

# BIG DATA

## THE WHATS, WHYS, AND HOWS OF DATA ANALYTICS

2016

### BIG DATA ANALYTICS IS MAINSTREAM. ARE YOU THERE YET?

Since the dawn of the computer age, people have speculated about how humans would harness technology in the future. Ten years ago, “big data analytics” was one of these technological predictions: that companies would use data to learn more about their customers, to make better business decisions, and even to predict the future. For businesses, that future is already here - and has been for some time.

### WHAT IS BIG DATA?

At one of the very early “data mining” conferences in the mid-1990s organized by the Association for Computing Machinery, much of the discussion revolved around learning interesting patterns from data. That early focus on serendipitous, yet useful, discovery is nicely captured by what is now a classic example - the “diapers and beer” story. A company reportedly discovered that on Friday evenings, shoppers who bought diapers also purchased beer. A creative manager might use this discovery to tailor intelligent promotions and even perhaps convert more “diapers people” into “diapers and beer” people.

Fast forward about fifteen years, and analytics is changing the “HiPPO principle.” No, not the African herbivorous mammal that is famously territorial and steamrolls tourists who get too close to its habitat. “HiPPO” is a term coined by Microsoft researcher Ron Kohavi that stands for “the

Highest Paid Person’s Opinion,” and another type of steamrolling that can happen when someone at the top of an organization has an idea. To illustrate how analytics challenged the HiPPO principle, consider online retail. Online experimentation platforms let companies do what is called rapid “A/B testing”, where one random group of users might see a certain type of product recommendation, while another random group at the exact same time would see something different. Hundreds of millions of users in real-time, perhaps in as short a time as a few hours, can help determine if a manager’s hunch is indeed worth exploring, or if it’s just a HiPPO. Firms were put on notice when such online experimentation platforms evolved. Join in – or risk feeding the HiPPOs.

As it turns out, the HiPPOs themselves, often people who have risen to the top for very good reason, have been the ones who have benefited the most from such a mindset change. Giving such transformational leaders the power to experiment in real time, with data-driven validation, can accelerate an organization’s innovation in a manner unseen previously.

This profound shift in mindset – from expecting analytics to offer serendipitous discoveries to thinking of analytics as an organizational mindset – shows how far the field has come over the years. Today we recognize analytics not as techniques, but as a mindset, a way of thinking. Former Apple CEO Steve Jobs famously said that everyone should know how to code because it teaches you how to think. The same is true of analytics. Businesses can think, and analytics is making it possible.

**TAKEAWAY FOR MANAGERS:** Move from a HiPPO to an organizational mindset that embraces analytics and experimentation. Take small steps. Start with a simple decision and ask how it would have been made from a HiPPO vs. Analytics perspective. For each decision, identify all the data sources your organization/group can bring to bear. How is big data changing the way businesses operate?

## HOW IS BIG DATA USEFUL?

Yet another shift over the years has been the focus on “big data”. Most executives don’t need this defined; they know it when they see it. Yet, the formal definition of what makes data “big” is useful, if only to bring to the forefront some possibilities and challenges. Today, this focuses on the four Vs – volume, variety, velocity, veracity. While volume is self-explanatory, the others are worth pondering a bit.

## VARIETY.

Businesses need to look broadly (i.e. beyond what’s sitting in their massive transactional databases) for data of different types or varieties. Social media data streams combine text, images, videos, emoticons, sarcasm and strange teenage languages. Trends can be spotted real time, without commissioning expensive surveys (the results of which come in sometimes after the person commissioning them has long gone). Help desk conversations are audio files, where inflections in a customer’s voice might suggest more than can be learned by mining the call transcript. Interesting possibilities – and challenges.

