

Big Data

Big Innovation

Enabling Competitive Differentiation
through Business Analytics

Evan Stubbs

WILEY



From *Big Data, Big Innovation*. Full book available for purchase [here](#).

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Preface

Writing is an interesting pursuit; where you start is rarely where you end up. This is my third book and while not originally intended to be a trilogy, things seemed to have panned out that way.

My first book, *The Value of Business Analytics*, was written for the “doers,” the people responsible for making things happen. It tried to answer the fundamental question people kept asking me: “Why don’t people *get* this?”

My second book, *Delivering Business Analytics*, was written for the “designers,” the people responsible for working out how things should happen. It opened the kimono, provided solutions to 24 common organizational problems, and laid the framework to identify and replicate best practices. It tried to answer the next question people kept asking me: “I know what I need to do, but *how* do I do it?”

This book is written for the “decision makers” and aims to answer the final question: “How do I innovate?”

There are countless models out there. Many are useful, including the ones presented in this book. Most try to make everyone follow the same approach. However, business analytics works best when it’s unique to the organization that leverages it. Differentiation means being different, something that’s all too often overlooked. Rather than just trying to copy, I hope you use the models in this book to create your own source of innovation.

I hope you find as much enjoyment reading this book as I had writing it.

Things move quickly. There’s always more case studies, more disruption, and more examples of how business analytics is fueling innovation. For the latest, keep the conversation going at <http://evanstubbs.com/go/blog>.

HOW TO READ THIS BOOK

This book introduces eight models:

1. The **Cultural Imperative**: Covered in Chapter 3, this outlines the five perspectives that support a high-functioning culture.
2. The **Intelligent Enterprise**: Covered in Chapter 4, this explains how organizations build the capability they need to innovate.
3. The **Value of Business Analytics**: Covered in Chapter 6, this explains the value that business analytics creates.
4. The **Wheel of Value**: Covered in Chapter 6, this explains how to get organizations to create value from big data.
5. The **Path to Profitability**: Covered in Chapter 7, this explains how to blend data science with value creation.
6. The **SMART Model**: Covered in Chapter 7, this explains how to hire and develop the right people.
7. The **Value Architect**: Covered in Chapter 7, this explains how to make sure data scientists create value.
8. The **Innovation Engine**: Covered in Chapter 8, this explains how to support innovation through dynamic value.

Everything else in this book outlines, justifies, and explains the steps necessary to make innovation from big data real. Chapter 8 is written for leaders interested in enabling ability and innovation and is arguably the most important chapter to read.

Due to the nature of the subject matter, this book covers a great deal of ground. To keep the content digestible, much of the detail has been summarized; for those interested in more, I'd strongly recommend reading my prior books, *The Value of Business Analytics* and *Delivering Business Analytics*. Where relevant, specific references are provided within the text. Endnotes to further reading are also provided throughout. Rather than a definitive list of reading material, readers should view these as a launching pad from which they can further explore whatever they're interested in.

This book is divided into four parts. The first highlights a number of current and emerging trends that will continue to dramatically change the face of business. It's true that things always change; in the

famous words of Benjamin Franklin (among others), “In this world nothing can be said to be certain, except death and taxes.” It’s also true, however, that we become so accustomed to change that we run the risk of underestimating the enormous disruption caused by continuous gradual change. If big data is the question, business analytics is the solution. Unfortunately for some, the answer it implies will eventually see entire industries disrupted.

The second part provides a framework through which leaders can understand the challenges they’re likely to face in changing their organization’s culture. It outlines the different perspectives organizations exhibit in moving from unstructured chaos to becoming an intelligent enterprise.

The third part focuses on how to leverage big data to support innovation. This isn’t easy. Innovation is amorphous. Business analytics is complex. Big data is daunting. Together, they can seem insurmountable. Within this part, we review the fundamentals behind success. It spans culture, human capital, organizational structure, technology design, and operating models.

Finally, the fourth part links them all into an integrated operating model that covers ideation, innovation, and commercialization; it gives a starting framework to develop a plan. It highlights the major considerations that need to be made and provides some recommendations to ensure that you “stay the course.”

As with my other books, this one relies heavily on practical examples throughout. Theory is good but where practice and theory contradict, practice grabs theory by the ears and smashes its head into the canvas. While anyone interested in the topic will hopefully find value in the entire book, readers interested in specific topics will benefit from going to specific sections.

Readers interested in understanding the broader impacts of big data along with how organizations tend to cope with disruption are encouraged to read Parts One and Two.

Readers responsible for restructuring organizations to take advantage of business analytics along with hiring and developing the right people are encouraged to read Parts Two and Three.

