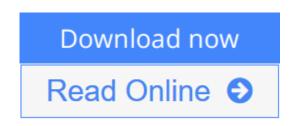# Bold: How to Go Big, Create Wealth and Impact the World

By Peter H. Diamandis, Steven Kotler

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"A visionary roadmap for people who believe they can change the world—and invaluable advice about bringing together the partners and technologies to help them do it." —President Bill Clinton

A radical, how-to guide for using exponential technologies, moonshot thinking, and crowd-powered tools, *Bold* unfolds in three parts. Part One focuses on the exponential technologies that are disrupting today's Fortune 500 companies and enabling upstart entrepreneurs to go from "I've got an idea" to "I run a billion-dollar company" far faster than ever before. The authors provide exceptional insight into the power of 3D printing, artificial intelligence, robotics, networks and sensors, and synthetic biology. Part Two draws on insights from billionaires such as Larry Page, Elon Musk, Richard Branson, and Jeff Bezos and reveals their entrepreneurial secrets. Finally, *Bold* closes with a look at the best practices that allow anyone to leverage today's hyper-connected crowd like never before. Here, the authors teach how to design and use incentive competitions, launch million-dollar crowdfunding campaigns to tap into tens of billions of dollars of capital, and finally how to build communities—armies of exponentially enabled individuals willing and able to help today's entrepreneurs make their boldest dreams come true.

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Editorial Review

Review
"*Bold* is a visionary roadmap for people who believe they can change the world---and offers invaluable advice about bringing together the partners and technologies to help them do it."<??> (President Bill Clinton)

"BOLD is an essential navigation tool for any proactive CEO who wants to remain relevant. In the next decade it is reasonable to assume that some of the corporations at the top of the Fortune 500 will be displaced by the 'exponential entrepreneur'. History tells us that if we don't proactively change and adapt, change will be imposed on us. BOLD, spells out the implications and opportunities driven by exponential changes transforming our world." (Jim Moffatt, CEO of U.S. Deloitte Consulting, LLP)

"*Abundance* showed us where our world can be in 20 years. *BOLD* is a roadmap for entrepreneurs to help us get there." (Eric Schmidt, Executive Chairman, Google)

"If you read one business book in the twenty-first century, this should be the one. When Peter and I cofounded Singularity University, we based it on the ideas of exponential change and 'learn by doing.' This book clearly explains how to apply these concepts to change the world and overcome the age old afflictions of human civilization."- (Ray Kurzweil, inventor, author, director of engineering at Google, Chancellor of Singularity University)

"In BOLD, Diamandis and Kotler have written another dazzler. A riveting look inside the world of exponential entrepreneurship—action-packed and action-oriented. I've purchased a copy for my entire team at Cisco." (Padmasree Warrior, CTO & Chief Strategy Office, CISCO)

"I loved Peter Diamandis' and Steven Kotler's book *Abundance*, their writing and their Vision. *BOLD* is an amazing sequel, a book that every entrepreneur should read. It is inspiring, filled with incredible insights and offers a practical how-to game plan for going big and impacting the world." (Michael Dell, CEO, Dell Computers)

"Expressed with sunny optimism and promise, Diamandis and Kotler share their extensive experience and knowledge, hoping to boost innovative potential within the technology startup arena and inspire readers to "get off the couch and change the world." An empowering and multifaceted "playbook" for the creative entrepreneur." (Kirkus)

"This is a manual for today's big thinkers to become tomorrow's bold leaders, using crowd-powered tools accessible to everyone." (Booklist)

"This invigorating discussion drives home the point that with better tools than we've ever had before, what we need most of all are great leaders." (Publishers Weekly)

"It makes bold predictions and teaches entrepreneurs how to thrive in the same way as our mammalian ancestors: by being nimble and resilient." (HuffingtonPost.com)

"The infectious optimism of *Bold* is inspirational" (New York Times "DealBook" Blog)

About the Author
Peter H. Diamandis is a *New York Times* bestselling author, and the founder of more than fifteen high-tech companies. He is the CEO of the XPRIZE (XPrize.org), Exec. Chairman of the Singularity University (SingularityU.org). He is Cochairman of Planetary Resources, Inc. and the Cofounder of Human Longevity, Inc. In 2014 he was named one of "The World's 50 Greatest Leaders" by *Fortune* Magazine.

