Reveal

Data Storytelling

How Visualizations Help Reveal the Story in Data

Introduction

Our world is awash with data. Over the last two years alone 90 percent of the data in the world was generated (Forbes, May 28, 2018) Every day, 2.5 quintillion bytes of data are created. Yet as noted in the MIT Technology Review, only 0.5 percent of all data is ever analyzed.

Why? Because on its own, data may not reveal much, and won't drive consensus, reveal problems, or inspire solutions.

For the most part, data by itself often means rows of unintelligible numbers and confusing jargon that can feel intimidating.

But when data is used to help tell a story, when visualizations (charts, graphs, and others) are used in a narrative sequence, data can be a powerful tool. Because stories help to answer the "why" by providing context.

This white paper looks at how:

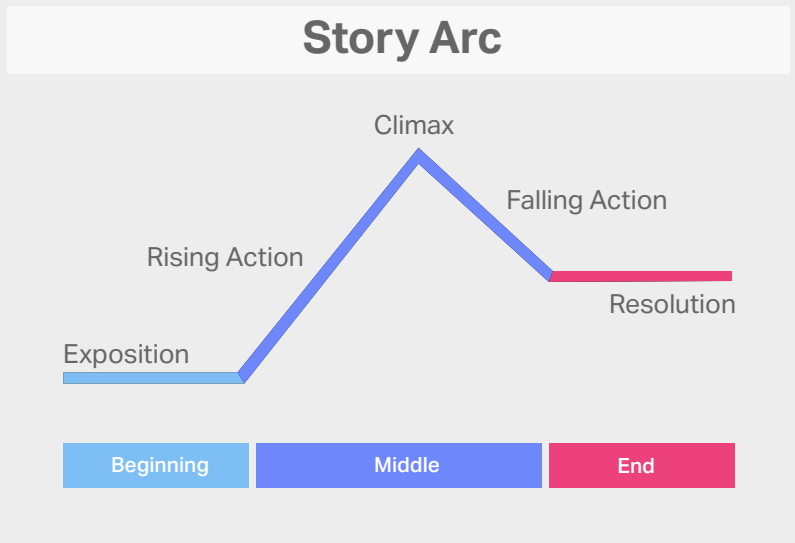
- Data storytelling builds on key concepts of storytelling
- Data storytelling makes data relevant and powerful in business
- New self-serve BI tools are making it easier than ever for more people in businesses – sales, marketing, product mgrs. – to use data strategically to solve problems and uncover opportunities.

> "No one ever made a decision because of a number. **They need a story.**
>
> "How Two Trailblazing Psychologists Turned the World of Decision Science Upside Down," Vanity Fair, December 2016

Quick primer – What is storytelling?

Storytelling has been with us a long time. And for many good reasons, but most important is that the basic structure works to entertain, educate, or convince. Great novels, popular movies, generational-changing presidential speeches—all have succeeded because of the power of story.

Good stories follow a simple structure, called the story arc, as shown in the figure below.



We are introduced to a character whose life is on a certain trajectory (beginning). Something changes—new challenge, desire, emotional moment—that confronts the character (rising action). How the character responds creates tension and reaches a climax or major decision point. The landscape changes as a result of the decision (falling action) and the drama plays out until a resolution to the drama is achieved (for better or worse).

Why is story effective?

Research shows that stories are effective because they are memorable, persuasive and engaging.

1. **Memorable**: A study by Stanford professor Chip Heath (Made to Stick author) found 63% could remember stories, but only 5% could remember a single statistic. While 2.5 statistics were used on average in the exercise and only 10% of the participants incorporated a story, the stories are what caught people's attention.

2. **Persuasive**: In another study, researchers tested two variations of a brochure for the Save the Children charity organization. The story-based version outperformed the infographic version by $2.38 to $1.14 in terms of per participant donations. Various statistics on the plight of African children were far less persuasive than the story of Rokia, a seven-year-old from Mali, Africa.

3. **Engaging**: Researchers also discovered people enter into a trance-like state, where they drop their intellectual guard and are less critical and skeptical. Rather than nitpicking over the details, the audience wants to see where the story leads them. As mathematician John Allen Paulos observed, "In listening to stories we tend to suspend disbelief in order to be entertained, whereas in evaluating statistics we generally have an opposite inclination to suspend belief in order not to be beguiled."

What is data storytelling? Why is it valuable in business?

Data storytelling is the use of storytelling techniques to interpret and understand the meaning behind data.

It's invaluable in business because it allows us to see trends, or understand problems, or interpret how our website or email marketing is performing. Data by itself can't provide that meaning because it must be understood in the context of the situation. Using elements of story helps to understand the context.

