Thomas H. Davenport
Nitin Mittal

All in On AI

How Smart Companies Win Big with Artificial Intelligence

HARVARD BUSINESS REVIEW PRESS

Thomas H. Davenport
Nitin Mittal

All in On AI

How Smart Companies Win Big with Artificial Intelligence

Harvard Business Review Press
Boston, Massachusetts

HBR Press Quantity Sales Discounts

Harvard Business Review Press titles are available at significant quantity discounts when purchased in bulk for client gifts, sales promotions, and premiums. Special editions, including books with corporate logos, customized covers, and letters from the company or CEO printed in the front matter, as well as excerpts of existing books, can also be created in large quantities for special needs.

For details and discount information for both print and ebook formats, contact booksales@harvardbusiness.org, tel. 800-988-0886, or www.hbr.org/bulksales.

The web addresses referenced in this book were live and correct at the time of the book's publication but may be subject to change.

Cataloging-in-Publication data is forthcoming.

ISBN: 978-1-64782-469-3
eISBN: 978-1-64782-470-9

CONTENTS

INTRODUCTION

No one was terribly surprised when Sundar Pichai, the CEO of Alphabet (parent company of Google), announced at a 2017 Google customer event that the company would be moving to "AI first." In an address to technology developers, Pichai said, "In an AI-first world, we are rethinking all our products and applying machine learning and AI to solve user problems."[1] Even before that, in 2015, Google had tallied up more than 2,700 AI and machine-learning projects across the company.[2] AI is embedded in virtually all its products and services for customers, including search, maps, Gmail, Duo/Assistant, and many others. It offers TensorFlow, a set of machine-learning algorithms and tools, to Google Cloud customers. Several of Alphabet's other businesses, including its autonomous vehicle company Waymo and its biotech company Calico, also make extensive use of AI.

That Alphabet/Google was all-in on AI was well known at the time by industry observers, so the announcement didn't get a lot of attention. It was normal behavior for Silicon Valley and hard-charging digital native organizations. There is even a book about AI-first companies among tech startups, also perhaps to no one's surprise.[3] People seemed to think, "That's just what Google does —and for that matter Facebook, Amazon, Tencent, Alibaba, etc."

But Alphabet/Google and other tech organizations weren't the only ones thinking about powering their business with AI. There are legacy businesses and even small- to midsize companies that have pursued the objective as well. For example, although few small businesses had AI on their radar screens at the time, radius financial group, a 200-employee mortgage originator in the

suburbs south of Boston, did.[4] Keith Polaski, the cofounder of the company and head of operations, began an intensive search for AI tools in 2016. Polaski refers to his business as "loan manufacturing," and he measures everything that happens in his mortgage manufacturing plant. He put AI and automation tools to work, and now his company is substantially more productive and profitable than the average for the industry.[5]

AI was supposedly taking place primarily in Silicon Valley, but the European aviation giant Airbus didn't get the message. Realizing that it needed to adapt and improve operational efficiency in the face of an aviation industry heavily disrupted by digitization, Airbus embarked in the mid-2010s on a broad digital transformation. AI and data were front and center of the change, with a wide variety of initiatives across the company. It invested in new technology and even began to retrain employees to use AI. Its program is no secret: Airbus's website reports, "Artificial intelligence (AI) is much more than a research field: it is a ubiquitous future technology with the potential to redefine all areas of our society. At Airbus, we believe AI is a key competitive advantage that enables us to capitalize on the value of our data."[6]

Airbus applies its AI capabilities across the width and breadth of its global organization, for its commercial airplane business as well as its Helicopters, Defense, and Space divisions. AI technology has been foundational for many Airbus offerings, including its OneAtlas imagery service, ATTOL (vision-based navigation for autonomous taxi, takeoff, and landing) demonstrator, vision-based navigation for helicopters, and virtual assistants to pilots in cockpits and astronauts in the International Space Station.

AI is certainly being aggressively pursued in China by digital native organizations like Alibaba and Tencent. However, it's also being applied to traditional businesses like insurance, banking, health care, and car sales. One giant company, Ping An, has thriving businesses in all those areas. It has used AI in each of them to rapidly pay insurance claims based on photos, determine identity using facial recognition for credit checks, enable

intelligent telemedicine, and determine the value of used cars. Its business model is to offer lifestyle financial consumer products to customers and internet users in "ecosystems" covering financial services, automobile services, health care, and smart cities services, learning all the time from their data to refine their AI scenario models.

