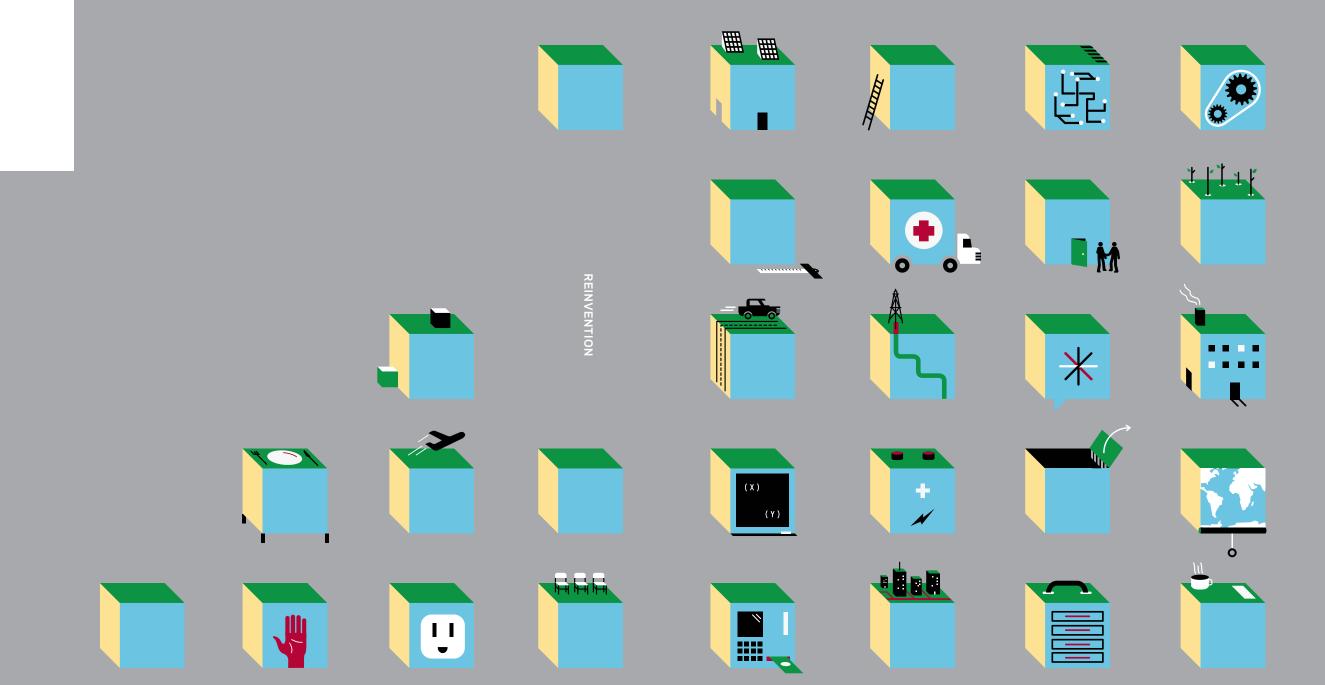
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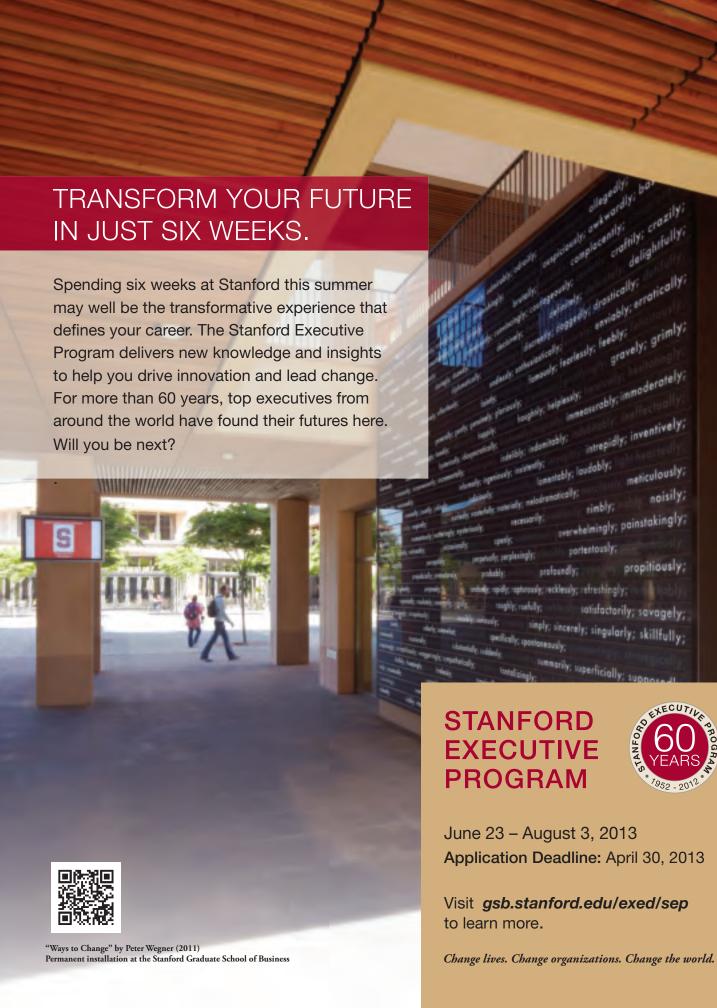
**SPRING 2013** 





RING 201

REINVENTION



### A LETTER FROM

### DEAN GARTH SALONER

### Reinventing Management Education: A Work in Progress

I'm excited to write about reinvention because it is a process I think about often at Stanford Graduate School of Business. Reinvention, as the theme in this issue of the magazine points out, is an opportunity to refine, rework, and improve ourselves as individuals and institutions so that we are better positioned to take on the challenges of business and society in a rapidly changing world.

We don't have to look far to see what happens to organizations that don't adapt to change. From bookstores to consumer electronics retailers to car manufacturers, companies across the world are closing their doors partly because they overestimated their strengths or disputed the signs of change. Educational institutions face similar challenges. If we want to continue to have meaningful impact and stay relevant to students and employers, we too must embrace the process of reinvention.

As a leader in management education, the GSB must preserve its core strengths and at the same time explore new opportunities to extend the reach of our expertise. In one of my favorite lectures by GSB faculty member Charles O'Reilly, he observes that some organizations are blinded by their success, and miss out on the opportunity to innovate. On the other hand, some organizations focus only on innovation and never get good at any one thing. The idea is that organizations must focus on what they do well and innovate if they are to evolve and maintain a leadership position. It is for this reason that Stanford GSB aims to be the ambidextrous organization that Charles talks about — one that delivers the highest-caliber, intimate education experience and also strives to move beyond the expected boundaries of a business school.

In the last six years, we've undertaken two major initiatives to enrich the school. In 2007, we improved student engagement by reforming the MBA curriculum, which introduced a more personalized curriculum combined with greater experiential learning. This revamp fosters the development of change agents who are capable of tackling the world's biggest problems. It also renews our commitment to staying strategically small, to investing in core disciplines, and to fostering a culture of collaboration.

The second transformational project was developing a new physical space to match our curriculum. The Knight Management Center, completed in 2010, combines an intimate classroom environment and modern technology with a center that promotes multidisciplinary collaboration. You can experience the magic of the GSB when you visit the Stanford Venture Studio, Town Square, Arbuckle Pavilion, or Bass Center.

The space enables creativity, community, and cross-pollination of ideas.

Our newest effort to ensure the vitality of the GSB is building educational technology into the experience. This past quarter, for example, faculty members Dan Iancu and Kostas Bimpikis created screencasts to flip the classroom and deliver online software tutorials for their core course, OIT 245, Optimization and Simulation Modeling. (In the flipped classroom, students view online instructional videos on their own time, and in-class time is used for active engagement.) Screencasting maximizes faculty-student time in the classroom and presents valuable opportunities to monitor and capture information about how students learn so we can analyze that data to support changes in the way we teach. We are accelerating our efforts to apply instructional technology like this to more courses for this year.

In addition, we are experimenting with how we can use distance education, including massive online open courses, or MOOCs, to disseminate our rich faculty expertise to broader audiences beyond the walls of Stanford. Last December, the GSB began offering its first online Certificate for Innovation and Entrepreneurship in partnership with the Stanford School of Engineering. The certificate program, which requires students to complete 8 of 12 courses, is attracting students from 14 countries. In August 2013, Stanford Ignite, a 9-week certificate for non-business graduate and professional students, will offer its first international program in Bangalore, India. GSB faculty will teach courses on the ground in India and deliver their lectures to students using distance education technologies from Stanford.

Stanford GSB will continue to have meaningful impact by maintaining our tradition of educating a select group of students on campus. At the same time, we will use technology to put the most relevant content, teachings, and intellectual capital in the hands of entrepreneurs and aspiring leaders around the globe. We don't know what the future of education technology will be, but we are positioning ourselves to experiment intelligently. Just as we reimagined our curriculum and recreated the GSB's physical structure, the results of which have far exceeded our expectations, education technology should help us refine the GSB experience as we enter this new era. A



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### **INTRODUCTION**

## Reinvention

We reinvent ourselves in big and small ways all the time — new careers, new homes, and new ideas. From time to time even magazines need to take a step back and ask what needs refreshing. So over the last several months we have focused on one goal: finding out what you want from a magazine and delivering it to you. ▶ With assistance from colleagues throughout the school, we conducted surveys and focus groups, and reached out to dozens of you by email, by phone, and in person. Here's what we learned: You want a magazine that sparks new ideas and that provides insights you can use in your personal and professional lives. You want a magazine that connects you with one another and evokes the feeling of the Stanford GSB. ▶ In your hands you are holding a redesigned and revamped *Stanford Business* 

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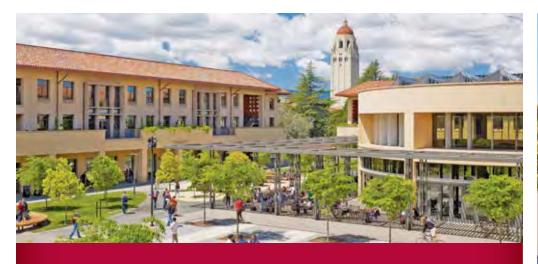


magazine that attempts to satisfy those interests. Its theme, fittingly, is reinvention. In each of three sections — Lives, Organizations, World — we present stories of individuals and industries that are rethinking how to solve some of the world's big business and professional challenges. > This is far from the first time the Stanford GSB has rethought the magazine. The first issue — the Alumni News Bulletin — was published on June 12, 1931. It was 11 pages. The magazine has since increased its page count, changed names several times, and added color — first to the cover, then to the front section, and now, with this issue, to Class Notes. Its editorial focus has also evolved over the years. > Reinvention is an ongoing process. In future issues, we will add new features and make adjustments to areas that aren't working the way we might have hoped. Your input is invaluable. Tell us what you like, and what you don't. Write us at StanfordBusiness@stanford.edu. — THE EDITORS

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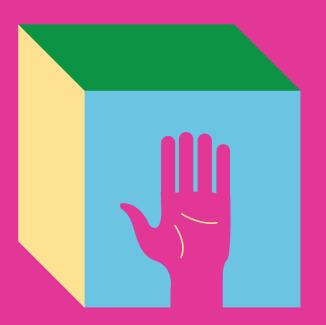
\* All support acknowledged here was received between September 1, 2011, and August 31, 2012.

For more information, please contact Corporate\_Relations@gsb.stanford.edu.









"The best ideas will not come from

### slamming three espressos and grinding it out, but rather

but rather at weird moments."

<sup>®</sup> −Rob Forbes, PAGE 24

8

LIVES

### **INNOVATION**

# How do you come up with good ideas?

Figure out what makes people mad — and then make it better.

BY KATHLEEN O'TOOLE

In 1987, Chip Conley made an unusual business decision: He bought a rent-by-the-hour hotel in San Francisco's Tenderloin district. But instead of running it for its past clientele, he asked his employees what new customer segment they should go after. The question generated a mixed bag of ideas, so Conley asked each person to come back in several days with a magazine that he or she thought would be read by the hotel's potential future customers. When six of seven came back with Rolling Stone, Conley relaunched the hotel for a clientele of hip musicians and their followers. Later, he would create, and then sell, Joie de Vivre, a chain of 40 boutique hotels for more than \$1 billion. The original themes for other hotels in his chain were based on magazines such as The New Yorker, Wired, Outdoor, and Elle,

Conley's successful concept highlighted an inconsistency in the way people tend to think about innovation. Often, we think of it as building new products and services based on the latest technology, says organizational behavior professor Hayagreeva Rao. Conley's approach to an age-old business, by contrast, illustrated how customer-focused innovation can be either about creating products or services that delight new customer segments, says Rao, or about removing things that drive customers away.

But how to achieve this goal? He suggests CEOs and other executives fill out a simple two-square-by-two-square framework developed by his former colleague Lisa Fortini-Campbell of the Kellogg School of Management. The two left squares are for things that generate negative customer emotions, and the right squares are for things about your business that generate positive emotions. The top squares are for emotions that are very strong — disgust and delight — and the bottom squares are for mild emotions — annoyances and niceties people consider frills.

Don't waste time on annoyances or frills, Rao says. "You want to focus on finding solutions to disgusters. The best definition of a disguster is something that people curse about."

To be concrete, he cites examples from the airline industry. An upgrade from coach to business class falls into the category of delighter for most people in this age of tight space in coach. If an airline adds an inflight magazine, you might enjoy it, but if you are like most people, it's a frill. You won't let it affect which airline you choose for your next flight. Similarly, if you are served Pepsi when you asked for Coke, you might be annoyed, but you are not likely to remember it by the time you reach the street. But if the airline loses your bags on a flight from Buenos Aires to San Francisco, that is a disguster. You are likely to curse and tell a bunch of other people about it.

Eliminating disgusters is not always intuitive, however. Rao cites the example of a drugstore chain that found unhappy customers among women who shop with small children. The problem of keeping two children under control in a drugstore chock-full of bottles and baubles was a major reason that Mary



### "The later you fail with a new idea, the higher the cost."

did not shop there. At first, executives thought they could do nothing with the analysis because Mary's problem was not something they controlled. But by adding a drive-through window they solved her problem. In the meantime, they also eliminated an annoyance for Ed and Angie, senior citizens who enjoy children but, nevertheless, don't need them underfoot while shopping for medicines. Once the toddlers were secured in their car seats, store managers were also able to re-sign the store aisles, tailoring them more to seniors' needs.

"The larger point of this example is that what is a disguster to one person won't be to another person," Rao says, "so you always have to think about your proposed solution from the point of view of the user or customer."

How do companies zero in on disgusters? Rao eschews surveys and focus groups, opting instead for an easily adapted approach used by the design firm Ideo. It includes putting a diverse team together and giving them time and cost limits, not unlike what Conley did. But it also involves having the team go out to observe people in a relevant environment. The team members identify customer problems, propose solutions, vote to select the best one, and with minimal materials physically construct a prototype of their favored solution. The prototype is then tested with strangers and revised based on the feedback.

An ABC Nightline video of an Ideo team attempting to redesign the ubiquitous grocery cart in five days, with the constraint of no higher cost than the current shopping cart, is available to watch on the web. In that case, the team tries out the team's best design on supermarket shoppers, clerks, and security officers.

In a weeklong class for 60 executives, Rao and colleague Bob Sutton, a Stanford engineering professor, applied Ideo's approach to the airline industry. They outfitted teams of five executives from diverse companies with video cameras and sent them to San Francisco International Airport where they were to observe customers of JetBlue Airways and come up with ideas for improving customer value at a reasonable cost.

One team observed two children crying. Investigating, they learned the kids were upset that airline personnel had whisked away Sparky, the family dog, to an unknown fate. Another team observed confused elderly travelers trying to maneuver from the curb through check-in, through security, and to the right gate.

The next day, each team tried to address those problems by building a prototype to test on users — other Stanford students to whom they would say, "Come here and try this. Tell me what's wrong." Then they went back to the drawing board for refinements.