Steven Kotler is a *New York Times* bestselling author, award-winning journalist and the Cofounder and Director of Research for the Flow Genome Project (FlowGenomeProject.co). His work has been translated into thirty-five languages and his articles have appeared in over seventy publications.

CHAPTER ONE

Good-bye, Linear Thinking . . . Hello, Exponential

Birth of a Behemoth

The year was 1878. George Eastman was a twenty-four-year-old junior clerk at the Rochester Savings Bank in need of a vacation. He chose to go to Santo Domingo, in the Dominican Republic. At the suggestion of a coworker, Eastman bought all the requisite photographic equipment to make a record of the trip. It was a lot of equipment: a camera as big as a Rottweiler, a massive tripod, a jug of water, a heavy plateholder, the plates themselves, glass tanks, an assortment of chemicals, and, of course, a large tent—this last item providing a dark place in which to spread emulsion on the plates before exposure and a dark place to develop them afterwards. Eastman never did go on that vacation.1

Instead, he got obsessed with chemistry. Back then photography was a "wet" art, but Eastman, who craved a more portable process, read about gelatin emulsions capable of remaining light-sensitive after drying. Working at night, in his mother's kitchen, he began to experiment with his own varieties. A natural-born tinkerer, Eastman took less than two years to invent both a dry plate formula and a machine that fabricated dry plates. The Eastman Dry Plate Company was born.

More tinkering followed. In 1884, Eastman invented roll film; four years later he came up with a camera capable of taking advantage of that roll. In 1888, that camera became commercially available, later marketed under the slogan "You press the button, we do the rest."2 The Eastman Dry Plate Company had become the Eastman Company, but that name wasn't quite catchy enough. Eastman wanted something stickier, something that people would remember and talk about. One of his favorite letters was K. In 1892, the Eastman Kodak Company was born.

In those early years, if you would have asked George Eastman about Kodak's business model, he would have said the company was somewhere between a chemical supply house and a dry goods purveyor (if dry plates can be considered dry goods). But that changed quickly. "The idea gradually dawned on me," Eastman said, "that what we were doing was not merely making dry plates, but that we started out to make photography an everyday affair."3 Or, as Eastman later rephrased it, he wanted to make photography "as convenient as a

pencil."

And for the next hundred years, Eastman Kodak did just that.

The Memory Business

Steven Sasson is a tall man with a lantern jaw. In 1973, he was a freshly minted graduate of the Rensselaer Polytechnic Institute. His degree in electrical engineering led to a job with Kodak's Apparatus Division research lab, where, a few months into his employment, Sasson's supervisor, Gareth Lloyd, approached him with a "small" request. Fairchild Semiconductor had just invented the first "charge-coupled device" (or CCD)—an easy way to move an electronic charge around a transistor—and Kodak needed to know if these devices could be used for imaging.4 Could they ever.

By 1975, working with a small team of talented technicians, Sasson used CCDs to create the world's first digital still camera and digital recording device. Looking, as Fast Company once explained, "like a '70s Polaroid crossed with a Speak-and-Spell,"5 the camera was the size of a toaster, weighed in at 8.5 pounds, had a resolution of 0.01 megapixel, and took up to thirty black-and-white digital images—a number chosen because it fell between twenty-four and thirty-six and was thus in alignment with the exposures available in Kodak's roll film. It also stored shots on the only permanent storage device available back then—a cassette tape. Still, it was an astounding achievement and an incredible learning experience.

Portrait of Steven Sasson with first digital camera, 2009

Source: Harvey Wang, From Darkroom to Daylight

"When you demonstrate such a system," Sasson later said, "that is, taking pictures without film and showing them on an electronic screen without printing them on paper, inside a company like Kodak in 1976, you have to get ready for a lot of questions. I thought people would ask me questions about the technology: How'd you do this? How'd you make that work? I didn't get any of that. They asked me when it was going to be ready for prime time? When is it going to be realistic to use this? Why would anybody want to look at their pictures on an electronic screen?"6

In 1996, twenty years after this meeting took place, Kodak had 140,000 employees and a $28 billion market cap. They were effectively a category monopoly. In the United States, they controlled 90 percent of the film market and 85 percent of the camera market.7 But they had forgotten their business model. Kodak had started out in the chemistry and paper goods business, for sure, but they came to dominance by being in the convenience business.

