How Google Works

Introduction—Lessons Learned from the Front Row

In July 2003, Eric Schmidt had been the CEO of Google Inc. for two years, when he received an email from one of the company's board members and investors, Mike Moritz, a partner at Sequoia Capital. It included a suggestion:

> you may want to think about picking a three hour slot in mid-august when the management presents to the board our campaign to compete with finland. (i do not think we should wait until the september meeting. this is far too important a topic and we've all learned that the best way to discover how short a year happens to be is to compete with finland.)

To the uninformed, this note might have been confusing. Why would Google, a several-hundred-employee, five-year-old Internet start-up based in Mountain View, California, be competing with Finland, a country of five million people that was over five thousand miles away and generally considered to be a friendly, peaceful place?

The Finland email arrived just when Eric felt like he was finally settling into Google. He had come from Novell, where he had been the CEO, and had also worked at Sun Microsystems and Bell Labs. After

growing up in northern Virginia, he graduated from Princeton with a degree in electrical engineering and received a master's degree and PhD in computer science from the University of California, Berkeley, so not only was he no stranger to working with engineers and computer scientists, he *was* one. Still, when he got to Google he stepped into a place very different from anywhere else he had been.

His "I have a feeling we're not in Kansas anymore" revelation started on his first day. When he arrived at the office that had been assigned to him, which was already quite modest by big-shot CEO standards, he found that it was occupied by several software engineers. Rather than kicking them out, he decamped to the next office over, which was more of a closet with a window than an actual office.

Then, a few weeks later, it got worse. One morning, as he walked down the hall to his ~~closet~~ office, he noticed that his assistant, Pam Shore, had a troubled look on her face.[1] He soon found out why: He had a new officemate. It was one of the search engineers, Amit Patel, who explained to Eric that *his* office had five inhabitants, with another on the way, and that his solution of sawing one of the desks in half to make more space hadn't worked. In comparison to his current space, Eric's spot seemed quite roomy, so Amit moved in. (The facilities crew had refused to move Amit's stuff into Eric's office, so he had done it himself.) Amit and Eric ended up sharing the office for several months. Clearly, this was not a measure-your-importance-in-square-feet kind of place.

Beyond the unusual facilities arrangements, the rest of Eric's transition into the company was fairly smooth. His relationship with the two cofounders, Larry Page and Sergey Brin, was strengthening every day. The company's advertising platform, AdWords, was starting to generate significant amounts of revenue (when the company filed for its initial public offering in 2004, the financial statements astonished most observers . . . in a good way), and even though "Google" as a verb

1. For Pam, anything other than a warm smile counts as "troubled."

wouldn't be added to the *Oxford English Dictionary* for another three years,[2] for millions of users Google search was already an important part of everyday life. The company was growing too, adding dozens of employees every month, including a new head of products, Jonathan Rosenberg, who came on board in February of 2002. Jonathan, like Eric, was the son of an economics professor. He joined Google after stints at Excite@Home and Apple, to build up the company's product management team and round out Eric's staff.

As Mike's email pointed out, though, there was a major competitor on the horizon, and it wasn't really our Nordic friends across the Atlantic. Finland was our internal code name for Microsoft,[3] at the time the most important tech company on the planet.[4] Eric knew that a huge chunk of Google's traffic came from people using Microsoft's Internet Explorer browser. Like everyone at Google, he believed that the Internet was the technology platform of the future and that search was one of its most useful applications. Therefore, it was only a matter of time before our friends from Redmond would take a real interest in what we were doing. And when Microsoft took a real interest in things start-ups were doing, things had a way of getting really interesting.[5]

The future of the company was at stake, and what to do was far from obvious. Moritz's note was a call to action. He asked Eric to rally the team and create a plan that would establish clear deliverables across

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2. The *Oxford English Dictionary* added "Google" on June 15, 2006. Other new words added in this update included "geocaching," "mash-up," "self-storage," and "texting." See Candace Lombardi, "Google Joins Xerox as a Verb" (*CNET News*, July 6, 2006).

3. In fact, "Finland" is a code name for the code name we actually used. If we used the actual code name in this book, it wouldn't be much of a code name, would it?

4. To get an idea of the awe in which Microsoft was held in those days, just look at the titles of some of the books about the company: *Microsoft Secrets: How the World's Most Powerful Software Company Creates Technology, Shapes Markets, and Manages People* (1995), *Overdrive: Bill Gates and the Race to Control Cyberspace* (1997), and *How the Web Was Won: How Bill Gates and His Internet Idealists Transformed the Microsoft Empire* (2000).

5. In the 1980s and '90s, it was virtually impossible for Silicon Valley technology entrepreneurs to get funding for their companies without first articulating to their investors their Microsoft strategy. If you didn't have a clear plan, you wouldn't get a check.

the company: product, sales, marketing, finance, and corporate development. Every aspect of how Google operated was on the table, and there was even talk about transitioning the company from its quirky start-up structure to a more traditional one organized around business units, to make it easier to develop new revenue streams (another thing the new plan was supposed to address). Most important, the plan needed to establish milestones and a roadmap of which products would ship, and when. In short, Moritz wanted what any sensible, normal board member would want: a comprehensive business plan.