The prototype should be made simply with \$200 or less of materials, Rao says. No PowerPoint presentations are allowed because solutions that will work tap into people's emotions, and those emotions are best reached through their five senses: taste, sight, smell, hearing, and touch.

On the next day, JetBlue chairman Joel Peterson, who also teaches at the Stanford GSB, came to class to hear the proposals. The first team proposed a way to handle a new "pet class" traveler with TV monitoring of the pet in the pet area of the plane. The second team proposed rewarding able-bodied volunteers with early boarding if they helped seniors through the airport maze. Both proposals impressed Peterson.

What is powerful about this approach to business innovation? For one thing, Rao says, the process can be used with any product or service. Secondly, it allows some ideas to "fail fast" when the financial and emotional investments in them are still low. Constraints on time and prototyping intensify the team's energy but make the decision to kill an idea less traumatic. "The later you fail with a new idea, the higher the cost," Rao explains. "That's why Ideo doesn't build full-scale models" of ideas.

In contrast, many companies "invest a lot of time and money into one idea, they test it, and when it fails, they say, 'Oh my god, we don't want to do that again."  $\Delta$ 

Hayagreeva Rao is the Atholl McBean
Professor of Organizational Behavior and
Human Resources. Joel Peterson is the
Robert L. Joss Consulting Professor of
Management. Robert Sutton is a professor of
organizational behavior (by courtesy) at the
Stanford GSB. Chip Conley received his MBA
from the Stanford GSB in 1984.



**ENTREPRENEURSHIP** 

# The Reinvention Machine

Lessons on Silicon Valley, from one of its founding fathers.

BY ERIKA BROWN EKIEL

Perched on Franklin "Pitch" Johnson's desk is a 4-inch steel ingot, a silent reminder of his first civilian job out of business school: a melter foreman in charge of several open-hearth furnaces in a steel mill in East Chicago, Ind. In 1962 Johnson left behind the grit and swelter of the mill to move back home to Palo Alto, Calif., and start an investment firm. Unaware of it at the time, Johnson was about to become one of the founding fathers of the world's most efficient startup machine: Silicon Valley.

"A burst of entrepreneurial activity took place that dwarfed any other period in the history of the United States," Johnson wrote in a paper on entrepreneurship in 1998. "What occurred in the next few decades was nothing less than an entrepreneurial revolution that shook the country and the world."

Since 1960 Silicon Valley has spawned thousands of high-tech companies. Cities the world over have tried to replicate the magic of the Valley but none has yet been able to create an environment that fosters entrepreneurship, disruption, and invention on the same scale.

Johnson knows something about winning, not only from his career but also from his childhood. His father, Franklin Pitcher Johnson, was an Olympic hurdler who went on to become the track coach at Stanford. Johnson Jr., also known as "Pitch," showed promise in track and field, which earned him a full scholarship to Stanford. When the atom bomb went off in 1945, however, Johnson's interests turned to physics, and he pursued a bachelor's degree in mechanical engineering. He earned a degree from Harvard Business School and served in the Air Force before going to work at the steel mill.

"One mistake is that entrepreneurs often plan to grow faster than reality will permit. They are too optimistic."

He returned to California, and in 1962, Johnson partnered with Bill Draper (the father of Timothy Draper, a well-known venture capitalist and cofounder of Draper Fisher Jurvetson) and founded Draper and Johnson Investment Company, one of the very first venture capital firms. Together, they visited university labs and knocked on doors of newly formed companies to unearth promising new inventions in which they could invest. Three years later Johnson launched his own firm, Asset Management Company, which has invested in more than 200 tech startups, including Amgen, Biogen, and Tandem. Johnson also developed and taught a course on venture capital at Stanford Graduate School of Business for 12 years. The class is still being taught today.

Johnson recently sat down with *Stanford Business* to share his insights into why and how Silicon Valley continues to thrive.

You've been part of helping other regions in the world to become centers of entrepreneurial activity. While many of these places have gotten better at this, Silicon Valley continues to dominate. Why? There are many conditions that allow Silicon Valley to thrive. First, in the U.S. we have had relatively moderate tax rates for capital gains. In the Bay Area we have three great research universities: UCSF [University of California, San Francisco], Cal [University of California, Berkeley], and Stanford University. Those schools produce students and attract professors who know a lot about

technology, and they produce the knowledge and research that leads to the creation of companies.

People forget San Francisco and Silicon Valley have their roots in pioneering. Failure is not unthinkable here. You can try again. In some places in Europe, however, it is a disgrace to fail and you have to retreat from business life. Most Silicon Valley business inhabitants understand that great technology means very little unless it can serve or create a marketplace. I go to Russia, and it's pulling teeth to get them to talk about anything but the technology itself. Once entrepreneurs come up with a scheme to move their technology ideas into the market, they need money. Here, we have an abundance of venture capital. In many places in the world, you need a rich friend or uncle.

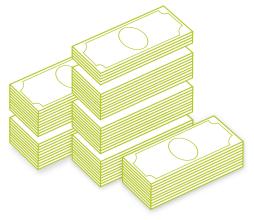
You have invested in more than 200 companies. Of which investment are you most proud? What made it so successful? Amgen. It got to be the biggest, and I had a major role along with Bill Bowes. Amgen serves the medical community with really important products. We make it possible for people to not get anemic when they have kidney dialysis. We picked a superb leader, George Rathmann, and created a great company that does a lot of good for patients. The principal purpose was always serving patients.

### What was your worst investment, and what made

it fail? Any investment when you get zero money back is the worst. I've done that several times. When I have failed, it's been because in my due diligence I didn't see the mode of failure. Often it was the inability to get along with other people, or they couldn't build a business because no one wanted to do business with them.

\$65 BILLION

The recent market capitalization of Amgen. Johnson says of the more than 200 investments he's made in his career, he's most proud of this one.



"The first thing you look for in an entrepreneur is a sense of integrity, honesty, openness, and decency.
The second thing is: Do they have a clear vision of the marketplace they want to serve?"

### What do you look for in a venture investment?

This is a big argument between me and my good friend Don Valentine, a founding partner of Sequoia Capital. The first thing you look for in an entrepreneur is a sense of integrity, honesty, openness, and decency. Once you think you have found a decent person, the second thing is: Do they have a clear vision of the marketplace they want to serve? Don believes that you need decent people, but the marketplace comes first, because you can't change that, but you can change the people. We both ask: Do they have a differentiated ability? Is their product workable? Do they have enough of a different idea that they will be free of certain kinds of competition? Will the business operate with good margins?

What are the most important characteristics of winning entrepreneurs? They must have a strong desire to compete and win, an intuitive understanding of marketplaces and how to serve them, and a deep understanding of technology and how it can be used to serve marketplaces. Those three things are fundamental. A fourth is high integrity and decent behavior. If you don't have that you will have a short run at success but you won't make it long term. Also, I have never met a successful entrepreneur who didn't have zeal.

What mistakes do you see entrepreneurs make most often? Running out of money. Often they plan to grow faster than reality will permit. They are too optimistic.

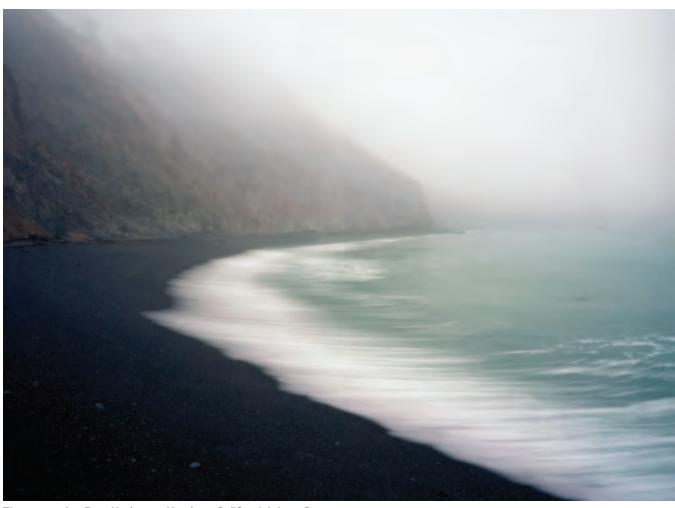
What mistakes do you see venture capitalists make most often? Very large venture firms have trouble doing small deals but the companies that end up being terrific investments often start as very small deals. Another mistake is getting impatient. We used to know it took five to seven years to build a company from scratch and take it public. Now, so many companies do it in their first year or two of life.

What should entrepreneurs look for in a venture capitalist? They should look for someone who can provide active help. It could mean contacts to customers or making judgments about strategy, tactics, and business plans. I've even worked booths at trade shows to lend a hand. They need someone they can feel comfortable telling the highlights and the lowlights. They should ask themselves: Does this venture capitalist want to win as badly as I do?

What is the best business advice you have ever received? When we were first starting our firm, a lawyer, Ed Huddleson, said to Bill and me: "We can write all the investment agreements you want but if you have to bring them out of the drawer, something has gone wrong. Invest in people you can believe in, and you will never need to take the papers out of the drawer."

What do you think is the next great wave of technical development? A continuation of the move into handheld devices and the use of those devices for communications as well as complex functions in the cloud; widespread use of individual human genomes to design drugs and treatments; the use of human stem cells and cells derived from stem cells to treat a large number of conditions and ailments.  $\Delta$ 

Pitch Johnson is a lecturer in management at the Stanford GSB. He developed and taught a course in entrepreneurship and venture capital at Stanford between 1979 to 1990. It was the first venture capital course taught in a graduate school of business.



Time expander: Bear Harbor, on Northern California's Lost Coast

### **PRESENCE**

### Get More Hours Out of Your Day

Research shows that moments of awe can change perceptions about that most precious commodity — time. BY SUSAN H. GREENBERG

If you're feeling pressed for time, you're not alone. Surveys show most working Americans feel that way. But what if there were a way to expand those precious minutes and hours? Research suggests there may be one: Elicit a sense of awe.

Experiencing something awe-inspiring — whether it's the Grand Canyon, a soaring cathedral, or a Puccini aria — can expand perceptions of time, enhancing quality of life. The key, says Jennifer Aaker, co-author of a new paper on the subject, is that awe makes us feel small, not larger than life, the way happiness can. "When you feel small, there's a reapportioning of what's out there," she says. "Time is reapportioned also."

The study, for the journal *Psychological Science*, defines awe as something that is both vast (in size, scope, number, ability, or importance) and capable of altering one's view of the world. To calculate the effects of awe on how people perceive and use time, Aaker — along with lead author Melanie Rudd of Stanford GSB's PhD program, and Kathleen D. Vohs, a professor

at the University of Minnesota's Carlson School of Management — conducted three experiments. In the first, they sought to assess whether awe would be more likely than happiness to enhance the perception of available time. They asked 63 students to watch a 60-second television ad. One group watched a commercial depicting people encountering "awesome" images waterfalls, whales, and space exploration. The other group watched a commercial that showed individuals crossing paths with a parade of happy, brightly dressed people tossing confetti. After, they all rated their agreement with a series of beliefs, including four key variations on the idea: "I have lots of time in which I can get things done."

Consistently, subjects who had watched the "awe" commercial agreed more strongly with the statements relating to ample time than those who had watched the "happy" ad. "When you feel awe, you feel very present — it captivates you in the current moment," says Rudd. "And when you are so focused on the here and now, the present moment is expanded — and time along with it."

The second experiment sought to determine whether people who experience awe would feel less impatient, as well as be more inclined to volunteer their time to charity. First, each of 86 student subjects was asked to write a personal narrative. Half described an experience that had filled them with awe — defined as "a response to things perceived as vast and overwhelming that alters the way you understand the world" — and half wrote about something that made them happy. Then they had to fill out a series of surveys, rating their feelings of impatience, their willingness to volunteer time and donate money to a worthy cause, and their overall feelings of excitement, awe, pride, and happiness.

Those who wrote about awe were more likely to craft essays about nature, art or music, or the accomplishments of others, while those who wrote about happiness were more likely to write about social interactions or personal accomplishments. But regardless of the essay topic, those in the awe group reported significantly less impatience than those who had recounted happy events. Furthermore, the awe essay writers indicated they'd be more willing to volunteer their time — but no more willing to donate money — than the happiness essay writers. That supports the argument

that awe makes people feel richer in hours, since participants were willing to be generous only with their time, not with their pocketbooks.

Building on the first two experiments, the third sought to demonstrate that awe, by expanding the perception of available time, would prompt participants to choose experiential over material gifts. In other words, someone who didn't feel pressed for time would value a temporal, sensory experience over a concrete possession.

To test the hypothesis, subjects were instructed to read one of two stories and attempt to empathize with the main character. The first story, meant to elicit awe, described climbing the Eiffel Tower for an expansive view of Paris. The second described ascending an unnamed tower for a view of a generic landscape. Neither story mentioned the word "awe." Then subjects rated their agreement with various statements about the availability of time, including "Time is slipping away" and "Time is boundless." They were also asked to select between a pair of equally priced hypothetical gifts, such as a watch and a Broadway show ticket, or a scientific calculator and a professional massage.

Like the earlier experiments, the third revealed a strong causal link between awe and the sense of more plentiful time. It also showed that members of the awe group were more likely than the neutral group to choose an experience — such as dinner out or a movie — over a material possession, such as a new jacket or backpack.

"Awe is more of a mindset than we think, and when it is present, it can reorient people's lives, goals, and values."

Additionally, those who expressed greater feelings of awe reported greater life satisfaction, at least momentarily.

The results of the three experiments proved more conclusive than the researchers had anticipated. "The power of the [awe] effect was surprising," says Aaker. "It was quite robust."

But how easy is it to generate awe? In a 2003 paper, "Approaching awe, a moral, spiritual, and aesthetic emotion," UC-Berkeley psychology professor Dacher Keltner and Jonathan Haidt, a former University of Virginia psychology professor now at New York University's Stern School of Business, described awe as "fleeting and rare." They examined the history of awe, tracing its role in ancient religious texts, including the Bhagavad Gita and the Bible, as well as in influencing political and social order through charismatic leaders such as Gandhi and Martin Luther King Jr. Philosophers have also tackled the subject, noting that awe is most easily felt in solitude, such as when hiking in the mountains or viewing a work of art. Edmund Burke wrote that awe which he called "the sublime" - is also more likely to arise from something obscure and surprising, rather than something clear and expected. Interestingly, one often-cited physical response that may best distinguish awe from other emotions is the presence of goose bumps.

Those goose bumps may not be as arbitrary or spontaneous as we might imagine. "[Awe] is more of a mindset than we think," says Aaker. "This research suggests you can cultivate it in similar ways, as you do gratefulness or happiness. Yet, when it is present, awe can transform people and reorient their lives, goals, and values."

Future studies will examine how malleable awe is, and how it can change other perceptions and behaviors. The larger goal, she says, is to understand how well various emotions — awe, gratefulness, peacefulness, or excitement — serve us in different situations. For now, perhaps the best we can do is watch a sunset or listen to a Brahms piano concerto. Then we'll feel like we have all the time in the world.  $\Delta$ 

Jennifer Aaker is the Stanford GSB's General Atlantic Professor of Marketing. Follow her on Twitter @aaker. PhD student Melanie Rudd discusses the research at http://stnfd.biz/hq9qR 16

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### **PERSONAL FINANCE**

# Does modern portfolio theory need reinvention? "The answer is clearly, 'No."

BY PAUL PFLEIDERER

Not long ago, a popular web publication published a piece arguing software is better at investing than 99% of human investment advisors. The piece pointed out the advantages of engineering-driven software solutions versus emotionally driven human judgment. Perhaps not surprisingly, some commenters, including some financial advisors, seized the moment to call into question one of the foundations of software-based investing, modern portfolio theory.

Given the doubts raised by a small but vocal chorus, it's worth spending some time to ask if we need a new investing paradigm and if so, what it should be. Answering that question helps show why modern portfolio theory still is the best investment methodology out there; it enables the automated, low-cost investment management offered by a new wave of internet startups including Wealthfront (which I advise), Personal Capital, Future Advisor, and SigFig.