Even that doesn't go far enough. There is still the question of what exactly Kodak was making more convenient. Was it just photography? Not even close. Photography was simply the medium of expression—but what was being expressed? The "Kodak Moment," of course—our desire to document our lives, to capture the fleeting, to record the ephemeral. Kodak was in the business of recording memories. And what made recording memories more convenient than a digital camera?

But that wasn't how the Kodak Corporation of the late twentieth century saw it. They thought that the digital camera would undercut their chemical business and photographic paper business, essentially forcing the company into competing against itself. So they buried the technology. Nor did the executives understand how a low-resolution 0.01 megapixel image camera could hop on an exponential growth curve and

eventually provide high-resolution images. So they ignored it. Instead of using their weighty position to corner the market, they were instead cornered by the market.

Do the Math

Back in 1976, when Steven Sasson first demonstrated the digital camera at Kodak, he was immediately asked for a ready-for-prime-time estimate. How long, frightened executives wanted to know, until his new invention posed a serious threat to the company's market dominance? Fifteen to twenty years, Sasson said.8

In arriving at this answer, Sasson made a quick estimation and did a quick calculation. He estimated the number of megapixels that would satisfy an average consumer at two million. Then, in order to figure out the time it would take for these two million megapixels to become commercially available, Sasson relied on Moore's law for his calculation—and that's where the trouble started.

In 1965, Gordon Moore, the founder of Intel, noticed the number of integrated circuits on a transistor had been doubling every twelve to twenty-four months. The trend had been going on for about a decade and, Moore predicted, would probably last for another.9 About this last part, he was off by a bit. All told, Moore's law has held steady for nearly sixty years. This relentless progress in price and performance is the reason the smartphone in your pocket is a thousand times faster and million times cheaper than a supercomputer from the 1970s. It is exponential growth in action.

Unlike the +1 progression of linear growth, wherein 1 becomes 2 becomes 3 becomes 4 and so forth, exponential growth is a compound doubling: 1 becomes 2 becomes 4 becomes 8 and so on. And this is the problem: This doubling is unusually deceptive. If I take 30 large linear steps (say three feet, or one meter per step) from my Santa Monica living room, I end up 30 meters away, or roughly across the street. If, alternatively, I take 30 exponential steps from the same starting point, I end up a billion meters away, or orbiting the Earth 26 times. And this was exactly where Kodak went wrong—they underestimated the power of exponentials.

The Six Ds

Underestimating the power of exponentials is easy to do. We hominids evolved in a world that was local and linear. Back then, life was local because everything in our forebears' lives was usually within a day's walk. If something happened on the other side of the planet, we knew nothing about it. Life was also linear, meaning nothing changed over centuries or even millennia. In stark contrast, today we live in a world that is global and exponential. The problem is that our brains—and thus our perceptual capabilities—were never designed to process at either this scale or this speed. Our linear mind literally cannot grok exponential progression.

But if the goal is to avoid Kodak's errors (if you're a company) or to exploit Kodak's errors (if you're an entrepreneur), then you need to have a better understanding of how this change unfolds—and that means understanding the hallmark characteristics of exponentials. To teach these, I have developed a framework called the Six Ds of Exponentials: digitalization, deception, disruption, demonetization, dematerialization, and democratization. These Six Ds are a chain reaction of technological progression, a road map of rapid development that always leads to enormous upheaval and opportunity.

So let's follow the chain reaction.

The 6 Ds of Exponentials: Digitalization, Deception, Disruption, Demonetization, Dematerialization, and Democratization

Digitalization. This idea starts with the fact that culture makes progress cumulative. Innovation occurs as humans share and exchange ideas. I build on your idea; you build on mine. This type of exchange was slow in the early days of our species (when all we had as a means of transmission was storytelling around the campfire), picked up with the printing press, then exploded with the digital representation, storage, and exchange of ideas made possible by computers. Anything that could be digitized—that is, represented by ones and zeros—could spread at the speed of light (or at least the speed of the Internet) and became free to reproduce and share. Moreover, this spreading followed a consistent pattern: an exponential growth curve. In Kodak's case, once the memory business went from a physical process (that is to say, imaged on film, stored on paper) to a digital process (imaged and stored as ones and zeros), its growth rate became entirely predictable. It was now on an exponential curve.