Something is working at Ping An; the company was only founded in 1988, and its 2020 revenues were nearly $200 billion. Again, it's not trying to hide its focus on AI; the website of Ping An Technology—the technology arm of Ping An—discloses: "Artificial intelligence is one of the core technologies of Ping An Technology, and has formed a series of solutions including predictive AI, cognitive AI and decision-making AI."[7] It further elaborates: "Ping An Technology has formed an intelligent cognition technology matrix, including facial recognition, voiceprint recognition, medical image AI reading, animal recognition and multimodal biometrics, which has gradually been widely and deeply used in real life." Even many tech firms couldn't put that statement on their websites.

Ping An, Airbus, and radius are traditional businesses. They are not tech or e-commerce companies, although they have substantial technology capabilities. They are typical of our focus on the role of AI in "legacy" companies. These are companies that take extensive advantage of the power of AI, even though it's not their core product or service offering. One head of AI at a retailer told us, "People ask me why I only take these data, analytics, and AI roles in legacy companies. It's because the job is too easy in born-digital businesses!" Although we suspect it's not as easy as it looks, we tend to agree. It is a hard thing to take an existing business in a traditional industry and go all-in on AI to transform its capabilities. As we did with Google at the beginning of this section, we will occasionally refer to AI-intensive tech companies and startups when there is a lesson to be learned from them or when they are partnering with traditional businesses. But our primary examples will be in industries and even companies that existed before we were born. We'll describe banks, insurance

companies, manufacturers, retailers and consumer products companies, information providers, life sciences companies, and even some government organizations. They have different business issues and customer needs, but they've all found their way to being all-in on AI.

Our focus in this book is on how large firms that existed well before AI are transforming themselves with the help of that technology. Instead of describing the average or most common approach to implementing AI, we'll profile the companies that are all-in on AI—they are making big and intelligent bets that this technology will lead to major business improvements, and they already have evidence that these bets are paying off. We refer to these companies' all-in approaches in multiple ways—"AI fueled," "AI powered," "AI enabled," etc. The common thread is that they are at the far end of the scale in their spending, planning, strategizing, implementing, and changing with regard to AI technology. Not every company will choose this ambitious approach, but we think that everyone can learn from it and perhaps even be inspired by it.

Our goal in the rest of these pages is to explore the concept of being all-in on AI and what is required for an organization to get there. Our perspective is a view of AI at its most extreme—the most aggressive adoption, the best integration with strategy and operations, the highest business value, the best implementation. We will describe the implications of aggressive AI usage for strategy, processes, technology, culture, and talent. Knowing what the leading adopters of AI are doing can be helpful to many other organizations as they attempt to assess the potential of the technology to transform their own business.

Our Experience

Both of us have had some experience working with and profiling such leading firms. Tom researched and wrote in the area of analytics for many years before moving into AI, and he wrote bestselling articles and books about "competing on analytics."[8]

The HBR article by that name was even designated one of the twelve must-read articles in the magazine's 100-year history. The response to the articles and books made it clear that companies and their management could benefit from this all-in perspective even when they chose a more incremental approach. Since then Tom has worked with hundreds of companies around the world who wanted to build their analytical capabilities and then start to employ their close cousin, AI. Some of the companies he profiled in his writing on analytics, like Capital One and Progressive Insurance, also make an appearance in this book. However, they have undertaken multiple specific initiatives to increase their AI capabilities as well.

Nitin has been thinking about, speaking on, and working with clients on what it means to be AI fueled for several years now. He has also found that many executives who are only moderately knowledgeable about AI find it useful to know how companies are transforming themselves by leveraging the breadth of AI technologies. Prior to focusing on AI, he worked with health-care and life sciences companies for about fifteen years to help them embrace data and analytics in their businesses. And as the head of analytics and AI at Deloitte in the United States for over five years, he's been able to engage with clients and executives who themselves have transformational objectives for AI, as well as vendor partners who make and market some of the world's most sophisticated AI technologies.[9] Further, he leads a strategic initiative at Deloitte in the United States aimed at using AI to transform the world's largest professional services firm.

