

# Best Practices for Powerful Dashboards



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## ABSTRACT

**In any domain in any organization, great dashboards are valuable not only because they can sum up important information and offer a single view of data but also because they are simple to use and offer a quick, unambiguous way to draw meaningful conclusions from data. Developing and designing such powerful dashboards does not come easily. Organizing data so it can be easily consumed and quickly understood by operational staff or decision makers requires a thorough understanding of the data and the business needs as well as skills, knowledge, and experience. The design, format, annotations, filters, arrangement, visualization type, and the underlying data all help make the difference between just another dashboard and a *powerful* dashboard. In this article, we will cover the key characteristics of such powerful dashboards and the best practices for developing them.**

## INTRODUCTION

There are many different definitions for what dashboards are, but Stephen Few's might be one of the most comprehensive ones: "A visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance." [Few, 2003]

If dashboards are intended to communicate important information at a glance, a digital dashboard should fit on a single screen. Scroll-

ing to see more would conflict with the very definition of a dashboard. Under the same logic, on any paper-based dashboards the information should be presented on a single page, though it is up to you what size paper to use.

Also as per the definition, a dashboard presents the most important performance indicators and measures that need to be monitored or referenced. The data feeding this visualization should always be updated without any involvement from the consumer. The frequency of the update will vary by organization and by purpose. As a rule of thumb operational dashboards require data in real time or near real time (usually daily), whereas executive and strategic dashboards require data to be refreshed less frequently (weekly, monthly, quarterly, or even yearly).

Lastly, digital dashboards often incorporate a certain level of interactivity to allow for further filtering and drilling down into the information, but this is not a mandatory feature. Keep in mind that these actions should not be required to see which performance indicators are underperforming, but rather interactivity should provide further optional insight into the information.

## **KEY CHARACTERISTICS OF A POWERFUL DASHBOARD**

### **CURRENT AND RELIABLE**

As mentioned, the frequency of data updates can differ depending on the need and purpose, but the data does need to be up to date. Before starting to develop a dashboard, determine how often the underlying data should be refreshed and the required date range. As a best practice,

if the date range is not obvious from the way the information is presented, you can mention it in the dashboard's title, subtitle, or description—or use it as a filter if it is appropriate to do so. Another best practice is to always include details about the last refresh date and the data source in the header or the footer of your dashboard in order to let the consumer know how current and relevant the underlying data is.

Even if a dashboard provides a clear-cut view into the needed metrics, is user friendly and accessible, and is automatically updated at the proper frequency, if the information is unreliable the dashboard quickly becomes unusable. This could happen for two reasons:

1. The underlying data is not clean
2. The information is misrepresented through incorrect or ambiguous labels or is presented in a way that leaves room for misinterpretation

Both these problems can be discovered through end-user testing and avoided by having a proper data governance and stewardship program in place to improve and maintain the quality of the data and provide clear definitions for business and technical metadata.

Outdated or unclean data will not only lead to poor decisions but will decrease trust in the data and the dashboard development team, jeopardizing further dashboard adoption. If the data is unclean, the only dashboards worth developing at that point are data quality audit dashboards.

### **TAILORED FOR ITS MEDIUM**

What is a dashboard if it is not visual? There are several tips I recommend for creating a dashboard that empowers the user to understand the

most information in the least time, but first you need to consider the medium.

Is your dashboard designed for desktop, laptop, mobile (tablet or phone), or even paper? Each medium will have a different resolution and will directly impact the layout of your dashboard as well as how much will fit on it. You want to avoid scrollable content (or multiple pages for the physical option). If a responsive design (i.e., a layout adapted on the fly based on the viewing environment) is not possible, consider offering multiple versions of the dashboard tailored to the different screen sizes your end user will most likely use to access it.

If the dashboard is static and paper-based, decide which paper size makes the most sense.