The basic questions being raised about modern portfolio theory run something like this: Hasn't recent experience — i.e., the financial crisis — shown that diversification doesn't work? Shouldn't we primarily worry about Black Swan events and unforeseen risk? And don't these unknown unknowns mean we must develop a new approach to investing?

Let's begin by laying out the key insights of modern portfolio theory. It is based in part on the assumption that most investors don't like risk and need to be compensated for bearing it. That compensation comes in the form of higher average returns. Historical data strongly supports this assumption. For example, from 1926 to 2011 the average (geometric) return on U.S. Treasury Bills was 3.6%. Over the same period the average return on large company stocks was 9.8%; that on small company stocks was 11.2%. Stocks, of course, are much riskier than Treasuries, so we expect them to have higher average returns — and they do.

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One of modern portfolio theory's key insights is that while investors need to be compensated to bear risk, not all risks are rewarded. The market does not reward risks that can be "diversified away" by holding a bundle of investments instead of a single investment. By recognizing that not all risks are rewarded, modern portfolio theory helped establish the idea that a diversified portfolio can help investors earn a higher return for the same amount of risk.

To understand which risks can be diversified away, and why, consider Zynga. Zynga hit \$14.69 last March and has since dropped to around \$3 per share last month. The major risks associated with Zynga's stock are things such as delays in new game development, the fickle taste of consumers, and changes on Facebook that affect users' engagement with Zynga's games.

For company insiders, who have much of their wealth tied up in the company, Zynga is clearly a risky investment. Although those insiders are exposed to huge risks, they aren't the investors who determine the "risk premium" for Zynga. (A stock's risk premium is the extra return the stock is expected to earn that compensates for the stock's risk.) Rather, institutional funds and other large investors establish the risk premium by deciding what price they're willing to pay to hold Zynga in their diversified portfolios. If a Zynga game is delayed, and Zynga's stock price drops, that decline has a miniscule effect on a diversified shareholder's portfolio returns. Because of this, the market does not price in that particular risk. Even the overall turbulence in many internet stocks won't be problematic for investors who are well diversified in their portfolios.

Modern portfolio theory focuses on constructing portfolios that avoid exposing the investor to those kinds of unrewarded risks. The main lesson is that investors should choose portfolios that lie on what's known as the efficient frontier, the mathematically defined curve that

describes the relationship between risk and reward. To be on the frontier, a portfolio must provide the highest expected return (largest reward) among all portfolios having the same level of risk. The internet startups construct well-diversified portfolios designed to be efficient with the right combination of risk and return for their clients.

### **DIVERSIFICATION**

Now let's ask if anything in the past five years casts doubt on these basic tenets of modern portfolio theory. The answer is clearly, "No." First and foremost, nothing has changed the fact that there are many unrewarded risks, and that investors should avoid these risks. The major risks of Zynga stock remain diversifiable risks, and unless you're willing to trade illegally on inside information about, say, upcoming changes to Facebook's gaming policies, you should avoid holding a concentrated position in Zynga.

The efficient frontier is still the desirable place to be, and it makes no sense to follow a policy that puts you in a position well below that frontier.

Most of the people who say that "diversification failed" in the financial crisis have in mind not the diversification gains that are associated with avoiding concentrated investments in companies like Zynga, but the diversification gains that come from investing across many different asset classes, such as domestic stocks, foreign stocks, real estate, and bonds. Those critics aren't challenging the idea of diversification in general — probably because such an effort would be nonsensical.

True, diversification across asset classes didn't shelter investors from 2008's turmoil. The historical record shows that in times of economic distress, asset class returns tend to move in the same direction and be more highly correlated.

These increased correlations are no doubt due to the increased importance of macro factors driving corporate cash flows. The increased correlations limit, but do not eliminate, diversification's value. It would be foolish to conclude from this that you should be undiversified. If a seat belt doesn't provide perfect protection, it still makes sense to wear one. Statistics show it's better to wear a seatbelt than to not wear one. Similarly, statistics show diversification reduces risk, and that you are better off diversifying than not.

### TIMING THE MARKET

The obvious question to ask anyone who insists diversification across asset classes is not effective is: What is the alternative? Some say, "Time the market." Make sure you hold an asset class when it is earning good returns, but sell as soon as things are about to go south. Even better, take short positions when the outlook is negative. With a trustworthy crystal ball, this is a winning strategy. The potential gains are huge. If you had perfect foresight and could time the S&P 500 on a daily basis, you could have turned \$1,000 on Jan. 1,

"The question is, how should we respond to uncertainties and Black Swans? One sensible way is to be more diligent in quantifying the risks we can see."



The average return on large company stocks between 1926 and 2011

2000, into \$120,975,000 on Dec. 31, 2009, just by going in and out of the market. If you could also short the market when appropriate, the gains would have been even more spectacular!

There are at least three reasons to be cautious about substituting a timing system for diversification. First, a timing system that does not work can impose significant transaction costs (including avoidable adverse tax consequences) on the investor for no gain. Second, an ill-founded timing strategy generally exposes the investor to risk that is unrewarded. In other words, it puts the investor below the frontier, which is not a good place to be. Third, a timing system's success may create the seeds of its own destruction. If too many investors blindly follow the strategy, prices will be driven to erase any putative gains that might have been there, turning the strategy into a losing proposition. Also, a timing strategy designed to "beat the market" must involve trading into "good" positions and away from "bad" ones. That means there must be a sucker (or several suckers) available to take on the other (losing) sides.

### **BLACK SWANS**

But what about those Black Swans? Doesn't modern portfolio theory ignore the possibility that we can be surprised by the unexpected? Isn't it impossible to measure risk when there are unknown unknowns?

Most people recognize that financial markets are not like simple games of chance where risk can be quantified precisely. As we've seen (e.g., the Black Monday stock market crash of 1987 and the "flash crash" of 2010), the markets can produce extreme events that hardly anyone contemplated as a possibility. As opposed to poker, where we always draw from the same 52-card deck, in financial markets, asset returns are drawn from changing distributions as the world economy and financial relationships change.

Some Black Swan events turned out to have limited effects on investors over the long term. Although the market dropped precipitously in October 1987, it was close to fully recovered in June 1988. The flash crash was confined to a single day. This is not to say that all "surprise" events are transitory. The Great Depression followed the stock market crash of 1929, and the effects of the financial crisis in 2007 and 2008 linger on 5 years later.

The question is, how should we respond to uncertainties and Black Swans? One sensible way is to be more diligent in quantifying the risks we can see. For example, since extreme events don't happen often, we're likely to be misled if we base our risk assessment on what has occurred over short time periods. We shouldn't conclude that just because housing prices haven't gone down over 20 years that a housing decline is not a meaningful risk. In the case of natural disasters such as earthquakes, tsunamis. asteroid strikes, and solar storms, the long run could be very long indeed. While we can't capture all risks by looking far back in time, taking into account long-term data means we're less likely to be surprised.

Some people suggest you should respond to the risk of unknown unknowns by investing very conservatively. This means allocating most of the portfolio to "safe assets" and significantly reducing exposure to risky assets, which are likely to be affected by Black Swan surprises. This response is consistent with modern portfolio theory. If you worry about Black Swans, you are, for all intents and purposes,

a very risk-averse investor. The modern portfolio theory portfolio position for very risk-averse investors is a position on the efficient frontier that has little risk.

The cost of investing in a low-risk position is a lower expected return (recall that historically the average return on stocks was about three times that on U.S. Treasuries), but maybe you think that's a price worth paying. Can everyone take extremely conservative positions to avoid Black Swan risk? This clearly won't work, because some investors must hold risky assets. If all investors try to avoid Black Swan events, the prices of those risky assets will fall to a point where the forecasted returns become too large to ignore.

A third and arguably pathological response to the Black Swan problem is to say that nothing is safe. An extreme event could significantly reduce the value of any asset ("We may not have seen it, but this doesn't mean that it couldn't happen"). I doubt anyone has gone to this nihilistic extreme, and I mention it to make it clear that being aware of the potential for unknown unknowns is useful, but not at the cost of decision-making paralysis.

Of course, if you are that privileged investor with a reliable enough crystal ball, by all means use it. The problem lies in knowing whether it is reliable enough.

Although unknown unknowns and Black Swan events make evaluating investment risks more challenging, they don't change the value of diversification and controlling the risks we do know about.

It's particularly important that young people at the beginning of their investing careers understand why the sloppy arguments against modern portfolio theory are so dangerous. With its insights about diversification and controlling risk, modern portfolio theory provides the best foundation for developing low-cost portfolios.  $\Delta$ 

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### INSPIRATION

# entrepreneurs discuss their how the retho businesses, careers, a

BY ERIKA BROWN EKIEL



**James Gutierrez** 

### "Share your secrets."

James Gutierrez is an entrepreneur and investor. In 2005, he founded Progreso Financiero to bring micro-lending to the U.S. Hispanic community and help thousands of families build credit and achieve their economic dreams. Since 2006, Progreso has made more than 250,000 loans through 83 locations in California and Texas. Gutierrez left Progreso in 2012 to pursue his next entrepreneurial venture.

As a former member of the Federal Reserve Board's Consumer Advisory Council, Gutierrez helped draft new policies on expanding financial opportunities for lower-income communities such as Title XII in Dodd-Frank and SB 1146, which increases the availability of safe and affordable smalldollar loans in California. He serves on the boards of the Silicon Valley Leadership Group, the Association for Enterprise Opportunity, Sponsors for Educational Opportunity, and private companies Plumzi and FairLoan Financial. He earned his MBA from the Stanford GSB in 2005.

What is the big idea behind your business? Progreso Financiero empowers lower-income Hispanics in the U.S. who largely lack FICO scores by using innovative algorithms and high-touch retail settings to provide responsible credit

and financial products.

What was the most difficult lesson you have learned on the job? It is better to hire missionaries than mercenaries. You should always hire based on culture and fit first. If you find someone with a great skill set who is very accomplished but does not believe in the mission of your company, he or she will destroy your culture. It may happen gradually but you can see your company changing. Choosing missionaries over mercenaries applies to directors, as well. Do not allow yourself to be awestruck by flashy, big-name people. When hiring a director, you should do the same intense work reference-checking as you would with a senior hire. Ultimately, directors will have more power over the future of the company and therefore, your future.

What gets you up in the morning? What always inspired me was helping the little guy. I don't think America does a good job of distributing opportunity equally. I grew up in a largely Hispanic community in Southern California. That motivates me to get involved in disruptive organizations that can level the playing field to give opportunities to people who are deserving. The first loan I made was to a guy who used the funds to build a bakery. He brought in his whole family to sign the loan. When his first payment was due 15 days later, I started getting worried as the day wore on and he didn't come into our store. He ran in just before closing with a huge box of bread from his bakery. He was so grateful for the loan that he wanted to share with us the dream we helped him create.

#### What is your greatest achievement?

My parents had a tough life growing up. My mother was born in Mexico and grew up in foster homes in East L.A. My father was Mexican American and also very poor. They were a working, agricultural migrant

family. My parents had to fight for a lot of basic things, and yet they managed to send us to great schools. My greatest achievement was showing them that I grew up to create something that has touched the lives of hundreds of thousands of people like them. Progreso has given 200,000 people from similar backgrounds the ticket to opportunity. It would be hard to match the pride in my parents' eyes the first time they came to visit me at Progreso and saw firsthand the impact we were making.

What values are important to you in business? Transparency and an open culture. I believe you should share what many consider to be secrets about how the company is really doing, including the financials, to everyone at the company, all the way down to the call center. There should be no hoarding information. I also believe it is important to support experimentation. Everyone at the company should be encouraged to do fast experiments that fail quickly. Based on those tests the best ideas should win. Also, your values as a company have to be rooted in living a purposeful life.

What impact would you like to have on the world? I want to be an entrepreneur who empowers others through the businesses I create, and I would like to represent my community in the public policy arena. In my time at Progreso I was fortunate to get involved in a lot of policy work, including developing banking and financial services regulatory reforms. We passed two laws I led.

What was your first paying job? It was the summer before college and I worked at Kaplan, the test prep company, in charge of SAT sales. I cold-called lists of people and sold them \$1,200 courses. It was the best experience for me. Part of being an entrepreneur is being a salesperson. The job at Kaplan taught me how to create a story around what I was selling so that what I was selling had meaning. At a certain point I realized I was not selling test prep but a dream. The dream was for the parents - for their kids to go to college and have an opportunity, for the parents to feel the pride of seeing their children becoming successful. I connected with them on the aspirational aspect of what their sons and daughters could be.

### "Fail fast and be proud of your failures."

Jessica Herrin is the founder and chief executive of Stella & Dot, a jewelry maker that sells its wares online and through over 10,000 independent, in-home sales reps dubbed "stylists." Herrin founded the company in 2003, offering both made jewelry and a do-it-yourself jewelry-making option. Previously, Herrin cofounded WeddingChannel, an online wedding planning resource guide and registry sold to TheKnot for \$78 million in 2007. She received her BA from Stanford in 1994 and then attended the Stanford GSB.

### In 10 words or fewer, what is the big idea behind your business?

Democratizing entrepreneurship by providing a flexible entrepreneurship platform for the modern woman.



What is the best advice you've ever

received? A former board member told me if I wanted to run or build a large company, I should first work at one. I had only worked at tech startups before Stella & Dot, so I went to work at Dell. It became a continuation of business school for me. I learned more about managing people at a larger scale. I would not have had exposure to that side of business operations if I had only worked at a "Wild West" startup. Another valuable piece of advice came from a cab driver in Texas. He was an angel in a cowboy hat. I was interviewing for my first job out of college and had a mountain of student loan debt. I had a job lined up in New York at an investment bank that would have paid me a lot of money. Meanwhile, I was on the way to an interview with a startup in Austin, which would offer more potential upside but at the cost of a lower salary and a greater chance of failure. I was torn. The cab driver asked, "Would it be worth the possibility of the best upside to go through the worst-case scenario?" In other words, if the worst-case scenario of failure isn't that bad, then go for the bigger opportunity without fear.

What advice would you give other entrepreneurs on how to build a great business? Being an entrepreneur must be your calling. It sounds lofty but building a business takes so much commitment and effort. Only if you love it can you levitate yourself over the obstacles that stand in the way of creating a business. You need to be mission-driven and authentically connected to what you do. You should not just pursue it because it makes money. You should do it because it is uniquely suited for you. With Stella & Dot I feel like I'm in the happiness business. I bound out of bed every morning for the opportunity to do it all again.

What inspires you? The success stories of our stylists. We just had our national sales conference where we bring thousands of our entrepreneurs together and celebrate their accomplishments. Our stylists have many different backgrounds, but we've all come together. Many love their careers and layer Stella & Dot on top, but many others never knew what it was to do what you love and get paid. They made career decisions because they thought it was the right thing to do. They were left with a feeling of: Is this it? Now these women are thriving. Every one of our stylists has a story. There is one ex-PR exec that had been home raising her three children for the last eight years.

Then her husband became ill with multiple sclerosis and was unable to work. Without skipping a beat or losing control of her schedule, she launched with Stella & Dot and now earns over \$200,000 a year. There are other women who have military husbands who are deployed abroad. The women they met through Stella & Dot help them in more ways than one. They are in the delivery room with them, making meals for them, building a community. It's truly inspiring.

What do you consider your biggest failure? I believe you have to fail fast and be proud of your failures. If you don't fail often, you are not trying hard enough. At WeddingChannel we raised a lot of venture capital. I didn't want to do that again and make glossy, expensive mistakes. I was committed to bootstrapping Stella & Dot out of my living room. I constantly experimented and iterated.

What values are important to you in business? Our company manifesto says it all. It's about following your passion and being authentic to who you are. It's about never resting on our laurels or being afraid to take risks. Staying agile, nimble. Recognizing that every day is day one. Most of all, I value people truly pursuing their passion. I only want people to work at Stella & Dot who feel like it fits into their life's mission. Life is way too short not to love what you do, why you do it, and who you do it with. Many Stanford alumni will have earned the ability to be selective. You need to ask yourself: Am I doing what I truly want to do, or just what others expect me to do?