For example, here's a set of data, essentially rows of a spreadsheet. Not only is this difficult to read, it doesn't provide any context or meaning to what we are seeing. We might consider this the beginning of the story arc. It simply describes what is, but in a difficult-to-understand format.

What's the story?

Even simple datasets are hard to read.

2018 Sales (000s of USD)

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Domestic	2,590	3,205	3,520	3,100	3,780	3,580	3,990	3,715	3,725	3,245	3,990	4,590	43,030
International	780	810	920	820	875	920	815	255	825	780	830	725	9,355
Total	3,370	4,015	4,440	3,920	4,655	4,500	4,805	3,970	4,550	4,025	4,820	5,315	52,385

If we use some simple visualizations, however, we can begin to see outlines of a narrative. At minimum, we can more quickly see what's been occurring with our sales. We might consider this the rising action of the story arc, as the initial situation changes.

2018 Sales (000s of USD)

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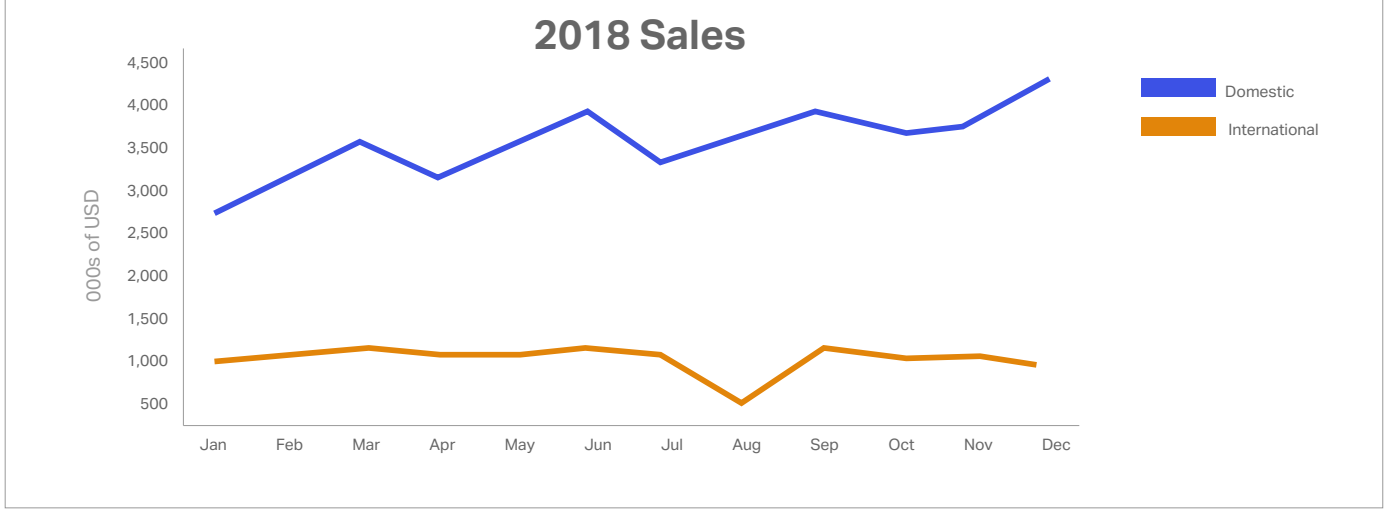
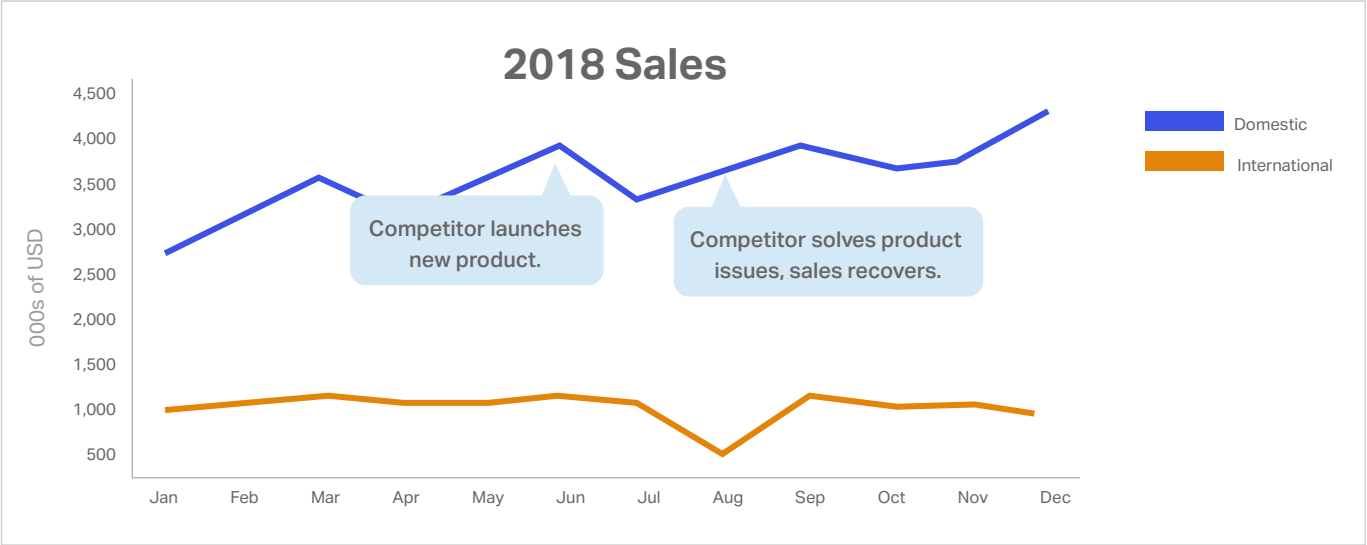


