Jugaad \jü-'gäd\

Hindi word meaning an innovative fix; an improvised solution born from ingenuity and cleverness; resourceful. Also known as *zizhu chuangxin* in China, *gambiarra* in Brazil, D-I-Y in the United States, *jua kali* in Africa, and *système D* in France.

JUGAAD INNOVATION

THINK FRUGAL, BE FLEXIBLE, GENERATE BREAKTHROUGH GROWTH

NAVI RADJOU JAIDEEP PRABHU SIMONE AHUJA

Praise for *Jugaad Innovation*

"We are entering an age when humanity's grand challenges are being solved by a new generation of 'do-it-yourself' innovators employing jugaad-style thinking. Today the entrepreneurial spirit of your very own employees, customers, and partners—empowered by new technologies—can literally change the world. X PRIZE has proven the value of jugaad by leveraging this bottom-up approach of 'better, faster, cheaper' to the point of sending a man into space for a fraction of what NASA spends. This compelling new book, *Jugaad Innovation*, articulates how you can start to accomplish amazing things on a shoestring. It is a vital read."

—Peter H. Diamandis, founder and chairman, X PRIZE Foundation

"*Jugaad Innovation* throws cold water in the faces of CEOs, reminding them of the immense power of grassroots, do-it-yourself, cheap, quick, simple innovation. This is one of the most important lessons that emerging markets are teaching the West."

—George F. Colony, CEO, Forrester Research

"*Jugaad Innovation* goes farther than conventional business books that chart consumer growth in Brazil, Russia, India, and China. It explains how emerging economies are pioneering the art of 'frugal engineering,' then provides practical tips on how Western companies—from tech startups to multinational industrial corporations—can likewise do more with less. A provocative and entertaining read for 21st century business leaders."

—Carlos Ghosn, CEO, Renault-Nissan

"The authors have it right: highly structured innovation processes can't deliver all the breakthroughs required by today's 'speed of business.' What's called for are new practices that work *with*—not against—the forces that drive our hypercompetitive world. *Jugaad Innovation* lays out the new principles that you—and every forward-thinking leader in your company—need right now."

—Charlene Li, founder, Altimeter Group; bestselling author, *Open Leadership*

"Businesses must move away from the top-down organizational hierarchies that have defined the past and transform themselves into social enterprises built on bottom-up, agile models based on collaboration. *Jugaad Innovation* shows how you can enable your entire ecosystem—employees, customers, and partners—to make significant contributions and drive hypergrowth. An important book for anyone who wants to compete in the future."

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"CEOs tend to manage innovation like an orchestra conductor—with a traditional, hierarchical, and prescriptive approach. *Jugaad Innovation* shows how to innovate like a jazz band—with improvisation, creativity, and agility. Both styles are necessary on today's global stage."

—Doreen Lorenzo, president, frog

"I've long argued that the role of business is to make the world a better place. In the new economy, this requires true innovation—bold ideas, gutsy people, and extraordinary actions. Need a new roadmap? Fresh inspiration? Accessible tools? It's all in this remarkable book, *Jugaad Innovation*. Get a copy for yourself and every member of your team today."

—Kevin Roberts, CEO worldwide, Saatchi & Saatchi; bestselling author, *LoveMarks*

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To our parents, who taught us to be frugal and flexible,
and encouraged us to follow our hearts

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FOREWORD

Ideas and creativity are the heart of my business, so when a book like *Jugaad Innovation* comes along, reframing as it does the language and methodology of innovation, it's time to get excited. As the authors note, this is a time of increasing complexity and greater scarcity of resources, of fractured financial models in the West, and confidently emergent economic powerhouses in the East and the South. What is revelatory is that the authors surface a new set of principles—from emerging markets such as India, Brazil, China, and Kenya—for breakthrough innovation that we must take notice of and start adopting if we are to regenerate growth.

I first met one of the authors —Jaideep Prabhu—at Judge Business School, University of Cambridge, when I was CEO-in-Residence. One of the joys of my role was meeting people like Jaideep and listening to their nascent ideas for making the world a better place. With his collaborators, Navi Radjou and Simone Ahuja, Jaideep has brought the concept of jugaad to life with the full color and exuberance that is India.