He closed the note with a flourish:

> so why not pick an evening in mid august to mark the completion of the plans for the mightiest campaign any of us will ever be in.

Since products would be the crux of this plan, Eric gave the project to Jonathan. His instructions: "I would like to review this in two weeks."

There was a problem, though, besides the fact that a huge company was coming to compete with us. Moritz was right: To take on the biggest gorilla in the jungle, we needed a plan. But he was also wrong, and to understand why he was wrong, and why he was inadvertently putting the two of us in a rock-and-hard-place sort of situation, it helps to first understand just what kind of company Google was.

"Just go talk to the engineers"

When Sergey and Larry founded Google in 1998, they had no formal business training or experience. They considered this an advantage, not a liability. As the company grew out of its first home in a Stanford dorm room, to Susan Wojcicki's garage[6] in Menlo Park, to offices in

6. Susan went on to become an employee and eventually the leader of all ad products and then YouTube, but her first Google title was landlord.

Palo Alto and then Mountain View, the founders ran it on a few simple principles, first and foremost of which was to focus on the user. They believed that if they created great services, they could figure out the money stuff later. If all they did was create the world's best search engine, they would be very successful.[7]

Their plan for creating that great search engine, and all the other great services, was equally simple: Hire as many talented software engineers as possible, and give them freedom. This approach suited a company born in a university lab, since in academia the most valuable asset is intellect (also, for some American universities, the ability to throw a football fifty yards). But while most companies say that their employees are everything, Larry and Sergey actually ran the company that way. This behavior wasn't corporate messaging, and it wasn't altruism. They felt that attracting and leading the very best engineers was the *only* way for Google to thrive and achieve its lofty ambitions. And they really meant engineers: The founders stopped Eric's first attempt to hire the estimable Sheryl Sandberg, now Facebook's COO, because she wasn't an engineer. (Sheryl went on to spend over six very successful years at Google.) As the company grew, the founders relented in this single-mindedness, but only a little bit. To this day the rule of thumb is that at least half of Google employees (aka Googlers) should be engineers.

The management tactics the founders used to run the company were equally simplistic. Like the professors in their Stanford computer science lab, who did not dictate what their thesis projects should be but rather provided direction and suggestions, Larry and Sergey offered their employees plenty of freedom and used communication as a tool to keep everyone moving in the same general direction. They had a very strong belief in the profound importance of the Internet and the power

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7. Although as business neophytes Sergey and Larry didn't realize this, their "focus on the user" mantra was consistent with Peter Drucker's idea of the purpose of business: "There is only one valid definition of a business purpose: to create a customer. . . . The customer is the foundation of a business and keeps it in existence." From *The Practice of Management*, (HarperBusiness, 1993 edition), page 37.

of search, and they communicated these points via informal meetings with the small engineering teams that populated the Google offices, and through company-wide "TGIF" meetings held every Friday afternoon, where any topic was fair game for discussion.

When it came to process, the founders ran things with a light touch. For years, Google's primary tool for managing the company's resources was a spreadsheet with a ranked list of the company's top 100 projects, which was available for anyone to see and debated in semi-quarterly meetings. These meetings were part status update, part resource allocation, and part brainstorming. The system was not very scientific: Most projects were prioritized on a scale of 1 to 5, but there was also room on the list for projects categorized as "new / far out" and "skunkworks." (Today we can't recall the distinction between the two, but at the time it all made perfect sense . . . sort of.) There was no concept of or recognized need for longer-range planning than this; if something more important came up, the engineers would figure it out and adjust the list.

This emphasis on engineering continued even as the company expanded the management team. The founders didn't hire Eric for his business acumen as much as for his track record as a technologist (Eric was a Unix expert and helped create Java—the software language, not the beverage or the island) and geek cred as an alum of Bell Labs. They hired Jonathan in spite of his economics and MBA degrees, because he was a proven product advocate and innovator from his days at Apple and Excite@Home. That we were business guys wasn't exactly a liability, but it wasn't a benefit either, at least not in Sergey's and Larry's minds.

Jonathan got a stark example of the founders' aversion to traditional business processes not long after he started at the company. As a seasoned executive in product management, he had plenty of experience in what's known as the "gate-based" approach to building products, which in most companies entails a series of well-defined phases and milestones, governed by various executive reviews, that escalate

slowly up the corporate food chain. This approach is designed to conserve resources and funnel information up from far-flung silos to a small set of decision-makers. Jonathan assumed that he was meant to bring precisely this type of discipline to Google, and he was supremely confident that he was just the guy to do it.

