There's Magic in Graphs:

How Data Visualization Leads to Better Decision Making

Corporate
Renaissance
Group

The Age of Big Data

72% of businesses are currently collecting data that they will never be able to use.

But that doesn't mean that the data isn't useful; it only means that the data isn't being used *properly*. Companies today are collecting "big data"; data sets that are so large and unwieldy that they simply can't be processed through traditional means (e.g. spreadsheets, tables).

In the world of big data, a key consideration is that 65% of the population are visual learners; they need to *see* their data in order to understand it.

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Why Data Visualization Matters

"The purpose of visualization is insight, not pictures," according to computer scientist Ben Shneiderman. Data visualization creates a method through which ordinary people can better consume and understand large volumes of data. When data is properly visualized, patterns become obvious. Visualizations can help individuals quickly draw simple, actionable conclusions.

The ideal state is for companies to spend less time compiling large volumes of data and leverage data visualizations to better identify and mitigate risks as well as proactively uncover valuable opportunities. Without data visualization, readers instead need to compile and compress the information on their own. **Not only does this take more time and effort, but it can also lead different people to different conclusions.**

Tables vs. Charts

To understand the benefits of data visualization, consider a standard graph of revenue over time.

In spreadsheet format, a reader might see the following data:

| January	$14,129
February	$16,784
March	$18,978
April	$17,241
May	$19,929

To comprehend this simple data, **the reader must read each line and then compare each new line to the subsequent line**. Only once they've done that will they be able to come to the conclusion that revenue went up, briefly went down, and then continued to go up. In the format of a graph, however, the reader would instantly be able to see that revenue was trending upwards.

REVENUE BY MONTH
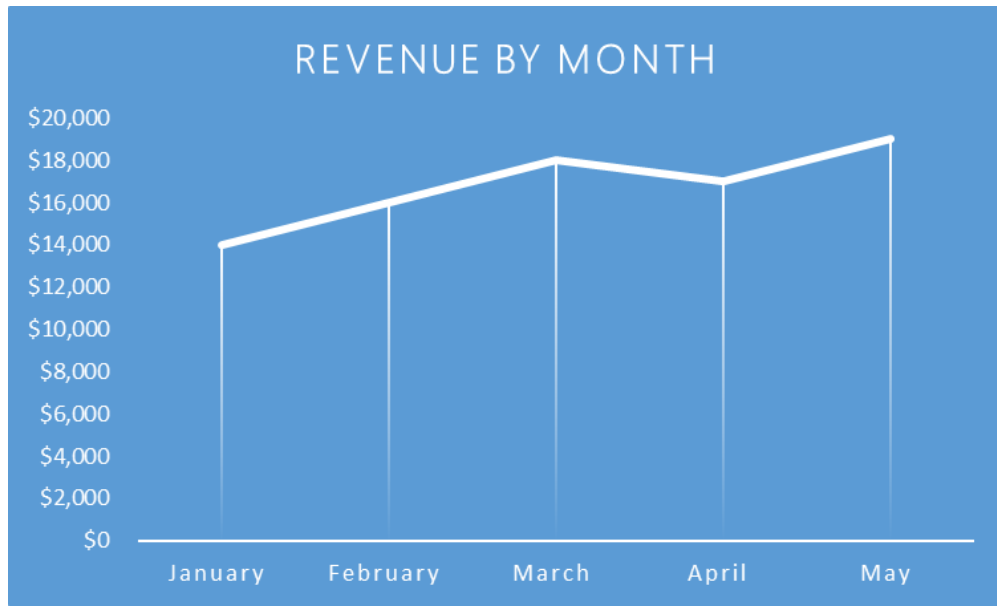
They would be able to visually recognize a small dip in revenue that was quickly recovered from, and they would even be able to see some additional information–such as the fact that revenue only dropped in April and that it never went below January. That is just the start. Organizations will layer on comparatives (prior year values, targets, etc.) into the visualizations to quickly assess performance and trends against key benchmarks.

"There is magic in graphs. The profile of a curve reveals in a flash a whole situation..."