This is a radically optimistic book and one that aligns with several strands of my own academic inquiry and gut instincts following forty years in business. My mantras unfold like this: be purpose inspired; change comes from the edge; devote yourself to world-changing ideas; emotion leads to action; creativity overcomes scarcity; in tough times, you need to win ugly. Their principles are parallel: be heart

powered; seek opportunity in adversity; do more with less; include the margin; remain asset light; the world is too complex for the mind alone. My touchstone for innovation is "fail fast, fix fast, learn fast." Theirs: "fail cheap, fail fast, fail often."

Jugaad Innovation journeys through several of emerging markets' most innovative initiatives, from low-tech street corner entrepreneurs in the Philippines meeting the needs of a local community to large industrial conglomerates in India and China seeking to improve the lives of hundreds of millions of people. The authors track a number of Western companies that have mirrored jugaad methods—Procter & Gamble and PepsiCo are two companies I have worked for—but on the whole conclude that "the Western innovation engine has become too rigid, insular, and bloated . . . consumes a lot of resources and makes a lot of noise but produces little of significance." Ouch.

Jugaad is therefore both a wake-up call for mature companies with over-developed processes of institutional innovation, and a primer for how to be resourceful with scarce resources. In my home country of New Zealand, the jugaad equivalent is called "#8 wire." In the early agricultural and industrial development of New Zealand, farmers and business people couldn't wait for the months it took for replacement parts or new machinery to arrive on the boat from Mother England—so they improvised solutions, made it up. It was amazing what could be achieved with a simple piece of fencing wire.

"Scarcity is the mother of invention" say the authors. Austerity is the new operating system both for many companies and indeed countries. Frugality is the framework of managers; re-using and recombining is a way of life for the characters who populate the pages of *Jugaad Innovation,* and it is a practice that we in the wasteful West need to learn and then get used to. In my business—communications, marketing, and advertising, aka selling—the advent of social media has slashed the type of budgets we were once used so. Creativity is our greatest savior. Great ideas are budget blind, it's just that we have little practice of working in this environment. Jugaad lights a path.

Where *Jugaad Innovation* really pumps my blood is in its discussion of "intuiting the latent needs of consumers." Steve Jobs had this intuition

and designed new products that people never imagined but are so obvious when they're in your hands. A classic frugalist, he defined presence as absence; he took away—the keyboard, the mouse, the computer box; he reduced and eliminated. My book *Lovemarks: The Future Beyond Brands* took the position that companies, if they were up to it, would be able to place themselves into the hearts of customers, be invited in, and be able to clearly answer the killer question that every customer has: "how will you improve my life?" The chest-thumping of companies who claim to put customers at the heart of what *they* do have the equation back to front. As the authors state, "your heart knows what your mind doesn't." They advocate "following your heart" with intuition, empathy, and passion; my trifecta is "mystery, sensuality, and intimacy."

The final element of jugaad to highlight is what I call "mental toughness." The authors refer to "building up your firm's psychological capital to boost its confident resilience." At Saatchi & Saatchi we have a founding statement of purpose: "Nothing Is Impossible." To this I added "One Team One Dream." Having crazies with purpose on your side is great; having unguided crazies is not. Just as I have invented, adapted, and stolen methods and techniques for organizing and keeping 6,000 people on the straight and narrow, these authors offer us a host of how-to's. You can't have a book about resourcefulness without resources, and *Jugaad Innovation* is generous in its roadmaps.

Until this book, the commonest currency I had with India was cricket. I captained cricket teams through my school years, beguiled by the mysteries of the googly (look it up on, um Google; it's a type of delivery bowled by a right-arm leg spin bowler) and the blatant power of hitting a six over square leg. Now I have jugaad, and my relationship with India and with innovation is reborn.

Grasmere, England
February 2012

Kevin Roberts
CEO Worldwide
Saatchi & Saatchi

CHAPTER ONE

JUGAAD
A Breakthrough Growth Strategy

We reached Ramakrishna Nagar, a village in the desert of Gujarat, a state in Western India, after travelling 250 miles from Ahmedabad, the state's capital. Our team—a Silicon Valley management consultant, a business school professor from the University of Cambridge, and the founder of a Minneapolis advisory boutique and media firm—had set out a few months earlier on an extensive research and travel project. Our mission: to discover new approaches to innovation in emerging markets such as India that could help Western firms take on the complexity of our tough and turbulent times.