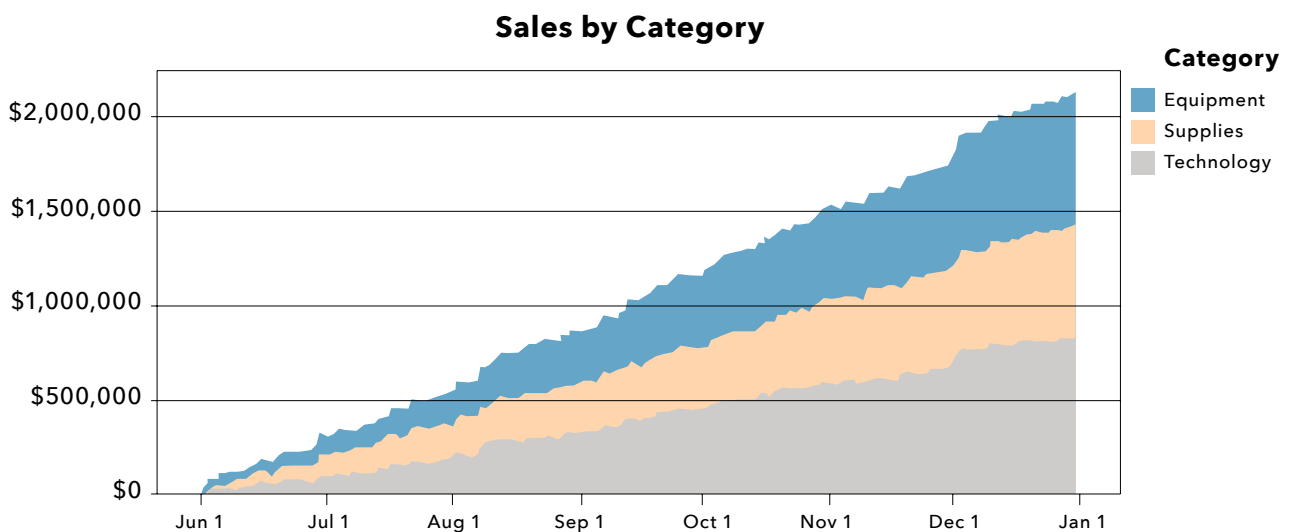
Most dashboard building tools will allow you to configure the dimensions of your dashboard based on standard presets.

### TITLES, CAPTIONS, AND TOOL TIPS

Use them! Some experts think that a great dashboard does not require titles or captions. I am a strong believer that a dashboard should have a title and even a short description to better inform the user what information is being presented. Why? If you have multiple dashboards with similar layouts and designs, a title reinforces the distinction between them.

You can provide necessary context with a one-sentence description or a call to action through captions if the dashboard is meant to entice the

|                    | June             | July             | August           | September        | October          | November         | December         |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Equipment          | \$96,056         | \$67,390         | \$101,499        | \$118,184        | \$104,585        | \$59,555         | \$147,095        |
| Supplies           | \$112,637        | \$83,344         | \$68,601         | \$63,426         | \$113,454        | \$79,424         | \$84,734         |
| Technology         | \$97,974         | \$84,940         | \$140,154        | \$131,299        | \$135,766        | \$85,160         | \$157,636        |
| <b>Grand Total</b> | <b>\$306,666</b> | <b>\$235,674</b> | <b>\$310,254</b> | <b>\$312,839</b> | <b>\$353,805</b> | <b>\$224,139</b> | <b>\$389,465</b> |



**Figure 1:** Comparison of visualizations.

audience to learn more about and analyze the information presented.

For your digital dashboards, consider displaying further information in tool tips that can appear when the user holds the pointer over or clicks on a specific element. Ensure this information is not crucial to the conclusion the dashboard is trying to convey, but rather offers further insight and supporting information.

### A PICTURE IS WORTH A THOUSAND WORDS

Try to refrain from using tables or pivot tables as dashboards; use visuals instead. It has long been proven that the human process of comprehension and insight is faster with visualizations. After all, insight is what a dashboard is trying to help you achieve.

Consider the example in Figure 1. The same information is being displayed in both the table and the graph. Opting for a table does provide the information, but it takes the user a lot more time to draw a conclusion about the cumulative totals than if the appropriate visualization is used instead.

Which type of visualizations you should use depends on your data and your needs, but you can use the following guidelines:

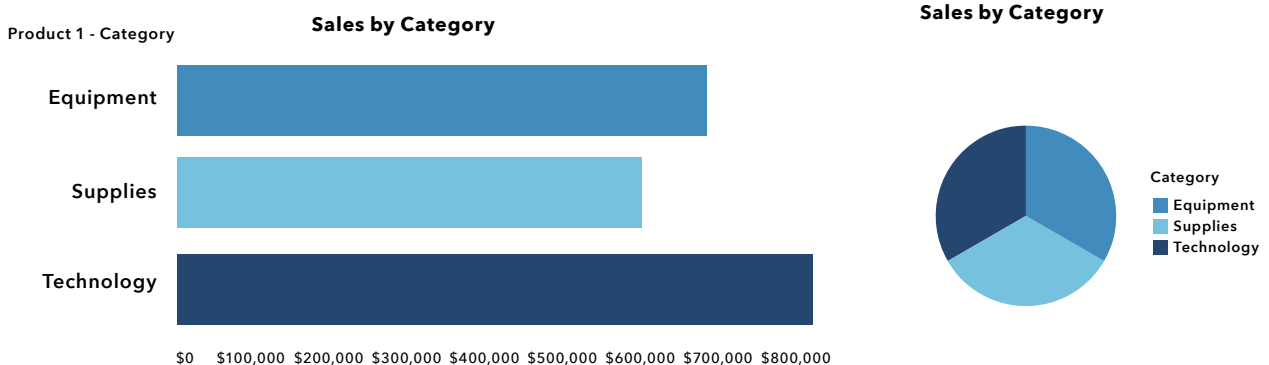
### BAR CHARTS, LINE CHARTS, AND SPARKLINES

A bar chart is one of the simplest and best ways to visualize one or more series of data, and yet many people opt for a pie chart or a table instead. As you can see in Figure 2, a bar chart is better suited for this data set than a pie chart—in the bar chart you can determine the difference in sales between equipment and technology much more quickly.

