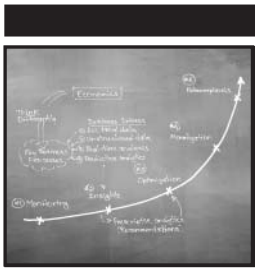
Big Data MBA



Big Data MBA

Driving Business Strategies with Data Science

Bill Schmarzo

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About the Author

Bill Schmarzo is the Chief Technology Officer (CTO) of the Big Data Practice of EMC Global Services. As CTO, Bill is responsible for setting the strategy and defining the big data service offerings and capabilities for EMC Global Services. He also works directly with organizations to help them identify where and how to start their big data journeys. Bill is the author of *Big Data: Understanding How Data Powers Big Business*, writes white papers, is an avid blogger, and is a frequent speaker on the use of big data and data science to power an organization's key business initiatives. He is a University of San Francisco School of Management (SOM) Fellow, where he teaches the "Big Data MBA" course.

Bill has over three decades of experience in data warehousing, business intelligence, and analytics. He authored EMC's Vision Workshop methodology and co-authored with Ralph Kimball a series of articles on analytic applications. Bill has served on The Data Warehouse Institute's faculty as the head of the analytic applications curriculum. Previously, he was the Vice President of Analytics at Yahoo! and oversaw the analytic applications business unit at Business Objects, including the development, marketing, and sales of their industry-defining analytic applications.

Bill holds a master's degree in Business Administration from the University of Iowa and a Bachelor of Science degree in Mathematics, Computer Science, and Business Administration from Coe College. Bill's recent blogs can be found at `http://infocus.emc.com/author/william_schmarzo/`. You can follow Bill on Twitter @schmarzo and LinkedIn at `www.linkedin.com/in/schmarzo`.

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About the Technical Editor

Jeffrey Abbott leads the EMC Global Services marketing practice around big data, helping customers understand how to identify and take advantage of opportunities to leverage data for strategic business initiatives, while driving awareness for a portfolio of services offerings that accelerate customer time-to-value. As a content developer and program lead, Jeff emphasizes clear and concise messaging on persona-based campaigns. Prior to EMC, Jeff helped build and promote a cloud-based ecosystem for CA Technologies that combined an online social community, a cloud development platform, and an e-commerce site for cloud services. Jeff also spent several years within CA's Thought Leadership group, creating and promoting executive-level messaging and social-media programs around major disruptive trends in IT. Jeff has held various other product marketing roles at firms such as EMC, Citrix, and Ardence and spent a decade running client accounts at numerous boutique marketing firms. Jeff studied small business management at the University of Vermont and resides in Sudbury, MA, with his wife, two boys, and dog. Jeff enjoys skiing, backpacking, photography, and classic cars.

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Acknowledgments

Acknowledgments are dangerous. Not dangerous like wrestling an alligator or an unhappy Chicago Cubs fan, but dangerous in the sense that there are so many people to thank. How do I prevent the Acknowledgments section from becoming longer than my book? This book represents the sum of many, many discussions, debates, presentations, engagements, and late night beers and pizza that I have had with so many colleagues and customers. Thanks to everyone who has been on this journey with me.

So realizing that I will miss many folks in this acknowledgment, here I go…

I can't say enough about the contributions of Jeff Abbott. Not only was Jeff my EMC technical editor for this book, but he also has the unrewarding task of editing all of my blogs. Jeff has the patience to put up with my writing style and the smarts to know how to spin my material so that it is understandable and readable. I can't thank Jeff enough for his patience, guidance, and friendship.

Jen Sorenson's role in the book was only supposed to be EMC Public Relations editor, but Jen did so much more. There are many chapters in this book where Jen's suggestions (using the Fairy-Tale Theme Parks example in Chapter 6) made the chapters more interesting. In fact, Chapter 6 is probably my favorite chapter because I was so over my skis on the data science algorithms material. But Jen did a marvelous job of taking a difficult topic (data science algorithms) and making it come to life.

Speaking of data science, Pedro DeSouza and Wei Lin are the two best data scientists I have ever met, and I am even more grateful that I get to call them friends. They have been patient in helping me to learn the world of data science over the past several years, which is reflected in many chapters in the book (most notably Chapters 5 and 6). But more than anything else, they taught me a very

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valuable life lesson: being humble is the best way to learn. I can't even express in words my admiration for them and how they approach their profession.

Joe Dossantos and Josh Siegel may be surprised to find their names in the acknowledgments, but they shouldn't be. Both Joe and Josh have been with me on many steps in this big data journey, and both have contributed tremendously to my understanding of how big data can impact the business world. Their fingerprints are all over this book.