- Henry D. Hubbard
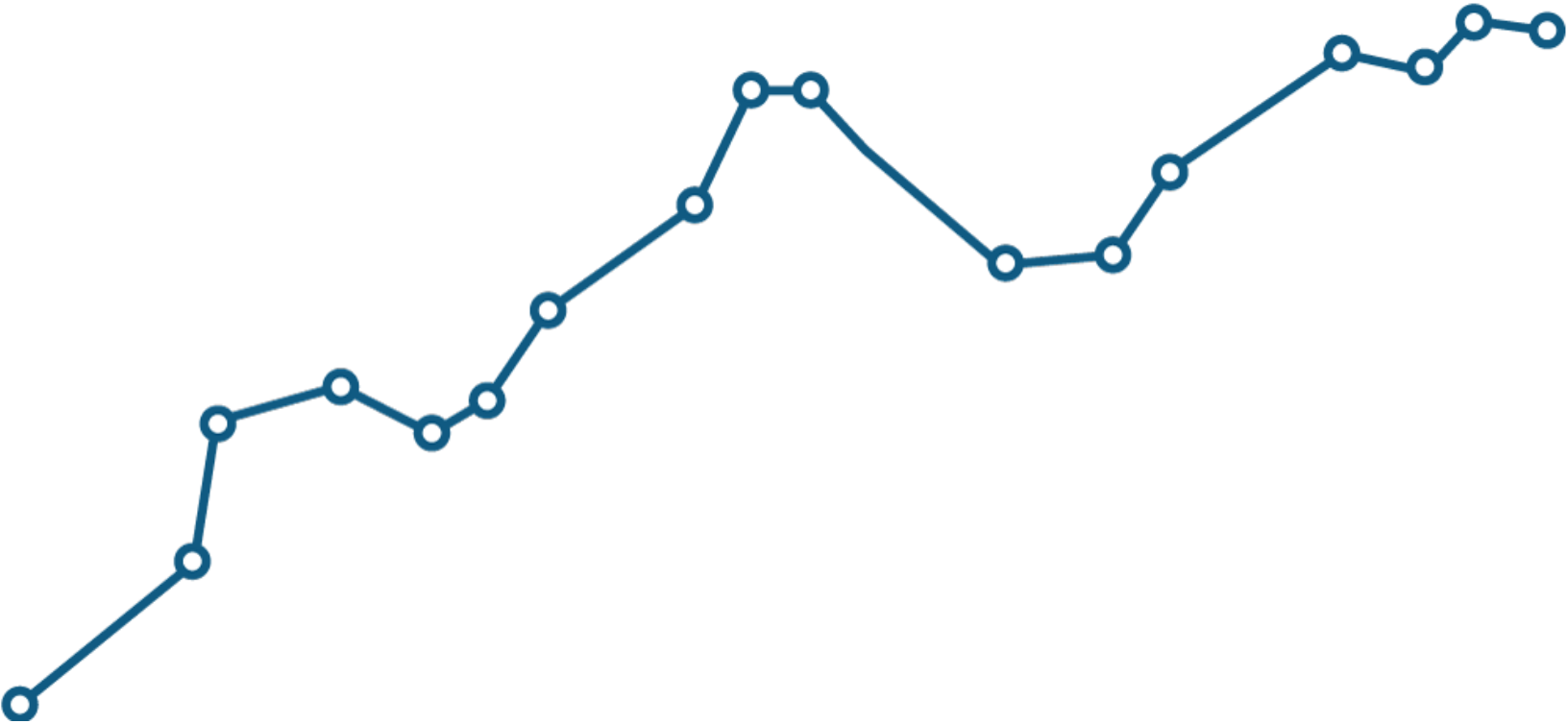
Process: How Data Visualization Works

Henry D. Hubbard, the creator of the periodic table of elements, once said, "There is magic in graphs. The profile of a curve reveals in a flash a whole situation - the life history of an epidemic, a panic, or an era of prosperity. The curve informs the mind, awakens the imagination, convinces." Data visualization helps the data to tell its story.

The Psychology Behind Visuals

When you look at a picture, your mind takes in the entirety of the scene immediately. This is the way your brain is meant to process things: environmentally. But when you look at data, your brain must first read the information, comprehend the information, and then understand the information in relation to context. All of these things are "artificial" and take much longer.

Building a data visualization takes advantage of this instinctive need to understand our surroundings. We understand when things are *closer* or *farther* from each other (scatterplot diagrams) or when things are moving *up* or moving *down* (line graphs). We understand when something looks *bigger* or *smaller* (pie charts) or when something is *taller* or *shorter* (bar graphs). A visualization is able to impart this information nearly immediately. The only question when creating a data visualization is exactly what information needs to be displayed.

