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“Imagination, capability, and opportunity take on a new dimension in the digital age. *Leading Digital* provides a framework for creating sustainable business differentiators across the value chain. A must-read for all those who aspire to become Digital Masters.”

—**Manish Choksi**, President of Home Improvement, Supply Chain and IT, Asian Paints

“Westerman, Bonnet, and McAfee have done a masterful job of describing the essential characteristics of Digital Masters and presenting a thoughtful and pragmatic leader’s playbook for digital transformation. This book is an exceptional contribution to strategy and management practice.”

—**John Glaser**, CEO, Health Services, Siemens

“The authors have lived on the cutting edge of how global organizations use digital technology to change and improve the way they do business. With this book, they bring us along on the transformation journey. If you want to prepare yourself to lead your organization through this profound change, *Leading Digital* is a must-read.”

—**Jean-Christophe LaLanne**, Executive Vice President and Chief Information Officer, Air France–KLM Group

“Using powerful examples, this impactful, evidence-based book demonstrates that mastery of digital technologies drives significantly high levels of profit and productivity across almost all industries—and shows you how to become a Digital Master yourself.”

—**F. Warren McFarlan**, professor, Harvard Business School

“We are living in a time where technology is impacting everything we do and touch like never before, where being connected is becoming a basic human right, and where the unshared certainties of all businesses are turning into shared uncertainties. *Leading Digital* offers a powerful and refreshing approach to what needs to be done during each stage of this journey.”

—**Osman Sultan**, CEO, Du, United Arab Emirates

LEADING DIGITAL

**TURNING TECHNOLOGY
INTO BUSINESS TRANSFORMATION**

GEORGE WESTERMAN | DIDIER BONNET | ANDREW McAHEE

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*Let us be grateful to the people who
make us happy; they are the charming gardeners who
make our souls blossom.*

—**Marcel Proust**

From George

*To Clare, Henry, and Marilyn, who transformed my life in
ways I never could have envisioned.*

From Didier

*To my wife Kathryn, for her immeasurable love and
support, and to my two own digital masters, Alexandra
and William, for keeping me on the right side of the
digital divide.*

From Andy

*To my coauthors, who have taught me much about
scholarship, writing, professionalism, and good cheer.*

I n t r o d u c t i o n

ARE YOU READY?

Technology is the biggest story in business today, plain and simple. There are other big stories, of course. The Great Recession of 2007–2009 and subsequent sovereign debt crises were hugely important events; they affected the fortunes of countless people and companies, and their impact is far from over. Globalization and offshoring are also key forces shaping strategy and structure both now and for some time to come. Demographics are shifting in ways that will cause deep and lasting changes in markets.

These are big deals, but technology is bigger. It's bigger because recent progress in all things digital is removing constraints and creating exciting new possibilities that affect everyone's lives and enterprises. Do you want to finally hear the voice of your customers and escape the narrow lenses of surveys and focus groups? Social media let you. Do you want all of your people to be available and productive no matter where they are? Mobile computing makes that possible. Want significantly better forecasts, judgments, and decisions in key areas? That's the promise of big data. Want to roll out entirely new organizational structures, business processes, and customer offerings, and to quickly modify them over time as circumstances change? We all know these things are possible because we've seen companies doing all of them.

The tech wave has been building for a long time, but has accelerated in recent years. The past decade has witnessed a remarkable run of

progress in digital technologies. The phrase *Web 2.0* entered popular use in 2004 to signify a deep change under way on the World Wide Web: a great democratization of content creation. The rise of Facebook, Twitter, *Wikipedia*, and many other utilities full of user-generated content shows that there really is a new version of the Web. Moreover, a new generation of computing devices seems likely to challenge, if not completely overturn, the decades-long dominance of the personal computer as the device of choice for knowledge workers. Apple's twin breakthroughs—the iPhone in 2007 and the iPad in 2010—ushered in the era of the smartphone and the tablet and made real the long-standing promises of mobile computing. These technology advances are staggering, but the real impact is how they are changing the way we live and work. Companies, and people, can do things that would have been impossible a decade ago.

The data center has been disrupted as much as the desktop has in recent years, thanks to the rapid rise of cloud computing, which is calling into question the standard assumption that you have to own technologies like servers, operating systems, and applications if you want to use them. Enterprise applications, social networks, mobile devices, sensors, and just about every other element of modern digital infrastructure generate scads of data—so much that we really do need to use the modifier *big* now to distinguish the current era. These and many other innovations are being combined to bring us the sharing economy, supercomputers that win game shows, cars that drive themselves, and a host of other novelties that fundamentally challenge our thinking about business structure, labor costs, and the relationship between people and machines.