What impact would you like to have on the world? Everyone wants to make the world a better place. My role is to help women feel more bold, empowered, and joyful. I want to help them create their own financial independence and community. I want to help women live their best lives.

What do you think is the greatest innovation in the past decade? The emergence of social networking. It has completely transformed the way we communicate and interact with people. It changes everything. It's as if you assumed the world was flat and now it's round, and you have to re-chart every course.



Steve Poizner

### "Focus. Then focus some more."

Whoever said politicians don't create jobs hasn't met Steve Poizner. This serial entrepreneur and 2010 California gubernatorial candidate is on his third startup. His last company, SnapTrack, brought GPS technology to mobile phones and sold to Qualcomm for \$1 billion in 2000. In October he launched Empowered, a partnership with UCLA Extension that offers training for adults who want to change careers or upgrade their job skills. He earned his MBA from Stanford GSB in 1980.

In 10 words or fewer, what is the big idea behind your business? Disrupt education and help boomers switch careers by closing the skills gap online.

What is the best advice you've ever received? Burt McMurtry, former chairman of Stanford's board of trustees and an early investor in my past companies, told me: "Focus until you think you've focused too much, then to more." Focus is particularly difficult with startups. It is so easy to go after multiple segments and niche opportunities but it focused too much, then focus some more." Focus is particularly difficult with

is best to focus like a laser beam on one or two opportunities. Once you master your products or services in a small area, you can expand from there.

What advice would you give other entrepreneurs on how to build a great business? Think big and build diverse, high-quality teams. Small problems can take as much time as big problems, so you should make it all worthwhile. With every organization I have ever built or run, the key to our success was putting together diverse, quality teams. Taking on big problems that impact the world requires massive amounts of intellectual power, and that can't be done by a couple of people who have the same viewpoints. When I took office in 2007 as the insurance commissioner for California, I wanted to assemble a diverse team of senior people. We hired Republicans, Democrats, and independents, as well as people from the insurance industry and consumer advocacy groups. The diversity of the team led to lively debates. When I made important, multibillion-dollar decisions they were based on understanding every aspect of the problem.

#### What is your greatest achievement?

I've been fortunate to have a bunch of entrepreneurial opportunities. If I had to pick one, I'd say the White House Fellowship. They choose 10 people each year from 1,000 applications. You can work for someone senior in the executive branch. In 2001 I was assigned to work with the National Security Council in the counter-terrorism group. My boss was Richard Clarke, who was the counterterrorism czar for multiple presidents. I worked on a number of projects, including how to protect our banking system, power grids, and the internet from cyberwarfare attacks.

What do you consider your biggest failure? When I ran for California governor in 2010 against Meg Whitman, who beat me in the Republican primary. I'm really concerned about California's economy and the high unemployment rate. As governor I could have tackled problems in our education and economic engine.

"I'm proud of my current venture. It's about skills training and getting people into positions where they can have an impact."

What impact would you like to have on the world? I want to create an environment where entrepreneurs can thrive. Entrepreneurship and innovation are being threatened by a subpar education system. I would love to continue to work on projects that foster innovation. I'm proud of my current venture. It's about education and skills training and getting people into positions where they can have an impact.

What was your first paying job? When I was 15 in Houston, Texas, I was an usher in a movie theater. I made \$1.10 an hour. I learned there what it meant to work hard and be a good employee. The first movie that played when I started in 1973 was The Godfather. I saw that movie 60 times and can quote chapter and verse.

What is the best business book you have read? Thomas L. Friedman's The World Is Flat. It described for me the chief problem in California. California helped create much of the technology that enables entrepreneurs all over the world to build businesses, which means those jobs no longer need to be in the U.S. or California. Friedman does an excellent job of describing how urgent it is to stay competitive in education and job creation.

What is the most valuable thing you took away from your time at Stanford? I had come right out of the University of Texas undergrad and was the youngest guy in my class. It was a growing experience. I am analytical by nature so quant classes were easy for me, but I learned the most in organizational behavior. That is where I first learned leadership skills that drive great teams. Thirty years later, I can say that class helped me make the biggest impact.

Whether you believe it or not, there are forces far greater than our strategies, passion, and willpower. I have become very expansive and humble in how I think about different answers.

What advice would you give other entrepreneurs on how to build a great business? Surround yourself with people you trust who complement your skillset, and then encourage debate and dissension. Keep your ego in check. Everyone at the company should feel comfortable having their own opinions. I don't believe in bluesky brainstorming or design by committee. I like to come in with ideas and ask individuals to challenge them.

How do you come up with your best ideas? The best ideas will not come from slamming three espressos and grinding it out, but rather at weird moments: in the middle of the night, when you are traveling on a train, when you are receptive to oblique inspiration and the suspension of disbelief. Zen teachers refer to this as "the beginner's mind, where possibilities are many." We are all too finely tuned. Our mind uses us more than we use our mind.

What values are important to you in business? Honesty and simplicity, and doing something that you believe has real value. Many companies do market research to try and anticipate the needs of the customer. I say just develop great products and tell an honest story about them. All the excess marketing spin in the commercial world has created a desire for authentic goods.

What impact would you like to have on the world? I'd like to make a positive difference socially as well as economically. I started PUBLIC Bikes at a time in the world when we consume 15% more goods than we produce, or need. I asked myself: What could you sell such that if you sold more, it would improve the quality of our lives? Bicycles are one solution. Getting people to reduce their dependency on private automobiles would do a lot for our environment and to improve connections with our communities. We need to sell 100,000 bicycles a year in the U.S. to make a difference. I started DWR [Design Within Reach] because I thought there was a market for higher quality and that the U.S. consumer was not as price-driven as many companies make them out to be. I felt customers would appreciate design

"Surround yourself with people you trust who complement your skillset, and then encourage debate and dissension."

better if they understood what was behind these objects: the human endeavor and initiative. So we associated all of our products with designers' biographies. It worked. Maybe it will also allow customers to appreciate themselves as designers; we all design something. Even a business memo is a piece of design.

What was your first paying job? I was a dishwasher at Tuesday's Child restaurant in Laguna Beach when I was 16. Fortunately, no one has to hand dry crystal goblets any longer.

What is the best business book you have read? Malcolm Gladwell's *The Tipping Point*, and *Zen and the Art of Motorcycle Maintenance* by Robert Pirsig. Gladwell helps us see that little things can make a big difference. Pirsig writes about a preoccupation with quality, which is elusive, and coming to terms with technology and understanding how it fits into a world with beauty.

What businessperson do you most admire? I admire the people who manage small businesses every day more so than those who have been successful in launching larger businesses. The great new chefs and restaurateurs in San Francisco who have built our food culture care deeply about what they do and perform the same tasks again each day out of passion.

What is the most valuable thing you took away from your time at Stanford? The friendships and ongoing relationships trump everything else. Your peer group becomes an important part of your life.



**Rob Forbes** 

### "Develop great products. Tell an honest story."

Rob Forbes is a serial entrepreneur with an eye for design. He earned his MBA from the Stanford GSB in 1985, and founded Design Within Reach in 1999 on the premise that he could disrupt the furniture and decorator businesses by selling modern designer furniture direct to consumers over the internet. The company reached \$100 million in revenue in less than 5 years and now sells through 43 stores. Three years ago he launched PUBLIC Bikes, which designs and sells commuter bikes. "Most business people underestimate the value of visual thinking," says Forbes.

In 10 words or fewer, what is the big idea behind your business? The value that design brings to our everyday lives: optimism. The right chair or a bike ride can put a smile on anyone's face.

What was the most difficult lesson you have learned on the job? You cannot control as much as you think you can.

Laura Ching

### "Solve a problem you would want solved."

Many emerging technology companies are working hard to make the printing press obsolete, but Tiny Prints uses technology to encourage its customers to write and send more cards and letters through the mail. Based in Sunnyvale, Calif., Tiny Prints helps people create and print customized stationery, invitations, and birth announcements. Tiny Prints cofounder Laura Ching talked with us about values, culture, and competing with yourself. She earned her MBA from Stanford GSB in 2000.

In 10 words or fewer, what is the big idea behind your business? Allowing people to connect more meaningfully beyond digital means.

What is the best advice you've ever received? Solve a problem that you would want solved. Also, my mom drummed into me: "If you are going to do something, you might as well do it well."

What advice would you give other entrepreneurs on how to build a great business? Building a great culture from the start is important. Don't put it off until later! We invested a lot of time and mindshare into culture from the beginning. We recruited people who were likeminded, and we made sure all our partners

were aligned in values and the type of company we wanted to build, as well as the personality of the company.

What inspires you - how do you come up with your best ideas? I have a burning desire to win and achieve. I was raised in a typical Asian family where that was important. I have a deep fear of letting people down. As a working mom I want to be a good role model for my children. I get my best ideas when I get off the grid and detach myself from my industry. Spending time thinking about fashion, toys, or architecture frees me up to think imaginatively. It's hard to be innovative when you are stuck in your own industry. You see artificial boundaries around what you can and can't do.

What was your first paying job? I was an assistant at my grandfather's construction company. I pushed a lot of paper. I was making minimum wage and learned that it took a lot of hard work to be able to support yourself. It made me realize I had better study hard so I could find more opportunities down the road.

What businessperson do you most admire? My grandfather. So much of what I have learned in business came from him. He was an entrepreneur in a day when it was hard for Asian people to break through.

What is the most valuable lesson you took away from your time at Stanford? To be confident in your own skin. I met so many people of different backgrounds.

There isn't a cookie-cutter way to success.

What do you think is the greatest innovation in the past decade? TiVo. A

For the full-length versions of these interviews, and for more insights and ideas from entrepreneurs, go to http://stnfd.biz/hpWK1

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### **FINANCE**

### How, and why, Anat Admati took on the global banking system

BY MICHAEL FREEDMAN

One day in the spring of 2010, Anat Admati, a finance and economics professor at the Stanford Graduate School of Business, opened up a well-known textbook on banking and was astonished by what she saw. "It basically has things in it that are in direct conflict with what we teach in basic finance," she said. "It was shocking. It was absolutely shocking." She stormed into colleague Paul Pfleiderer's office. "I've had it," she told him. "I've heard enough nonsense. This is it. I don't care what anyone says. There is something wrong with banking. At all levels."

For Admati, it marked a turning point. In the 27 years since receiving her PhD in operations research from Yale, her scholarly pursuits had been primarily dedicated to a highly technical, theoretical sort of work that focused on real-life topics such as bargaining and shareholder activism, but did so from a perspective likely to be of interest mainly, or perhaps exclusively, to other scholars. But when Lehman Brothers collapsed and the industry went into free fall, her own field of study, finance, was suddenly taking center stage in a far broader debate. And slowly at first, but

relentlessly and with increasing speed, Admati began asking questions and pushing back against some of the biggest players in the global economy.

As the crisis unfolded, Admati experienced what the rest of the financial world was seeing: panic, fear, and intense uncertainty. "I grew up in Israel, and it was like this feeling of war, this feeling of not knowing what was going to happen." On a deeper level, she says she felt what she calls the "trauma of an academic." The crisis was calling into question some of the key tenets of what she and her colleagues understood about the way companies operated. The mathematical models she had spent her life working on were colliding with reality.

As she started delving into the particulars, she discovered that bankers and banking experts, including academics, were making what she found to be a peculiar argument: that increased capital requirements — that is, mandating that banks use relatively less debt and more equity so they are less vulnerable to declines in their asset value — are "expensive" for society. Moreover, bankers were arguing there were serious tradeoffs between safer banks and lending, growth, and efficiency.

At first, she thought she was missing something. After all, scholars and bankers had been studying this for years, decades even. Numerous textbooks, academic articles, policy papers, and commentary had been written on the subject. And while she was increasingly skeptical of the arguments, she was reticent to step out too far into the public eye. Not an expert on banking *per se*, she felt she would be viewed as just one of thousands of professors.

Seeking a way to shape and present her views, she enrolled in a program called the OpEd Project, which aims to increase the diversity in the nation's opinion pages, and in particular the number of women contributors. On the first day of the session, run by Stanford's Clayman Institute for Gender Research, facilitators went around the room and asked the women to say what made them an expert. Instead of banking, Admati, a mother of three, focused her attention on a community problem: a rash of teen suicide attempts on the train tracks running through Palo Alto.

Admati had become interested in means restriction — the theory that suicide attempts can be reduced by making it more difficult for individuals to get access to dangers like unguarded train tracks, firearms, and prescription pills. In the evenings, she sat at the crossing with friends and others, including the current Palo Alto mayor. She went to school board and city council meetings and raised money to hire a guard. She wrote an oped for the *Palo Alto Weekly*, published in April 2010, calling on "everyone in this community, organizations and individuals, to respond to this challenge."

Through this experience, it became clear to Admati that any entrenched problem, whether local, national, or global, could be changed through the involvement of greater numbers of people. Having her first op-ed published emboldened her to focus more publicly on banking.

Admati began saying out loud what she and some of her colleagues had been saying quietly in the hallways and in emails: that banks seemed to be receiving an unwarranted exception from the basic principles of finance. "Banking experts were making up their own rules," she says. "As if banks, as businesses and corporations, lived in a different reality, as if they were on a planet where gravity did not apply."

The questions Admati started asking did not make her particularly welcome in much of the world of banking. Admati worked her way into a conference at the New York Fed and got 10 minutes to express doubts about a proposal championed by some academics that was receiving much attention at the time, something called contingent capital (defined as debt that converts to equity when a certain trigger is hit).

Afterward, one of the participants urged her to write up in more detail the content of her comments. He told her he believed there was a lot of confusion in banking. Deliberations in Basel about banking



Anat Admati: "Banking experts were making up their own rules."

reform were being derailed by invalid arguments. Those who wanted to counter those arguments did not have enough writing that explained the issues.

Along with Stanford GSB colleagues Peter M. DeMarzo and Paul Pfleiderer, and Martin F. Hellwig of the Max Planck Institute for Research on Collective Goods in Bonn, Germany, Admati spent the summer of 2010 writing a 70-page paper titled "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity Is Not Expensive."

The paper concluded that requiring banks to have more equity would not increase their funding costs except for reducing their ability to benefit from subsidies. Whereas bankers may have their own incentives to choose high leverage and to "economize" on equity, their high indebtedness was harmful to the economy, contributed to the fragility of the financial system, and, in fact, distorted banks' lending decisions.

The scholars proposed that regulators set much higher equity requirements than were being put forth, and urged regulators to manage the transition by banning banks' dividends and other payouts to shareholders, mandating equity issuance. Contrary to claims that increased equity requirements reduce lending, it is, in fact,

"Many people are angry and don't know what to do. We're hoping to teach them what to ask for — to tell them what can be done."

high indebtedness and debt overhang that lead banks to avoid making loans, they said. "U.S. banks paid tens of billions of dollars in dividends since 2007 and through the worst of the crisis," Admati said at the time. "If withholding dividends is done under the force of regulation, there will not be a stigma for any individual bank."

People started to take notice. At a September 2010 conference in Vienna, one of the discussants said he had waited 40 years for this kind of paper. "Can a million bankers be wrong?" he asked, rhetorically. "I now know, yes." Admati and colleagues also discovered they were not alone. Academics have pointed out some of these issues at least since the 1990s. A central banker from New Zealand had said basically the same thing as far back as 2004.

In November 2010 she and 20 scholars signed a letter to the *Financial Times* that argued a healthy banking system must be the goal, not merely "high returns for banks' shareholders and managers, with taxpayers picking up losses and economies suffering the fallout."

From there, she continued to write papers, comment letters, and op-eds, expanding her network further. With encouragement from academic colleagues, including Simon Johnson, an economist at the MIT Sloan School of Management, she wrote a lengthy feature published by the *Huffington Post* titled "What Jamie Dimon Won't Tell You," referring to the head of JPMorganChase. The next month, she published a full op-ed in the *Financial Times*. Then, she published pieces in *Bloomberg*, the *New York Times*, and elsewhere.