## VELOCITY.

The speed at which data “hits you” has changed significantly, with constant streaming bits. Not all of it needs to be acted on, but some might need immediate action. A pattern of credit card transactions in the last minute across hundreds of stores might be so unusual that it needs to be stopped before it can trigger a tsunami of fake charges. Fear need not be the only motivator here (though it often is). Web logs in the last few seconds might suggest that a new article published online in the New York Times is being read by chocolate lovers. As precious seconds tick by, thousands of such readers flock to read an article that has a finite shelf life. In an hour, it might be too late for Godiva to realize this might have been a great time to show that ad for any new chocolate product worth promoting.

## VERACITY.

Not everything that hits you at this velocity is correct. Sometimes the data was corrupted by random noise, sometimes it was manipulated. Consider online reviews: While tremendously useful, the issue of fake reviews has come up many times. A big data world is messy. But for businesses that embrace it, this world offers opportunities and new ways of doing business. No writer of a big data article passes on the opportunity to introduce a new “V” to the big data dialog.

## VISION.

Vision is the ability to see things. The grand possibility, often associated with visionaries, is seeing things that others may not see. A much less lofty goal is seeing things that everyone should see once the excuse of not having the data is taken away. Big data often provides such vision. A heat map of a retail store can show where customers tend to stop and where they don't. A school's student responses to specific questions in a standardized test might show systematic deficiencies or strengths. Data from monitoring devices might indicate severe drowsiness or a likely heart attack. Data from cars or cell phones can today show maps of streets highlighting specific regions where bumps are encountered. With such readily available data, what's the excuse for not responding to make businesses and organizations better? Our networked society is creating a proliferation of new types of big data, making it easy to see things that were once invisible.

**TAKEAWAY FOR MANAGERS:** Bring your best minds and use the 5 Vs to critically examine your different data sources. In this process, identify challenges you have to solve or be aware of, and identify the new ideas that come from taking this perspective.

## WHY ARE COMPANIES USING BIG DATA ANALYTICS – AND WHY SHOULD YOU?

Why are firms using big data analytics? There are three broad reasons – value, norms and culture. An immediate reason for analytics is that executives see value, either in terms of increasing revenues/opportunities or reducing costs/risks. The last two decades have shown that there is an abundance of low hanging fruit - and some fruit at the very top promising perennial youth. Companies have cleverly used analytics to target mailings, thereby avoiding sending grandma glossy video game fliers. Trading desks have squeezed data to reveal niche trading opportunities. Loan approvals are algorithmically generated, bringing firms new and reliable customers while minimizing bad calls. Online product recommendations have generated billions in sales for retailers. Today we see such examples in every sector in the world economy. A second reason is that analytics is very much a part of the norm in many industries. Rather than asking “why?” firms are likely to be asked “why not?” when faced with the prospect of bringing data and analytics to bear when there are important decisions to be made. For many firms this is an important consideration as well. A third reason why firms are using analytics today is culture.