We came to Gujarat to meet with Professor Anil Gupta at the Indian Institute of Management (IIM) in Ahmedabad.[1] Professor Gupta runs Honeybee Network, a non-profit organization that identifies and cross-pollinates grassroots innovation all across India. Over more than two decades, Honeybee had populated a database with over ten thousand inventions of grassroots entrepreneurs who have created ingenious solutions for pressing socioeconomic problems in their local communities. Professor Gupta suggested we meet with one of these rural entrepreneurs.

As we left an arrow-straight concrete highway to follow narrower and increasingly cratered gravel roads, the temperature rose to a debilitating 120 degrees. Stepping out of our air-conditioned jeep, we could feel the weight of the desert's oppressive heat.

Mansukh Prajapati greeted us warmly outside his workshop.[2] A potter by trade, Prajapati had for years been experimenting with clay to produce a variety of durable goods, many of which were on display in the office outside his "lab." We were parched—and grateful when he asked

us if we wanted water. We had run out, and there wasn't any sign of a store or kiosk nearby to restock. He reached around to a faucet, handed us cups, and, beaming with pride, said, "Please, have this cold water—from my fridge."

Baffled, we looked more closely at the terra-cotta box in front of us. It was made entirely of clay, except for a glass door and a plastic faucet at the bottom. While sipping the refreshingly cool water, we looked around and found no electrical cord, no battery—just clay. Amused by our expressions, Prajapati explained how this clay fridge—the Mitticool (*mitti* means "earth" in Hindi)—works: water from an upper chamber seeps through the side walls, cooling the lower food chamber through evaporation. The fridge consumes no electricity, is 100-percent biodegradable, and produces zero waste during its lifetime. An ingenious invention!

But this inventor and his personal story are even more impressive. Prajapati doesn't work for NASA or Whirlpool, and he doesn't have a Ph.D. in quantum physics or an MBA from Stanford. In fact, he didn't even finish high school. His R&D lab—a simple open-air room with clay in various shapes and forms arrayed on the floor and an oven tucked away in the corner—is a far cry from the sprawling campuses of GE and Whirlpool, which swarm with hundreds of engineers and scientists.

In 2001, an earthquake had devastated Prajapati's village and the surrounding area. Reading a report of the devastation in the local newspaper, he noticed a photo caption: "Poor man's fridge broken!" The photo featured a smashed earthen pot commonly used by villagers to fetch water and keep it cool. And though the newspaper had called it a fridge in jest, it triggered Prajapati's first eureka moment. *Why not use clay*, he thought, *to make a real fridge for villagers—one that looks like a typical fridge, but is more affordable and doesn't need electricity?* Over five hundred million Indians live without reliable electricity, including most of the people in Prajapati's village.[3] The positive health and lifestyle benefits of owning a fridge in a desert village where fruit, vegetables, and dairy are available only intermittently would be tremendous.

Prajapati's training as a potter, coupled with his intuition, told him that he was on to something. He experimented for several months and

eventually had a viable version of the Mitticool that he began selling to people in his own village. The fridge—which costs around US$50—was a hit. Prajapati worked tirelessly on design improvements, and began selling Mitticools across India, and then internationally. He couldn't keep up with the rising demand and had to find ways to scale up—fast.

Then he had a second eureka moment. Why not transform pottery from an artisanal craft into an industrial process? He could leverage his traditional knowledge of pottery to mass-produce goods that met modern consumer needs. So Prajapati first developed an entirely new and more efficient method of working with clay. Then he began training women in his village in these industrial pottery techniques and finally hired them to work in his new factory. Soon a "mini" Industrial Revolution in pottery was launched in this remote Indian village.

Mitticool was the first product that Prajapati mass-produced in his factory. He soon built other products from clay, such as a nonstick frying pan that retains heat longer than other frying pans and costs a mere US$2. From one man and one idea has grown a frugal yet fruitful industry, one that employs large numbers of people in his own community and serves consumers in India and abroad. Prajapati's groundbreaking inventions, which deliver more value at less cost, have earned him accolades from all over the world—including from the president of India. And *Forbes* magazine recently named him among the most influential rural Indian entrepreneurs, one of few to have made an impact on the lives of so many.[4]

JUGAAD: THE GUTSY ART OF IMPROVISING AN INGENIOUS SOLUTION

The Mitticool, an idea born out of adverse circumstances, shows how a resilient mindset can transform scarcity into opportunity. Combining limited resources and a never-say-die attitude, Prajapati tapped into his empathy and passion for his fellow community members to conjure up an ingenious solution that improved lives in Gujarat and beyond. Not only did he produce a cheap and effective cooling device, but he also created jobs for dozens of undereducated women. In doing so, Prajapati

is both driving environmental and socioeconomic sustainability in his community and ensuring the financial sustainability of his own business. Prajapati embodies the true spirit of *jugaad*.