A few months later, Jonathan presented Larry with a product plan that was a manifestation of the gate-based approach at its finest. There were milestones and approvals, priorities, and a two-year plan of what products Google would release and when. It was a masterpiece of textbook thinking. All that remained was for him to receive a rousing round of applause and a pat on the back. Sadly, this was not to be: Larry hated it. "Have you ever seen a scheduled plan that the team beat?" he asked. Um, no. "Have your teams ever delivered better products than what was in the plan?" No again. "Then what's the point of the plan? It's holding us back. There must be a better way. Just go talk to the engineers."

As Larry spoke, it dawned on Jonathan that the engineers he was talking about weren't engineers in the traditional definition of the role. Yes, they were brilliant coders and system designers, but along with their deep technical expertise many of them were also quite business savvy and possessed a healthy streak of creativity. Coming from an academic background, Larry and Sergey had given these employees unusual freedom and power. Managing them by traditional planning structures wouldn't work; it might guide them but it would also hem them in. "Why would you want to do that?" Larry asked Jonathan. "That would be stupid."

So when Mike Moritz and the board asked us to create a traditional, MBA-style business plan, we didn't want to be stupid. We knew that the Google patient would reject a formal, regimented plan as if it were an alien organ transplanted into its body, which in many respects it would be. As experienced business executives, we had joined Google with the idea of bringing "adult supervision" to a chaotic place. But by the summer of 2003 we had been at the company long enough

to realize that it was run differently than most any other place, with employees who were uniquely empowered, and operating in a new, rapidly evolving industry. We understood the dynamics of our new industry enough to get that the way to fend off Microsoft was continuous product excellence, yet we also understood that the best way to achieve that excellence was not via a prescribed business plan, but rather by hiring the very best engineers we could and then getting out of the way. We understood that our founders intuitively grasped how to lead in this new era, but they—by their own admission—didn't know how to build a company to the scale where it could achieve their ambitious vision. They were great leaders of computer scientists, but we needed more than computer scientists to create a great company.

We also understood that the rules to guide us in this endeavor did not even exist yet, and they certainly couldn't be found in the type of traditional business plan that Mike Moritz wanted.

So we found ourselves, at this critical moment in the company's history, stuck in the middle. We could do what Moritz wanted and write a traditional business plan. That would keep our board happy, but it would not motivate or inspire our employees, it would not help attract the new talent the company so desperately needed, and it wouldn't address the strategic dynamics of this brand-new industry. Most important, the company's founders would kill it before it ever saw the light of day. And maybe fire the two of us while they were at it.

The Finland plan

The plan that we ultimately presented to the board bore a close enough resemblance to a traditional business plan that the members departed the meeting satisfied that, yes, we have a business plan! Looking back now on that document, we are surprised in how many ways it was spot on. It was all about how Google would focus on its users and build excellent platforms and products. It said that Google would always offer higher-quality services and make those services easily accessible.

It proposed that our foundation be built on users, and that more users would draw more advertisers. There were a few tactical points covering how we would fend off competitive threats, but basically the way to challenge Microsoft, we said, was to create great products.

Which was, as it turned out, exactly the right thing to do.

Microsoft did aggressively challenge us, reportedly spending nearly $11 billion[8] in an attempt to knock Google off its perch as a key player in the Internet search and advertising business. Microsoft programs like MSN Search, Windows Live, and Bing, and acquisitions like aQuantive, failed to achieve true prominence, not because they were poorly executed but because Google was so well prepared for them. We worked incessantly to make search better. We added images, books, YouTube, shopping data, and any other corpus of information we could find. We created our own set of applications, such as Gmail and Docs, and made them all web-based. We improved our infrastructure by leaps and bounds, so that we could more quickly crawl an index of online data and content that was growing exponentially.[9] We made search faster and available in more languages, and improved our user interface to make it easier to use. We added maps and better local results. We worked with partners to ensure that it was always easy for users to access us. We even expanded into some areas where Microsoft excelled, such as browsers, launching Google Chrome and making it the fastest and most secure browser in the industry from day one. And we monetized all of this with highly efficient and effective ad systems.

Eric used to warn his team that "Microsoft will come at us, wave after wave." They did, and still do, but nevertheless the business plan that Moritz pushed us to develop worked beyond our wildest dreams. Today Google is a $50-billion company with over forty-five thousand

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8. Jay Yarow, "Steve Ballmer's Huge Reorg of Microsoft Could Bury One of the Company's Biggest Embarrassments" (*Business Insider*, July 9, 2013).

9. This was remarkably challenging. Imagine repeatedly climbing a mountain that is rapidly growing in size, and every time you climb it you need to get to the top faster than your previous trip. That's what it was like, except the mountain was made out of data, not dirt and rocks.

employees in over forty countries. We have diversified from Internet search and search advertising into video and other forms of digital marketing, successfully transitioned from a PC-centric world to a mobile-centric one, produced a successful suite of hardware devices, and pushed the technology edge with new projects that promise, for example, to bring Internet access to everyone and create cars that drive themselves.