Use a bar chart when you want to display data over a number of related series such as time, product, revenue, or region.

Use a line chart when you want to track changes in a number of dependent data sets over a short or long period of time. Use sparklines when you want to display the trend in a single data set. Sparklines are also great for small spaces.

For all of these chart types, you should use the same color for the same series. Provide a legend if multiple colors are used across different series.



**Figure 2:** Comparing the readability of bar graphs and pie charts.

## MAPS

Use a map when you want to display a geospatial data set. Most of the time, topological maps are recommended; they have been simplified so that only vital information remains and unnecessary details have been removed.

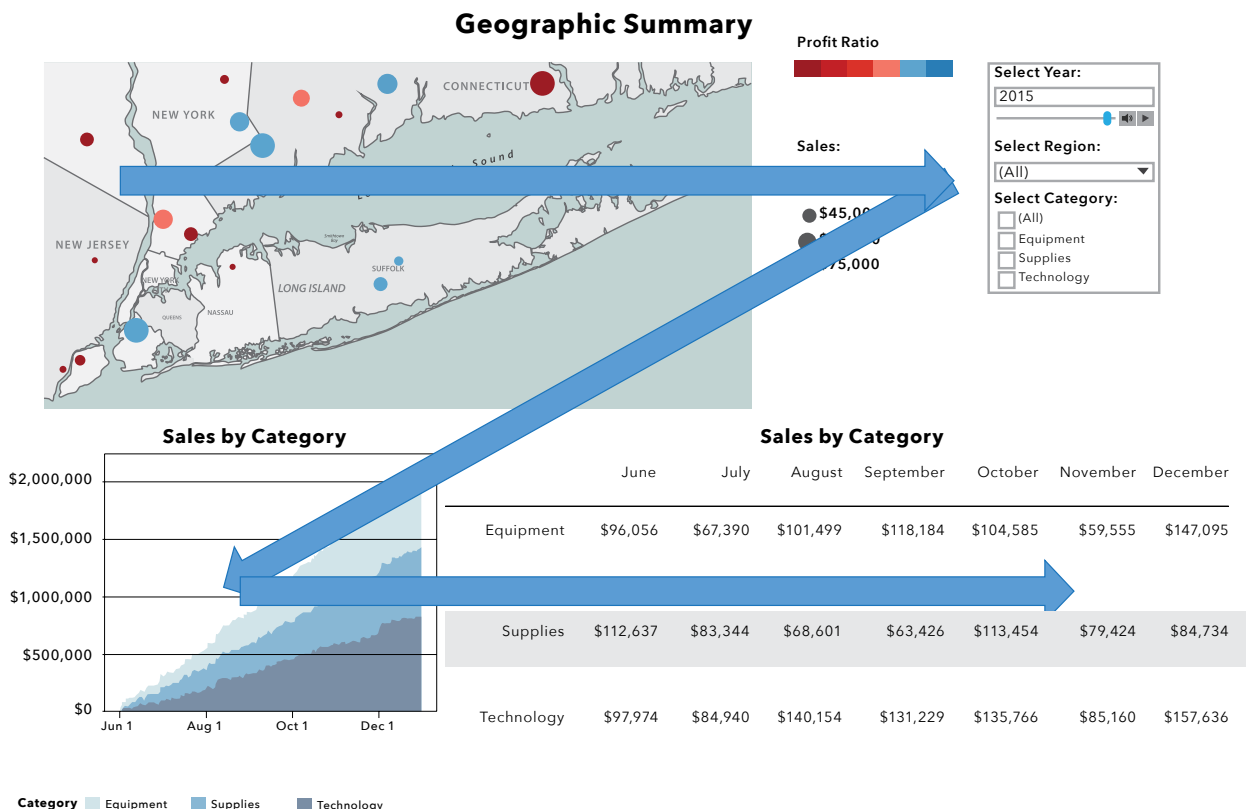
## LEGENDS

Anytime you decide to use more than one color or shape—such as on scatter graphs—legends become mandatory. Place your legend close to the view it's referencing to avoid shifting the viewer's eye away and ensure the shapes are the same size.