Finally, readers interested in integrating these building blocks into an operating model that supports innovation will find Part Four especially valuable.

CORE CONCEPTS

This section presents the core vocabulary for everything discussed in this book. It is provided to ensure consistency with my prior two books as well as to provide a quick primer to newcomers. Readers comfortable with the field are encouraged to skip this section.

This book refers repeatedly to a variety of concepts. While the terms and concepts defined in this chapter serve as a useful taxonomy, they should not be read as a comprehensive list of strict definitions. Depending on context and industry, they may go by other names. One of the challenges of a relatively young discipline such as business analytics is that while there's tremendous potential for innovation, it has yet to develop a standard vocabulary.

Their intent is simply to provide consistency. Terms vary from person to person and while readers may not always agree with the semantics presented here given their own background and context, it's essential that they understand what is meant within this book by a particular word. Key terms are italicized to try to aid readability.

Business analytics is the use of data-driven insight to generate value. It does so by requiring business relevancy, the use of actionable insight, and performance measurement and value measurement.

This can be contrasted against *analytics*, the process of generating insight from data. Analytics without business analytics creates no return—it simply answers questions. Within this book, analytics represents a wide spectrum that covers all forms of data-driven insight, including:

- Data manipulation
- Reporting and business intelligence
- Advanced analytics (including data mining, optimization, and forecasting)

Broadly speaking, analytics divides relatively neatly into techniques that help understand *what happened* and those that help understand:

- What will happen
- Why it happened
- What is the best one could possibly do

Forms of analytics that help provide this greater level of insight are often referred to as *advanced analytics*.

The final output of business analytics is *value* of some form, either *internal* or *external*. Additionally, this book introduces the concept of *dynamic value*, the potential of multiple competing points of view to fuel innovation. Internal value is value as seen from the perspective of a team within the organization. Among other things, returns are usually associated with cost reductions, resource efficiencies, or other internally related financial aspects. External value is value as seen from outside the organization. Returns are usually associated with revenue growth, positive outcomes, or other market- and client-related measures.

This value is created through leveraging *people*, *process*, *data*, and *technology*. Encompassing all of these is *culture*, the shared values and priorities of an organization. *People* are the individuals and their skills involved in applying business analytics. *Processes* are a series of *activities* linked to achieve an outcome and can be either *strongly defined* or *weakly defined*. A strongly defined process has a series of specific steps that is repeatable and can be automated. A weakly defined process, by contrast, is undefined and relies on the ingenuity and skill of the person executing the process to complete it successfully.

Data are quantifiable measures stored and available for analysis. They often include transactional records, customer records, and free-text information such as case notes or reports. *Assets* are produced as an intermediary step to achieving value. Assets are a general class of items that can be defined, are measurable, and have implicit tangible or intangible value. Among other things, they include documented processes, reports, models, and datamarts. Critically, they are only an asset within this book if they can be automated and can be repeatedly used by individuals other than those who created it.

Assets are developed through having a team apply various *competencies*. A competency is a particular set of skills that can be applied to solve a variety of different business problems. Examples include the ability to develop predictive models, the ability to create insightful reports, and the ability to operationalize insight through effective use of technology.

Competencies are applied using various *tools* (often referred to as *technology*) to generate new assets. Often, tools are consolidated into

a common *analytical platform*, a technology environment that ranges from being spread across multiple desktop PCs right through to a truly enterprise platform.

Analytical platforms, when properly implemented, make a distinction between a *discovery environment* and an *operational environment*. The role of the discovery environment is to generate insight. The role of the operational environment, by contrast, is to allow this insight to be applied automatically with strict requirements around reliability, performance, availability, and scalability.

The core concepts of people, process, data, technology, and culture feature heavily in this book; while they are a heavily used and abused framework, they represent the core of systems design. Business analytics is primarily about facilitating change; business analytics is nothing without driving towards better outcomes. And, when it comes to driving change, every roadmap involves having an impact across these four dimensions. While this book isn't explicitly written to fit with this framework, it relies heavily on it.

Readers interested in knowing more are heavily encouraged to read *The Value of Business Analytics* and *Delivering Business Analytics*.



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CHAPTER 1

Lead or Get Out of the Way

The greatest leaders are as much a product of their time as they are a reflection of their skill. Without Hitler, what would we remember of Churchill? Without Xerxes, the legend of the 300 Spartans led by Leonidas would never have happened. Without the right context, even those with the greatest potential remain part of the peanut gallery, shouting epitaphs at those who wear the limelight.

It's in times of crisis that leaders emerge—times of change, times like the present.

