Understanding Data Visualization

Linking process, people, and technology to understand and communicate data

Executive summary
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Businesses today are being inundated with data from every direction, but this data has no meaning or value until it is processed, understood, and acted upon. Data visualization technology can simplify and accelerate these tasks. At a time when data discovery, analysis, and presentation capabilities are more vital than ever, businesses should seize the opportunity to not only realize the importance of data visualization but also to develop a strategy around it.
Data visualization simplifies the work of understanding data by playing to the strength of the human mind, which thrives on pattern recognition. Consequently, data visualization has long been used for explanatory purposes. Publications such as The New York Times pioneered the use of data-rich infographics to make an editorial point. Now, however, the proliferation of technology and mobile mediums has enabled these same publications to create leading-edge interactive data visualizations, which empower readers to explore data on their own.

Similarly, companies are finding that data visualization is extremely valuable to them for exploration in addition to communication. In the oil and gas industry, for example, companies use data visualization to display terminals, inventories, and pipelines on maps, making it easier and more intuitive to understand the downstream supply chain and spot potential bottlenecks or outages before they occur.

It is therefore in the best interest of businesses to adopt data visualization as a new common language for data exploration and communication. To harness the full power of data visualization, though, companies need to clarify their reasons for using it. Do they intend to explore data, or to explain it? Without clarity, companies risk losing their competitive edge by using the wrong people, processes, and tools for the job.

With the growing recognition of data visualization as a powerful tool for both communicating and exploring data, new opportunities in the marketplace have opened up. While often expensive and time-consuming to implement, business intelligence (BI) tools have long been and continue to be quite useful for generating static reports of relatively stale data. Now, though, lighter-weight data visualization tools with user-friendly interfaces and sophisticated presentation capabilities are coming into play. Because these tools are more interactive, real-time, and low-cost, they are proving to be attractive alternatives to traditional BI solutions. Still, depending on the business need, other solutions may be more appropriate, such as advanced analytics software for statistical analysis or data visualization libraries for custom work.

These many data visualization tools are quite promising and powerful, but they are only the tip of the iceberg. Data visualizations are only as good as the data behind them, and though these tools are increasingly valuable for integrating disparate data sources, they are by no means the solution to insufficient or poorly managed data. Therefore, it is important that companies follow a consistent data management process that begins far in advance of implementing data visualization.

While data visualization is a viable and valuable opportunity for companies, they must recognize that it is a multi-disciplinary field that involves a variety of sub-processes that must be well-integrated to succeed. The first step is to identify the business question and determine the goal of the data visualization—to learn, or to explain what has been learned. The relevant data must then be gathered, formatted, filtered, and analyzed. When the analysis is complete, the final step is to decide how to represent the data visually so that the viewer grasps it easily and intuitively. Clearly, a company’s dedication to “designing for analytics,” one of the seven trends in the 2013 Accenture Technology Vision, plays a huge role in the ultimate success of data visualization.

It is equally important to find the right people for the job. Successful data visualization draws on multiple disciplines: computer science, statistics and data mining, graphic design, and human-computer interaction. A crucial question for businesses is whether to hire these specialists full-time or engage them as needed. Data visualization skills are both highly technical and in great demand, leading to shortages of experts. Until the software industry develops technology to make data visualization more accessible to non-specialists—and that day may not be far off—companies will have to contend with the skills shortage.

Accordingly, it’s crucial for companies to decide whether data visualization is a core business activity for them. If advanced data analysis and visualization are part of a company’s core focus, then they should create teams of specialists and consider investing to develop some of the required skill sets internally. Companies whose core processes do not include data visualization need to consider how advanced they want their data visualizations to be. Simple day-to-day reports can be left to employees trained in basic data visualization techniques. More advanced data visualizations will likely require outside help.

As technology improves and data visualizations become more real-time, interactive, and accessible, people will be able to more easily explore data on the fly, and decision-makers will be able to react better and faster. With the power to turn raw data into meaning and meaning into understanding, data visualization can enable businesses to strategically learn from their data and act upon it. But companies need to be clear about their reasons for using data visualization and assemble the appropriate processes, people, and tools for the job.
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