Of course, it's not just Kodak. Anything that becomes digitized (biology, medicine, manufacturing, and so forth) hops on Moore's law of increasing computational power.10 Thus the first of our Ds is digitalization, for the simple reason that once a process or product transitions from physical to digital, it becomes exponentially empowered.

Deception. What follows digitalization is deception, a period during which exponential growth goes mostly unnoticed. This happens because the doubling of small numbers often produces results so minuscule they are often mistaken for the plodder's progress of linear growth. Imagine Kodak's first digital camera with 0.01 megapixels doubling to 0.02, 0.02 to 0.04, 0.04 to 0.08. To the casual observer, these numbers all look like zero. Yet big change is on the horizon. Once these doublings break the whole-number barrier (become 1, 2, 4, 8, etc.), they are only twenty doublings away from a millionfold improvement, and only thirty doublings away from a billionfold improvement. It is at this stage that exponential growth, initially deceptive, starts becoming visibly disruptive.

Disruption. In simple terms, a disruptive technology is any innovation that creates a new market and disrupts an existing one. Unfortunately, as disruption always follows deception, the original technological threat often seems laughably insignificant. Take the first digital camera. Kodak took great pride in things like convenience and image fidelity. Neither were present in Sasson's original offering. His camera took twenty-three seconds to snap and store a 0.01 megapixel, black-and-white photograph. Well, no threat there.

In the eyes of the Kodak brass, Sasson's innovation would remain more toy than tool for many years to come. With their focus on the quarterly profits of their chemicals and paper business, they didn't understand the disruption soon to be wrought by exponentials. If Kodak had done the math, their executives would have realized that the desire to not compete against themselves was actually a decision to put themselves out of business.

And out of business is where the company went. By the time Kodak realized its error, it was unable to keep pace with the digitalization of the industry. Kodak began to struggle in the nineties and stopped turning a profit by 2007, then filed for Chapter 11 in January of 2012.11 Because it forgot its mission and failed to do the math, a gargantuan hundred-plus-year-old industry foundered and became yet another cautionary tale about the disruptive nature of exponential growth.

We live in an exponential era. This kind of disruption is a constant. For anyone running a business—and this goes for both start-ups and legacy companies—the options are few: Either disrupt yourself or be disrupted by someone else.

The Last Three Ds

Digitalization, deception, and disruption have radically reshaped our world, but the chain reaction we're tracking is cumulative. Thus the three Ds that follow—demonetization, dematerialization, and democratization—are far more potent than their predecessors.

Demonetization. This means the removal of money from the equation. Consider Kodak. Their legacy business evaporated when people stopped buying film. Who needs film when there are megapixels? Suddenly one of Kodak's once-unassailable revenue streams came free of charge with any digital camera.

In one sense, this transformation is the downstream version of what former Wired editor-in-chief Chris Anderson meant in his book Free. In Free, Anderson argues that in today's economy one of the easiest ways to make money is to give stuff away.12 Here's how he explains it:

I'm typing these words on a $250 "netbook" computer, which is the fastest growing new category of laptop. The operating system happens to be a version of free Linux, although it doesn't matter since I don't run any programs but the free Firefox Web browser. I'm not using Microsoft Word, but rather free Google Docs, which has the advantage of making drafts available to me wherever I am, and I don't have to worry about backing them up since Google takes care of that for me. Everything else I do on this computer is free, from my email to my Twitter feeds. Even the wireless access is free, thanks to the coffee shop I'm sitting in.

And yet Google is one of the most profitable companies in America, the Linux ecosystem is a $30 billion industry, and the coffee shop seems to be selling $3 lattes as fast as they can make them.

Billions and billions in goods and services, as Anderson pointed out, are now changing hands sans cost. Now, sure, there is loss-leader free—as with Google's giving away their browser but making a killing off the information they gather along the way—and there's open-source efforts like Wikipedia, Linux, and all the rest, which are actually free. Either way, it's a shadow economy, yet happening in plain sight. Literally. At the time Anderson wrote Free, beyond a few extremely obscure papers, economists had not studied the idea of free in the marketplace. It was a blank spot on the map. In other words, even people who make their living studying economic trends were fooled. Once demonetization arrived, they didn't know what hit them.