Still, Admati felt she wasn't getting far enough. She had built a vast network that included some of the stars of the banking system, such as Bank of England governor Mervyn King and former head of the FDIC, Sheila C. Bair. Admati was appointed to an FDIC advisory committee that includes former Federal Reserve chairman Paul Volcker and former Citicorp CEO John Reed. She had some access to the pages of influential media outlets. But only in a book, she decided, could she fully flesh out the issues and try to change the debate and have a more meaningful impact. So, with Martin Hellwig, she began drafting a book for a general audience, The Bankers' New Clothes: What's Wrong with Banking and What to Do About It.

As she worked on that, she and her colleagues published another paper, "Debt Overhang and Capital Regulation." The paper explored why high leverage is inefficient for corporations, but observed that banks are unusual for two reasons. First, the implicit and explicit safety nets that support and subsidize banks mean their creditors are less likely to worry about default than they would be with other kinds of companies. As a result, creditors impose fewer restrictions and covenants on banks, and banks often borrow at lower rates than they would have had to pay based on the risk of their assets. Second, the compensation structure in banking actually encourages high leverage.

Bank management, they write, has incentives to make "large cash payouts such as dividends and share buybacks that maintain high leverage and harm creditors and the public." Indeed, they wrote, the main beneficiaries from high leverage may be bank managers, while "the majority of the banks' shareholders, who hold diversified portfolios and who are part of the public, are likely to be net losers."

The book addresses the idea that years after Lehman's collapse, the financial system remains "dangerous and distorted." It also explores a related, but somewhat different, issue: the politics behind the

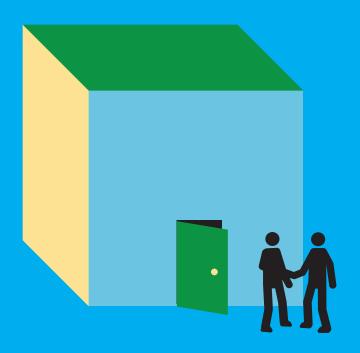
decision-making processes that have stymied attempts to tighten regulation and improve enforcement. For months, Admati and Hellwig write, they had been "exposing the invalid arguments that were being given against reform. ... However, important parts of the policy discussion go on behind closed doors. Even when regulators ask for public comment on a proposed regulation, most contributions come from the industry and its supporters, and additional lobbying goes on behind the scenes."

In their attempts to hold meaningful discussions, they write, they discovered that many politicians, regulators, and others "had no interest in engaging on the issues," in part because they preferred to avoid challenging the banking industry. "People like convenient narratives," they write, "particularly if those narratives disguise their own responsibility for failed policies. Academics get caught up in theories, based on the belief that what we see must be efficient. In such a situation, invalid arguments can win the policy debate."

Admati says she hopes her work will alert people to that fact, educate them, and empower them to make changes in the system. "Many people are angry but they don't know what to do," she says. "What we're hoping is to teach them what to ask for — to tell them what can be done."  $\Delta$ 

Anat Admati is the Stanford GSB's George G.C. Parker Professor of Finance and Economics. She is the author, with Martin Hellwig, of the new book, The Bankers' New Clothes: What's Wrong with Banking and What to Do About It. Follow her on Twitter @anatadmati

# Organizations



"Top inventors were much more likely to leave if their companies went public, and the ones who stayed behind showed a steep decline in

## innovation quality."



**EXTREME** 

### Duct Tape, Empathy, and Radical Collaboration: A Tool Kit for Changing the World

BY MICHAEL FREEDMAN

Over the last decade, 325 Stanford students have participated in Design for Extreme Affordability, a five-month-long course in which the students learn to design, prototype, and build products for some of the world's poorest people. The students have worked together in teams, traveled to 14 countries and worked on 80 projects in collaboration with 22 global partners. Among the many success stories: Miracle Brace, designed for the Miraclefeet Foundation, which is helping to solve a frequent cause of disability in the developing world, clubfoot, through a series of bars and shoes that can be fit to each child from birth until the end of treatment around age 5; d.light design, which brings solar-powered lanterns to rural households that previously relied on dangerous kerosene; and the Tripod Pump Frame, designed with and manufactured by Proximity Designs, which makes low-cost irrigation devices to help farmers in rural Myanmar.

Later this year, PBS is scheduled to air a documentary on the class, produced by filmmaker Ralph King, which will chronicle



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Scott Macdonald, Jess Adrian, and Anna Xu convert a whiteboard into a gutter to catch and transport water to a bucket.

the lives of students on three teams as they learn to work together in the United States and abroad to build and bring new products to market. The documentary also examines the role the instructors play in helping the students grapple with the many challenges of doing so. *Stanford Business* caught up with the teaching team during a break from a day spent culling through a record 132 applications for the 40 spots in this year's class, the 10th since it began. Here are excerpts of the conversation.

### One of the things you emphasize in this class is collaboration, and that's true among teachers and students. Why is that?

Jim Patell: When we started, one of the rules we had was that every course would be taught by at least two faculty members from different departments, and it would not be one of those things where I would do Monday and someone else would do Wednesday. We would both be there for every session. And the d.school was very much intended to be a place with a culture where truly interdisciplinary courses could be taught. But if you want to talk about teamwork, we ought to turn to Julian, because Julian has entered, been drawn into, the course for about five years now, and his role has been explicitly on teams and team building.

Julian Gorodsky: I'm a member of the founding team of the d.school that built this place and embedded within it a welcoming appreciation for human relationships and what it takes to have a team that really can work well together. Focusing on

extreme affordability, we've worked hard with each other and found places of real communication with each other. I think that is part of what we are demonstrating to the students while we're teaching them radical collaboration and design thinking.

### Why is radical collaboration the right model for creating the kinds of products you want?

Dave Beach: To focus on the teaching team first: I come from 40 years of history teaching mechanical engineering, and trying to connect design and building together. I've learned from Jim Patell. I've learned from Stuart Coulson. Jim's a professor in the business school; Stuart's an entrepreneur — a very successful, high-tech entrepreneur. When we meet as a group — usually seven people — it's a stimulating and amazing experience. The range of ideas is much greater than I would have if I met with myself or with colleagues in a traditional field — in my case, design. More ideas come out. More excitement comes out.

And the other thing that's wonderful about this collaboration is that there are no titles here. There's no sense of hierarchy. Everyone's ideas are just as good as anybody else's. So, from my perspective, this idea of radical collaboration — I don't know what either of those words really mean. What I know is that this team of teachers has a great time together, and I, personally, am much more creative than I could possibly be doing anything without the team.

### I imagine it can be daunting for a physicist, say, to be put in the same room as a poet and asked to collaborate.

**Sarah Stein Greenberg:** My experience as a student was that as a person with a health care and business background — a



A team of students attempts to capture water with a plastic funnel attached to a wood frame.

nonprofit background — I had never had the occasion to work with engineers before. I had not worked closely with people from the medical school. I had not worked closely with people from all across the Stanford campus. And we don't realize how much you grow up in your own academic discipline until you see that reflected back at you in the different ways that another student operates. That was a profoundly important moment in my own education. And I think there's a belief operating when you're trying to solve these kinds of very messy problems and potentially create something new and powerful. Having more diverse perspectives at the table is going to broaden your array of potential solutions. But getting to the point where you can productively work as a team across so many disciplines is challenging.

### What's the process of making it more comfortable?

Stuart Coulson: On the day the students find out what team they are on, I run a business quiz and kind of rapid business research project. The idea is to show that a multidisciplinary team can all contribute to the area of business research for competitive analysis, for understanding the market, and for various other things. It's also a team building exercise because I'm asking you to do an impossible job in a very small amount of time. So, the very first thing they experience, other than the team members, is a pressure situation because by the time we get to the end of class, they're all going to be in a pressure situation to try to finish their project. And it's a certain amount of hype. The idea is to get people excited about their new project, their new task, and to start to understand their new environment.

**Beach**: Being surrounded by people from a variety of disciplines generates very high expectations, of course. People

"We do an exercise at the beginning of class to send home the message: 'You're not designing for yourself. People are more different from you than you think they are."

understand before they apply that they're going to spend more time — like all their time — on this course. But I think a couple things mediate against you in the sense of fear. I think the first one is that the very first exercise when they walk in the class — the very first hour in the class is a joint exercise in which everyone is kind of equally able to contribute. And, in fact, at least for the engineers, but I think probably also for others in the class, the idea of going and meeting people that are different from you, and developing empathy, and extracting from that some sense, some point of view about what you might do to be helpful, is something that any sensitive human being can contribute to equally. It's a matter of energy. It's a matter of commitment. But it's not a matter of professional background. So, the most important part of the course is probably not the outcomes, but that whole idea that an important part of your professional life, whether you're a doctor, a lawyer, an engineer, a business person, a geologist, is appreciating people and learning how to develop empathy and construct a point of view around that. It's equally available to everybody.

#### That word: empathy.

**Gorodsky**: It's empathy for the human factor — empathy for yourself, for example.

For me, coming into this work and getting to work with a remarkable team, I frequently feel humble. I've experienced more doubt, more uncertainty — all the things that students talk about. In getting together and working with this team: "I don't know what he knows. I don't know what she knows." And you get through that. And you break through that because you're really working collaboratively. That goes on with the students.

### How do you have empathy for someone you've never met and have no experience of in the developing world?

Stein Greenberg: Having fresh eyes is an incredibly valuable tool. It's easier to fall into the trap of designing for yourself if you're imagining a user down the road in Mountain View than if you are traveling to a different part of the world. You, and your other teammates, who have totally different perspectives from you, are soaking in every shred of evidence and data that you can, and then you're having an ongoing collaboration with a partner, and testing. Patell: On the first day of class students do an exercise where they need to redesign the oral hygiene experience. Its point is to send home the message: "You're not designing for yourself. People are more different from you than you think they are." And it takes something mundane, like a wallet or brushing your teeth, where you might think that everybody does it or wants it the same, and they find out that the person standing next to them — literally, who's about the same age, going to the same university, probably similar socio-economic status — is immensely different from them on something as mundane as how you brush vour teeth.

The second thing is empathy. One of the things we force our students to do is put together what we call a point of view statement that captures empathy for the ultimate user, as well as a separate one for partner organizations. What are their constraints? What is your partner organization's mission? What promises have they made that they're trying to fulfill through this project of which you are



Testing: Jim Patell (right) measures water captured by a student team, with first-year MBA student Ambrose Gano.

unaware? And it all comes down, I think, to a word we use a lot — at least I use a lot — about being intentional.

Many people's experience of life, and even from when you were a kid, you were put on a baseball team or whatever it was. Well, we're here to play baseball. We're here to design a product. We're here to do whatever. And the team dynamics — the team evolves the way it's going to go. But it's taken as this random variable that has a life of its own, and that you're lucky or unlucky, as opposed to saying that the way your team operates, the way you get along, is malleable. It can be influenced. It can be not entirely managed, but you can be intentional about how this experience unfolds.

It's worth calling a timeout now and then to diagnose where you are, and to be intentional about what you want to do next. And you can influence that flow of human interaction.  $\Delta$ 

David Beach, Professor of Mechanical Engineering; Director, Product Realization Laboratory

Stuart Coulson, Consulting Associate Professor, Hasso Plattner Institute of Design (the d.school)

Julian Gorodsky PhD, Consulting Associate Professor; d.shrink for the d.school; Team Shrink (psychologist) for the BioDesign Fellowships; and Clinical Psychologist

James Patell, Herbert Hoover Professor of Public and Private Management, Stanford GSB

Sarah Stein Greenberg, Managing Director at the d.school; Stanford MBA '06; and alumna of the Design for Extreme Affordability class



If you had a strategy professor, he or she probably taught you to avoid competition. The professor was wrong. Of course, when organizations compete, they make it difficult for each other to perform well. This fact has led to a great misunderstanding among business leaders, especially those trained in business schools, that they should avoid competition.

The reality is that pressure from competition causes people to search for ways to improve their company's performance. These improvements, in turn, make companies stronger competitors. So now these improved firms put more pressure on their rivals, who must also find a way to improve. Once those rivals improve, they now are stronger competitors, starting the whole cycle over again.

So it is that competition causes organizations to learn, which in turn intensifies competition in a self-accelerating process known as the "Red Queen" effect. This term was coined by the evolutionary theorist Leigh Van Valen in reference to Lewis Carroll's Alice who remarks to the Red Queen: "Well, in our country, you'd generally get to somewhere else — if you ran very fast for a long time as we've been doing." To this the Red Queen responds: "A slow sort of country! Now, here, you see, it takes all the running you can do, to keep in the same place." In an ecology of learning organizations, relatively stable performance masks absolute development.

The Red Queen is at work around us all the time, triggering progress on many fronts. When the Korean steel firm POSCO came up with the "finex" process, this innovation raised the bar for any firms wanting to compete in the global steel business. Those steel firms that kept pace are still competing today. Similarly, when Qualcomm revolutionized digital wireless transmission by making CDMA technology workable, this put pressure on every other firm in that space to respond. Apple, Samsung, Nokia, Ericsson, LG, and many other firms engaged in that competition for years. Some still are competing, but only by remaining innovative.

The result? Well, to the firms involved it can feel like they are running in the same place since each is evaluated relative to the others. But for the rest of us, we've seen, among other things, enormous, clunky cell phones with giant antenna evolve into the sleek design and functionality of the iPhone.

As a consumer, you probably think of this amazing record of innovation as something that was inevitable. But this development did not have to happen. Each innovation along the way was carried out by a firm as it attempted to do a better job, in turn raising the bar for others. So, if you are lamenting that your device cannot map correctly, worry not. Competition still thrives in the wireless industry, so the better devices out there will pressure your manufacturer to do a better job.

Still, many believe firms are supposed to find a way to avoid competition — to gain "positional advantage" or locate in "blue oceans" where rivalry is weak. Had Qualcomm, Apple, LG, Samsung, "Avoiding competition would be more comfortable, for sure. But that is just a way to shut down the engine that generates innovation."

and others taken this advice, how different the wireless industry would be! (Indeed, many experts on the telecommunications industry argued just a few years ago that it was a "natural monopoly," where competition would be "ruinous!") Avoiding competition would be more comfortable, for sure. But avoiding competition is just a way to shut down the engine that generates innovation.

But, you might say, surely competition is bad for an organization's performance. Don't monopolists outperform other firms? Isn't that why so many companies are trying to dominate their markets? Well, yes, in the short run a monopolist performs better than a firm facing rivalry (other things equal). But, over time, that monopolist gets lazy. Meanwhile, over time, firms facing competition continue improving.

In fact, I estimated the statistical effects of Red Queen competition on hundreds of firms over many, many years, and found the following pattern: When you compare inexperienced firms, the monopolist performs better. But over time, experience makes the firms facing rivalry improve, eventually becoming better performers than had they found a way to be a monopolist. That is the Red Queen effect. As a firm competes, it becomes more capable, and so performs better. Even though its rivals also perform better, the net effect turns out to be beneficial in time. Highly competitive markets, over time, feature some of the world's greatest competitors. So your strategy professor was wrong: Competition is good for you.  $\Delta$ 

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TRADE-OFFS

## Do IPOs Speed Up Technological Innovation?

A new study shows why the answer is often no.

BY EDMUND L. ANDREWS

For many entrepreneurs, it is a dream on par with finding the Holy Grail: an initial public stock offering that can turn a startup into the next Google and a 20-something founder into the next mega-millionaire. Yet, for all that money and drama, do initial public offerings — IPOs — speed up technological innovation?

Not necessarily. An eye-popping new study by Shai Bernstein, an assistant professor of finance at the Stanford GSB, finds that innovation *slowed down* by about 40% at tech companies after they went public. In a meticulous analysis of patent data from nearly 2,000 companies, Bernstein found that newly public companies became noticeably more incremental and less ambitious with their in-house research than comparable firms that stayed private.