Jugaad is a colloquial Hindi word that roughly translates as "an innovative fix; an improvised solution born from ingenuity and cleverness." Jugaad is, quite simply, a unique way of thinking and acting in response to challenges; it is the gutsy art of spotting opportunities in the most adverse circumstances and resourcefully improvising solutions using simple means. Jugaad is about *doing more with less*. (We feature articles and videos on jugaad on our companion website, JugaadInnovation.com.)

Jugaad is practiced by almost all Indians in their daily lives to make the most of what they have. Jugaad applications include finding new uses for everyday objects—Indian kitchens are replete with empty Coke or Pepsi bottles reused as ad-hoc containers for dried legumes or condiments—or inventing new utilitarian tools using everyday objects, like a makeshift truck cobbled together with a diesel engine slapped onto a cart (interestingly, the origin of the word jugaad, in Punjabi, literally describes such makeshift vehicles).

The word jugaad is also applied to any use of an ingenious way to "game the system." For instance, millions of cellphone users in India rely on "missed calls" to communicate messages to each other using a prearranged protocol between the caller and receiver: think of this as *free textless* text messaging. For example, your carpooling partner may give you a "missed call" in the morning indicating he has just left his house and is on his way to pick you up.[5] Hence, the word jugaad carries a slightly negative connotation for some. But by and large, the entrepreneurial spirit of jugaad is practiced by millions in India simply to improvise clever—and completely legitimate—solutions to everyday problems.

In this book, we delve into the frugal and flexible mindset of thousands of ingenious entrepreneurs and enterprises practicing jugaad to creatively address critical socioeconomic issues in their communities. Jugaad innovators like Mansukh Prajapati view severe constraints, such as a lack of electricity, not as a debilitating challenge but as an opportunity to innovate and overcome these very constraints.

The entrepreneurial spirit of jugaad is not limited to India. It is widely practiced in other emerging economies such as China and Brazil, where entrepreneurs are also pursuing growth in difficult circumstances. Brazilians have their own word for this approach: *gambiarra*.[6] The Chinese call it *zizhu chuangxin*.[7] The Kenyans refer to it as *jua kali*.[8] The French have a term too—Système D.[9] Throughout this book we profile jugaad entrepreneurs from Argentina, Brazil, China, Costa Rica, India, Kenya, Mexico, the Philippines, and elsewhere who have created simple yet effective solutions to address vexing problems that their fellow citizens face. We hope to shed light on how these jugaad innovators think and act—and identify the valuable lessons we in the West can learn from them.

JUGAAD IN THE WEST

While jugaad is currently the dominant form of innovation in emerging markets, in the West it is practiced only in isolated instances. And although the 1980s TV series *MacGyver* popularized the American jugaad spirit—also known as *Yankee ingenuity*—very few Western *corporations* actually practice jugaad today.[10] Yet jugaad was once a big part of Western innovation too. It was the flexible mindset of jugaad-style innovators that catalyzed growth in Western economies like that of the United States during the Industrial Revolution.

For instance, in 1831 a self-educated Virginian farmer named Cyrus McCormick introduced his newly invented mechanical grain reaper. The reaper promised to free farm workers from back-breaking labor and address the problem of scarce food supplies that plagued his community. When McCormick was born in 1809, over 80 percent of Americans were dependent on agriculture for their livelihood (by 1970 that figure had dwindled to just 4 percent).[11] In early nineteenth-century America, farmers harvested grain crops by hand, requiring many laborers to complete the task. Cyrus McCormick's father had wanted to make life easier for his fellow farmers. He spent twenty-eight years trying to develop a machine that could automate grain harvesting, but

he gave up after multiple unsuccessful attempts. When his son Cyrus was barely twenty-two, he took over his father's invention and tinkered with the machine to make it work. In his family barn, which served as a makeshift workshop, he spent many months tweaking the design for an automated grain-harvesting machine, using limited resources and hand-made components. Finally, in 1831, he came up with a workable and elegant version of the mechanized reaper, capable of harvesting more grain than five men could gather using the earlier cradles.[12]