Nor is it just economists or, for that matter, Kodak executives. Skype demonetized long-distance telephony; Craigslist demonetized classified advertising; Napster demonetized the music industry. This list goes on and on. More critically, because demonetization is also deceptive, almost no one within those industries was prepared for such radical change.

Dematerialization. While demonetization describes the vanishing of the money once paid for goods and services, dematerialization is about the vanishing of the goods and services themselves. In Kodak's case, their woes didn't end with the vanishing of film. Following the invention of the digital camera came the invention of the smartphone—which soon came standard with a high-quality, multi-megapixel camera. Poof! Now you see it; now you don't. Once those smartphones hit the market, the digital camera itself dematerialized. Not only did it come free with most phones, consumers expected it to come free with most phones. In 1976, Kodak controlled 85 percent of the camera business. By 2008—one year after the introduction of the first iPhone (the first smart phone with a high-quality digital camera)—that market no

longer existed.

How Many Photos Are Taken Each Year?

The decline of print and explosion of digital photography

Source: http://digital-photography-school.com/history-photography

What makes this story even stranger is that Kodak knew this change was coming. Moore's law was well established at that point, already driving the ceaseless expansion of memory storage capacity, the process that would lead to the demonetization of photography. Kodak's engineers surely knew this. They arguably also knew about Hendy's law—which states that the number of pixels per dollar found in digital cameras doubles every year—as the term was coined by an employee of Kodak Australia, Barry Hendy. The writing wasn't just on the wall for Kodak—they had put it there themselves. Yet Kodak still failed to stay ahead of this curve.

Take a look at the chart below.

>$900,000 worth of applications in a smart phone today

Application

$ (2011)

Original Device Name

Year*

MSRP*

2011's $

1

Video conferencing

free

Compression Labs VC

1982

$250,000

$586,904

2

GPS

free

TI NAVSTAR

1982

$119,900

$279,366

3

Digital voice recorder

free

SONY PCM

1978

$2,500

$8,687

4

Digital watch

free

Seiko 35SQ Astron

1969

$1,250

$7,716

5

5 Mpixel camera

free

Canon RC-701

1986

$3,000

$6,201

6

Medical library

free

e.g. CONSULTANT

1987

Up to $2,000

$3,988

7

Video player

free

Toshiba V-8000

1981

$1,245

$3,103

8

Video camera

free

RCA CC010

1981

$1,050

$2,617

9

Music player

free

Sony CDP-101 CD player

1982

$900

$2,113

10

Encyclopedia

free

Compton's CD Encyclopedia

1989

$750

$1,370

11

Videogame console

free

Atari 2600

1977

$199

$744

Total

free

$902,809

*Year of Launch

The roughly $900,000 worth of applications in a smart phone today

* Manufacturer's Suggested Retail Price

It shows all the 1980s luxury technologies that have dematerialized and now come standard with your average smartphone. An HD video camera, two-way video conferencing (via Skype), GPS, libraries of books, your record collection, a flashlight, an EKG, a full videogame arcade, a tape recorder, maps, a calculator, a clock . . . just to name a few. Thirty years ago the devices in this collection would have cost hundreds of thousands of dollars; today they come free or as apps on your phone. And smartphones are the fastest-spreading technology in humanity's history.

Democratization. Obviously, this chain of vanishing returns has to end somewhere. Sure, film and cameras now come free with smartphones, but there are still the hard costs of the phone with which to contend. Democratization is what happens when those hard costs drop so low they becomes available and affordable to just about everyone. To put this in perspective, let's return to Kodak.

The company didn't just make money selling cameras and selling film, they also sold everything on the back end of the process: they developed the film, manufactured the paper the photographs were printed on, and manufactured the chemicals used to develop that film. Why was this such a good business? First, when you snapped your photos, you had no idea which of them would actually turn out to be any good, so you printed them all. Remember those rolls of film where nothing was in focus? You still paid. Second, snapping photos was only part of the fun; printing extra copies and sharing those photos was the real treat.