One of the biggest reasons for our success, though, is that the plan we delivered to the board that day in 2003 wasn't much of a plan at all. There were no financial projections or discussions of revenue streams. There was no market research on what users, advertisers, or partners wanted or how they fit into nicely defined market segments. There was no concept of market segmentation or discussion of which advertisers we would target first. There was no channel strategy or discussion of how we would sell our ad products. There was no concept of an org chart, with sales doing this, product doing that, and engineering doing some other that. There was no product roadmap detailing what we would build and when. There was no budget. There were no targets or milestones that the board and company leaders could use to monitor our progress.

There were also no tactics on how we would build the company or, more specifically, how we would stay loyal to Larry and Sergey's "just go talk to the engineers" ethos while building an enterprise that could take on the world's most powerful technology company and achieve our audacious global ambition of transforming lives by the billions. We left that out for the simple reason that we didn't know how we were going to do it. When it came to management tactics, the only thing we could say for sure back then was that much of what the two of us had learned in the twentieth century was wrong, and that it was time to start over.

When astonishing isn't

Today we all live and work in a new era, the Internet Century, where technology is roiling the business landscape and the pace of change is accelerating. This creates unique challenges for all business leaders. To

understand those challenges, it helps to step back for a moment and consider just how amazing things are.

Three powerful technology trends have converged to shift the playing field fundamentally in most industries. First, the Internet has made information free, copious, and ubiquitous—practically everything is online. Second, mobile devices and networks have made global reach and continuous connectivity widely available. And third, cloud computing[10] has put practically infinite computing power and storage and a host of sophisticated tools and applications at everyone's disposal, on an inexpensive, pay-as-you-go basis. Today, access to these technologies is still unavailable to much of the world's population, but it won't be long before that situation changes and the next five billion people come online.

From a consumer perspective, the convergence of these three technological waves has made the impossible possible. Taking a flight somewhere? On the day of your departure, your phone will remind you when to leave for the airport, tell you the terminal and gate from which the flight departs, and let you know if you will need an umbrella when you get to your destination, all without you having to ask. Want to track down any piece of information? Type or speak a word or two, and the answer pops up almost instantly, picked from a giant pile of information comprised of most of the world's knowledge. Hear a song you like? Hold up your phone, tap a button, identify the song, buy it, and then listen to it on any device, anywhere in the world. Need to know how to get somewhere? Your phone (or your glasses or watch) will literally tell you how, and show you the traffic along the way. Traveling to a foreign country? Talk into your phone (or your glasses or watch) and see or hear your words translated into practically any language on the planet, or point it at a sign and read it in your native tongue. Like art? You can virtually walk through many of the world's greatest museums

10. It's called "cloud computing" because the old programs to draw network schematics surrounded the icons for servers with a circle. A cluster of servers in a network diagram had several overlapping circles, which resembled a cloud.

and see their paintings in far greater detail than anyone ever has, except perhaps the artists who created them. Want to know if that restaurant you picked for tonight's date has the right ambience or easy parking? Virtually drive there, walk through the front door, and take a tour inside. Table 14 looks perfect!

When we went to college in the late 1970s and early '80s, we called home once a week, on Sundays, always before five p.m. because that's when the rates went back up. When Jonathan's son was studying in Australia a couple years ago, he occasionally joined the family back home in California for dinner, via video hangout, on a laptop that sat at his place at the table. For free.

What's most astonishing is that these astonishing things aren't astonishing at all. It used to be that the most powerful computers and the best electronics were at the office, and once you left work you had to get by on phones attached to walls, maps on paper, music from radio stations that played what they felt like playing, and televisions brought in by two big guys and attached to cables or antennae. These aspects of life remained practically unchanged for years. Today, though, wow innovations are commonplace.

Speed

As much as technology has affected consumers, it has had an even bigger impact on businesses. In economic terms, when the cost curves shift downward on a primary factor of production in an industry, big-time change is in store for that industry.[11] Today, *three* factors of production have become cheaper—information, connectivity, and computing power—affecting any cost curves in which those factors are involved. This can't help but have disruptive effects. Many incumbents—aka pre-Internet companies—built their businesses based on assumptions of

11. For those of you who don't speak economist, "downward shifting cost curve" means "stuff that was expensive is now cheap."

scarcity: scarce information, scarce distribution resources and market reach, or scarce choice and shelf space. Now, though, these factors are abundant, lowering or eliminating barriers to entry and making entire industries ripe for change.[12] We saw this first in the media business, whose entire product can now be rendered digitally and sent around the world for free. But practically every industry is, at some level, information-driven. Media, marketing, retail, health care, government, education, financial services, transportation, defense, energy… We can't think of an industry that will escape this era unchanged.

The result of all this turmoil is that product excellence is now paramount to business success—not control of information, not a stranglehold on distribution, not overwhelming marketing power (although these are still important). There are a couple of reasons for this. First, consumers have never been better informed or had more choice.[13] It used to be that companies could turn poor products into winners by dint of overwhelming marketing or distribution strength. Create an adequate product, control the conversation with a big marketing budget, limit customer choice, and you could guarantee yourself a good return. Ever eat at a Bennigan's? A Steak and Ale? In their heyday in the 1980s, these chains had hundreds of locations in the United States, all of them offering perfectly decent food and service.