The reaper wasn't even Cyrus McCormick's first invention. Despite little education, at age fifteen he had invented a lightweight grain cradle that could cut and stack grain more efficiently. A few years later he developed two new types of plow. Nineteenth-century America—struggling with a scarcity of resources, yet fertile with opportunities—teemed with jugaad entrepreneurs like Cyrus McCormick whose clever inventions brought great benefits to the society at large.[13]

Yet Cyrus McCormick's most famous jugaad invention—the mechanized reaper—wasn't an instant commercial success. His fellow farmers, accustomed to manual methods of harvesting, were initially skeptical about the usefulness of this unfamiliar machine. McCormick struggled for years to sell his machines. He found success through further flexible jugaad thinking: pioneering the practice of word-of-mouth marketing, he got his first few customers to recommend his reaper to other potential customers. Eventually, sales of his reapers picked up, and McCormick shifted production to a factory in Chicago. His machines started selling well and dramatically improved agricultural practices across the country. In the process, McCormick also laid the groundwork for many innovative sales and marketing practices—like assessing customers' credit-worthiness and offering a "money-back guarantee"—that are now standard practices of Western businesses across industries. McCormick proved to be not only an ingenious technical inventor but also a great *business model* innovator. And although McCormick's life was filled with adversity—from factory fires to patent disputes—he always bounced back with resilience. McCormick's jugaad inventions enabled scores of American workers to shift from farming to factory work—thus accelerating the Industrial Revolution.[14]

Among the many early American jugaad innovators, the best-known may well be Benjamin Franklin. Franklin experienced scarcity and learned about the virtue of frugality firsthand, growing up in a large Puritan family of nine brothers and seven sisters.[15] When he was just ten years old, Franklin left school and started working in his father's candle and soap shop to help support his family. Early on, Franklin developed a knack for using limited resources to devise ingenious and frugal solutions to tackle the everyday problems of his contemporaries. Franklin's legendary ingenuity was fueled by his genuine empathy for his fellow citizens. One of his most practical inventions was the Franklin stove.[16] During the eighteenth century, homes in the United States were primarily heated by inefficient fireplaces that spewed smoke while much of the heat they generated escaped up the chimney. They were also hazardous, as their sparks could trigger fires that quickly devoured wood-built homes.

Franklin's jugaad innovation to tackle this problem was a new type of stove with a simple hooded enclosure in the front and an air box in the rear. The new stove and its reconfiguration of the flues enabled a more efficient fire, one that consumed 75 percent less wood and generated twice as much heat.[17] The Franklin stove delivered "more with less." An early advocate of open source technology, Franklin turned down the patent offered for his original design, stating that altruism rather than profit was his driving motive for developing the efficient stove. He wanted all Americans to benefit from his invention. In fact, Franklin patented *none* of his inventions. In his autobiography, he wrote that "as we enjoy great advantages from the inventions of others, we should be glad of an opportunity to serve others by any invention of ours; and this we should do freely and generously."[18] As a serial jugaad entrepreneur, his approach to innovation was always inclusive: his ingenious but simple inventions—including the lightning rod, bifocals, and a carriage odometer—enhanced lives throughout the colonies.

America's founding fathers, as well as its creative farmers, industrial pioneers, and scientific explorers in the nineteenth and early twentieth centuries—from Ben Franklin to Cyrus McCormick to the Wright brothers—were historic practitioners of jugaad in the West.

These ingenious entrepreneurs spurred the Industrial Revolution in Western nations, building a strong foundation of economic leadership that lasted for decades. In the twentieth century, however, especially after World War II, Western nations gradually lost touch with this jugaad spirit as they matured into postindustrial economies and became attached to a systematized, predictable way of life and work. Improvised ingenuity—the essence of jugaad—took a back seat to a more formally structured approach to innovation.

HOW THE WEST LOST ITS JUGAAD

In the twentieth century, as North American and European economies expanded, Western corporations began to institutionalize their innovation capabilities, creating dedicated R&D departments and standardizing the business processes needed to take their ideas to market. They focused on *managing* innovation, just as they managed any other business activity. This industrialization of the creative process led to a *structured* approach to innovation with the following key characteristics: big budgets, standardized business processes, and controlled access to knowledge.