Adaobi Obi Tulton and Chris Haviland are my two Wiley editors, and they are absolutely marvelous! They have gone out of their way to make the editing process as painless as possible, and they understand my voice so well that I accepted over 99 percent of all of their suggestions. Both Adaobi and Chris were my editors on my first book, so I guess they forgot how much of a PITA (pain in the a**) I can be when they agreed to be the editors on my second book. Though I have never met them face-to-face, I feel a strong kinship with both Adaobi and Chris. Thanks for all of your patience and guidance and your wonderful senses of humor!

A very special thank you to Professor Mouwafac Sidaoui, with whom I co-teach the Big Data MBA at the University of San Francisco School of Management (USF SOM). I could not pick a better partner in crime—he is smart, humble, demanding, fun, engaging, worldly, and everything that one could want in a friend. I am a Fellow at the USF SOM because of Mouwafac's efforts, and he has set me up for my next career—teaching.

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Another special thank you to EMC, who supported me as I worked at the leading edge of the business transformational potential of big data. EMC has afforded me the latitude to pursue new ideas, concepts, and offerings and in many situations has allowed me to be the tip of the big data arrow. I could not ask for a better employer and partner.

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My mom and dad both passed away, but I can imagine their look of surprise and pride in the fact that I have written two books and am teaching at the University of San Francisco in my spare time. We will get the chance to talk about that in my next life.

But most important, I want to thank the EMC customers with whom I have had the good fortune to work. Customers are at the frontline of the big data transformation, and where better to be situated to learn about what's working and what's not working then arm-in-arm with EMC's most excellent customers at those frontlines. Truly the best part of my job is the chance to work with our customers. Heck, I'm willing to put up with the airline travel to do that!

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Introduction

I never planned on writing a second book. Heck, I thought writing one book was enough to check this item off my bucket list. But so much has changed since I wrote my first book that I felt compelled to continue to explore this once-in-a-lifetime opportunity for organizations to leverage data and analytics to transform their business models. And I'm not just talking the "make me more money" part of businesses. Big data can drive significant "improve the quality of life" value in areas such as education, poverty, parole rehabilitation, health care, safety, and crime reduction.

My first book targeted the Information Technology (IT) audience. However, I soon realized that the biggest winner in this big data land grab was the business. So this book targets the business audience and is based on a few key premises:

- Organizations do not need a big data strategy as much as they need a business strategy that incorporates big data.
- The days when business leaders could turn analytics over to IT are over; tomorrow's business leaders must embrace analytics as a business discipline in the same vein as accounting, finance, management science, and marketing.
- The key to data monetization and business transformation lies in unleashing the organization's creative thinking; we have got to get the business users to "think like a data scientist."
- Finally, the business potential of big data is only limited by the creative thinking of the business users.

I've also had the opportunity to teach "Big Data MBA" at the University of San Francisco (USF) School of Management since I wrote the first book. I did well enough that USF made me its first School of Management Fellow. What I

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experienced while working with these outstanding and creative students and Professor Mouwafac Sidaoui compelled me to undertake the challenge of writing this second book, targeting those students and tomorrow's business leaders.

One of the topics that I hope jumps out in the book is the power of data science. There have been many books written about data science with the goal of helping people to become data scientists. But I felt that something was missing—that instead of trying to create a world of data scientists, we needed to help tomorrow's business leaders think like data scientists.

So that's the focus of this book—to help tomorrow's business leaders integrate data and analytics into their business models and to lead the cultural transformation by unleashing the organization's creative juices by helping the business to "think like a data scientist."

Overview of the Book and Technology

The days when business stakeholders could relinquish control of data and analytics to IT are over. The business stakeholders must be front and center in championing and monetizing the organization's data collection and analysis efforts. Business leaders need to understand where and how to leverage big data, exploiting the collision of new sources of customer, product, and operational data coupled with data science to optimize key business processes, uncover new monetization opportunities, and create new sources of competitive differentiation. And while it's not realistic to convert your business users into data scientists, it's critical that we teach the business users to *think like data scientists* so they can collaborate with IT and the data scientists on use case identification, requirements definition, business valuation, and ultimately analytics operationalization.

This book provides a business-hardened framework with supporting methodology and hands-on exercises that not only will help business users to identify where and how to leverage big data for business advantage but will also provide guidelines for operationalizing the analytics, setting up the right organizational structure, and driving the analytic insights throughout the organization's user experience to both customers and frontline employees.

How This Book Is Organized

The book is organized into four sections:

- **Part I: Business Potential of Big Data**. Part I includes Chapters 1 through 4 and sets the business-centric foundation for the book. Here is where I introduce the Big Data Business Model Maturity Index and frame the big data discussion around the perspective that "organizations do not

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need a big data strategy as much as they need a business strategy that incorporates big data."

