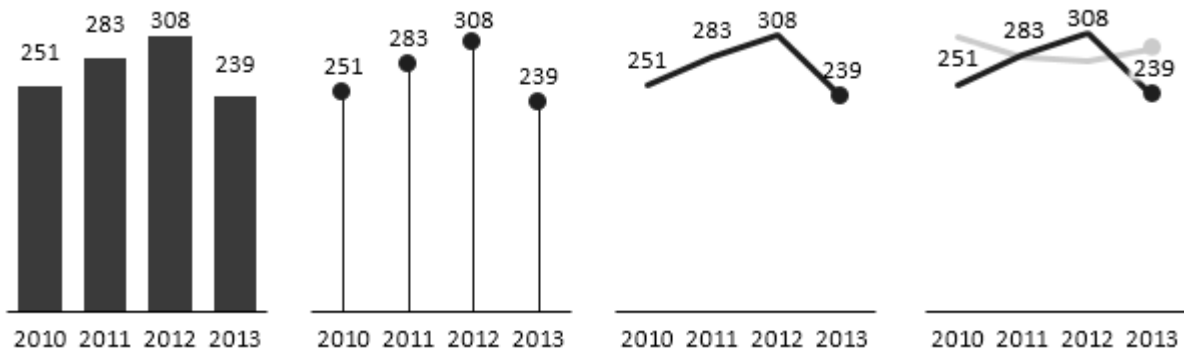


TIME-SERIES (TREND) ANALYSIS

Time series (trend) analysis is a similar task to structure analysis but performed when the data categories represent time (years, quarters, months, weeks, days, timestamps).

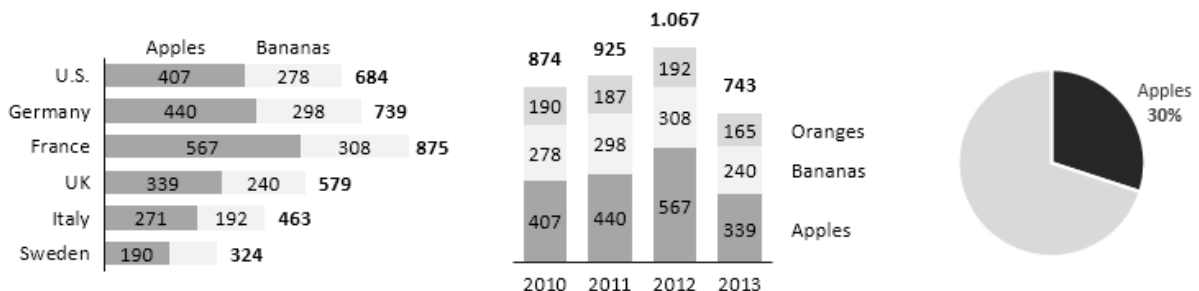
Depending on the situation, the reader will perform the following types of comparisons within the displayed time series:

1. **Looking up** a specific value (e.g. the sales value of the last month)
2. **Comparing** two values between each other
3. **Observing trends** in the data (subsets of values with a specific pattern, e.g. linear growth or other type of seasonality)



PART-TO-WHOLE COMPARISON

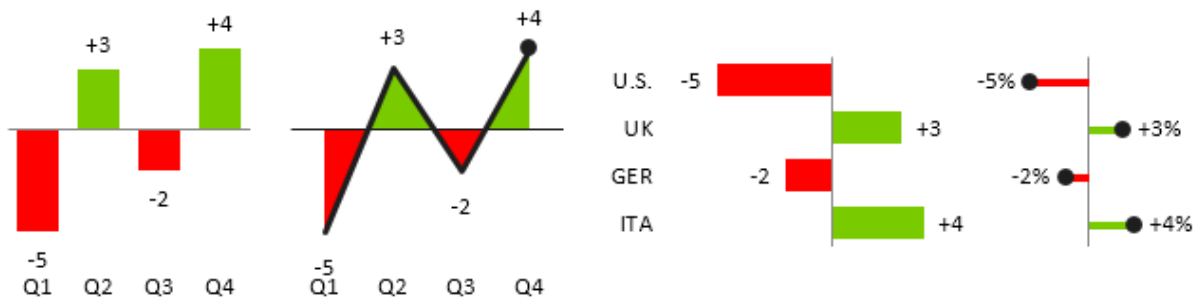
Here users try to assess the **relation of a part to the whole** value (e.g. sales of one product to total sales of the company). The analysis exposes the “significance” of each part relative to the total value. Use stacked bar charts for part-whole comparison (and OK, pie charts as well, but only in very limited cases!):