But this structured innovation approach, which helped Western firms become highly successful in the second half of the twentieth century, has three clear limitations in the fast pace and volatility of the twenty-first century: it is too expensive and resource consuming, it lacks flexibility, and it is elitist and insular.

The Structured Approach Is Too Expensive and Resource Consuming Western firms have come to believe that their innovation system—like any industrial system—will generate more output (inventions) if fed more input (resources). As a result, the structured innovation engine is capital intensive. It requires an abundant supply of financial and natural resources at a time when both are increasingly scarce. The approach is designed to deliver "more with more"—that is, firms charge customers a hefty premium for overengineered products

that are expensive to develop and produce. For instance, the thousand companies in the world that invest the most in innovation—many of which are Western firms—spent a whopping $550,000,000,000 (yes, that's US$550 billion!) on R&D in 2010 alone.[19] But what did they get in return for all this expense? Not much, according to research conducted by the management consultancy Booz & Company. They found that the three Western industries that spend the most on R&D—computing and electronics, healthcare, and automotive—struggle to generate a steady stream of groundbreaking inventions, despite their hefty R&D investments. Hence there is *a weak correlation* between how much money your firm spends in R&D and how well it performs in terms of developing and marketing products that generate a significant financial return. To put it bluntly, *money can't buy innovation.* Fittingly, a Booz & Company report carries a photograph of a dejected-looking CEO wearing a T-shirt that reads: "We spent $2 billion on R&D and all we got was this lousy T-shirt." The caption illustrates well the frustrations of Western corporate leaders facing, on the one hand, huge financial constraints, and on the other, immense pressures from shareholders to deliver growth.[20]

The pharmaceutical industry is one sector where the "bigger is better" R&D strategy is clearly running out of steam. Big Pharma's spending on R&D ballooned from $15 billion in 1995 to $45 billion in 2009.[21] Yet the number of new drugs launched annually has dropped by 44 percent since 1997.[22] This is especially bad news for Big Pharma, given that between 2011 and 2016 drugs worth a whopping $139 billion are set to go off patent.[23] To further complicate things, Big Pharma in the United States is facing a growing backlash from politicians and the public as health care costs spiral out of control, even as fifty million Americans continue to lack basic health insurance.

The drug industry is not an exception. The U.S. auto sector spent $16 billion on R&D in 2007 alone.[24] But American automakers nevertheless trail their Japanese, Korean, German, and even Chinese and Indian rivals, as frugal consumers worldwide clamor for more compact, fuel-efficient, and environmentally friendly cars. The U.S. market share of the Big Three—Chrysler, General Motors, and

Ford—has steadily declined, from 70 percent in 1998 to 44.2 percent in 2009.[25] In December 2008, the cash-strapped automakers asked the U.S. government for a $34 billion bailout to cover employee health care expenses and prevent bankruptcy and massive layoffs.[26] Since December 2009, the U.S. government has given $82 billion in aid to the Big Three—including $62 billion to General Motors and Chrysler alone (both carmakers filed for bankruptcy protection).[27]

The Structured Approach Lacks Flexibility With so much money invested in R&D, Western firms have become risk averse in their approach to innovation. They have implemented standardized business processes such as "Six Sigma" (an integrated set of management techniques designed to decrease production defects and increase operational efficiency by standardizing processes) and "stage gate analysis" to manage and control their innovation projects. These structured processes were expected to drastically reduce uncertainty—and risk of failure—from the entire innovation process and make R&D projects more predictable in both execution and outcomes. But these structured business processes and methods are unfit to deliver the agility and differentiation that enterprises need in a fast-paced and volatile world.

Take Six Sigma—the well-known management strategy pioneered by Motorola in 1986 and the corporate dogma of leading Fortune 500 firms such as GE and Boeing. Six Sigma is a set of practices designed to improve quality by eliminating defects. With a Six Sigma process implemented, there is a statistical expectation that 99.99966 percent of the products manufactured will be free of defects. Six Sigma works marvelously when you are seeking to institutionalize "sameness," and this comes in handy when you are mass-producing widgets in a predictable environment. But Six Sigma is like a straitjacket: once you get in, you are stuck, and when things start to change, you can't move (let alone dance).[28]