Two decades back, the only people who could snap and share at will were those wealthy enough to afford the considerable paper, printing, and processing costs associated with several thousand photographs. But with the digital camera, you gained the benefit of knowing in advance which shots are actually worth printing, and with the creation of photo-sharing websites like Flickr, you could avoid printing altogether. The sharing of images became free, fast, and completely democratized.

Democratization is the end of our exponential chain reaction, the logical result of demonetization and dematerialization. It is what happens when physical objects are turned into bits and then hosted on a digital platform in such high volume that their price approaches zero. Such is the case with today's smartphones and tablets. In fact, it's also the case with wireless connectivity, which is what allows these devices to communicate with the Internet. Right now, Google and Facebook are in an arms race, with plans to spend billions to launch drones, balloons, and satellites capable of providing free or ultra-low-cost Internet access to every human on Earth.13

Many legacy institutions (like Kodak) once were able to make a great living resting on their laurels. According to Yale professor Richard Foster, in the 1920s the average life span of an S&P 500 company was sixty-seven years.14 Not anymore. Today the final three Ds in our chain reaction can disassemble companies and disrupt industries almost overnight, reducing the average life span of a twenty-first-century S&P 500 company to only fifteen years. Ten years from now, according to research done at the Babson School of Business, more than 40 percent of today's top companies will no longer exist.15 "By 2020," comments Foster, "more than three quarters of the S&P 500 will be companies that we have not heard of yet."16

For linear-thinking companies, the six Ds of exponentials are the six horsemen of the apocalypse—no question about it. But this is not a book designed to protect legacies from exponentials. It is a book for entrepreneurs looking to harness the power of exponentials to start building new, bold legacies. For these exponential entrepreneurs, the future is not about disruptive stress; rather, it's frothing with disruptive opportunity.

The New Kodak Moment

In his book Exponential Organizations, Singularity University global ambassador and former head of innovation at Yahoo Salim Ismail defines an exponential organization as one whose impact (or output)—because of its use of networks or automation and/or its leveraging of the crowd—is disproportionally large compared to its number of employees.[17] A linear organization—like, say, Kodak—is the opposite: lots of employees and lots of physical processes and facilities. For all of the twentieth century, exponential organizations did not exist and linear companies were protected from upstart intruders by sheer size. Those days are gone.

In October 2010, a couple of young Stanford grads, Kevin Systrom and Mike Krieger, founded an exponential organization called Instagram. Wired magazine described Instagram as a "Shiva-the-destroyer application posing as a hipster hobby."[18] And what was that hobby exactly? The next step in George Eastman's vision of making photography—to borrow the phrase—as convenient as a pencil.

In this, Instagram was extraordinary. Combined with the explosion of high-resolution multi-megapixel smartphone cameras, this renegade start-up completely demonetized, dematerialized, and democratized the capturing and sharing of photographic memories. Sixteen months after the founding of the company, Instagram was valued at $25 million.

Instagram Number of Users

Sources: http://instagram.com/press;

http://www.macstories.net/news/instagrams-rise-to-30-million-users-visualized/

In April 2012, Instagram for Android was released. Downloaded more than a million times in one day, it was the killer app for the already killer company.[19] Instagram's value shot up to $500 million. Enter Facebook.

Facebook is also in the life-sharing, life-documenting business—and they did the math. Instagram was growing exponentially. With nearly 30 million users, it wasn't just a photo-sharing service; it had become the photo-sharing service, with a very powerful social network to boot. Facebook didn't want the competition, and they didn't want to play catch-up. Thus, on April 9, 2012, just three months after Kodak filed for bankruptcy, Instagram and its thirteen employees were bought by Facebook for $1 billion.[20]

But how is this possible? How did Kodak—a hundred-year-old behemoth with 140,000 employees and a 1996 value of $28 billion—fail to take advantage of the most important photographic technology since roll film and end up in bankruptcy court? Simultaneously, how did a handful of entrepreneurs working out of the proverbial Silicon Valley garage go from start-up to a billion-dollar buyout in eighteen months, with a little more than a dozen employees? Simple: Instagram was an exponential organization.