Of course, this also leads to another point: data visualization can also be *misleading*. If the right data isn't presented in the right way, it's very easy for the viewer to draw conclusions that simply aren't there. This is why data visualization must be primarily about **presenting good data in a non-biased way.**

How Data Visualization Leads to Better Decision Making
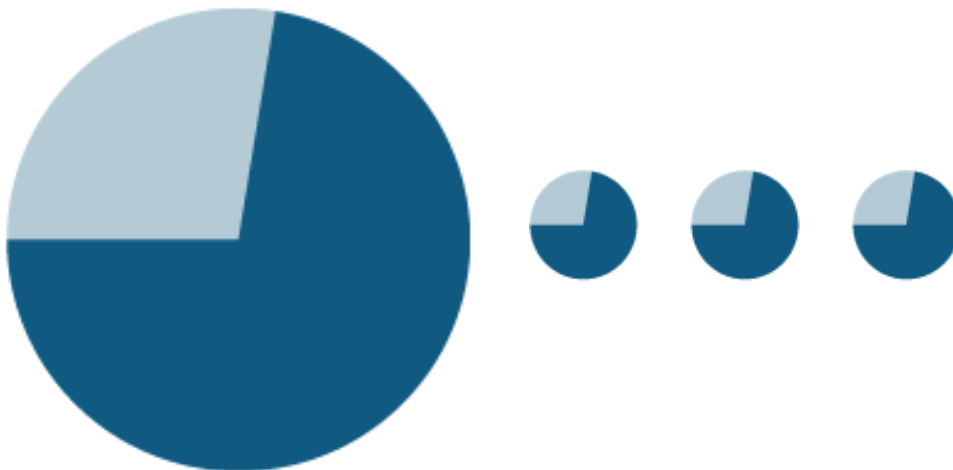
Data visualization can both present data and also present it in a specifically compelling way. Consider the [annual report completed by Caritas Kontakladen](#), which used both photographs and data to make an engaging sequence of points. These points are tremendously memorable and easily digested, which is important for an organization that is focused on outreach. **This information can be understood by *anyone* at a glance.** Alternatively, this information could have been compiled in the form of spreadsheets or written reports, but it's very unlikely that it would have been as easy to understand. In this annual report, the visualizations are also being used to make a *point* about the data, which is another area in which visualizations can excel. Visualizations cross the boundary between pure data and entertainment.

At the other end of the spectrum, there are companies that use their visualizations to study logistics, such as shipping and transportation. Setosa was able to use a visualization to identify areas in which transportation may "bunch," thereby vastly increasing wait time. The visualization of bunching both illuminates why the bunching happens and what its consequences are. **These types of visual simulations tell a complete story with large sets of data in a very short amount of time.** There could be an *extensive* amount of data used in such a visualization, ranging from simply when busses stopped where to where each bus was on their route every minute. The more accurate this simulation becomes, the more information a viewer will be able to glean.
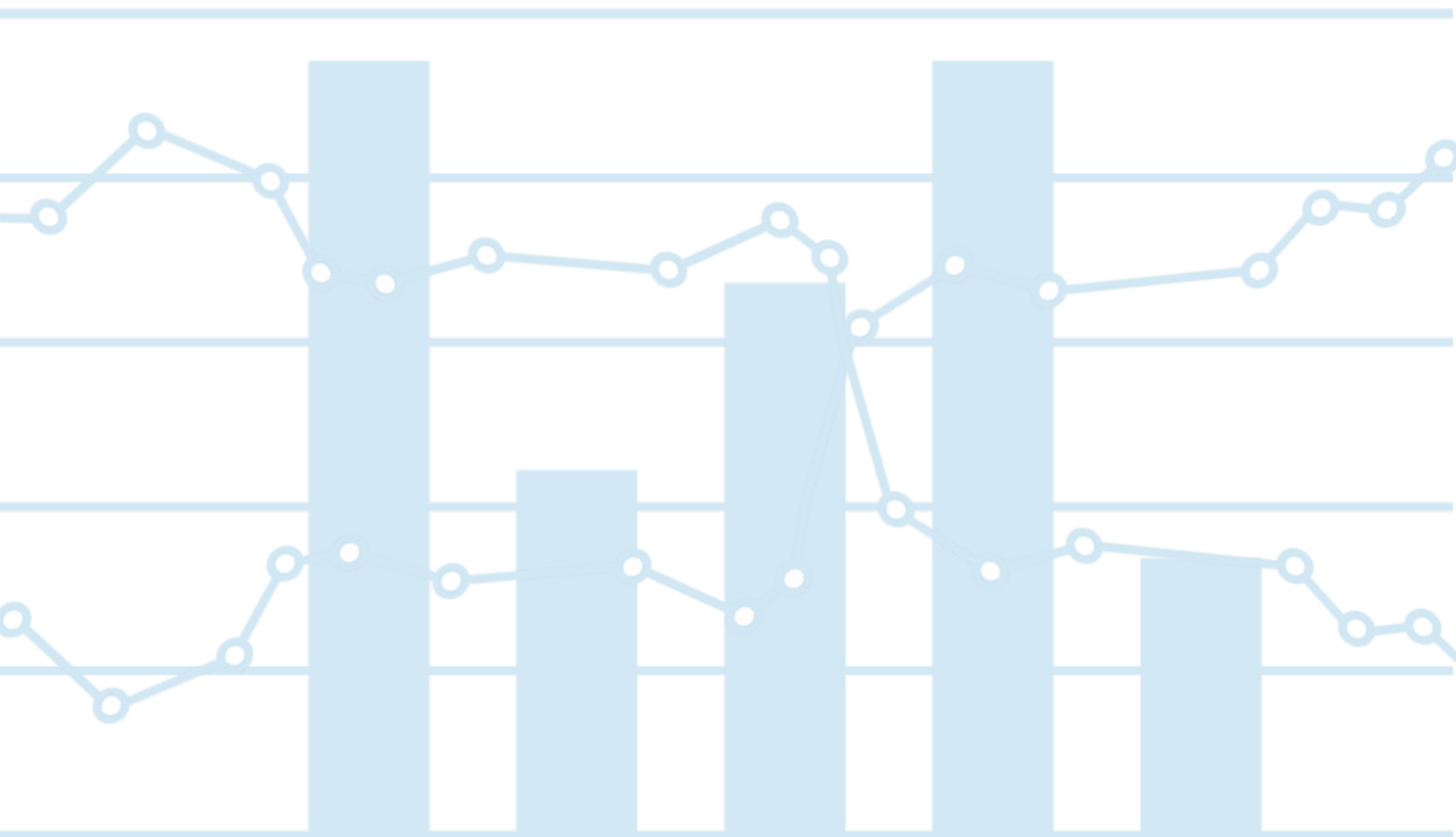
Business Tools for Data Visualization