But what's missing is the "why." Why did sales domestically dip in March and July, and why did they recover?

To make the data valuable and insightful, we need to provide some context. What was occurring in the market that might have affected our sales? This might include the climax of the story arc followed by falling action.

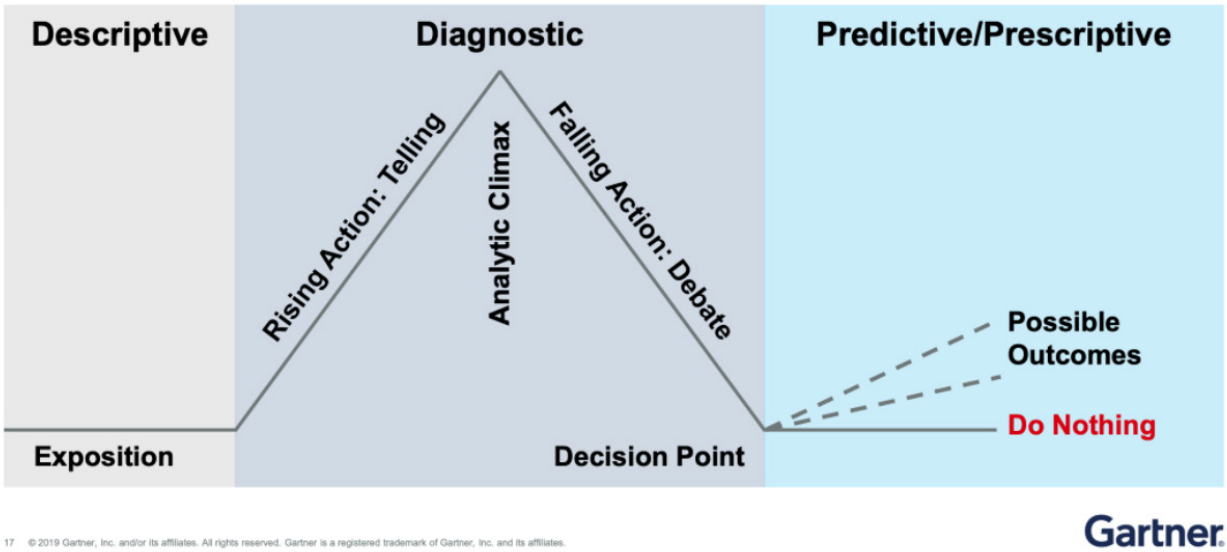


This helps us to tell a story around the data. Our major competitor launches a new product and attracts media coverage. Perhaps this put a question mark in the minds of our customers, and temporarily reduced buying. Or maybe there were other factors that haven't even been considered.

This is where a twist on the traditional storytelling arc comes into play.