The last time there was this much technological innovation hitting the business world was the first time. It was the Industrial Revolution, when new machines bent the curve of commerce, capitalism, and, indeed, human history. Today, innovation in digital technologies is bringing our world into what one of us (Andy) and his coauthor Erik Brynjolfsson called “the second machine age” in their 2014 book of the same name.

Are you ready for the second machine age? With all due respect, you're probably not.

We say this because for the past three years, we've been conducting research on how firms around the world and in many industries work with digital technologies. We've collected data and interviewed people at hundreds of companies. We've talked with executives and examined the companies' performance. We've studied both how the companies approach all things digital and the results of their efforts.

Our most fundamental conclusion is that *Digital Masters*—companies that use digital technologies to drive significantly higher levels of profit, productivity, and performance—do exist, but they're rare. For reasons that we'll explain here, most firms fall short of digital mastery. That's the bad news, and it's why we believe you're probably not ready to survive and thrive in the second machine age.

Here's the good news: the reasons that companies fall short of digital mastery aren't mysterious or too numerous to list. In fact, the reasons are pretty easy to categorize. Companies that struggle with becoming truly digital fail to develop digital capabilities to work differently and the leadership capabilities required to set a vision and execute on it. The firms that excel at both digital and leadership capabilities are Digital Masters.

If you read the business press about technology, you might well surmise that most Digital Masters are American; that most American masters reside in Northern California, the Pacific Northwest, or New England; and that most of these companies are in the hardware and software businesses. And certainly, giants like Apple, Facebook, and Amazon.com, and start-ups from San Francisco to Boston are excellent users of technology. But these aren't the Digital Masters we're talking about.

In fact, we didn't even include them in our research. We wanted to understand how technology was being adopted and used *in the 90-plus percent of the economy that doesn't do technology for a living*. So we didn't look at Silicon Valley's stars. And we didn't look at start-ups and other small companies either, because their tech-related opportunities and challenges are quite different from those faced by large enterprises.

We focused on big companies, in industries from finance to manufacturing to pharmaceuticals. These companies power much of the economy, but are rarely mentioned in the technology news. Not all of them are Digital Masters, but still, many are doing amazing things with technology. We also spent a lot of our time looking outside the United States, for the simple reason that most of the world is there. The diffusion of business technology is a global phenomenon, and we wanted to understand what was happening around the world. So we conducted research at large enterprises from around the globe to understand their approaches to harnessing the many recent waves of innovation in information and communication technology and to see which approaches worked best. We discovered all kinds of companies, both those struggling and those succeeding in the great challenge of becoming digital. As we explained above, the companies that are succeeding—and they range across industries and sectors—we’re calling Digital Masters. And Digital Masters outperform their peers. Our work indicates that the masters are 26 percent more profitable than their average industry competitors. They generate 9 percent more revenue with their existing physical capacity and drive more efficiency in their existing products and processes.

As we’ll show, achieving digital mastery is not an impossible task or arcane art. It doesn’t require that you hire away Google’s top talent or spend 20 percent of revenue on technology every year. It does require some level of human capital and investment, of course, but the main requirements are time, tenacity, and leadership. With these, knowledgeable companies can assemble the elements of technological progress into a mosaic not just once, but continuously over time. Digital Masters, in short, keep making digital technologies work for them even though the technologies themselves keep changing.

Our research has convinced us—and with this book, we hope to convince you—that digital mastery is an achievable goal for any enterprise. We’ll give many examples of what digital mastery looks like, why it’s important, and how it can be developed. We hope that you’ll find the examples compelling, and that you’ll use our work to help you embark on your own journey toward becoming a Digital Master.

This is an important journey because when it comes to the impact of digital technologies on the business world, we ain't seen nothin' yet. The innovations and disruptions of the past ten years have been nothing short of astonishing, but they're just the warm-up acts for what's to come.

Robots will become more dexterous, mobile, and aware of their surroundings. They will start showing up not only on factory floors, but also in warehouses, stockrooms, and retail environments. Their close cousins, autonomous vehicles, will start driving and flying at first in remote areas, and then probably in populated ones.