We both find AI fascinating, but even more interesting is the complex interplay of AI with business strategy and business models, key processes, organization and change management, and the existing technology architectures that established companies all have. Developing a great new algorithm is an impressive achievement, but no more so than pulling off a major business change initiative that includes AI. We like working with and writing about organizations that use technologies—AI in

particular—to discover new ways of competing and doing business. That's the kind of story you'll find in this book.

What You'll Learn in This Book

As with the foregoing examples, we'll provide many descriptions of what AI-fueled companies are doing with AI. But they are contained within broader discussions of what it takes to be successful with AI at the "all-in" level. The chapter topics, and the companies featured in each chapter, include:

Chapter 1: What Does It Mean to Be AI Fueled?

We describe what it takes to be an AI-fueled organization, including the specific technologies that companies use, the ways they achieve value, and the components that define an all-in approach to AI. We mention a variety of companies in the chapter, but Ping An and DBS's digibank chatbot in India are singled out in some detail.

Chapter 2: The Human Side

We argue in this chapter that the most important attribute in AI success is not machinery, but human leadership, behavior, and change. We begin the chapter with a discussion of Piyush Gupta, the CEO of DBS Bank, as an effective leader of his organization's AI initiative. We also discuss leadership issues at Morgan Stanley, Loblaw, and CCC Intelligent Solutions. In the area of improving the understanding and adoption of AI by both management and employees, we discuss Shell, Deloitte, Airbus, Bank of Montreal, Eli Lilly, and Unilever.

Chapter 3: Strategy

AI is capable of enabling or transforming business strategy, and how it does so is the focus of chapter 3. In it we describe three major strategic archetypes that AI organizations can adopt. In the

course of describing these archetypes, we describe a variety of companies: Loblaw, Toyota, Morgan Stanley, Ping An, Airbus, Shell, SOMPO, Anthem, FICO, Manulife, Progressive, and Well.

Chapter 4: Technology and Data

You can't do advanced AI without some advanced technology and considerable data, so in chapter 4 we describe the components of a modern AI-oriented tech infrastructure and data environment. We discuss using all the tools in the AI toolbox, data for AI, automated machine learning or AutoML, machine learning operations or MLOps, legacy technologies, and scaling AI applications. Among the companies discussed in this chapter are DBS, the Kroger Co. (and its 84.51° subsidiary), Shell, Unilever, Anthem, and Airbus.

Chapter 5: Capabilities

AI, like any other business capability, can be assessed and ranked in terms of how far along a company is on various dimensions. Since there are different strategic archetypes for the use of AI, there are different capability models for each one. We describe the capabilities of Ping An in detail in this chapter, as well as Scotiabank, Manulife, Progressive, and Anthem. We also describe ethical AI capabilities in this chapter and focus on Unilever as our primary example.

Chapter 6: Industry Use Cases

Use cases or AI applications are at the core of how an organization applies the technology to its business issues. In this chapter we describe use cases across a variety of industries. We separate the list into common and less common use cases and provide examples of early and aggressive adopters in each industry. Companies featured include Walmart, Seagate, Capital One, the US and Singapore governments, Cleveland Clinic, Pfizer, Novartis, AstraZeneca, Eli Lilly, and Disney.

Chapter 7: Becoming AI Fueled

In the final chapter we describe a set of four alternative paths to becoming AI fueled. Each path is illustrated with a particular example. Deloitte is the example for the first path, which describes a move from being solely people-focused to people- and AI-focused in professional services. CCC Intelligent Solutions is the example for a path moving from a focus on information to a focus on AI. Capital One illustrates the path from an analytically focused company to an AI-focused one. Finally, Well—a health-care startup—is the illustration for starting from scratch to build a set of AI capabilities.

Despite all this content, the book is not a standard recipe for going all-in on AI. Every organization will vary in its rationale, strategy, and specific path for aggressively integrating AI into its business. We're confident, however, that the examples and lessons in this book will aid each organization in its individual journey. At a minimum, we hope that reading about what these early and leading organizations are doing with AI will provoke you to say about your own company, "We'd better get moving."