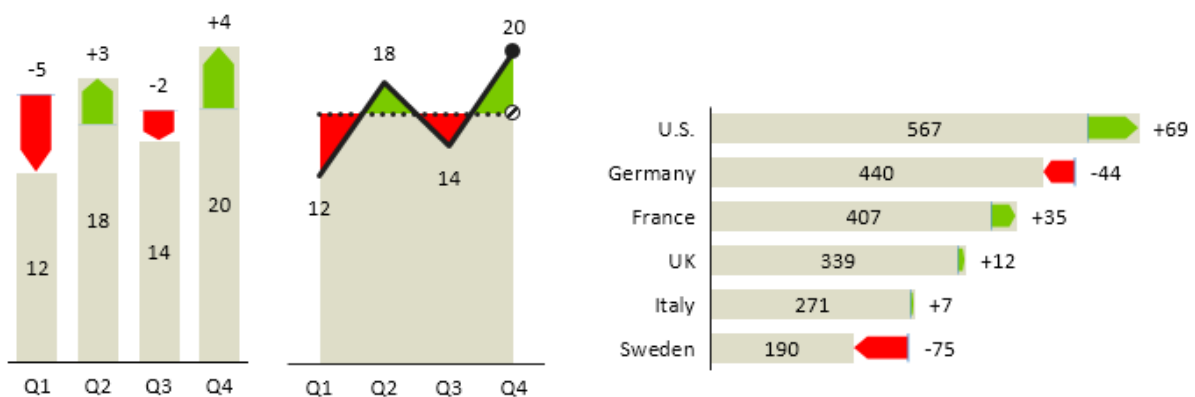


VARIANCE ANALYSIS

Variance analysis is the most fundamental task in business reporting. Understanding deviations from targets or budgets and growth rates from previous periods is a core requirement in almost any organization. Use **“plus-minus” charts** to show variance over time or over structures:



Use **“integrated variance” charts** to display actual values as well as deviations. Since both values (actual and deviation) are shown, the user can evaluate both the *importance of each deviation* (its magnitude) as well as its **relative share of actual value** at the same time:



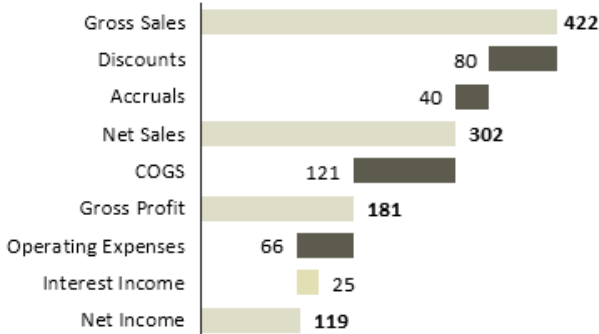
Variance charts are the key ingredient of successful business reports. Focus on changes and deviations!



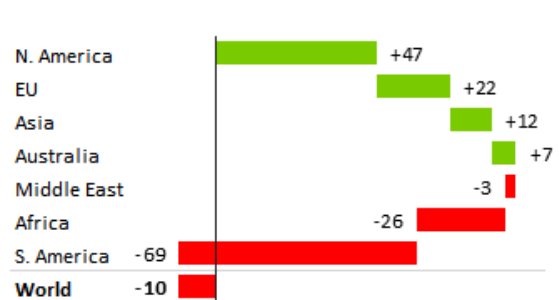
CONTRIBUTION ANALYSIS

Contribution Analysis is a special type of part-to-whole analysis to assess the *contribution* of all parts to the whole value. There are two main versions of Contribution Analysis: (1) Contribution of variances and (2) Contribution of categories. Use **waterfall chart** for contribution analysis, it is simply perfect for showing explanations *why* a total value has changed. Here are 4 typical examples:

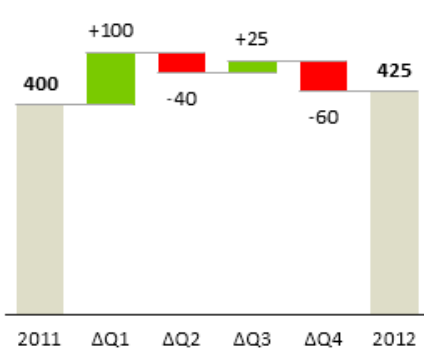
Profit&Loss Statement



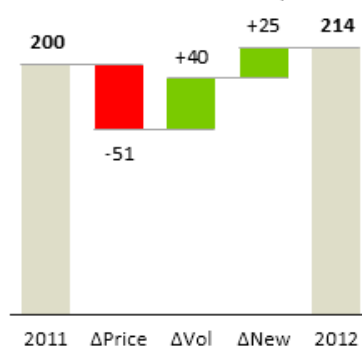
Contribution of variances to total



Contribution of variances



Price/Volume/New Analysis



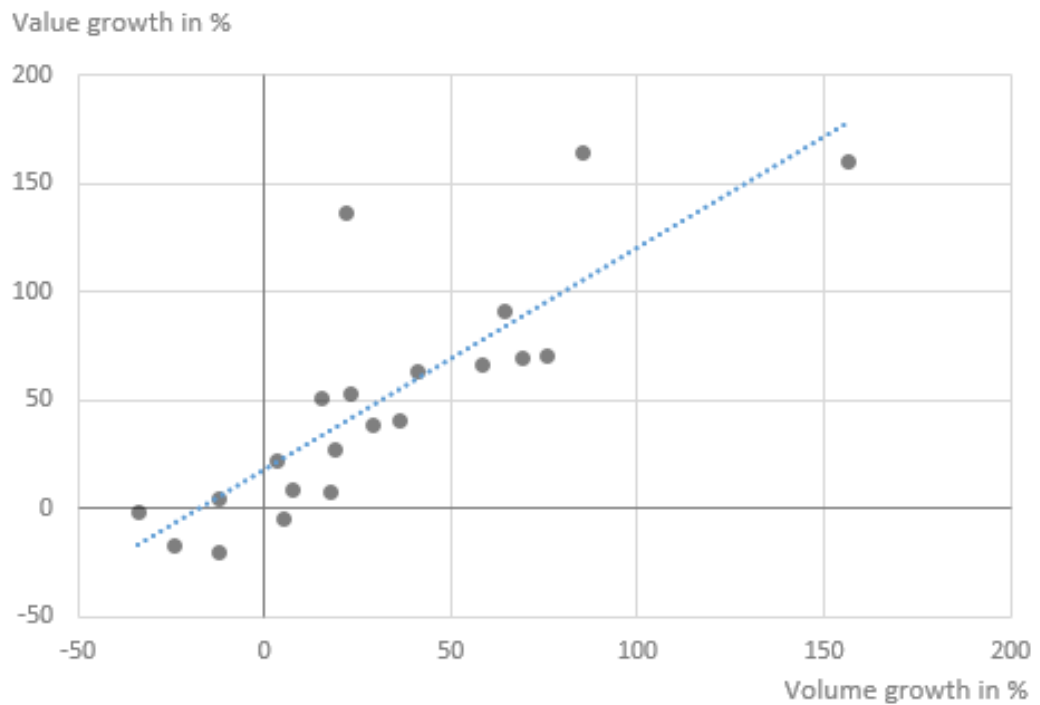
Waterfall chart is also called the **“bridge” chart** for obvious reasons.

Waterfall chart is a perfect visualization for contribution analysis.



CORRELATION ANALYSIS

Correlation analysis is used to assess whether two variables are correlated. It is also suitable for spotting outliers. Use scatter plot for correlation analysis:

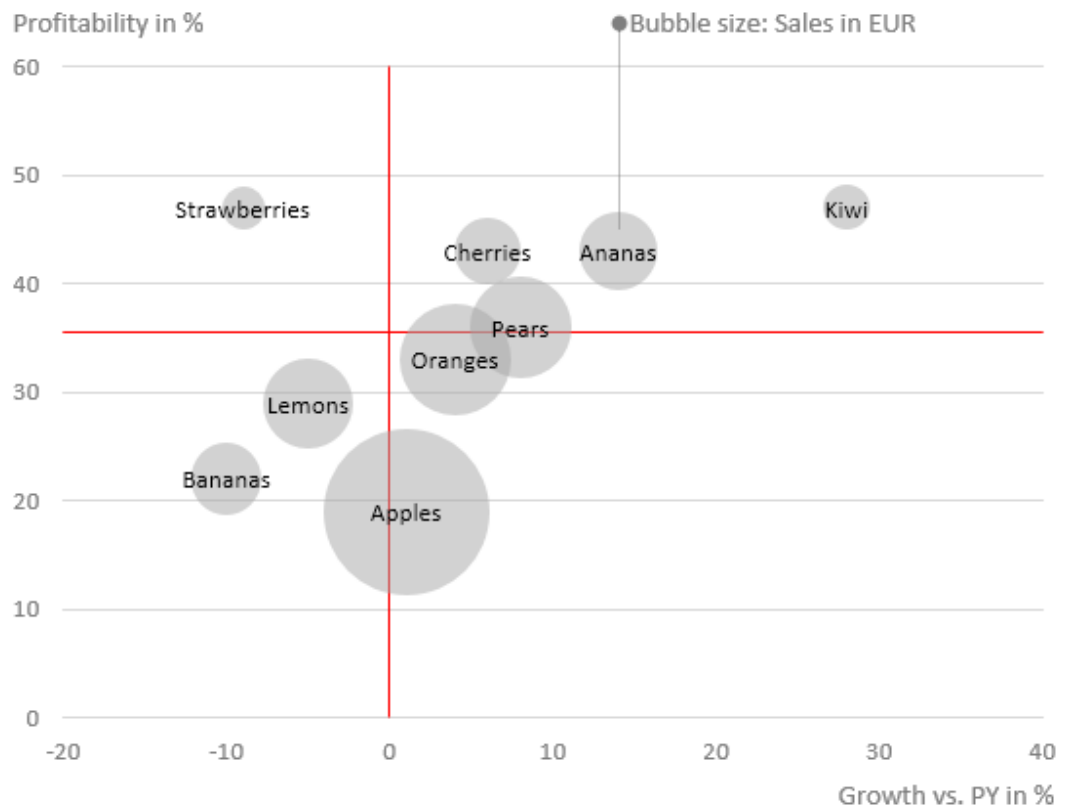


If two variables are in correlation, this does not necessarily mean that there is a cause & effect relationship between them!



PORTFOLIO ANALYSIS

To analyze a portfolio of data categories (e.g. products, customers, suppliers, plants, etc.) by 3 variables, use the bubble chart:





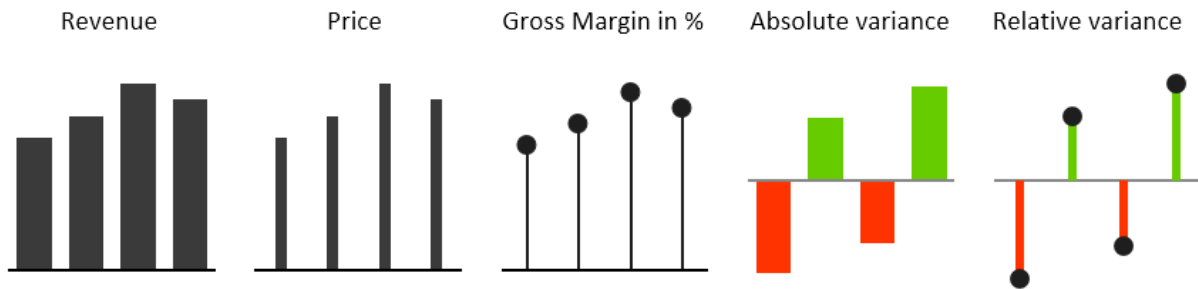
3

Select the optimal chart shape for your data

Once you have determined the correct chart orientation and the intended task of your visualization, you are ready for your last major decision: **which chart *shape* should I use?**



Instead of always just using the identically looking “default” column chart regardless of what it actually represents, you should use **different chart shapes for different types of values** (KPIs). This is called *shape coding*:

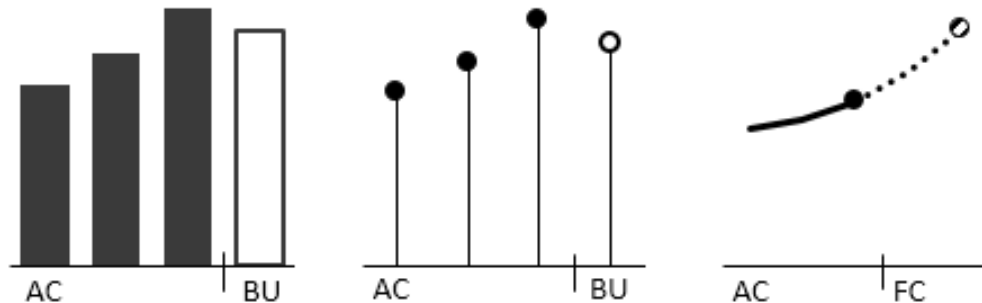


For example, **the columns in the Price chart are much thinner than the ones in the Revenue chart**. This is quite intuitive – revenue values are usually way bigger than prices since price is actually a *ratio* of revenue, divided by quantity (a value/volume division). Similarly you can use “**pin**” **charts** (yes, the “lollypops” 😊) **for percentages** since they are value/value or volume/volume divisions and are thus *without* any unit (just indexes, %). So it seems intuitive to use chart shapes *without* width for indexes in business reporting. Once readers understand this, they will instantly know what they are looking at, even without reading the labels. Especially in a repeating process, such as monthly reporting.