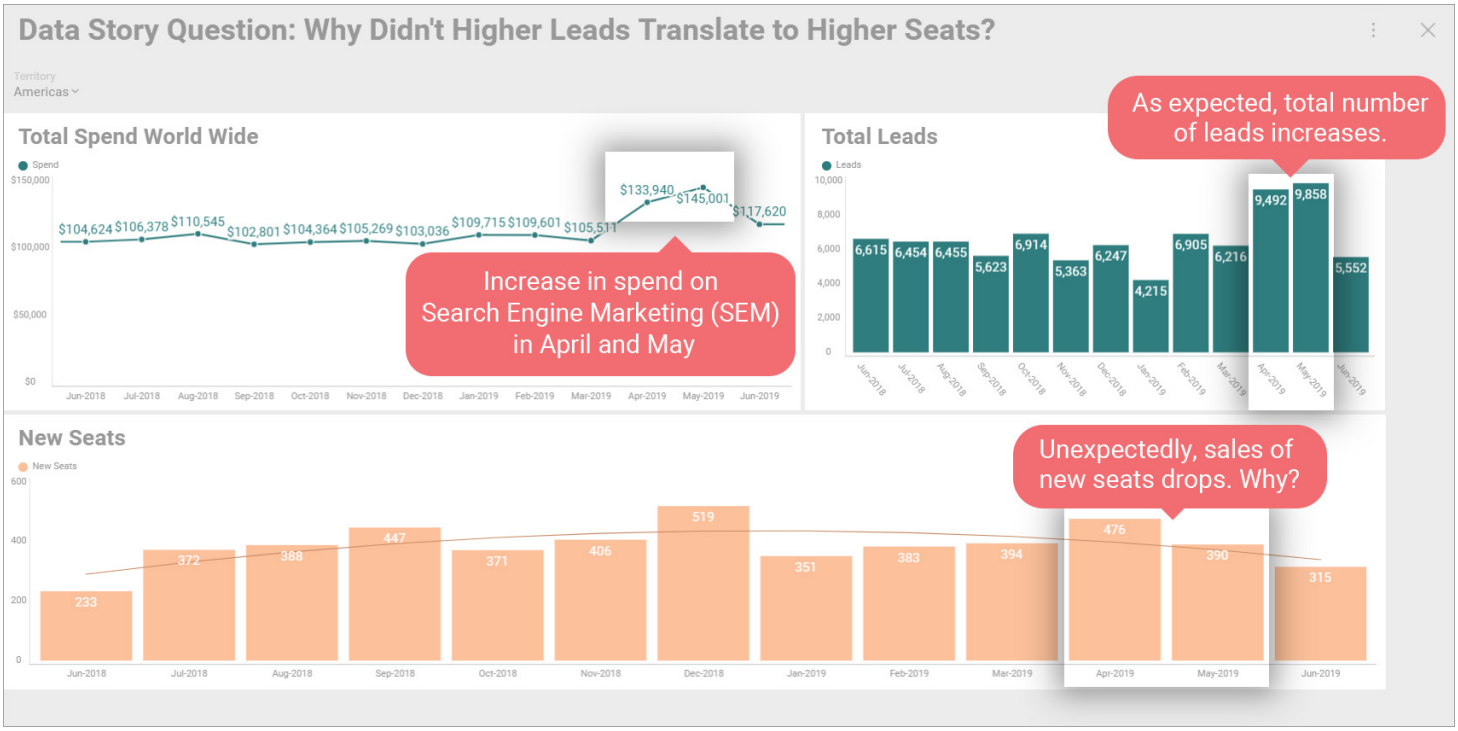
The data storytelling arc

According to Gartner analyst, James Richardson, the traditional story arc needs to be modified when applied to data storytelling. In his model shown below, story follows a similar trajectory but changes in the middle and end stage. Falling action in this model describes "debate." It's an opportunity for a sales team, or manufacturing plant floor managers, or healthcare analysts, to debate the meaning of the interpreted data. And in the final stage, to reach a decision point with multiple outcomes.