Things are different today. Cities and suburbs have unique

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12. We borrow the phrase "the economics of abundance" from the technology visionary George Gilder, who has observed that every economic era is based on a key abundance and a key scarcity. (When horsepower was scarce, for example, land was abundant—but the opposite was true in the industrial era, when the cost of horsepower fell to just pennies per kilowatt hour.) The result of cheap bandwidth, as Gilder wrote in a remarkably prescient 1996 essay, is "a completely different computer architecture and information economy. . . . Feeding on low power and high bandwidth, the most common computer of the new era will be a digital cellular phone with an IP address." See George Gilder, "The Gilder Paradigm" (*Wired*, December 1996), reprinted from an issue of the *Gilder Technology Report*.

13. Peter Drucker anticipated this development back in 2001, when he wrote that the center of power has shifted from the supplier to the distributor, and that "in the next thirty years, it will certainly shift to the customer—for the simple reason that the customer now has full access to information worldwide." See Peter Drucker, *The Essential Drucker* (HarperBusiness, 2011), page 348.

restaurants for every taste—locally owned as well as chains—and prospective diners have access to a wealth of information about their quality, from both professional critics and citizen reviewers, on sites ranging from Chowhound to Yelp. With so much information and so many good choices, it's harder for an incumbent, crummy restaurant (chain or not) to survive, regardless of the size of its marketing budget, and easier for a new, high-quality place to gain a word-of-mouth foothold.[14] The same is true of cars, hotels, toys, clothes, and any other product or service that people can research online. The customer has abundant choice, with practically infinite digital shelf space (YouTube has well over a million channels; Amazon sells over fifty thousand books about business leadership alone). And the customer has a voice; provide a bad product or lousy service at your peril.

We've experienced this phenomenon firsthand several times in the Internet Age. When Jonathan worked at Excite@Home and wanted to strike up a search partnership with Google, his CEO decided not to do the deal, telling Jonathan that "Google's search engine is better, but we'll out-market them." Excite@Home is gone, so that obviously didn't work out very well. (On the plus side, the "@" symbol has gone on to be a huge sensation!) Excite@Home's management wasn't unique in its belief in the power of brand and marketing to carry less-than-brilliant products. Have you ever heard of Google Notebook? How about Knol? iGoogle? Wave? Buzz? PigeonRank?[15] These were all Google products that, while they had some merit, never caught on with users. They weren't good enough, and so they died a deserved death. The tailwind of Google's marketing and PR engine and brand wasn't nearly strong

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14. An economist at the Harvard Business School studied the impact of Yelp on restaurant revenues, finding that positive reviews boost sales in independent restaurants (as opposed to chains). As a result, in markets with a high level of Yelp use, chain restaurants have lost customers. See Michael Luca, "Reviews, Reputation, and Revenue: The Case of Yelp.com" (Harvard Business School Working Paper, September 2011).

15. PigeonRank utilized "pigeon clusters (PCs)" to compute the relative value of web pages. Its demise was particularly quick: It launched on the morning of April 1, 2002, and was shut down at midnight that same day.

enough to overcome a headwind of mediocrity. As Jeff Bezos, founder and CEO of Amazon, says: "In the old world, you devoted 30 percent of your time to building a great service and 70 percent of your time to shouting about it. In the new world, that inverts."[16]

The second reason product excellence is so critical is that the cost of experimentation and failure has dropped significantly. You see this most dramatically in high-tech industries, where a small team of engineers, developers, and designers can create fabulous products and distribute them online globally for free. It's ridiculously easy to imagine and create a new product, try it out with a limited set of consumers, measure precisely what works and what doesn't, iterate the product, and try again. Or throw it out and start over, that much smarter for the experience.

But experimentation costs are lower for manufactured goods as well. One can model prototypes digitally, build them with a 3-D printer, market test them online, adjust their design based on the resulting data, and even raise production funds online with a prototype or slick video. Google [x], a team working on some of Google's most ambitious projects, built the first prototype of Google Glass, a wearable mobile computer as light as a pair of sunglasses, in just ninety minutes. It was quite crude, but served a powerful purpose: Don't tell me, show me.

Product development has become a more flexible, faster process, where radically better products don't stand on the shoulders of giants, but on the shoulders of lots of iterations. The basis for success then, and for continual product excellence, is speed.

Unfortunately, like Jonathan's failed gate-based product development framework, most management processes in place at companies today are designed with something else in mind. They were devised over a century ago, at a time when mistakes were expensive and only

16. Quoted in George Anders, "Jeff Bezos's Top 10 Leadership Lessons" (*Forbes*, April 23, 2012).

the top executives had comprehensive information, and their primary objectives are lowering risk and ensuring that decisions are made only by the few executives with lots of information. In this traditional command-and-control structure, data flows up to the executives from all over the organization, and decisions subsequently flow down. This approach is *designed* to slow things down, and it accomplishes the task very well. Meaning that at the very moment when businesses must permanently accelerate, their architecture is working against them.