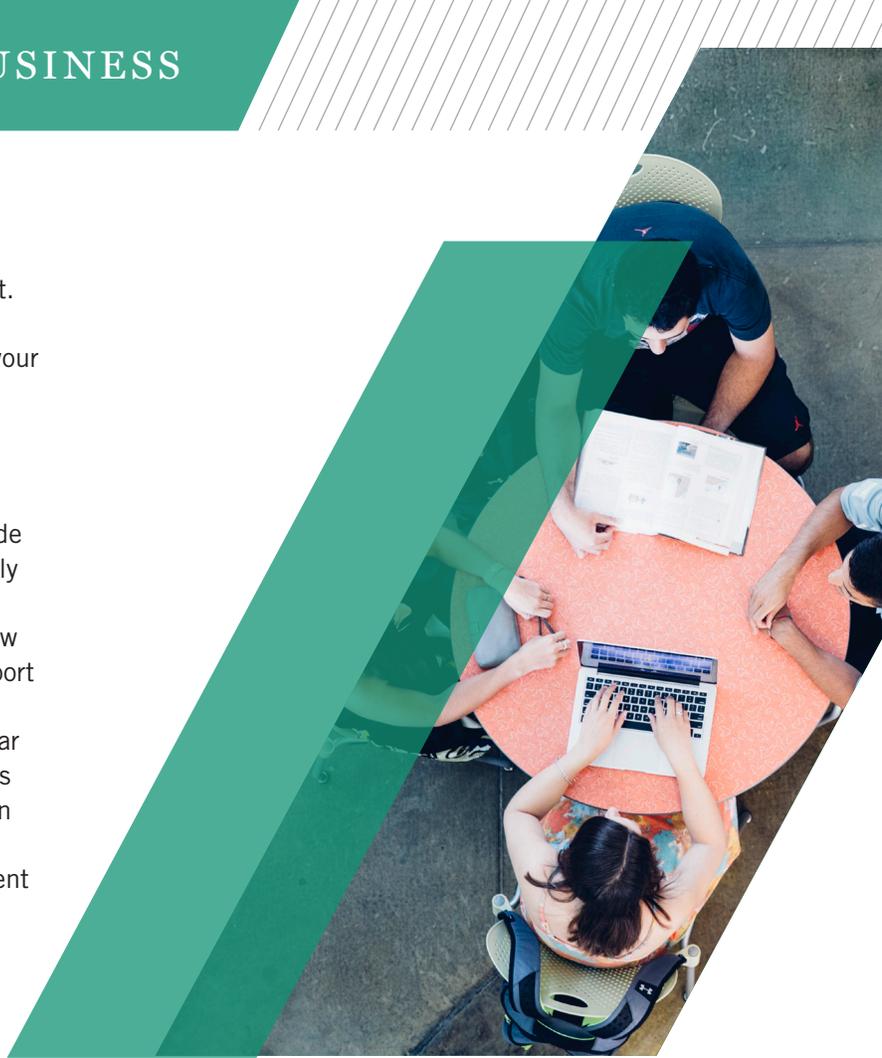
Data-driven projects are not justified solely in terms of ROI any more. It's understood to, quite simply, be the right way to do things. The new generation of students coming out of business schools and into firms are bringing this mindset with them. One cohort at a time, they are changing the way business is conducted. Firms that have this culture are more likely to be the ones these bright minds will gravitate to. The intangible benefits from that can even go beyond what analytics can directly do for firms. For those arriving somewhat late to the movement the good news is that others have made the mistakes. Yet, there are a dizzying array of choices in terms of development tools, complete end to end solutions, niche products and services. While you can get up and running quickly today with many of these solutions, the analytics culture and mindset cannot be bought off the shelf. These take time to develop and deserve the kind of investment in people that needs long term vision. Finding and maintaining the right people to guide and drive these should be a CEO's priority.



**TAKEAWAY FOR MANAGERS:** Before getting caught up in execution, identify the higher reasons driving the project. Is it value, norms, culture or a combination? Build, experiment, evaluate, iterate, deploy and then monitor your models.

## IS DATA ANALYTICS ALWAYS THE ANSWER?

On a final note, perhaps it's worth revisiting a claim made here. Analytics is *a* right way to do things, not necessarily *the* right way. History is full of people, who with their creative ideas, designed transformative products and new ways to do things. There may have been no data to support any of these, nor would it have been easy to get data by experimenting on hypotheticals. Instead of an electric car that can go forever on a charge, how about one that does zero to 60 in a whiff and requires a mortgage rather than a typical car payment to buy? Or a music player with no buttons on it? Sometimes you have to make that judgment call to go with the person, or the idea. That's a story for another day.



**ABOUT THE AUTHOR** Balaji Padmanabhan is the Anderson Professor of Global Management and the chair of the Information Systems Decision Sciences Department at the USF Muma College of Business. Padmanabhan's research addresses data analytics for business applications, algorithms for online news recommender systems, management of data analytics in firms, fraud detection in healthcare, analytics in examining service quality and customer churn, behavioral profiling, and pattern discovery. His work has been published in both computer science and information systems journals and conferences including Management Science, Information Systems Research, MIS Quarterly, and INFORMS Journal on Computing. He also works with several firms on technical, strategic and educational issues related to business and data analytics.

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