Welcome to the New Kodak Moment—the moment when an exponential force puts a linear company out of

business. As we shall see over and over again, these New Kodak Moments are not aberrations. Rather, they are the inevitable result of the six Ds of exponential growth. And for those linear-thinking executives trying to hang on to their jobs, this leads us to three final Ds: distraught, depressed, and departed. But for exponential entrepreneurs, these New Kodak Moments are ripe with possibility.

A Question of Scale

Today, exponential technology is not just putting linear companies out of business, it's also putting linear industries out of business. It's shifting the entire landscape, disrupting traditional industrial processes—like the process by which consumer goods are invented and come to market. For the right entrepreneur, there's considerable opportunity within this disruption.

Ben Kaufman was the right entrepreneur.21

Ben Kaufman was born in 1986 and raised on Long Island in New York. He was a horrible student, but also a horribly inventive student. In his senior year of high school, Kaufman decided he wanted to build a "stealth iPod"—a device that would allow him to listen to his iPod shuffle, in class and in secret, without his teacher ever noticing.

So Kaufman came home from school and built a prototype out of spare parts—mainly ribbon and gift wrap paper—proving to himself that the design would work. He also felt that other people would want one as well. But rather than be satisfied with a prototype, he somehow convinced his parents to remortgage their home and lend him $185,000 to take his invention to market. With cash in hand, Kaufman was on the next flight to China.

Once he got to China, Kaufman learned the hard way that creating a consumer product wasn't just about raising the money. "You need access to industrial design, distribution, marketing, branding, packaging . . . There's literally a list of thirty things you need to have to be successful . . . It's just really, really hard."

Kaufman persevered. He founded Mophie, an Apple accessories company, and brought that initial product to market. Then, using his hard-won skills, his company delivered several dozen other Apple accessories. After that came Kaufman's next company, Quirky, the inspiration for which came to him early one morning in New York.

"I was sitting on the subway," he explains, "and there was a woman wearing my first product, the stealth iPod I had prototyped back in high school. Seeing that made me realized that I wasn't unique in having a good idea. What was unique were all the circumstances that lined up in order for me to execute on my idea. It hit me that it wasn't just me. Invention is typically inaccessible. It's really, really hard for everyone."

Standing in the way of invention is financing, engineering, distribution, and legalities—all the myriad quagmires that we loosely call the process of product development. So, in Quirky, Kaufman created a company whose mission is to "make invention accessible." Or as he says: "Make it possible for all people regardless of their love, circumstances, and pedigree to execute on their great ideas."

To do just that, Kaufman swapped out the linear for the exponential, open-sourcing the entire process of product development. A Quirky user simply posts his or her product idea to the site, where other users vote on its feasibility and desirability. And what the crowd likes, the crowd builds, one crowdsourced, open-sourced step at a time. This means the Quirky community will shepherd your idea from prototype onto the shelves at Target, while sidestepping all of the traditional development bottlenecks. That's also where the

name Quirky comes from. "It's a weird way of looking at product development," explains Kaufman. "We're changing the way that communities interact and what they do online together. Now they're not just finding each other and sharing things, they're actually building things."

Quirky launched in 2009, quickly raised over $79 million in funding, and has already introduced several hundred products to market.22 There's a flexible power strip called Pivot Power, a collapsible clothes hanger called Solo. There are new bookcases, backpacks, cord management devices, cleaning products, cooking products, and just about anything else you can imagine. But the real difference is speed. Go back twenty-five years and the time it took for any of these inventions to come to market was measured in years. With Quirky, it takes about four months.

And unlike linear companies, whose old-world structure and processes limit their ability to rapidly introduce new products, Quirky, with a community north of 800,000, has already released over three hundred products and is currently introducing two to three new ones a week. Rather than closed-door design sessions and behind-the-scenes marketing moves, everything at Quirky is transparent, available online, and open to the public. This is to say, everything at Quirky is designed to let any entrepreneur take advantage of the amazing power of exponential organizational tools such as crowdsourcing.

And the entrepreneur should take advantage. The goal here is not to teach you how to become Ben Kaufman, it's to teach you to harness exponential platforms like Quirky, or to encourage you to create similar platforms yourself.