The "smart creative"

The good news is that those same economics of abundance that are roiling industries are churning up workplaces too. Today's work environment is radically different than it was in the twentieth century. As already noted, experimentation is cheap and the cost of failure—if done well—is much lower than it used to be. Plus, data used to be scarce and computing resources precious; today both are abundant, so there's no need to hoard them. And collaboration is easy, across a room, a continent, or an ocean. Put these factors together, and you suddenly have an environment where employees, from individual contributors to managers to executives, can have an inordinately big impact.

The default term today for these employees—the ones working in information-based jobs who, to put it way too simplistically, think for a living—is "knowledge workers." This is a label that management guru Peter Drucker first coined in 1959 in a book called *Landmarks of Tomorrow*.[17] Much of Drucker's subsequent work talked about how to make these knowledge workers more productive, and use of the term has risen steadily since the 1960s. Typically, the most valuable knowledge workers are the ones who thrive in the straitjacketed world of corporate process, by building deep expertise in a narrow set of skills. ("Morty? He's our spreadsheet guy. Vicki? She's our warehouse go-to.

17. Peter F. Drucker, *Landmarks of Tomorrow* (Harper, 1959).

Pete? He runs the basketball pool.") They don't seek mobility; organizational status quo is where they excel. Great companies such as IBM, General Electric, General Motors, and Johnson & Johnson offer management tracks for people with the greatest potential, whereby these stars rotate in and out of different roles every two years or so. But this approach emphasizes the development of management skills, not technical ones. As a result, most knowledge workers in traditional environments develop deep technical expertise but little breadth, or broad management expertise but no technical depth.

When we contrast the traditional knowledge worker with the engineers and other talented people who have surrounded us at Google over the past decade+, we see that our Google peers represent a quite different type of employee. They are not confined to specific tasks. They are not limited in their access to the company's information and computing power. They are not averse to taking risks, nor are they punished or held back in any way when those risky initiatives fail. They are not hemmed in by role definitions or organizational structures; in fact, they are encouraged to exercise their own ideas. They don't keep quiet when they disagree with something. They get bored easily and shift jobs a lot. They are multidimensional, usually combining technical depth with business savvy and creative flair. In other words, they are not knowledge workers, at least not in the traditional sense. They are a new kind of animal, a type we call a "smart creative," and they are the key to achieving success in the Internet Century.

The primary objective of any business today must be to increase the speed of the product development process and the quality of its output. Since the industrial revolution, operating processes have been biased toward lowering risk and avoiding mistakes. These processes, and the overall management approach from which they were derived, result in environments that stifle smart creatives. Now, though, the defining characteristic of today's successful companies is the ability to continually deliver great products. And the only way to do that is to attract smart creatives and create an environment where they can succeed at scale.

And who, exactly, is this smart creative?

A smart creative has deep technical knowledge in how to use the tools of her trade,[18] and plenty of hands-on experience. In our industry, that means she is most likely a computer scientist, or at least understands the tenets and structure of the systems behind the magic you see on your screens every day. But in other industries she may be a doctor, designer, scientist, filmmaker, engineer, chef, or mathematician. She is an expert in doing. She doesn't just design concepts, she builds prototypes.

She is analytically smart. She is comfortable with data and can use it to make decisions. She also understands its fallacies and is wary of endless analysis. Let data decide, she believes, but don't let it take over.

She is business smart. She sees a direct line from technical expertise to product excellence to business success, and understands the value of all three.

She is competitive smart. Her stock-in-trade starts with innovation, but it also includes a lot of work. She is driven to be great, and that doesn't happen 9-to-5.

She is user smart. No matter the industry, she understands her product from the user or consumer's perspective better than almost anyone. We call her a "power user," not just casual but almost obsessive in her interest. She is the automotive designer who spends her weekends fixing up that '69 GTO, the architect who can't stop redesigning her house. She is her own focus group, alpha tester, and guinea pig.

A smart creative is a firehose of new ideas that are genuinely new. Her perspective is different from yours or ours. It's even occasionally different from her own perspective, for a smart creative can play the perspective chameleon when she needs to.

She is curious creative. She is always questioning, never satisfied

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18. The English language requires that we choose a gender when using pronouns, and we find that using pronouns makes the task of authorship easier. In this section, we describe our smart creative as a she. In others, she's a he.

with the status quo, seeing problems to solve everywhere and thinking that she is just the person to solve them. She can be overbearing.

She is risky creative. She is not afraid to fail, because she believes that in failure there is usually something valuable she can salvage. Either that, or she is just so damned confident she knows that even in the event that she does fail, she can pick herself up and get it right the next time around.

She is self-directed creative. She doesn't wait to be told what to do and sometimes ignores direction if she doesn't agree with it. She takes action based on her own initiative, which is considerable.