Built around stable and predictable processes, programs like Six Sigma cannot enable the rapid change that companies need as they seek to mass customize products and services, satisfy increasingly diverse

and finicky customers, and keep up with technology shifts. Worse, the orthodox Six Sigma culture weeds out "positive deviance"—the uncommon strategies used by those pioneering employees in a company who use unconventional and counterintuitive methods to solve vexing business problems that can't be addressed using traditional approaches.[29] But, as Malcolm Gladwell points out in *Outliers*, positively deviant behavior and ideas are what actually drive game-changing innovation.[30] That explains why George Buckley, CEO of 3M—where an outlier named Art Fry invented the now-indispensable Post-it® Notes by sheer serendipity—rolled back several Six Sigma initiatives at 3M in a bid to revive innovation in the firm. Buckley points out: "Invention is by its very nature a disorderly process. You can't put a Six Sigma process into that area and say, Well, I'm getting behind on invention, so I'm going to schedule myself for three good ideas on Wednesday and two on Friday. That's not how creativity works."[31]

The Structured Approach Is Elitist and Insular Throughout the twentieth century, Western firms built large R&D labs that employed hundreds of top scientists and engineers, based on a belief that "knowledge is power" and that controlling access to it was key to success. Thus innovation became an elite activity controlled by a few high priests: engineers and scientists working under conditions of secrecy in in-house labs close to headquarters. Only these chosen few were invited into the R&D department and given the resources and permission to innovate. Any new knowledge they generated was closely guarded. Collaboration with other employees—let alone outsiders—was shunned. The assumption was that to dominate markets through innovation one needed two things: top-of-the-line technology and ownership of the best intellectual property, both of which could be bought with enough money. However true that assumption might have been in an earlier industrial era, it is far less valid now. Part of the old belief was that only a bunch of smart Ph.D.s could *invent* new things. But in today's consumer-driven economy we know that it's more important to *commercialize* technology, which requires knowledge of fields such as design and marketing—skills that

engineers and scientists may not necessarily have.[32] As Bob McDonald, CEO of Procter & Gamble, explains: "For us, innovation is not invention. It's the conversion of a new idea into consumer delight and, ultimately, into revenues and profits. If an idea or technology cannot be successfully commercialized, it's not an innovation."[33]

Further, in an interconnected world powered by social media, the intellectual property that one can buy isn't the only source of new ideas. Finding, sharing, and integrating globally dispersed knowledge among all levels of employees is just as important, if not more so. Consider this statistic: as of this writing, every Facebook user creates, on average, ninety pieces of content per month, contributing to more than thirty billion pieces of shared content—ranging from family photos to web links to posts—across the Facebook social network.[34] The power of innovation has shifted from the professional class to the masses. Creativity has been democratized—thanks to social media tools like Facebook. As strategy consultant and author Gary Hamel says, "The underlying principles on the Web of natural hierarchy, transparency, collaboration and all the rest—those characteristics are going to have to invade management. The idea of a hierarchy that fundamentally empowers the few and disempowers the many is more or less dead."[35]

Yet top-down R&D systems are often unable to open up and integrate such bottom-up input from employees and customers. Younger, creative employees use new technologies like social media in order to brainstorm ideas, creating a virtual watercooler. Structured organizations often find it hard to integrate these methods of innovation into their business model. The chief information officer of a large engineering services firm told us, "Many of our younger employees brainstorm new ideas on Facebook. As a result, Facebook has become the virtual brainstorming place where people gather and hatch ideas. I really don't know how to funnel those ideas back into our corporate R&D systems."

Bottom line: the processes, systems, and mindsets that underpin the structured approach to innovation are now failing. Although in years past corporations were able to survive and even thrive with this approach, it was designed to help them compete and win in a relatively

stable, slower, and predictable world of abundance—one that no longer exists. Today's highly complex and turbulent business environment demands a new approach to innovation and growth—one that is frugal, flexible, and participative.

COMPLEXITY STRETCHES WESTERN FIRMS' ABILITY TO INNOVATE

In a global survey conducted by IBM in 2010, 79 percent of the 1,500 CEOs surveyed said that they anticipated greater complexity in the future environment.[36] Worryingly, fewer than half of these CEOs believed that their firms were prepared to respond creatively to this increasing complexity. The main reason is that Western firms' structured approach to innovation is ill-equipped to help them innovate *faster, better, and cheaper* as they seek to cope with five major components of complexity—scarcity, diversity, interconnectivity, velocity, and breakneck globalization.