Instead of always using the default column chart, use different chart shapes for different KPIs.



Similarly you can use *patterns* to code data scenarios like Actual, Budget, Forecast and Previous Year. For example, here is how budget values can look like:



Check out [IBCS](#) (International Business Communication Standards) for more great ideas like this.

Achieving consistency in business reporting is critical!

It is relatively easy to select the perfect chart shape when you only have one chart. That's not rocket science and many researchers and authors have written guidelines on how to do this. But business reporting is so much more than just designing one single chart. In fact, most times you will have to use **several charts at once to get the full message across to your readers.**

Often you'll need to design a report with many pages, a BI dashboard with several screens, etc. This is when consistency in your design becomes of utter importance.

Just as traffic signs consist of consistent colors and shapes that always mean the same thing, **elements in business reports should be consistently designed** to depict or "code" the same meaning with always the same shapes, colors, patterns, etc.

Same colors and shapes always mean the same thing in traffic signs. So should they in your reports, presentations or dashboards!



Emphasize single values or trend?

The shape of a chart itself determines what we will see and how we will interpret the numbers. Several “gestalt” laws govern our visual perception. That’s a fact. **Different chart shapes will convey different messages to your audience.**

For instance, some charts are more suitable for emphasizing single values, while others are better at displaying trends. Let’s illustrate this with the following examples:

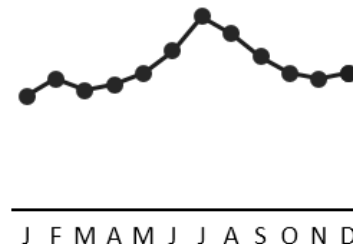
Bar



While we can see the overall trend, the vertical tendency and clear indication of bar heights support us in comparing single values (compare heights between two single values, such as Jul to Aug or Nov to Dec).

Use this chart shape when the number of periods is small and only when the chart is big enough.

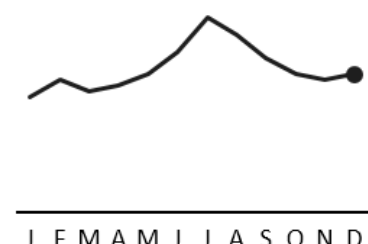
Line with dots



The flow of the line emphasizes the trend, while the dots mark the height of a single value.

There is much more emphasis on the continuation or the flow of the values (trend analysis), but still some support for single value comparisons.

Line



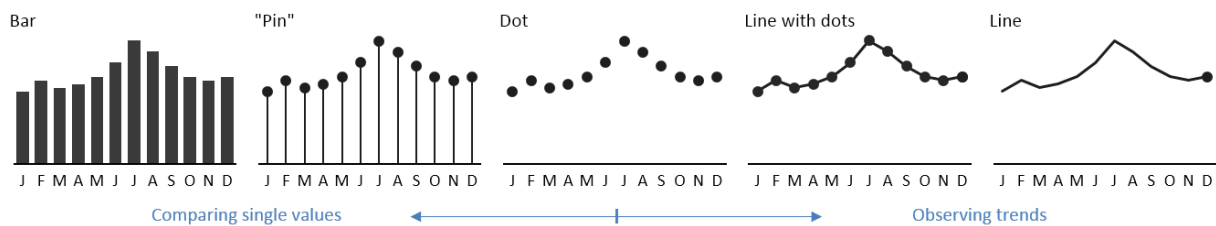
There is no explicit graphical support for single value comparisons, making it very hard to estimate the differences between particular months.

What is left is the continuity of the line, clearly exposing the trend in the data.

**Use bars for value comparisons,
use lines to reveal trends.**



So, the perception of different chart shapes is clearly **ordered** from vertical bars (“columns”) to more “horizontally” oriented lines:



Still puzzled which shapes to use?

OK, here are **two rules of a thumb**:

1. **Use chart shapes on the left when single values are important** (e.g. annual or monthly figures) and when you expect that users will compare values between each other (e.g. current month to previous month). Also note that this is only meaningful when charts are big enough that you can comfortably display the columns and labels.
2. **Use chart shapes on the right when you want the users to focus on overall trends**. Also, choose line charts when you're limited with space (e.g. small chart sizes, small category widths, ...).

Just remember, before you click to insert your perfect chart, think about the **3 fundamental rules**!

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