THE FUTURE IS NOW

Our world is a fascinating one; we're at an inflection point, one defined by big data and business analytics. What was once science fiction is becoming reality. Let's be frank though—that sounds pretty hackneyed. After all, hasn't *everything* been science fiction once?

This is true. It's also true, however, that science fiction is a deep well to draw from. A well where some ideas are so fantastical that it seems impossible that they'll ever become reality. Asimov, a science fiction writer, for example, wrote speculatively of "psychohistory" in his *Foundation* series.¹ A form of mathematical sociology, scientists would use massive amounts of behavioral information to predict the future.

Through doing so, they were able to foresee the rise and fall of empires thousands of years in advance.

As with all good stories, power always comes with constraints. Accurate predictions were only possible given two conditions. First, the population whose behaviors were to be modeled needed to be sufficiently large—too small, and the predictions would become error-prone. Second, the population being modeled could not know it was being modeled. After all, people might change what they were doing if they knew they were being watched.

It seems fantastical, doesn't it? Still, this is fundamentally the promise of big data. We know more about the world than ever before. Many of those being watched are still unaware of how much things have changed. Between national intelligence, security leaks, and the potential of metadata, most of us are only just realizing *how much* information is out there. And, by analyzing that data, we have the power to predict the future in ways that people still can't believe. Amazon, for example, took out a patent in late 2013 on a process to ship your goods *before* you've ordered them.² Big data offers unparalleled insights and predictive abilities, but only to those who know how to leverage it. For most, getting value from big data is a challenge. However, the reflection of every challenge is opportunity.

Things have changed. And, it's a rare leader who isn't aware he or she needs a plan to realize this opportunity. However, there's a twist. It's not just a good idea. It's not something that's *going* to happen. It's happening *now*.

Catalyzed by books such as *Thinking, Fast and Slow*³ and *Nudge*,⁴ behavioral economics is already blending data with heuristics and psychology to create new models to describe and influence consumer behavior. Recognizing the power of a scientific approach to analyzing information, the U.K. government established a dedicated Behavioral Insights team to take advantage of these ideas. Formed in 2010 and nicknamed the "nudge unit," their goal was to blend quantitative and qualitative techniques to improve policy design and delivery.⁵

The model has proved to be a popular one. In late 2012, the Behavioral Insights Team went global through partnership with the government of New South Wales in Australia. In mid-2013, the Obama administration appointed Yale graduate Maya Shankar to create a similar task force.

Paul Krugman, winner of the Nobel Memorial Prize for Economic Sciences, credits Asimov's vision of a mathematical sociology as inspiring him to enter economics.⁶ This vision of a future shaped by our ability to analyze information is becoming real. And, it's changing the face of medicine, policy, and business. Thanks to constantly increasing analytical horsepower and falling storage costs, the cost of sequencing the genome has dropped from US\$100 million in 2001 to just over US\$8,000 in 2013.⁷ More than just being cheaper, every decline in sequencing costs puts us that much closer to truly personalized medicine.

Even the social web is sparking innovation. Facebook's acquisition of Oculus, Instagram, and Whatsapp wasn't just an attempt to diversify. It was a deliberate attempt to stay engaged across all channels *all the time*. With over a billion people now on Facebook, it's amazing what one can find by scanning personal interactions. Organizations like the United Nations (UN) are tracking disease and unemployment in real time through the large-scale analysis of social media.⁸ The Advanced Computing Center at the University of Vermont is using tens of millions of geolocated tweets in its Hedonometer project to map happiness levels in cities across the United States.⁹

The future is closer than it's ever been. Taking the leap to Asimov's psychohistory isn't as far-fetched as it once might have seemed.

THE SECRET IS LEADERSHIP

It's hard to ignore the potential of big data. Realizing it, though, that's tricky. For every successful project there's a mountain of failed projects. Few in the field have escaped completely unscathed. Anyone who says she has probably hasn't been trying hard enough.

If you're reading this book, it's a fair assumption that you're interested in linking big data to innovation. The cornerstone to this is business analytics. Big data and business analytics go together hand in glove. Without data, there can be no analysis. And without business analytics, big data is just noise. Together, they offer the potential for innovation. Innovation, however, requires change, and change is impossible without leadership.

Without value, all of this is meaningless. Big data has the potential to make things more efficient. It can generate returns. It might simply

answer “the hard questions” that no one knows the solution to. Some of these benefits lead to internal value, such as productivity. Others lead to external value, such as revenue. Still others can lead to total reinvention through dynamic change. Not all of these are complementary. Because of this, harnessing the full potential of big data involves walking the tightrope between the dynamism of change and the stability of continuous improvement.