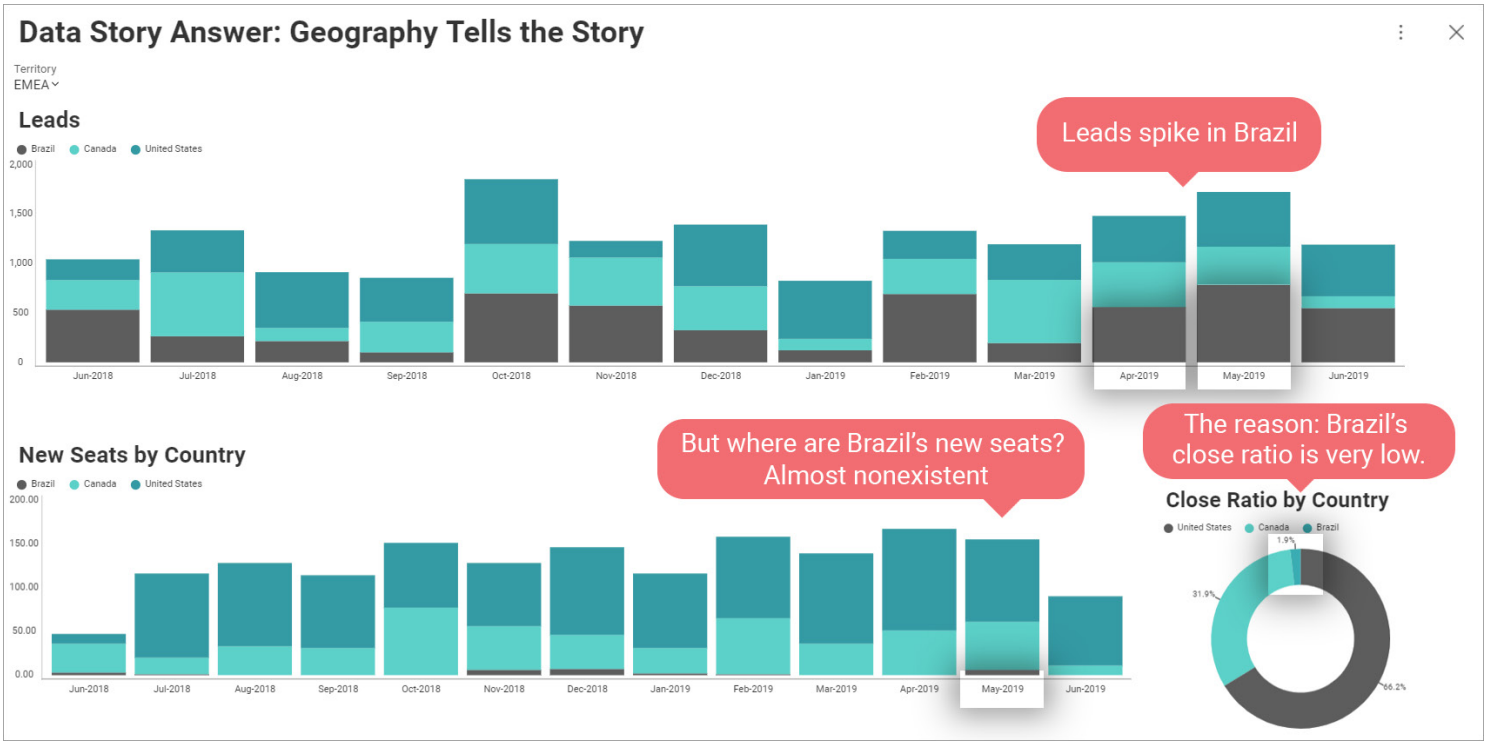
Telling the data story: An example

Let's apply the Gartner model to a real example. The company is a SaaS vendor and is looking to increase its sales of "seats" -- product subscriptions – through Search Engine Marketing (SEM). The company builds a simplified dashboard that shows its total spend on SEM, which includes display ads and other pay-per-click (PPC) advertising. You can see this in the top left quadrant in the dashboard below. The chart on the right shows Total Leads and the lower part of the dashboard – New Seats – is shown in the chart at the bottom.



The dashboard immediately reveals a quandry, a data story question: If total spend was increased substantially in April and May, and Total Leads went up in both months, as expected, then why did new seats just have a short bump in April followed by declining seat sales in May and June?

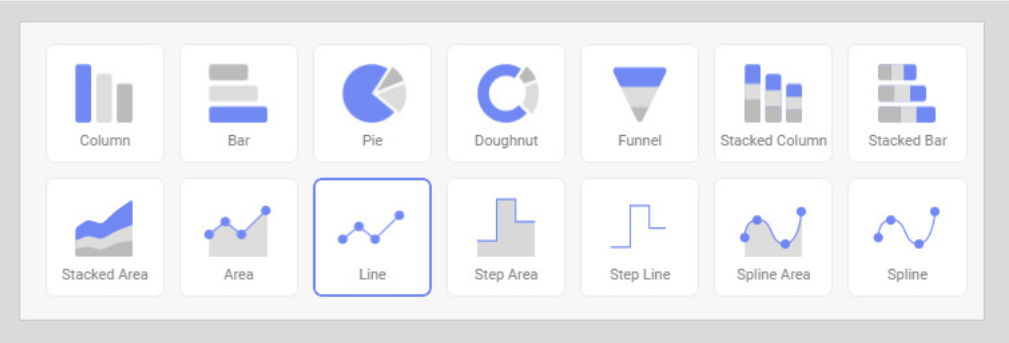
The answer can be found by looking deeper into the data. When we break leads out by geography (see dashboard below) we see that leads spiked in Brazil in April and May. But when we look at new seats in Brazil, they are virtually nonexistent. What happened? If we examine the “close ratio” in each country—the percentage of leads that convert to new seats—we see that Brazil’s ratio is extremely low, especially compared to the US and Canada.