Scarcity Even as Western economies struggle to emerge from the global recession, access to financial capital remains restricted for small and midsize companies—which account for two-thirds of job creation in the United States—while consumers struggle to obtain loans from risk-averse banks.[37] For instance, America's consuming middle class, which accounts for two-thirds of national spending and forms the bedrock of the U.S. economy, is feeling the pinch. Between 2000 and 2010, the inflation-adjusted income of middle class American households dropped by 7 percent. In late 2011, an astounding 46.2 million Americans (or 15 percent of the U.S. population) were living in poverty and nearly 50 million lacked health insurance.[38] Not surprisingly, in 2011 only 65 percent of Americans believed their children would be able to achieve the American Dream—down from 69 percent in 2008.[39]

In times like these, it's unrealistic to expect Western governments to come to the rescue of their citizens, as they are feeling the squeeze as well: U.S. public debt, for instance, has increased by over $500 billion, on

average, every year since 2003. As of early August 2011, the total public debt of the United States was a whopping $14.34 trillion dollars.[40] In the UK, public sector borrowing skyrocketed to £175 billion (US$253 billion) or 12.4 percent of GDP in 2009—the highest level of borrowing among all developed nations.[41] Heavily indebted Western governments have no choice but to cut down on public services, and this will only further hurt already stretched Western consumers.

Meanwhile, natural resources like oil and minerals are becoming more scarce and consequently more expensive. While everyone frets about the escalating price of oil, another precious resource—water—is also becoming increasingly scarce. One out of three U.S. counties faces a risk of water shortages in coming decades, and fourteen states, including California and Texas, face an extreme threat to their water sustainability.[42]

Further, the outlook of Generations Y and Z marks a significant change in both the workforce and the consumer base. These frugal and environmentally conscious young consumers are more comfortable working with scarcity and seem to instinctively follow jugaad in their daily lives. They innately appreciate the need to do more with less, having experienced firsthand the worst economic times since the Great Depression. The MacArthur Research Network on Transitions to Adulthood and Public Policy conducted five hundred interviews with twenty-somethings on their cost-conscious lifestyle and concluded that their "frugality could last a lifetime."[43]

All three trends—financially constrained consumers and governments, dwindling natural resources, and greater numbers of frugal Gen Y and Z consumers wanting low-impact environmental products— have put scarcity on the agenda for Western companies, forcing them to find frugal ways to grow with less. The raw materials necessary to make new products will cost more in the future, and consumers' financial constraints will drive them to look for low-cost products that still deliver results in an eco-friendly way.

Diversity The workforce of most Western companies is now more diverse than ever before. The Gen Y (also known as the Millennials) and

Gen Z—with their distinctive values and expectations—are now joining Generation X and the baby boomers at work. The COO of a large Silicon Valley–based tech firm told us, "For the first time in my life, I now manage workers across four generations—which is more difficult because we have to accommodate the diverse values and expectations of our multigenerational workforce."

Meanwhile, traditionally homogeneous markets are now more fragmented, as consumers from minority groups seek solutions tailored to their unique needs. For instance, Hispanics already account for more than one-third of California's population and are expected to become a majority in that state by 2042.[44] As a result, corporate leaders have to learn to reconcile the varying values and expectations of their diverse workforce and consumer communities they serve. Unfortunately, the structured approach to innovation—rigid, insular, elitist, and promoting *uniformity*—is limited in its ability to deal with a world of diversity.

Interconnectivity Cloud computing, mobile technologies, and social media have created new ways for companies to connect and engage deeply with their current and prospective customers and partners alike. Indeed, the United States is turning into what Daniel Pink calls a "free agent nation," one in which a growing number of professionals are escaping "corporate fortresses" by leveraging professional social networks like LinkedIn to freelance their skills.[45] Technology has fostered a growing need for creative freedom among employees and citizens by forcing CEOs to open up their business models and organizational structures to make the most of a connected society and workforce. Specifically, the rigidity of the structured approach limits the use of more flexible ways of innovating that involve groups *outside* the firm, such as consumers and partners. And the insularity of the structured approach limits the involvement in innovation—even *within* the firm—of employees who are not strictly tasked with doing R&D.

Velocity The speed of change is increasing on multiple fronts—technological, market, and competitive. In particular, product life cycles are getting shorter, putting pressure on corporations to launch new products