## SPATIAL ARRANGEMENT

Here's something most of us tend to do when loading a website, opening a document, or reading anything printed: we first look to the top left. It's no different on a dashboard. Place your most important view in the top left, as this is where the reader's eye is naturally drawn (assuming their native language is written left to right). Then arrange the following views in a Z pattern with the most important information following this top-to-bottom, left-to-right pattern (see Figure 3).

Follow the same pattern if you include any chained interactivity (i.e., if selections in one view affect the way information is presented in another).



**Figure 3:** Usual dashboard reading order for English-speaking users.

## FILTERS

Making the dashboard interactive enables your end users to perform basic analytical tasks and learn more about their data. Sure, viewers should be able to get any necessary information from the dashboard in its default state, but allowing them to drill down into a view provides them with further insights and answers that may help them perform their jobs more efficiently.

If your filter applies to only one view, it's best to place it close to that view and to the side following the spatial arrangement tips previously mentioned. Remember, you don't want to break the zigzag pattern by placing it in a counterintuitive location. If your filter applies to the entire dashboard, place it at the top of the first row of views, placing multiple filters from

side to side in order of importance. Be mindful of the number of filters you employ—depending on what visualization tool you're using, filters might tax the data refresh time.

## COLORS

This area can be quite subjective, but my advice is to use the Brewer palettes when possible. These palettes are color combinations selected first and foremost to be colorblind friendly; they will not confuse people with red-green colorblindness—which occurs in approximately 8.4 percent of the population. Most of these palettes are also color printer friendly and photocopy friendly, meaning they will remain clear even after black-and-white photocopying. For example, the view on the right of Figure 4 is visible and clear for colorblind users.

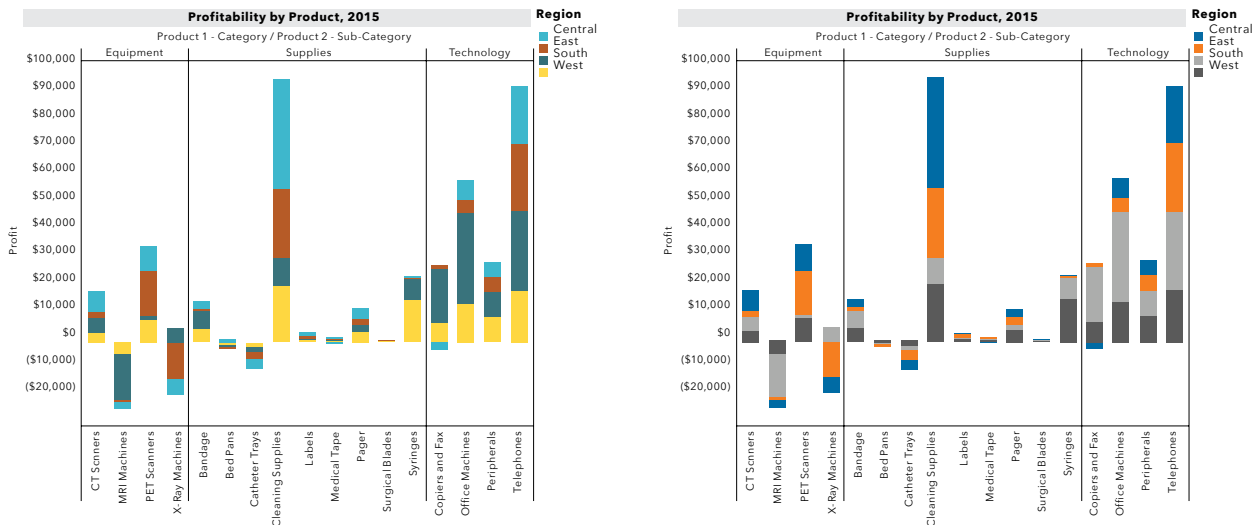


Figure 4: Example of using standard vs. Brewer palettes for visualizations.

**ACCESSIBILITY**

Last, but not least, the dashboard needs to be accessible. For that reason, ideally it will be Web-based so it's available from anywhere with an Internet connection. Security is important, especially if the dashboard presents sensitive information, so restricting access with a user name and password is essential. However, if you require more than one authentication layer, you will create frustration in your dashboard consumers.

**CONCLUSION**

It's always been important to use data to make quick, effective decisions. Powerful dashboards can facilitate this objective as they can offer the proper information and visualizations to expedite and enhance the decision-making and analysis process. Following the pointers described above, your dashboards can maximize their potential and become powerful tools to support your organization's goals. ●

**REFERENCES:**

Few, Stephen [2003]. *Information Dashboard Design: The Effective Visual Communication of Data*, O'Reilly, p. 34.