In order to extract quick and effective meaning and spot trends of large datasets, modern businesses require the use of technology. Most businesses have more than just a few data points to plot in a pretty picture and need to trust systems to manipulate, process and display data in appropriate graphs and charts. For years, Excel® has been the primary tool used by many businesses to turn tables into visuals. Spreadsheets are relatively easy to use and contain features for easy chart creation; however, cannot intelligently process large volumes of data and require a significant amount of manual work to produce one-off charts.

Data stored in Excel and shared does not provide the highest level of security, tables often contain static data that has an expiry date (becomes quickly outdated), and the integrity of the data can be a concern as it can be overwritten or formulas can be broken. The next best option is to employ expert statisticians and program coders to create custom business analysis applications and algorithms–a very lengthy and expensive solution not practical for small and medium-sized companies.

The good news is that many technology solutions now exist that allow fast, accurate, and secure analysis and visualization of company data without spreadsheets or programming.

According to Dashboard Insight, the last two decades have seen the field of data visualization explode into dozens, and even hundreds of focus areas.

Dashboards and data discovery tools, scorecard applications, analytics suites, and an assortment of other integrated software tools enable businesses, researchers, and individuals to explore their data in new and increasingly imaginative ways. In fact, there is now such a healthy selection of available solutions that a new hurdle has emerged. The onus rests on companies to properly analyze their unique data analysis needs and to find a solution that fits.

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Big data isn't going away. There will be [40 zettabytes of data in the world by 2020](#), and this is growing exponentially. **Without the appropriate analysis, most of this data will never be used.**

Data visualization empowers organizations to create actionable conclusions from their data, thereby leading to both better and faster decision making. But that doesn't mean that it's easy. As noted, data visualization can also be misleading if it's not completed with properly cleansed data (identifying and addressing any records that may be corrupt or inaccurate)—the visualization itself is only useful if the data is accurate and complete.

All of this often requires the service of a professional data visualization company. While data visualization tools are readily available on the market, it often allows companies to get started but often requires the expertise of a professional services firm to help formulate and deploy a real solution (rather than simply installing a tool).

Professional services firms, like CRGroup, can help companies with their data visualization needs with key insights around business technology (integrations, data warehousing, data cleansing, data transformation, etc.) and the best practices on how businesses and industries can competitively leverage these solutions.

About CRGroup

Since 1989, Corporate Renaissance Group (CRGroup) has been delivering expert consulting services and proven technology systems to help organizations streamline, automate, and extract insight from data for improved decision making and business performance. We can design and take your data analysis and business intelligence initiatives from concept to reality. We use our expertise with top data visualization and business intelligence software solutions to deliver complete end-to-end solutions that rapidly and cost-effectively meet even the most unique data warehousing, analysis and reporting requirements.

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crg@crgroup.com

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Not sure which solution is right for you? We can help!

Contact us to get started or to book your free data visualization assessment.
1-800-576-6215 sales@crgroup.com

Sources

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