Consider Candace Klein, a crowdsourcing expert and the very busy CEO of Bad Girl Ventures, a company that helps women start businesses. Every Saturday night, Klein gets together with a group of women friends for cocktails. "Some of us run businesses," explains Klein, "and some of us are stay-at-home moms, but we're all really inventive and entrepreneurial. We usually spend Saturday night talking about whatever it is we'd like to invent next. And we park these ideas on Quirky. Sometimes that takes a little work, but most of the time we're done putting the idea onto the site in about fifteen minutes."23

Over the past few years, the ideas that Candace and her cocktail klatch have parked on Quirky have generated over $100,000 in revenue, a six-figure salary for work done while getting buzzed.

But that's not the whole story. Equally important is that Kaufman's success and, by extension, Klein's success, rest upon another radical shift in the playing field—a shift in scale.

In the early days of exponentials, disruptions were of the Kodak variety. Companies that made digitizable goods and services—the publishing business, the music business, the memory business, etc.—were threatened. But Quirky gives us a look at the next level up. It is no longer goods and services being subjected to the Six Ds; it's whole industrial processes. Quirky is an alternative to the entire twentieth-century product development chain—an alternative to every single step in that once hugely capital-intensive process.

And again, it's not just Quirky. Go back ten years, and hospitality and lodging was an incredibly capital-intensive business. If you wanted to build a nationwide chain of available hotel rooms you had to, well, build those actual hotel rooms. But that's not what Airbnb did.

Technically, Airbnb is a hosting platform, except that term doesn't exactly reflect the scale of disruption the company has wrought. By providing a place to post available spare bedrooms, open garage apartments, even empty vacation homes, this site allows anyone to turn unused space into a bed-and-breakfast. By mid-2014, just six years into their existence, Airbnb had over 600,000 listings in 34,000 cities and 192 countries and

had served over 11 million guests. Most recently the company was valued at $10 billion—making it worth more than Hyatt Hotels Corporation ($8.4 billion)—and all without building a single structure.24

Then there's Uber, a different kind of hosting platform—one going head-to-head with the taxi and limousine industry.25 Download the Uber app and you can order a car, get information about the driver, watch the car's approach on a map, and, with your credit card already stored online, pay instantly. Yet Uber doesn't own a fleet of vehicles or manage a stable of drivers. The company simply provides a connection between people with assets (aka luxury cars) and you, the customer. In other words, by putting would-be passengers together with luxury vehicle owners, Uber cut out the middleman, dematerialized a boatload of infrastructure, and democratized a sizable segment of the transportation industry. And fast. Four years after launching their mobile, Uber is operational in thirty-five cities, and worth $18 billion.

Quirky, Airbnb, and Uber are great examples of entrepreneurs taking advantage of the expanding scale of exponential impact. They have created billion-dollar companies in record time. They are the absolute inverse of everything we believed was true about scaling up a capital-intensive businesses. For most of the twentieth century, scaling up such businesses required massive investments and time. Adding workforce, constructing buildings, developing vastly new product suites—no wonder implementation strategies stretched years into decades. It wasn't unusual for a board of directors to "bet the company" on a new and extremely expensive direction whose outcome would remain unknown until long after most of those board members retired.

That was then.

Today linear organizations are at dire risk from the Six Ds, but exponential entrepreneurs have never had it so good. Today the shift from "I've got a neat idea" to "I run a billion-dollar company" is occurring faster than ever.

This is possible, in part, because the structure of exponential organizations is very different. Rather than utilize armies of employees or large physical plants, twenty-first-century start-ups are smaller organizations focused on information technologies, dematerializing the once physical and creating new products and revenue streams in months, sometimes weeks. As a result, these lean start-ups are the small furry mammals competing with the large dinosaurs—meaning they're one asteroid strike away from world dominance.

Exponential technology is that asteroid.

In times of dramatic change, the large and slow cannot compete with the small and nimble. But being small and nimble requires a whole lot more than just understanding the Six Ds of exponentials and their expanding scale of impact. You'll also need to understand the technologies and tools driving this change. These include exponential technologies like infinite computing, sensors and networks, 3-D printing, artificial intelligence, robotics, and synthetic biology and exponential organizational tools such as crowdfunding, crowdsourcing, incentive competitions, and the potency of a properly built community. These exponential advantages empower entrepreneurs like never before.

Welcome to the age of exponentials.

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From reader reviews:

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