She is open creative. She freely collaborates, and judges ideas and analyses on their merits and not their provenance. If she were into needlepoint, she would sew a pillow that said, "If I give you a penny, then you're a penny richer and I'm a penny poorer, but if I give you an idea, then you will have a new idea but I'll have it too." Then she would figure out a way to make the pillow fly around the room and shoot lasers.

She is thorough creative. She is always on and can recite the details, not because she studies and memorizes, but because she knows them. They are *her* details.

She is communicative creative. She is funny and expresses herself with flair and even charisma, either one-to-one or one-to-many.

Not every smart creative has all of these characteristics, in fact very few of them do. But they all must possess business savvy, technical knowledge, creative energy, and a hands-on approach to getting things done. Those are the fundamentals.

Perhaps the best thing about smart creatives is that they are everywhere. We have worked with plenty of smart creatives who boast computer science degrees from elite universities, but plenty more who don't. In fact, smart creatives can be found in every city, in every school, in every class and demographic, and in most businesses, nonprofits, and government organizations: the ambitious ones of all ages who are eager (and able) to use the tools of technology to do a lot more. Their common characteristic is that they work hard and are willing to

question the status quo and attack things differently. This is why they can have such an impact.

It is also why they are uniquely difficult to manage, especially under old models, because no matter how hard you try, you can't tell people like that how to think. If you can't tell someone how to think, then you have to learn to manage the environment *where* they think. And make it a place where they want to come every day.

A fun project for the two of us

Which brings us back to our journey at Google. By the time we delivered that business plan to the board back in 2003, we knew that we had to do what so many business leaders are faced with today: reinvent our rules for management and create and maintain a new kind of work environment where our amazing smart-creative employees could thrive, in our case in a company growing by leaps and bounds. While we were brought into Google to provide "adult supervision," to succeed we ended up having to relearn everything we thought we knew about management, and our best teachers were the people who surrounded us every day at the Googleplex.

We've been working on this ever since, and along the way, like all good students, we kept notes. Whenever we heard something interesting in a staff meeting or product review, we scribbled it down. When Eric wrote his periodic memos to Googlers about the company's priorities, Jonathan would note its best sections and stow them away for later use. When Jonathan sent emails to the product team, lauding a practice that was working well or calling out one that wasn't, Eric would add his own opinions and analysis. Over time, we started to create a framework for how to manage in this new world.

Then, a few years ago, Nikesh Arora, who heads Google global sales and business operations, asked Jonathan to give a talk to a group of Google sales leaders from around the world. Nikesh is himself a

prototypical smart creative. He holds a degree in electrical engineering from the Indian Institute of Technology and joined Google in 2004 to run sales in Europe, despite not having much experience leading a sales organization of that size. He came to California in 2009 to run the global business team. Nikesh always excels, so Jonathan knew the bar was set very high for this particular talk. Google had passed its first decade and was growing like crazy, and Nikesh wanted Jonathan to pass some of the tribal wisdom that he and Eric had accumulated about managing at Google to our next generation of leaders. This was a perfect opportunity to pull together all of those notes on what the "students" had learned from the "teachers" over the years.

The talk was very well received, so we turned it into a management seminar for Google directors, meeting with small groups of Google leaders to review our principles and swap stories about managing smart creatives. Finally, Eric did what all great managers do when they want something to happen: He proposed an idea. His email read:

> I'm sufficiently impressed with the work here that I propose that Jonathan and I write a book on management.
>
> Of course due to the principles we will espouse in the book Jonathan will do all the work and I will get all the credit :) that was a joke.
>
> In any case I think it would be a fun project for the two of us.
>
> Jonathan what do you say?

Eric was inspired by a John Chambers talk he once heard. Chambers, the highly respected CEO of Cisco, had recounted how, when he was starting out at Cisco in the early 1990s, he met every few months with Lew Platt, then the CEO of Hewlett Packard, to talk strategy and management. At one point an appreciative John asked Lew why he was

investing so much of his valuable time to help out a young executive at a different company. "This is the way Silicon Valley works," Mr. Platt replied. "We're here to help you."

Steve Jobs, the late founder and CEO of Apple, who often provided his neighbor Larry Page with advice, had a more colorful way of expressing this same spirit. Our friend Leslie Berlin, the Silicon Valley historian, was researching a biography on Intel cofounder Bob Noyce, and asked Steve during an interview why he had spent so much time with Noyce early in his career. "It's like what Schopenhauer said about the conjurer," Steve replied. He retrieved a book of essays by nineteenth-century German philosopher Arthur Schopenhauer, and read her a passage from one with the chipper title of "On the Sufferings of the World": "He who lives to see two or three generations is like a man who sits some time in the conjurer's booth at a fair, and witnesses the performance twice or thrice in succession. The tricks were meant to be seen only once, and when they are no longer a novelty and cease to deceive, their effect is gone."[19] (We suspect that the ability to pull out a Schopenhauer quote during an interview was precisely one of those tricks.)