And that's not all. Top inventors were much more likely to leave if their companies went public, and the ones who stayed behind showed a steep decline in "innovation quality." Indeed, the newly public tech companies became much more dependent on buying technology from outside — usually by making corporate acquisitions.

That's almost the opposite of what one might expect. Young tech firms go public on the strength of their innovative promise, and going public provides them with cash to double down on their R&D.

From the vantage point of public policy, IPOs may still be a net positive for tech innovation. Many companies go public because they have just scored a major breakthrough and use their new resources to scale up the business. And even if newly public companies do become less daring, they can still propel innovation indirectly by paying top dollar for startups. Google has bought 100 companies since it went public in 2004. Facebook paid \$1 billion for Instagram just as it was going public in May 2012.

Bernstein's findings, however, raise an important, but largely unexplored, management issue: IPOs appear to spur the outsourcing of innovation. It is a complex tradeoff, and one that tech entrepreneurs and investors may want to examine in more depth.

Bernstein reached that conclusion after a detailed comparison of patent data between companies that went public and similar companies that decided to stay private. All told, the study covered thousands of tech companies that either went public or withdrew IPO plans between 1985 and 2003.



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"The research also confirmed what even blockbuster companies in Silicon Valley have worried about for years: IPOs can spark a brain drain."

To gauge "innovation," Bernstein collected data on nearly 40,000 patents awarded to companies both before and after they announced plans to go public. In addition to tracking the absolute number of patents, he estimated the innovative importance of each patent based on the number of times it had been cited in other patent applications.

The basic idea is straightforward:
Patents that are cited more frequently
are likely to represent more fundamental
breakthroughs. But Bernstein also
estimated the "originality" of patents,
based on how many different technologies
were cited. Last, but not least, he analyzed
data about the inventors themselves.

Bernstein compared two categories of companies: those that completed public offerings and those that filed IPO registrations with the Securities and Exchange Commission but later withdrew them. To make apple-to-apple comparisons, he compared companies that were in the same technology sectors and that contemplated public offerings in the same year.

He found that the two groups of companies had broadly similar characteristics up to the point they decided to go public or stay private. Both groups had high-quality patents that were much more heavily cited than those of companies that didn't try to go public. The two groups were also similar in size, age, and research spending. And there were no significant differences in the quality of the IPO underwriters, which is often a proxy for the quality of the companies.

Not surprisingly, the biggest distinction between the companies that went public and those that stayed private was the stock market's appetite at the time. If the techheavy NASDAQ went into a swoon just after a company filed to go public, the company was much more likely to call off its plans. Almost one third of all the abandoned IPOs between 1985 and 2003 occurred in 2000 — the year the dot-com bubble collapsed.

The real difference in innovation came after companies completed public offerings. The average quality of those patents, as measured by how often they were cited, declined by about 40% in the 5 years after going public. By contrast, companies that remained private stayed on the same track as before.

Bernstein also confirmed what even blockbuster companies in Silicon Valley have worried about for years: IPOs can spark a brain drain.

He divided inventors into three categories: "stayers," "leavers," and "newcomers." Inventors were about 18% more likely to become leavers at companies that went public. Much more startling, however, was that the stayers saw a 48% decline in the quality of their patents. Inevitably, IPO firms recruited large numbers of newcomers.

One explanation for the brain drain is that top inventors have little incentive to stay after an IPO, in part because they often become overnight millionaires. An IPO also dilutes an inventor's stake in subsequent breakthroughs because those future profits will be spread among many more investors.

Bernstein suggests that yet another important reason for the brain drain is that IPOs lead to different management incentives. Executives at publicly held companies may become more cautious, for example, because they are subject to market

pressures and worry more about career threats and takeovers, and feel pressure to tell investors a simple story.

To find out more, Bernstein compared companies with two different management structures. In the first group, chief executives were also chairs of the board and had more autonomy to resist market pressures. The second group had separate chairs and chief executives, which usually means the chief executive is less insulated from market pressure.

The result: Companies with separate board chairs and chief executives — those more likely to be sensitive to outside investors — saw a much bigger drop in innovation, and inventors were more likely to leave

Bernstein cautions that initial public stock offerings still may be good for innovation in general. Public companies may not be as technologically ambitious or as willing to take risks as firms that stay private, but public companies have better access to capital for tapping innovation generated by smaller companies.

But going public clearly changes the mindset of companies, and that might be a reason for some companies to think twice about the Holy Grail.  $\Delta$ 

Shai Bernstein is an assistant professor of finance at the Stanford GSB.

#### **ENERGY**

# Solar Power's Bright Future

A conversation with Stefan Reichelstein on the economics of solar power.

BY BILL SNYDER

Nearly everyone thinks that generating electricity via solar power is good for the environment, but there's much less agreement on whether it makes sense from an economic point of view. At what point will solar power be competitive with electricity generated by conventional, fossil-fuel plants, and how long will subsidies need to remain in place before the solar industry can stand on its own? Those are some of the questions addressed in "The Prospects for Cost-Competitive Solar PV Power," a paper by Professor Stefan Reichelstein of the Stanford GSB, and Michael Yorston, a 2012 graduate of the Department of Management Science and Engineering at Stanford.

Their paper breaks new ground in studying the life-cycle cost of electricity generated by solar photovoltaic, paying particular attention to key factors such as location, public subsidies, and the long-term learning effects in manufacturing solar panels. Reichelstein explains:

#### Why did you decide to study the economics of solar photovoltaic power?

Renewable energy and solar in particular remain rather controversial in the public debate about energy policy. Passions have been running high. What motivated me is the bewildering range of statements you have out there regarding the cost effectiveness of electricity based on solar PV. Given the range of opinions, I wanted to do my own analysis. I'm looking at it from the point of view of a business economist who is interested in measuring the lifecycle cost of this abundant energy source.

**Your main conclusions?** Solar PV is not yet competitive with fossil fuel, like natural gas, from the perspective of a utility that can either build a new natural gas power plant or invest in solar installations.



Sunny days: Reichelstein says industry has consistently been able to lower the cost of solar panels.

For a commercial power user, say a business with plenty of rooftop space, the cost of generating your own electricity is now on par with what the business would need to pay in retail electricity prices. In that sense, grid parity has been achieved for commercial-scale installations. However, I need to add immediately that this is subject to two important qualifiers. The facility has to be in a favorable location, such as the Southwestern United States, and secondly the business must be able to take advantage of the current federal tax subsidies.

Concerning the future, and this may sound like a pun, the future of solar PV looks rather bright. The industry

has consistently been able to lower the cost of solar panels. If this trend can be maintained for the next 10 years, and if subsidies are continued for that period, there is a real prospect for solar to become cost competitive on its own — that is, without a subsidy — at least for commercial installations. Utility-scale installations will take longer to become competitive; possibly 15 years, though it obviously becomes murkier to make projections that far into

What happens if subsidies disappear or are sharply reduced? The current federal tax subsidies come out of the Economic

"There is a real prospect for solar to become cost competitive on its own — that is, without a subsidy — at least for commercial installations."



up, we are projecting that, at that point in time, solar-generated electricity would be competitive with that generated from fossilfuel power plants.

#### Why will it take longer for utility-scale installations to stand on their own than for commercial-scale installations?

You have different benchmarks. For commercial-scale — and also for residential — solar, the benchmark is the retail price of electricity, while for utility-scale projects it is the wholesale price. The difference between the two is the cost of transmission, distribution, and administration; that is, everything that gets you from generating the power to delivering it to your customers.

What assumptions are you making about the cost of generating electricity from fossil fuels? We believe that natural gas, as opposed to coal, is the most important fossil fuel competitor to renewable energy. In our cost projections, we have assumed a modern combined-cycle gas power plant with the price of natural gas given by the historical average observed in the United States over the past 10 years.

#### Are you factoring in the price of oil? No.

Oil is not used widely to generate electricity. The price of oil would be relevant to our analysis only to the extent that you want to compare gasoline-powered cars against electric vehicles.

Isn't it true that panel costs have dropped sharply because of excess capacity in the industry? Yes, solar panel producers are waiting for demand to catch up with current industry capacity. Until that happens, the panel producers will continue to hurt in terms of profits. In 2011 alone, panel prices came down about 40%, a drop that can't be attributed to the learning curve alone. Without the capacity glut caused by new entrants, but taking into account the historic learning curve, we would have predicted a drop in prices of about 20% in 2011. Without the excess capacity in the industry, our estimate of the current life-cycle cost of electricity

generated by solar PV would have been about 15% higher than it was.

In large part, solar PV panels are semiconductors; does Moore's Law apply to them as well? Yes, in a sense. Moore's Law speaks to the rate at which the number of transistors doubles on an integrated circuit. In the context of solar panels, it appears that whenever the total cumulative amount of panels produced doubles, the unit cost decreases by 20%.

What is driving the economics of solar **power?** A mix of federal tax incentives has been especially helpful to commercialscale installations, and even to home installations. We've also seen dramatic growth in recent years of utility-scale installations despite their current cost disadvantage relative to fossil fuel power plants. The reason appears to be the additional subsidy mechanisms at the state and local level. Here in California, Assembly Bill 32 [a 2006 law that set goals for reducing greenhouse gas emissions] and the state's "renewable portfolio standard," which requires that 33% of California's electricity come from renewable resources by 2020, seem to be driving demand. Other countries, such as Germany, have different subsidy mechanisms that yield similar effects. A

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Stabilization Act of 2008 and will be in place until 2016 unless Congress changes the rules. The solar panel manufacturing industry has been on a remarkably steady learning curve for several decades now, which has pushed down the systems price of solar panels at a dramatic rate. However, this learning curve seems very much dependent upon production volume. So, if the tax subsidies were to cease, new production volume would probably be lower, and the effect of that would be to slow down the rate of cost improvements.

If the current preferential tax treatment is kept in place for about the next 10 years, and the observed learning curve holds



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**INSURANCE** 

The \$86 Billion Fix: A group of scholars proposes a plan that could put the reins on health care spending.

BY EDMUND L. ANDREWS

Long before Democrats passed their sweeping health care reform in 2010, economists across the political spectrum had argued that bad tax incentives were a major contributor to the soaring cost of American medical care.

Unfortunately, the main target of that ire was also the biggest and most politically untouchable tax subsidy in the entire code: the exclusion for employer-sponsored health insurance.

Now, a group of top health care economists at Stanford and Columbia universities has come up with an ingenious tax proposal that they say could break the political logjam and reduce waste even more than earlier proposals. It could even mesh with "Obamacare."

The idea comes from four battlehardened veterans in the health care wars: John Cogan, a former advisor to President Reagan; Joseph Bankman; and Daniel Kessler — all of Stanford University — and R. Glenn Hubbard, a former advisor to President George W. Bush and now dean of Columbia University's School of Business.

The tax exclusion for employer-paid health insurance is the nation's biggest tax break, and costs the Treasury about \$300 billion a year. It's also the anchor of American health care finance:
The vast majority of Americans who have health insurance get it through a tax-free, company-sponsored plan.
Many employees also get to deduct their out-of-pocket expenses up to a limit, which in 2013 is \$2,500.

Economists have complained that these tax breaks, especially the larger employer tax deduction, create perverse incentives for everybody involved — employers, workers, doctors, and hospitals. Employers have an incentive to offer gold-plated health insurance, because the after-tax cost is lower than paying workers the same amount of money in higher wages.

Employees have an incentive to spend more than they need, or even want, because they pick up only a small part of the bill. Health care providers, if paid on a feefor-service basis, have a big incentive to prescribe extra tests and treatment.

Conservative politicians have tried to chip away at this, without much luck. Republicans have pushed through modest tax deductions for out-of-pocket costs, but didn't touch the basic system. In the 2008 presidential elections, U.S. Sen. John McCain essentially proposed replacing the employer-based tax break with a much bigger individual tax deduction for out-of-pocket expenses. But McCain lost that election, and Republicans haven't pushed it.

Even President Obama ran into trouble when he proposed a limited surtax on "Cadillac" insurance plans to help pay for health care reform. Labor unions fiercely objected, and Democrats effectively limited the surtax to what you might call "Rolls Royce" insurance.

In a new paper for the National Bureau of Economic Research, the four economists propose an alternative fix. Instead of replacing the employer-based exclusion, they propose neutralizing much of its moral hazard by adding a novel tax deduction for out-of-pocket medical expenses.

Unlike previous proposals for a deduction on all *actual* out-of-pocket expenses after an individual incurs them, the new deduction would be an upfront benefit based on that individual's *estimated* out-of-pocket costs for the coming year.

The economists argue that the task would be easier than it sounds, and outline a formula based on insurers' own calculations about the actuarial value of their policies. Under the formula, estimated out-of-pocket costs would depend on commonly available statistics about insurance policies such as their premium, co-payments and deductibles, and enrollees' average age and health status. People with more comprehensive insurance would get smaller tax breaks than those with higher co-payments.

One advantage of a tax break for estimated out-of-pocket costs is that it would be simpler: People wouldn't have to save receipts and document expenses in order to get the tax benefit. They would simply get their deduction, regardless of how much they spent. Most people would still keep their company-sponsored insurance, the economists predict. But some people would have an incentive to take on more of the cost sharing, because their tax breaks would be higher if they chose plans that require higher copayments and deductibles. That, in turn,

would discourage wasteful spending, the economists argue, because those who pay more out of pocket will be more likely to keep total spending down.

Cogan, Kessler, Bankman, and Hubbard argue that their new twist would also eliminate more of the perverse incentive for waste, since a deduction for actual expenses is only valuable if an individual runs up medical bills. A deduction based on estimated expenses would be valuable whether or not an individual runs up bills — there's no "use it or lose it" element. If patients feel they don't really need a particular treatment, they can spend their tax benefit on something they want more.

The risk is that an individual's actual out-of-pocket expenses might turn out to be much higher than the estimate. But the economists argue that the risk would be modest, because people would still be relying on traditional insurance for most of their health care.

How much would the new deduction cost taxpayers? The economists estimate that the cost would be relatively modest, about \$5 billion a year, because the revenue loss would largely be offset by the declining use of the exclusion for employer-paid insurance.

Meanwhile, the economists estimate that the altered incentives could reduce private health care spending by about 8.5% or \$86 billion a year. If that reduction in demand were to put a brake on overall health care spending, which has chronically climbed faster than general inflation, the changes might dent the biggest government spending spiral of them all: Medicare and Medicaid.  $\Delta$ 

Daniel Kessler is a professor of political economy at Stanford GSB. Joseph Bankman is the Ralph M. Parsons Professor of Law and Business at Stanford Law School. John Cogan is the Leonard and Shirley Ely Senior Fellow at Stanford's Hoover Institution.

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# Students explore ways to improve basic health care while reducing costs.

BY LEE GOMES

At a time when "medical innovation" often is associated with dramatic pharmaceutical advances, complex imaging equipment, and other high-tech wonders, students at Stanford are also looking for innovation at the other end of the spectrum: relatively simple, low-cost modifications to existing health care processes that would reduce costs while improving outcomes.

One example is the *Design for Service Innovation* lab (also known as the dLab), which, for the last two academic years, has been jointly offered by Stanford's business, medical, and design schools. The lab emphasizes a "bottom-up" approach to innovation, with students working closely with patients, caregivers, and others, understanding their needs and, in some cases, getting ideas for their innovations directly from the interested parties.

"We are strong believers in humancentric design," said James M. Patell, who co-led the most recent lab along with Stefanos Zenios. "It's crucial for our students to gain empathy for the real patients, doctors, nurses, and families.

"The course doesn't start by trying to think up some cool new technology. It starts by trying to understand a real need — a weakness in the system, or an instance in which the system is failing its constituents. Then, we do whatever it takes to fix it," noted Patell.

The 30 students enrolled in the class last year were placed in 4- or 5-person teams. Each team was assigned a realworld health care problem at a clinic in the Bay Area, many of which were associated with a medically underserved population. Following are three representative projects.



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#### FOLLOW-UP COLONOSCOPY

**The population**: Senior citizens, mainly native Chinese and Russian speakers, being served at the Ocean Park Health Center, run by the San Francisco Department of Public Health in the city's Sunset District.