The secret behind success is leadership. Without it, it’s impossible to balance the opportunity for reinvention with the benefits of continual improvement. A strong leader can do more with access to limited capability than the best team can without a leader.

We don’t yet know the final impact of big data and business analytics. We do know, however, that it *will* change things. Change in itself isn’t new; we already live in a world where change has become so normal that it’s almost invisible. However, for reasons that are covered in the next chapter, big data is “bigger” than this. It’s likely to cause large-scale industrial and social disruption not seen since the industrial revolution, not because of what it is but because of what it represents.

Our future may be one where the economy only requires a tenth of the current workforce. Guided by the use of operational analytics and intelligent algorithms, it might lead to large-scale social unrest due to chronic unemployment and wealth centralization. It may be one where privacy becomes meaningless and the most personal aspects of our lives become public property. It may be one where *precrime*, the ability to predict crimes before they occur, becomes a reality.¹⁰

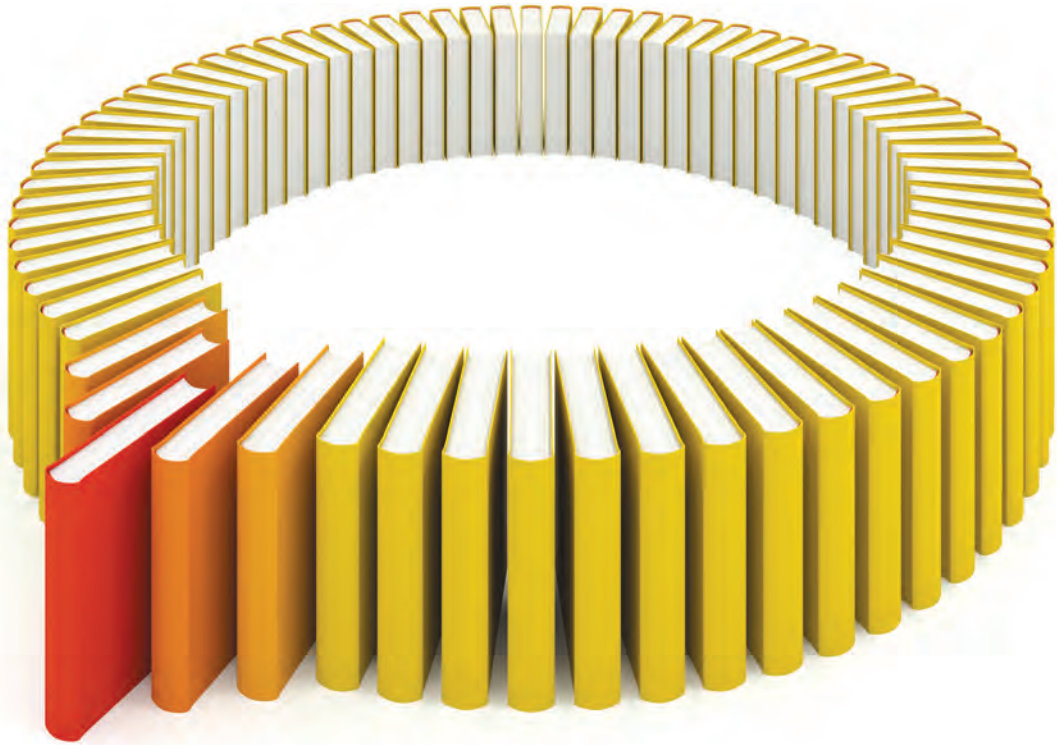
These may seem absurd, but, they’re already happening. Through automating analytics, some organizations are able to achieve orders of magnitude of higher levels of productivity than their peers. The impact this will have on the labor market is unclear. Katz, a Harvard economist, suggests that even though there’s no precedent for a structural change in the demand for jobs, today’s digital technologies present many unanswered questions.¹¹ Historically, technological innovation has almost always led to greater long-run employment. Thanks to the potential of intelligent systems, the biggest question is this: Will the future reflect the past? It’s possible, as far-fetched as it might sound, that the entire middle-skilled strata of the labor market may simply become unemployable.¹²

The division between the “haves” and “have-nots” continues to grow. Sharing selfies and personal details has become the norm on SnapChat, Facebook, and a multitude of other social media sites. Through analyzing interests, social networks, and behavioral patterns, organizations such as Google, LinkedIn, and Facebook have become experts in guessing who you might know. And, some justice departments are already experimenting with predictive analytics to better understand the likelihood of recidivism for offenses such as driving under the influence or domestic violence.

The world doesn’t need custodians to navigate this period of rapid change. It needs leaders—people with the confidence, vision, and ability to redefine their world. Whether it’s for profit or for the common good, the future is business analytics.

NOTES

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