The data these drones generate will be combined with the streams from countless sensors as we instrument (in other words, slap a sensor on) just about everything. As the entrepreneur Gil Elbaz puts it, "The world is one big data problem."¹ The coming years will show that if Elbaz's comment is an overstatement, it's not much of one. Digital Masters will take this torrent of data; combine it with the latest innovations in artificial intelligence, machine learning, and visualization; and use the resulting insights to make smarter decisions, see the future more clearly, drive out inefficiencies, and better understand their customers. Everyone else will fall behind.

No one can predict all the digital innovations that the coming years will bring. Perhaps the best general prediction is an expansion of what inventor, entrepreneur, and venture capitalist Marc Andreessen wrote in a 2011 *Wall Street Journal* column: "Why Software Is Eating the World."² We wholeheartedly agree and just want to expand on his point: the elements of the digital world—software, hardware, networks, and data—are pervading the business world, and they're doing so quickly, broadly, and deeply. Regardless of industry or geography, businesses will become much more digitized in the future. It's inevitable—so the time to start pursuing digital mastery is now.

If you want to become a Digital Master, read on. Chapter 1 defines digital mastery: what it is, what it means, and how it varies from company to company and from industry to industry. Our research has identified the key characteristics that make companies Digital Masters. What these masters have done, though not easy, can be adopted by any

company willing to follow a similar path. Digital Masters excel at two essential capabilities. They build digital capabilities by rethinking and improving their business processes, their customer engagements, and their business models. They also build strong leadership capabilities to envision and drive transformation. Each dimension of capability is important on its own. Together, they make you a Digital Master.

The next two parts of the book examine the two critical capabilities that constitute the DNA of digital mastery in turn. Part I focuses on digital capability. It is the *what* of digital mastery—the investments and initiatives that executives have undertaken to transform the way their companies operate. Chapter 2 examines the most visible aspect of digital capabilities—*how you engage with customers*. This capability goes beyond websites and mobile apps to truly change the customer experience. Chapter 3 explores a far less visible, but equally important element of digital capability, namely, *operational processes*. Digital technology allows companies to break some of the traditional paradoxes of operational excellence, helping you to build capabilities that improve efficiency and agility, power new customer engagements, and enable new business models—all while remaining largely hidden from your competitors. Finally, chapter 4 discusses *new business models*, from reconfiguring delivery models to creating new products and services to reinventing whole industries. Through these models, you can gain an advantage over your competitors and outwit new entrants.

Part II focuses on the other critical dimension, leadership capabilities. These are the *how* of digital mastery—the ways in which executives are driving change. Large companies are prone to both inertia and entropy; it can be tough to get started, and even tougher to keep things moving in the same direction. The only effective way we've seen to drive transformation is top-down, through strong senior executive direction coupled with methods that engage workers in making the change happen. Chapter 5 shows how to create a *transformative digital vision*. Vision sets the aspirations for your company, but many companies lack this essential part of driving transformation. Chapter 6 then describes a distinctive approach to *engagement*, which is the process of

energizing employees to make the vision a reality. Chapter 7 examines *digital governance*. Vision and engagement are just part of the story of leadership capabilities. An energized workforce, believing strongly in a shared vision, may still proceed in many directions. Governance provides the guardrails and steering wheel to keep the transformation on the right track. Finally, chapter 8 examines the *technology leadership capabilities* you will need to power your transformation forward: the strong relationship that Digital Masters build between their IT and business leaders, and the way these companies use that relationship to drive change in their internal platforms and digital skills.

Part III constitutes what we call the *leader's playbook for digital transformation*. This toolset, synthesized from the insights in previous sections, provides concrete management guidance to help get you started in creating your own digital advantage. Chapter 9 is the starting point: *framing* the digital challenge. It shows how to build awareness, understand your starting point, craft a vision, and align your senior executive team around it. Chapter 10 shows how to *focus your investments*. It provides advice on how to translate your vision into action, build the required governance, and fund your transformation. Chapter 11 is about *mobilizing the organization* to make the transformation happen—signaling your ambitions, earning the right to engage, setting new behaviors, and starting to evolve the company's culture. Finally, chapter 12 discusses how to *sustain the change*. It includes building foundation skills, aligning incentives and reward structures, and continuously monitoring progress. Although each topic in Part III could be a book on its own, each chapter contains a self-diagnostic exercise, as well as some useful examples and techniques to help you get started.

Our overarching conclusion from this work is simple: we ain't seen nothin' yet. Within the next ten years, industries, economies, and probably entire societies will be transformed by a barrage of technologies that until recently have existed only in science fiction, but are now entering and reshaping the business world. Becoming a Digital Master is challenging, but there has never been a better time. The longer you wait, the more difficult it will become.