This provides a valuable “data story” that we might have missed without easy-to-visualize data. That even though our leads were showing growth, our sales were decreasing. Only by looking deeper into the data, by regional breakdown, could we learn the true cause of the problem. Which then allowed the company to turn insights into action by choosing to adjust the spend on a regional basis, or to change their model to a longer sales cycle when dealing with other geographic regions.

Key to data storytelling: Simplicity

To see data storytelling spread widely and become part of the non-technical employee's everyday work, the experience must be simple and engaging. It must be easy to add a data source. Easy to drag and drop data fields onto a workspace and see it display in a chart or grid. Then easy to make selections to see different charts—a doughnut, a funnel, a spline. In Reveal, all these options are simple to use and easily accessible.



Self-service analytics—Empowering front-line managers

Self-service analytics tools are expanding quickly and are allowing less data-savvy users to use data storytelling techniques.

Data and analytics leaders know that getting business managers to assimilate and act on data can be hard work, for many reasons. But as shown in this paper, an interesting story will grab anyone's attention. Joining data and stories is therefore a natural step, and more people are taking that step aided by technology, with storytelling part of the core capabilities of modern BI and analytics platforms.

Self-service BI and analytics platforms users now have access to a range of capabilities to help them create compelling data stories. They can draw from an array of data visualization forms, ranging from well-known chart types (bar/column, line/area, pie) to geographic mapping and more varied and sophisticated charts (such as heatmaps and candlestick charts). Arranged into a time or conceptual sequence, these visualizations can help reveal findings, trends, implications or underling patterns. Read Best Techniques for Storytelling with Data for guidance on selecting visualization types.

This flow of findings delivers compelling narratives that can overcome barriers between people and data, engaging the former and delving deeper into the latter. The key aim of storytelling is to encourage and energize critical thinking in exploring data insights for business decisions.

Want to create impactful data stories? Reveal can help.

Reveal is an embedded business intelligence platform that allows users to easily interpret, visualize, and share relevant insights from an organization's data. Reveal is optimized as a developer, cloud and mobile first solution. With it, app developers can embed stunning visualizations and business analytics into their apps in 85% less time than if they built it in-house.

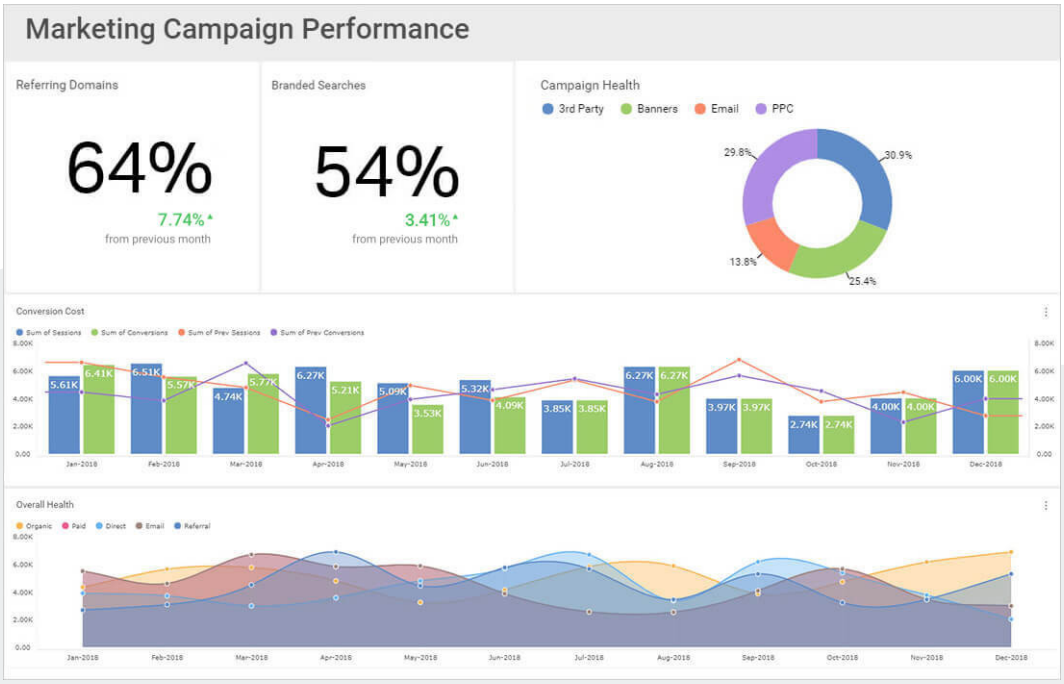
Here are some of Reveal's main benefits:

1. **Simple to Use:** Reveal offers the simplest way to visualize business data. Unlike competitors that require a cumbersome and complex series of steps, Reveal enables users to select a beautiful visualization (chart, pie chart, dashboard), connect to a data source and go.