**The problem:** Getting them to show up, fully prepared, for a colonoscopy.

Patients at the clinic who are 55 or older have annual stool screenings. In a very small percentage of the patients — less than 1% — the results of the test trigger the need for a follow-up colonoscopy. But notifying patients, and then preparing them for the procedure, is a lengthy, complicated process. Patients drop out at each stage, especially when they learn about some of the unpleasant pre-screening preparation requirements.

The problem is compounded when language difficulties are added to the mix. The staff at the Ocean Park Health Center faced challenges in its colonoscopy-related education efforts, even when aided by "patient navigators" fluent in the patients' native language. Explanations, delivered either in person or on the phone, often were quickly forgotten. Professionally prepared educational materials, especially brochures, often were set aside, unread.

The proposal: Personalized letters from the health center team provided to patients at key points in the screening process. In talking with patients and staff, the Stanford students realized that patients considered a personalized letter written on professional stationery and delivered via first-class mail to be a serious matter that required their utmost attention. The proposal calls for every patient requiring the procedure to receive such letters, hand-signed by a caregiver at the clinic. The letters would be in their native language, and would carefully explain everything they needed to know to prepare for the procedure. While the letters would duplicate most of what would be contained in a brochure, the quasi-legal, personalized nature of the communications resulted in patients taking them more seriously. Tests suggested that patients would keep the letters in a safe place, and share them with their children or other family members, as befitting an important communication.

**Students**: Jia Chang, Hayley Chan, Anya Greenberg, and Elena Kaye.

#### TRANSITION INTO ADULT CARE

**The population**: Adolescent patients at hospitals with strong pediatric programs, such as the Lucile Packard Children's Hospital.

The problem: There is a large population of pediatric patients who have been receiving intensive medical care for most of their lives. Babies born prematurely or with clear health challenges often develop close personal relationships with their care providers as they grow older, due to the frequency with which they need to seek care. This sort of pediatric medicine usually is extremely personal, because of the deep emotional bonds that develop over the years between care providers, patients, and their families.

As pediatric patients reach adulthood, however, they are required to enter the traditional adult healthcare system. This transition often is a shock, as young people suddenly must fend for themselves after a lifetime of being at the center of a nurturing and supportive network.

**The proposal:** A transition specialist assigned to patients, while still in their midteens, to help them prepare.

The specialist, working with each individual, would be responsible for developing and then implementing a master plan to help young people take this crucial step. He or she might, for example, engage in role-playing activities with the young patients, teaching them the assertiveness they will need to communicate their medical needs when their parents no longer are accompanying them through the process. The specialist also might help patients prepare a one-page "resume," which would serve to introduce themselves to new caregivers, bringing them up to speed on current medical conditions, without patients having to answer the same sets of questions they've answered dozens of times in the past. And special attention would be paid to explaining some of the most opaque aspects of the adult health care system, notably

**Students**: Jacqueline Jacobs, Brian Kidd, Cammie Lee, and Alisa Mueller.

#### FIRE STATION HEALTH PORTAL

**The population**: Residents of Oakland, with the potential to expand across Alameda County.

The problem: What are the best locations for drop-in health clinics, designed for medically underserved residents? Are fire stations reasonable candidates? Fire stations are dispersed throughout the community, and their staffs already have considerable experience in matters of emergency care. Since the buildings are city-owned, adding space to them to accommodate a clinic would be easier than starting from scratch with a new structure.

The solution: The students came to appreciate early on that it would not be practical to expect a busy urban fire station to also function as a drop-in health clinic, although a clinic conceivably might be built next to a fire station. But in the process, the students realized that just as important as deciding where to place a clinic is figuring out exactly what services the clinic ought to provide. Because different communities have differentiated needs, no single scope of services would be appropriate for everyone. The team designed a decisionmaking tool that could help communities determine the scope of services they ought to offer in each local clinic. The Java-based program helps rank the community's needs, while also systematically taking into account the severity of the diseases treated, cost of treatment, legal risk, number of emergency department visits that potentially could be averted, and other important factors.

**Students:** Spring Sun, Ian Connolly, Maura Aranguren, Mira Wijayanti, and Curtis Chow.  $\Delta$ 

James Patell is the Herbert Hoover Professor of Public and Private Management at the Stanford GSB. Stefanos Zenios is the Charles A. Holloway Professor of Operations, Information and Technology. The students were from a wide sampling of the Stanford population, including from the business, medical, law, and engineering schools.



Brenden Millstein: Trying to optimize energy usage in a building can be "an incredible amount of work for relatively little financial benefit."

#### **ENVIRONMENT**

### Two Green Approaches

Brenden Millstein's Carbon Lighthouse helps businesses and individuals conserve energy and cut waste. Here's how.

BY LEE GOMES

There are all manner of approaches to green investing, and the folks at Carbon Lighthouse Association manage to combine two of them under the same roof. The for-profit portion of the company helps businesses conserve energy via a unique business model in which Carbon Lighthouse pays for all the up-front costs and then gets reimbursed over time from the money clients save. Separately, a nonprofit portion of Carbon Lighthouse is aimed at individuals who want to make sure that any money they spend on carbon offsets isn't wasted. Carbon Lighthouse CEO Brenden Millstein, who received his MBA from Stanford GSB in 2010, explains how it all fits together.

Compared to other parts of the world, energy costs in the United States are relatively low, at least if you don't consider externalities like climate change. Does this fact lessen the incentives for businesses to conserve energy? Definitely. Utility bills in the U.S. might be, say, three bucks a square foot. But the salary of the people working in the building might be the equivalent of \$300 a square foot. When you look at all of the steps that need to be taken to comprehensively optimize energy usage in a building, it ends up being an incredible amount of work for relatively little financial benefit.

What exactly is so hard about it? If you're a building owner trying to reduce energy, right now you have to work with many different firms. There are companies that will make your lighting more

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"About \$400 million is spent every year on voluntary carbon offsets, and there's a pretty good argument to be made that, unfortunately, the vast majority of that money is wasted."

efficient, and other companies that might install solar panels. Everything is totally fragmented.

How does Carbon Lighthouse do it? We combine all of that into one easy package. We figure out absolutely everything that could possibly be done to reduce energy, and every single new system that would need to be installed to make that happen. And then we install it, and even pay for it up front. So, if we determine it will cost \$200,000 to save a company \$100,000 per year on energy, we will front them that \$200,000. Then the company pays us back \$80,000 a year, until they have repaid the \$200,000.

Aren't there a lot of consultants who do something similar? There are a lot of companies that do parts of what we do, but most of them are manufacturers; they make equipment. So when they send an engineer to a site, his or her job is to get enough data to justify the sale of a new piece of equipment. We try to achieve the maximum amount of savings with the least amount of equipment, since we're often paying for the equipment up front. Our interests and our clients' interests are totally aligned. We find that we're able to get 90% or 95% of the savings that a manufacturer might get, but with literally one-tenth of the cost.

Carbon Lighthouse also works with carbon offsets, helping business and individuals buy offsets in an audited and verifiable way. Are there problems with the current system of buying offsets? About \$400 million is spent every year on voluntary carbon offsets, and there's a pretty good argument to be made that, unfortunately, the vast majority of that money is wasted. One big difficulty involves verification. Someone might say, "I'll plant a forest in some country thousands of miles from here." But it's very difficult to make sure that the forest was actually planted. Or, to make sure it wasn't planted on land that previously had a forest that ended up being cut down. Or, to make sure that the people planting the forest didn't sell the same offset to 4,000 other people.

How do you help with this? Not many people know this, but there is a mandatory cap-and-trade system in the U.S. It's called the Regional Greenhouse Gas Initiative, and it's comprised of nine northeastern states from Maine to New York. It was set up through a system of state laws, and it's binding on all of the power plants in the region. Because of that legal framework, this particular market is very well regulated, but the average consumer hasn't been able to participate in it. Carbon Lighthouse forms a bridge between this legally enforceable market and environmentally aware individuals and institutions so that when they buy carbon offsets, they can have confidence in the process.

Most of the time right now it's a Wild West show. On Nov. 14, 2012, California initiated its cap-and-trade market. Unlike the East Coast market, it was oversubscribed: There was three times more demand for carbon allowances than supply. This means California's system is directly reducing carbon emissions and raised a much needed \$289 million for the state. Carbon Lighthouse Association is in the process of registering with the California auction system. Once registered, the association will participate in the auctions, further reducing the supply of carbon emission permits, and helping the transition to a zero-carbon economy.  $\pmb{\Delta}$ 

Millstein received an \$80,000 Social Innovation Fellowship from the Center for Social Innovation at the Stanford GSB.



"Our goal is for this to

#### become self-sustaining,

so you have Malawians teaching Malawians how to do it.

I don't have a magic bullet yet."

—Stephen Rudy, PAGE 50 Malawians how to do it.

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#### **HEALTH**

# How a British doctor and an American businessman teamed up to reinvent the way anesthesia is delivered in the developing world

BY R.M. SCHNEIDERMAN

As Hurricane Sandy ravaged the East Coast last fall, knocking out power in half of Manhattan and even at New York University's Langone Medical Center, Stephen Rudy found himself in the dark. Yet, when the power went out, Rudy wasn't at home in Brooklyn. He was in Uganda at a 300-patient hospital in Soroti, a city roughly nine hours by car from the country's capital of Kampala.

Standing in a small operating room, Rudy, who earned an MBA from Stanford Graduate School of Business in 1984, watched as a local doctor administered anesthesia to a variety of patients: women who needed C-sections, men with hernias. The power went out about a dozen times. During one urgent C-section, the room became dark, and the surgeon simply strapped on rock climbing headlamps and continued. During another procedure, the power didn't come back for 20 minutes. Under normal circumstances, this could have been a disaster; the patient could have woken up, or even worse, died. But not this time. "It was phenomenal to watch the surgeon and the staff," Rudy says. "Nobody panicked."

The reason: The staff in Soroti weren't using conventional anesthesia machines hydraulic, pressurized devices that require electricity to mix oxygen or some form of compressed air with the drugs that put the patients to sleep. Instead, they were using a Universal Anesthesia Machine (UAM), a device sold by Rudy's company, Gradian, a two-year-old nonprofit, created to provide access to anesthesia in developing countries, where electricity is often unreliable. Of the 230 million surgical procedures performed each year across the globe, an estimated 15% are done without proper anesthesia. Many of these occur in developing countries where power outages are common, and acquiring a steady supply of pressurized gas is expensive. To solve this problem, the UAM borrows from an older method of delivering anesthesia that vaporizes drugs and mixes them with room air if no other oxygen source is available.

In the late 1990s, Paul Fenton, a British anesthesiologist, invented the UAM, but it took more than a decade for him to secure funding for the development and first deployment of the UAM. Once the financial backing came through Rudy was hired as Gradian's CEO and from there the device took off. The pair, along with the company's small staff and dedicated financial backers, helped reinvent the way anesthesia is delivered. Today, they are



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creating a market for the UAM across the developing world, and selling the machines at cost — \$12,000, including shipping — to donors, governments, and NGOs. To date, hospitals and NGOs are using the machines in 10 countries, and Rudy hopes there will be many more to come. "The key issue," he says, "is how do we scale this up? We have moved 30 of these machines, but we need to move hundreds of them. The need for these devices is almost endless."

Gradian's small team — they have just three full-time employees and several consultants — still have a long way to go,

but for Fenton, the progress they've already made has been a long time coming. For years, he had witnessed a host of anesthesia and surgery-related challenges in Malawi, where he began working at a hospital in 1986. To deal with unpredictable electricity and an inadequate supply of pressurized oxygen, hospitals have long relied on makeshift devices, which, like the UAM, use drugs that don't require a pressurized delivery system. Technically, these devices work, he says, but they're old and unreliable, and if they break down, parts are very difficult to replace. "You really have no idea how much anesthesia you're putting into a patient" with these older machines,

Rudy says. "We've heard horror stories about [them] breaking down altogether, and the doctors have to stop a procedure if they can, or they basically just lose a patient on the table. It's a horrible situation."

Fenton, a wiz of a mechanical engineer, rejiggered these older devices and developed a prototype, which he shopped around to a variety of companies in the late 1990s. But there weren't any takers, and for more than 10 years, the concept went nowhere.



The courtyard outside Mulago Hospital in Kampala, Uganda. Gradian's Stephen Rudy says in many hospitals in Africa family members stay close during a hospitalization, and one often sees them cooking food and cleaning clothes, both for the patient and themselves.

A few years ago, however, his invention was given new life. Fenton was hired to help write curriculum for an anesthesia training program for the Nick Simons Foundation, a nonprofit dedicated to improving health care in Nepal. Its creator, Jim Simons, a legendary mathematician and hedge fund manager, started the foundation with his wife, Marilyn, to honor their son, Nick, whose love for Nepal was cut short when he drowned in a swimming accident. During a meeting with Jim Simons in 2009, Fenton showed him a diagram of his anesthesia machine, and Simons funded five prototypes. They tested one device on



hundreds of patients at a hospital in England and three others in Nepal, and the results were so encouraging that the foundation decided to create a nonprofit startup — Gradian — to develop a traditional market for the device and sell it at cost to hospitals and NGOs around the world.

Around this time, Rudy, a veteran of the medical technology industry who had spent years working at startups, was looking for something philanthropic to get involved with. After applying on the jobs bulletin board at Stanford GSB, a recruiter contacted him and soon he left his life in Silicon Valley behind to become Gradian's CEO. "My kids are in college," he said. "My wife was looking to retire, so abruptly, we just sold the house and moved to New York without a forethought whatsoever."

Fenton still had a number of contacts in Malawi and the country became Gradian's first test project. To date, it's also been its biggest success. Rudy and company started by donating a device to a hospital in need. An NGO bought another, and soon word spread that the UAM worked, that it was reliable, and that it was helping. Donors and NGOs responded by purchasing seven more devices, and word is still spreading. "It showed us that our strategy of seeding a market with some donations and transitioning to a break-even sales model has validity in at least some markets," says Rudy. "I'm gratified by that. And by the momentum."

In other countries, such as Uganda and Nigeria, a market has not yet developed, and Gradian's business is donation-based. Rudy, of course, isn't beholden to shareholders. His company doesn't have to worry about profits, and the Simons family is in this for the long haul. Their only metric: how many patients they're helping. "The whole idea of Gradian is to eventually break even, instead of losing money, which we're very good at right now," says Rudy.

"The key issue is, how do we scale this up? We have moved 30 of these machines, but we need to move hundreds."

Still, the company's mission — to make a difference and provide emergency care to developing countries that need it — is fraught with challenges. One of the major problems the company faces is a disconnect between the people and groups who have money to purchase the devices, and the hospitals that need them. "We don't sell this machine to hospitals because our hospitals have no money," he says. "We sell them to NGOs, and they're typically not even in-country NGOs."

This disconnect makes ramping up UAM sales difficult, especially as it pertains to working with both foreign governments and American agencies such as USAID. "A government might want to buy 15 anesthesia machines once every 3 years," Rudy says. "But we've only been around for two. A nonprofit donor will work more quickly."

Another major problem for Gradian has been providing proper training. Many hospitals in the developing world don't have their own anesthesiologists, and training is typically poor. "Anesthesia is a pretty deep art," says Rudy, especially when there are complications.

Even if someone is trained, whoever uses the device also tends to act as its chief mechanic. "The machine has been pretty robust," Rudy says, "but getting service for machines to these hospitals has been a pretty big challenge. We're going to places where they haven't really used general anesthesia."

The result has been that Gradian has been forced to fly in anesthesiologists and offer free training on the devices. "It's hugely expensive," Rudy says. "So the difficulty looking at this from a business model isn't the selling part. It's actually the logistics of delivering the machines and ensuring that when we leave, they're well understood."

Brain drain is another problem, as citizens who become well trained on the devices soon have opportunities to move to bigger and better jobs in less rural areas. "Our goal is for this to become self-sustaining," says Rudy, "so you have Malawians teaching Malawians how to do this. I don't have a magic bullet yet."