We both came to Google as seasoned business executives who were pretty confident in our intellects and abilities. But over the humbling course of a decade, we came to see the wisdom in John Wooden's observation that "it's what you learn after you know it all that counts."[20] We had a front-row seat as we helped our founders and colleagues create a magnificent company—you might say that we saw the conjurers at work—and used it to relearn everything we thought we knew about management. Today we see all sorts of companies and organizations, big and small, from all industries and all over the world, come to

19. Arthur Schopenhauer, *Essays and Aphorisms* (Penguin, 1970).

20. Coach Wooden, who died in 2010 at the age of ninety-nine, won ten national championships while coaching men's basketball at UCLA. But he coached there for fifteen years before winning the first of those championships, so he knew something about learning. See John Wooden and Steve Jamison, *Wooden on Leadership* (McGraw-Hill, 2005), page 34.

Silicon Valley to see if they can soak up the insights and energy that make it such a special place. People are eager for change, and that's what this book is about: In the spirit of our forefathers here in Silicon Valley, we'd like to share some of the conjurers' secrets and translate them into lessons that anyone can use.

Our book is organized to mirror the development stages of a successful, growing business or new venture, which can become a self-perpetuating virtuous cycle, sort of like a snowball rolling down the hill, getting bigger as it picks up momentum. We prescribe a series of steps businesses can follow to attract and motivate smart creatives, each of which propels the business to the next step. The steps build and depend on each other, but none of them is ever completed and all of them are dynamic.

We open by discussing how to attract the best smart creatives, which starts with culture, because culture and success go hand in hand, and if you don't believe your own slogans you won't get very far. We then cover strategy, because smart creatives are most attracted to ideas that are grounded in a strong strategic foundation. They know that business plans aren't nearly as important as the pillars upon which they are built. Then, hiring, which is the most important thing a leader does. Hire enough great people, and the resulting intellectual mixture will inevitably combust into creativity and success.

The team is hired, the business grows, now the time comes to make hard decisions. This is where we talk about consensus and how to get there. Our following chapter is about communications, which become vital (and harder) as the organization grows. Innovation is up next, since the only way to achieve sustained success is through continuous product excellence, and an environment of innovative primordial ooze is the only way to get there. We conclude with some thoughts on incumbents and how to imagine the unimaginable.

Pyramids unbuilt

None of this is easy, and many of our lessons we learned the hard way, through long meetings, contentious struggles, and errors. We also humbly acknowledge our great luck in having joined a spectacular company, run by brilliant founders, at the unique moment in history when the Internet was taking off. We weren't quite born on third base thinking we had hit a triple, but first or second sounds about right.

We certainly don't have all the answers, but we have learned a lot about this new world where technology reigns supreme and employees are uniquely empowered to make a big difference. We believe that these lessons could perhaps provide insights and ideas for leaders of all types of organizations, from large enterprises to new start-ups, from nonprofits to NGOs to governments, or at least provoke informed discussions of how our experiences at Google might apply in other companies and realms. But mostly, our hope is that we can give you—along with a good read—the ideas and tools to go build something new.

And when we say "you," we mean you, entrepreneur. You are out there. You may not think of yourself as an entrepreneur yet, but you are. You have an idea you're sure will change everything; you might have a prototype, or even a first version of a product. You're smart, ambitious, and hunkered down in a conference room, garage, office, café, apartment, or dorm room, alone or with your small team. You think about your idea even when you're supposed to be doing something else, like studying, performing your day job, or spending time with your kids and partner. You are about to launch a new venture, and we'd like to help.

And when we say "venture," we aren't restricting ourselves to the technology start-ups that surround us here in Silicon Valley. Employees expect much more from their companies now, and they are often not getting it. This is an opportunity: The principles that we talk about apply to anyone who is trying to start a new venture or initiative, either from scratch or from within an existing organization. They aren't just

for start-ups, and they aren't just for high-tech businesses. In fact, when skilled leaders can harness all of the great assets of an ongoing organization, that organization can have a far greater impact than a start-up. So just because you don't have a hoodie and a seven-figure check from a venture capitalist, that doesn't mean you can't create the next big thing. All you need is the insight that your industry is transforming at a rapid pace, the guts to take a risk and be part of that transformation, and the willingness and ability to attract the best smart creatives and lead them to make it happen.

Is that you? Are you ready? As Peter Drucker pointed out, the Egyptian who conceived and built the pyramids thousands of years ago was really just a very successful manager.[21] The Internet Century brims with pyramids yet unbuilt. Let's get started.

And this time, with no slave labor.

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21. Peter F. Drucker, *The Essential Drucker* (HarperBusiness, 2011), pages 312–13. Drucker writes, "Management as a *practice* is very old. The most successful executive in all history was surely that Egyptian who, forty-seven hundred years or more ago, first conceived the pyramid—without any precedent—and designed and built it, and did so in record time."