- **Part II: Data Science**. Part II includes Chapters 5 through 7 and covers the principle behind data science. These chapters introduce some data science basics and explore the complementary nature of Business Intelligence and data science and how these two disciplines are both complementary and different in the problems that they address.
- **Part III: Data Science for Business Stakeholders**. Part III includes Chapters 8 through 12 and seeks to teach the business users and business leaders to "think like a data scientist." This part introduces a methodology and several exercises to reinforce the data science thinking and approach. It has a lot of hands-on work.
- **Part IV: Building Cross-Organizational Support**. Part IV includes Chapters 13 through 15 and discusses organizational challenges. This part covers envisioning, which may very well be the most important topic in the book as the business potential of big data is only limited by the creative thinking of the business users.

Here are some more details on each of the chapters in the book:

- **Chapter 1: The Big Data Business Mandate**. This chapter frames the big data discussion on how big data is more about business transformation and the economics of big data than it is about technology.
- **Chapter 2: Big Data Business Model Maturity Index**. This chapter covers the Big Data Business Model Maturity Index (BDBM), which is the foundation for the entire book. Take the time to understand each of the five stages of the BDBM and how the BDBM provides a road map for measuring how effective your organization is at integrating data and analytics into your business models.
- **Chapter 3: The Big Data Strategy Document**. This chapter introduces a CXO level document and process for helping organizations identify where and how to start their big data journeys from a business perspective.
- **Chapter 4: The Importance of the User Experience**. This is one of my favorite topics. This chapter challenges traditional Business Intelligence reporting and dashboard concepts by introducing a more simple but direct approach for delivering actionable insights to your key business stakeholders—frontline employees, channel partners, and end customers.
- **Chapter 5: Differences Between Business Intelligence and Data Science**. This chapter explores the different worlds of Business Intelligence and data science and highlights both the differences and the complementary nature of each.

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- **Chapter 6: Data Science 101**. This chapter (my favorite) reviews 14 different analytic techniques that my data science teams commonly use and in what business situations you should contemplate using them. It is accompanied by a marvelous fictitious case study using Fairy-Tale Theme Parks (thanks Jen!).
- **Chapter 7: The Data Lake**. This chapter introduces the concept of a data lake, explaining how the data lake frees up expensive data warehouse resources and unleashes the creative, fail-fast nature of the data science teams.
- **Chapter 8: Thinking Like a Data Scientist**. The heart of this book, this chapter covers the eight-step "thinking like a data scientist" process. This chapter is pretty deep, so plan on having a pen and paper (and probably an eraser as well) with you as you read this chapter.
- **Chapter 9: "By" Analysis Technique.** This chapter does a deep dive into one of the important concepts in "thinking like a data scientist"—the "By" analysis technique.
- **Chapter 10: Score Development Technique.** This chapter introduces how scores can drive collaboration between the business users and data scientist to create actionable scores that guide the organization's key business decisions.
- **Chapter 11: Monetization Exercise**. This chapter provides a technique for organizations that have a substantial amount of customer, product, and operational data but do not know how to monetize that data. This chapter can be very eye-opening!
- **Chapter 12: Metamorphosis Exercise**. This chapter is a fun, out-of-the-box exercise that explores the potential data and analytic impacts for an organization as it contemplates the Business Metamorphosis phase of the Big Data Business Model Maturity Index.
- **Chapter 13: Power of Envisioning**. This chapter starts to address some of the organizational and cultural challenges you may face. In particular, Chapter 13 introduces some envisioning techniques to help unleash your organization's creative thinking.
- **Chapter 14: Organizational Ramifications**. This chapter goes into more detail about the organizational ramifications of big data, especially the role of the Chief Data (Monetization) Officer.
- **Chapter 15: Stories**. The book wraps up with some case studies, but not your traditional case studies. Instead, Chapter 15 presents a technique for creating "stories" that are relevant to your organization. Anyone can find case studies, but not just anyone can create a story.

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Who Should Read This Book

This book is targeted toward business users and business management. I wrote this book so that I could use it in teaching my Big Data MBA class, so included all of the hands-on exercises and templates that my students would need to successfully earn their Big Data MBA graduation certificate.

I think folks would benefit by also reading my first book, *Big Data: Understanding How Data Powers Big Business*, which is targeted toward the IT audience. There is some overlap between the two books (10 to 15 percent), but the first book sets the stage and introduces concepts that are explored in more detail in this book.

Tools You Will Need

No special tools are required other than a pencil, an eraser, several sheets of paper, and your creativity. Grab a chai tea latte, some Chipotle, and enjoy!

What's on the Website

You can download the "Thinking Like a Data Scientist" workbook from the book's website at `www.wiley.com/go/bigdatamba`. And oh, there might be another surprise there as well! Hehehe!

What This Means for You

As students from my class at USF have told me, this material allows them to take a problem or challenge and use a well-thought-out process to drive cross-organizational collaboration to come up with ideas they can turn into actions using data and analytics. What employer wouldn't want a future leader who knows how to do that?

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