2. **Delivers a Modern UX:** Drive new revenue and increase customer satisfaction by adding a new, modern UX to apps. Reveal Embed includes engaging, informative and eye-popping visual dashboards that can transform the user experience of an app.

3. **Evolve the App Experience on any Device:** Keep users in an application and continue to evolve an app with a key differentiator like embedded analytics. This adds immediate value to an application, enabling users to make smarter decisions faster.

4. **Create Stickiness:** Software vendors face constant pressure to improve and differentiate their app to reduce churn. In an age of free trials where users often "try before they buy," the apps that succeed will be those that are "stickier" — the ones that give users more value the more they use the app. This stickiness, this value, is the UX of the dashboard experience, plus the ability to add new native mobile device options (iOS, Android) to your branded solutions.



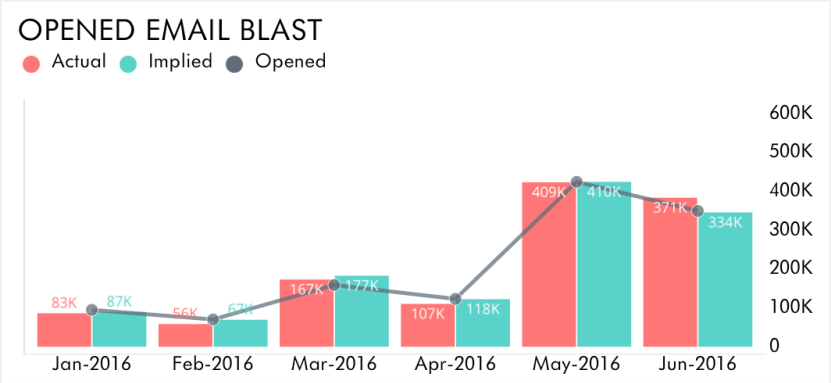
Appendix

Find the right pattern

When analyzing data, searching for patterns or interesting insights is a great starting place for creating the base of your story. The three common patterns conveyed through data are trends, correlations, and outliers.

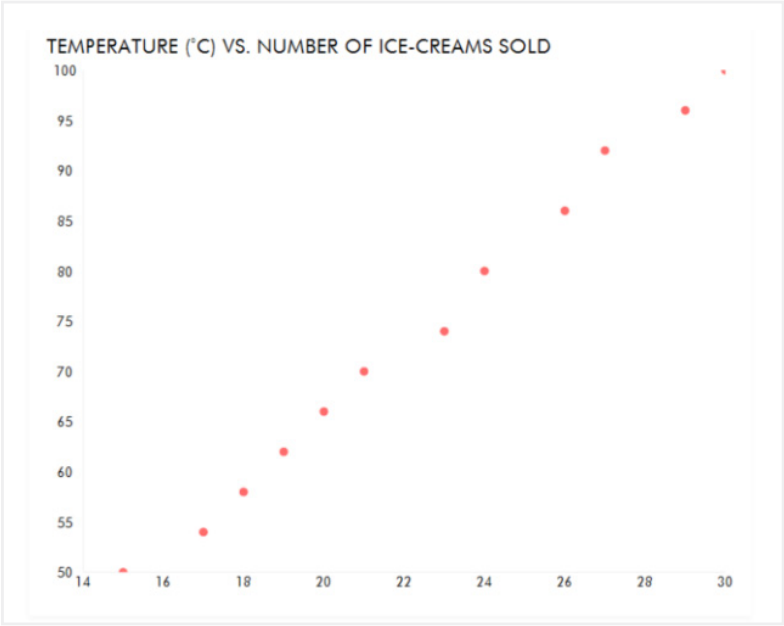
Trends

You can use data to express a variety of different things, but one of (if not the) most common theme for data visualizations is displaying trends. Tracking trends over time is a frequent favorite, used for its simplicity and clarity. These are most often displayed in the form of bar, area and line charts.



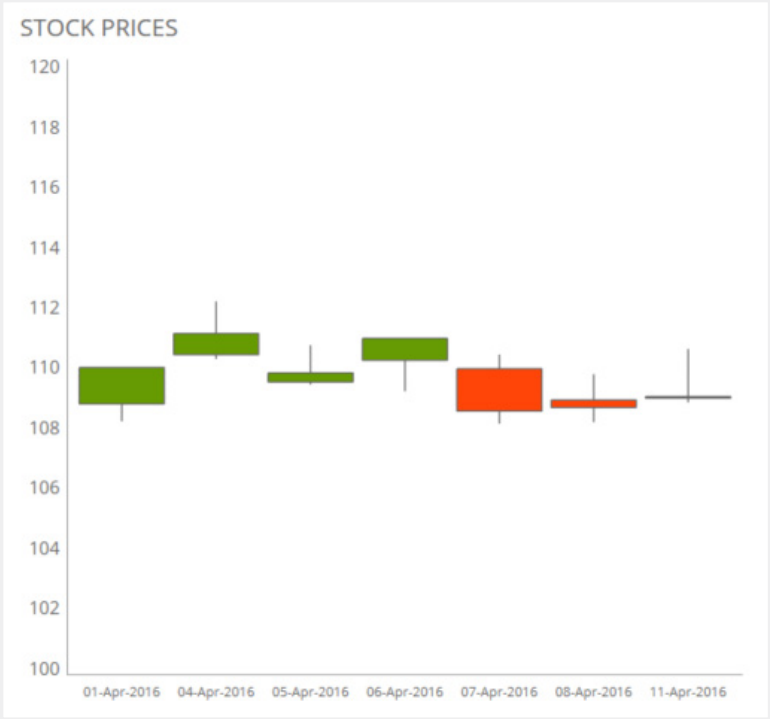
Correlations

The perfect pattern for comparing and contrasting, correlations help put your data into perspective. You may have found an interesting parallel between two data sets, or an alarming difference between two others. There is a certain attraction to seeing two elements juxtaposed, and correlation patterns are extremely popular. By highlighting the two side-by-side, your results become far clearer and more striking.



Outliers

Outliers may seem like a burden when analyzing data and are recognized by some as ‘faulty data’. While this is sometimes the case, they can actually form the starting point for creating your data story. Outliers are defined as data that lies a considerable distance away from the mean or median average, and so are good ways of identifying any dissimilarities or unusual instances in your findings.



Glossary of basic ideas and terms

The following terms will explain the core principles that make up data visualization: its variations, how it’s analyzed and how it’s displayed.

Business Intelligence

Business Intelligence – or BI – is something of an umbrella term. It refers to a variety of software applications that are used to analyze an organization's data. Being an umbrella term, BI encapsulates the processes of data mining, online analytical process, querying and reporting.

BI provides a means of analyzing data without having to wait for IT or statisticians to run their own complex reports, letting anyone back up their business decisions with solid data.

Data types

When we have access to so much data, it can be hard to tell it all apart. Data can be categorized into 'data types', which distinguish different types of data based on their qualities. Some of the most common data types5 include:
It's worth noting that certain data types match well with certain 'data relationships', which we'll touch on below.

- **Quantitative**. Quantitative data can be counted or measured, and all values are numerical.
- **Discrete**. Discrete data is also numerical, but is confined to a finite number of possible values.
- **Continuous**. Continuous data is measured and has a value within a range.
- **Categorical**. Categorical data can be sorted according to a specific group or category.

Visualizations

As mentioned above, the human brain is particularly visual, and so the ability to turn information into aesthetically pleasing images is a valuable asset. At its core, that is what's meant by data visualization: "an effort to help people understand the significance of data by placing it in a visual context"[6]

Data relationships

Understanding what type of data you have at your disposal is great, but even more important is understanding the best way to visualize it. Choosing the correct data relationship to marry with your data can take your presentation from interesting to influential.

Nominal comparison A simple comparison of the quantitative value of subcategories, such as the humble bar chart.

Deviation An examination of how data points relate to one another, and in particular how far a given data point differs from the mean. E.g. Bell Curve graph

Distribution The spread of data, often around a central value.

Correlation Data with two or more variables may demonstrate either a positive or negative correlation towards each other. This is often showcased with a 'trend line'.

Part-To-Whole Relationships Showing a subset of data compared to the larger whole. This is often found as a percentage and commonly displayed as a pie chart.

Dashboard

Just like the dashboard in a vehicle, the purpose of a data dashboard is to organize and present information in a way that's easy to read and understand. In IT, a dashboard is a user interface and is much more interactive than the dashboard of a car, for example. In Business Intelligence, a dashboard consolidates numbers and metrics on a single screen, displaying the current status of key performance indications (KPIs) for a business.

About Infragistics

Infragistics has been in business for 30 years as a developer tools company – Reveal is a combination of their decades-long expertise in Data Visualization, Data Access & User Experience to bring to market a complete self-service solution that gives everyone in an organization the power to use data to make smarter business decisions.

Now that you've read our whitepaper, try Reveal today!

Contact us to learn more about Reveal and the value it can bring to your organization:

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