Perhaps, but at the hospital in Soroti, as the staff scrambled in the dark, the UAM helped them complete their surgeries. "We did about six or seven surgeries that day, and they were all successful," says Rudy. "That's what the UAM is designed for."  $\Delta$ 



"The Saudi Arabia of Gas": A drilling rig in a Pennsylvania soybean field captures natural gas from the underlying Marcellus shale formation by using hydrofracking technology.

#### **NATURAL RESOURCES**

# The Game Changer

Former U.S. Defense Secretary William Perry joins the head of the U.S.-China Energy Forum to explain how shale gas could transform global energy.

BY KATHLEEN O' TOOLE

In a relatively short time, U.S. shale gas production has lowered the price of natural gas in the United States to a quarter of the price in Europe and prompted some utilities to scrap plans to build coal-fired electricity plants. Meanwhile China is gearing up to apply the technology known as hydraulic fracturing, or fracking, to its shale deposits in hopes that its growing energy demand can be met with gas instead of dirtier coalfired plants.

Here are edited excerpts from comments made by Dennis Bracy, CEO of the U.S.-China Clean Energy Forum and chair of the Washington State China Relations Council, and Stanford Professor Emeritus William Perry, the 19th U.S. Secretary of Defense. It is followed by excerpts from a Q&A with Perry at the same event.

Dennis Bracy The U.S. and China together consume half the energy on Earth. In coal, we, combined, consume 62% of the coal on Earth. And coal represents 40% of global greenhouse gas emissions, so it's something we have to focus on.

Our energy pie in the U.S. is growing at about 1% per year. China's demand is growing at 1% per month. If you heard that China is doing everything possible in renewables, absolutely true. But they're also building a lot of new coal plants and hydro. We work together on these things that are perhaps not as sexy, but really, really important to the whole scheme of things.

This new natural gas phenomenon seems to be changing everything. I hope it works out. I hope fracking is everything the industry says, and nothing that the opponents say. But it has changed the balance of power in the industry where coal plants are now shifting to natural gas.

China is wildly seeking this because they don't have any natural gas to speak of. They've got pipelines coming into China. But it affects not only our two countries' energy policy, but also worldwide geopolitics. China clearly has a plan. You can see it all over the world: lining up resources, lining up strategic relationships. If gas turns out to be the magic elixir in this, then that will drive a whole set of decisions.

William Perry If we continue to pursue efficiencies, we should be able to offset increased energy demand with increased efficiency [in the United States]. So I see this as a break-even state. But how can we do better than that so we can actually decrease our use of coal plants? Solar and wind are still too expensive. I think it will take at least 5 years to get the cost down to grid parity. And even with grid parity, it will take 10 to 20 years to increase the contribution of renewables from 1% to 10% of grid electricity. So, in sum, alternative fuels are potentially important, but their contribution is still small, and it will take a long time for them to play a significant role.

Shale gas is truly a game changer. It is a huge resource in the United States. Some have called us the Saudi Arabia of gas with more than a century of supply. The technology is mature. It was developed in the United States more than 10 years ago, and its success has already greatly exceeded anyone's expectations. It's already at scale — it went from 10% to 20% of the total U.S. [electricity] production in

a 10-year period, and we have gone from an importer of natural gas to an exporter. Most interestingly, it has been demonstrated to be cost effective. It has already resulted in lower prices for gas, which has had a ripple effect on other sources of energy.

As you mentioned, shale gas could be a game changer for the next 100 years. Do you have any comment on the influence of shale gas on renewable energy development and on carbon dioxide emissions for the next several decades?

I can't answer the question fully but here are a couple comments about it: Shale gas is twice as good as coal but it still has emissions, so it is not a panacea. Solar and wind is the more desirable option, but I find it hard to be optimistic soon. Grid parity [for solar and wind] is going to be harder and harder to reach as the cost of natural gas goes down.

Natural gas has three negatives associated with it. It does have carbon dioxide emissions. Secondly, it's the enemy of alternative energy sources — it makes it harder and slower for them to reach grid parity, and it's also the enemy of nuclear power because nuclear power used to be the cheap source of electricity.

Could you comment about water pollution potential with fracking? I can comment, but not authoritatively. I've read on both sides of the argument. One

"This new natural gas phenomenon seems to be changing everything.

I hope it works out. I hope fracking is everything the industry says, and nothing that the opponents say."

side says it is causing water pollution. This is particularly [true] in Western Pennsylvania where people are saying it is getting into their water supply, and the drilling companies say that can't happen, we have this pipe totally encased so the water can't get out. I don't know what the truth is. I suspect the truth is that if drilling is done properly the water can't get out. If, indeed, fracking is going to damage the water supply, that is a huge barrier to moving forward. Everything I've been able to read from engineers says that does not have to be the case.

There are other environmental issues that are almost fundamental, such as people who live in the area being annoyed by all the trucks and activity that comes with the operation. That's a fact of life. But I think the water issue can be dealt with.

#### With the development of shale gas, will the U.S. become more supportive of international targets on greenhouse emissions reduction set for 2025?

I would like to see us become more supportive of that in any case, but any such international agreement meets automatic resistance in some circles. It's part of the political deadlock we have right now. International agreements are right up there with carbon tax as an issue that is politically volatile. I'm not optimistic about our ability to make political decisions, but I do think technically our ability to achieve those goals could be much enhanced by shale gas.

But again, shale gas is only a halfway house in terms of the environment. It has about half the carbon emissions of coal but it still has emissions, and in the strategy that I have laid out, I started with a fallback position until zero or low-carbon emissions can become a reality. It's here and now, and we can move very quickly to replace coalfired plants with gas-fired plants, and we should do that.  $\Delta$ 

William Perry is a senior fellow at the Freeman Spogli Institute for International Studies. He spoke at a 2012 conference sponsored by the Stanford Program on Regions of Innovation and Entrepreneurship. 56 WORLD SPRING 2013 STANFORD BUSINESS

#### **TEACHER DEVELOPMENT**

# Bridging the Teaching Gap: An entrepreneur looks to transform education in his native Ghana—and beyond.

BY LEE GOMES

Combining business disciplines picked up at Stanford and his finance career with his own deep knowledge of realities in Ghana, Kwabena Amporful, a 2008 MBA graduate of the Stanford GSB, has designed a teacher training initiative called the Institute of Teacher Education and Development, or INTED. A nonprofit organized in the United States and Ghana, it just finished its first year of operation in Ghana. Amporful talked about what INTED has been able to accomplish so far, and what is left for it to do. Here are excerpts:

How would you describe the basic problem that you are trying to address with INTED? Across sub-Saharan Africa, secondary school enrollment is increasing. Currently, about half of students of high school age are in school in most countries on the subcontinent, which is about 20 percentage points higher than two decades ago. There are many problems in the schools, but one of the most significant is that most of the education systems in these countries do not put in place support for teachers to be able to handle the increasing class sizes. One way this problem manifests itself is that student outcomes, at least from performance on terminal exams, has

steadily declined or remained low in most African countries. UNESCO describes sub-Saharan Africa as having the worst teaching gaps in the world.

We chose to begin our work in Ghana, which has one of the easier and more willing education systems to work with in Africa. But we have a serious problem in Ghana, where there is the stigma of limited social regard for the teaching profession: University graduates will mostly prefer to remain unemployed rather than to teach at the pre-tertiary level. Incentives and poor training explain this. In a country beset with generally low levels of remuneration, salaries of pre-tertiary teachers are at the lowest of the range. Consequently, the teaching profession recruits individuals mostly with high school certificates, and provides them with the kind of pre-service teacher training program that one principal from our participant schools asked INTED to help improve. The country's existing teacher training colleges could use an upgrade. Newly trained teachers end up using pedagogical techniques that are decades old. And due to limited funds, there are usually inadequate and insufficient teaching and learning materials to go around.

Can you give me some examples of the classroom challenges? You have some teachers who think teaching involves coming into the classroom, sitting down, and reading out loud from a textbook. Or, they might write things on the board, and have students simply copy what they write into their notebooks. Or, teachers will present topics with no discussion or input from students. There is a general hurry to complete the syllabus, which makes learning an exercise in memorization and regurgitation for students. Teachers feel that the three-year high school experience is short, and that it leads to undue focus on exam preparation. In the United States and elsewhere, low-paid teachers are usually exposed to professional development. In Ghana, teachers are lucky if they get professional development programs once or twice in their career.

#### So what exactly does INTED offer?

Our training, which we hope goes viral, starts from a basic professional development curriculum that focuses on six key pedagogical modules, where we bridged modules that teachers had some familiarity with, such as lesson design, with new modules, such as critical thinking and active use of technology. Our basic curriculum also has a team focus on instructional leadership. Basically, we bring in teachers for a 6-day, 8 a.m. to 5 p.m. Fellows Program, with each day devoted to one of these modules. We also have a 2.5 week residential Master Fellows Program, where we select the best teachers in a school and train them so that they can return to their school and propagate the training among their colleagues. The master fellows lead the training of the fellows in our programs. The fellows and master fellows then begin a year-long mentoring and collaboration where they cross-mentor each other during the academic year when they take these practices to their schools.

How did you plan the basic curriculum in the first place? We worked with the Center to Support Excellence in Teaching at the Graduate School of Education at Stanford University to design our professional development curriculum, together with input from several local schools. We went to 51 high schools throughout Ghana, asking teachers and school leaders what they were lacking that could be addressed with professional development and training. Then we asked them what they would like such a program to have. Then, we spent 12 months designing it.

What sorts of results have you had so far? In this first year of our 3-year pilot program, we trained 67 teachers and school leaders from 14 schools that directly

"We have a serious problem in Ghana, where there is the stigma of limited social regard for the teaching profession."



Kwabena Amporful: Most of the education systems in sub-Saharan Africa "do not put in place support for teachers to be able to handle the increasing class sizes."

impact 1,340 students. It's a little too early to comprehensively report any results, and there are definitely no test or exam scores. But there have been two meaningful developments so far. First, we received a lot of follow-on training requests from our school-participant schools, and we support master fellows to work across schools to train each other's colleagues. For the first time teachers from different schools are collaborating to train their fellow teachers. Another area we have some early anecdotal evidence from is our baseline and program evaluation surveys, where we saw a significant increase in teacher confidence. Before the program, only 17% of participant teachers and school leaders said they had confidence in their teaching skills across the six areas we taught. Once they got through our program, the figure increased to nearly 100%.

#### Do you have adequate funding to train as many teachers as you'd like to? Not

by a long shot. The \$80,000 associated support we got from the Social Innovation Fellowship was a fantastic start — a blessing really — toward our first full-year budget of about \$250,000. We trained about half of our target 10% of the teachers and leaders in the 14 participant schools in our inaugural class. But we have big plans: We are looking to reach 10% of the 700+ schools

in Ghana in our first 3 pilot years. And starting next year, we will be developing a focus on girls education: training female teachers to be role models for girl students.

Is there anything Ghana-specific about the program, or could it work in other parts of Africa as well? The good news is that most of the education systems across West Africa use pretty much the same syllabus at the secondary level. So even these early solutions that we are coming up with to support teachers in Ghana are very transportable to countries across West Africa. In Ghana, there are over 700 secondary schools; in Nigeria, there are more than 3,000; in Liberia and Sierra Leone, the needs are greater. The economies of these countries have been growing above 5% over the last few years, and I believe they will need a trainable workforce with at least solid high school education that contributes to and benefits from the expanding economies. There are 15 other countries in West Africa other than Ghana. and the rest of sub-Saharan Africa beckons. A

Kwabena Amporful received an \$80,000 Social Innovation Fellowship from the Stanford GSB's Center for Social Innovation to help launch his initiative.



It's one of the world's most intractable problems: bringing Israelis and Palestinians together to resolve the Middle East conflict. But while such a complex and systemic issue may seem overwhelming, recent social science is showing that even small interventions can help people move their attitudes and actions in directions that promote peace.

In her work, Stanford psychologist Carol Dweck focused on one major barrier to successful conflict resolution in the Middle East: each group's intensely negative attitudes toward the other group in the conflict. Because direct attempts to alter attitudes toward an adversary can backfire by making people more defensive, her research with four colleagues tested the value of a more indirect route: getting people to think about whether groups, in general, can change.

In earlier research, Dweck and others had shown that when individuals are faced with others' negative behavior, those who believe people can grow and change are less likely to seek retaliation than those who believe people's human traits are fixed. Mindsets about whether people are malleable or fixed "play a major role in the perpetuation of hatred and the unwillingness to compromise," Dweck says.

Investigators undertook four studies to test how this insight might be used in the Israeli-Palestinian conflict. The first study, using a nationwide sample of Israeli Jews, showed that a belief that groups were able to learn and change predicted positive attitudes toward Palestinians, which, in turn, predicted Jews' own willingness to compromise on issues such as settlements on the West Bank.

In three other studies, the researchers gave a scientific article demonstrating that "violent groups can change their ways" to Israeli Jews, Palestinian citizens of Israel, and Palestinians in the West Bank. Among those who read the article, which did not mention any particular adversary, such an intervention led to more positive attitudes toward the opposing group and, in turn, increased willingness to compromise for peace. Writing in *Science* magazine, Dweck and her coauthors observed that their research showed "even in the face of prolonged conflict, deeply rooted beliefs may be malleable, and mechanisms may exist for bringing more constructive attitudes to the fore." A

Carol Dweck is a professor in the Department of Psychology, Stanford School of Humanities and Sciences. She discussed this research at the 2012 "Science of Getting People to Do Good" briefing, sponsored by the Stanford GSB's Center for Social Innovation.

BELIEFS

### Reimagining the Peace Process

How small, psychological interventions can redefine the way we think about peacemaking.

BY MARGUERITE RIGOGLIOSO

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#### **INCENTIVES**

# An economist looks to the samurai to show how financial innovation can help reduce ethnic violence.

BY KATHLEEN O'TOOLE

Behind the car bombs, drone attacks, and uprisings around the world lies a very old and common problem: how to curb the fear people experience when another social group threatens their future. In recent research, economist Saumitra Jha has found examples where political reforms that leverage financial tools have provided the path to peace and prosperity.

Jha's research interests are influenced in part by his own background. Born in Great Britain to Indian parents, he spent his early childhood in an industrial town in Scotland, where kids often used ethnic slurs for each other. In India, he witnessed violent demonstrations for state rights triggered by caste-based affirmative action policies and saw the effects of religious violence elsewhere in the country. As an adult researcher, he's had to be ultrasensitive to not cause offense in some Indian neighborhoods because his surname signifies the wrong caste in that area. And

as a graduate student in Cambridge, he had his teeth broken by fellow English citizens who didn't seem to like his Asian roots.

The professor says he is "interested in how you get different ethnic and social groups to cooperate with each other — or at the very least not kill each other." Although these problems are very current, they have also been around for centuries, he says, "and societies have solved them many times in the past." Here are edited excerpts from a discussion about some of his latest research:

We seem to see entrenched poverty connected in many places to group conflicts - ethnic violence in Africa, religious violence in the Middle East, and class hostilities in much of Latin America. Why is that? There's a common observation among development economists that even when you know what a good reform looks like, such as improving women's education, people who feel they lose from those reforms often mobilize to prevent those reforms from taking place. This is true for public policy, and it's also true in industry where people with new ideas create startups that can disrupt existing companies. An entrenched elite often resists changes that not only improve the welfare of others but [also] may even increase the pie for everybody.

#### How would you get around this dilemma?

I've approached it in different ways, but the one I'm most excited about is financial innovation that aligns incentives for disparate groups. One of the examples I find really compelling is from 19th century Japan. Nowadays, we don't think of Japan as being caste ridden the way we think of India, but Japan had a more entrenched caste system than India in the 19th century. It was enforced by the government. A financial reform mechanism helped change that.

The country had just fought a war, and the samurai, who won the war, expected to be rewarded. You had not only an entrenched elite but also one that knew how to fight and had a monopoly on bearing arms. The leaders wanted to modernize the country rapidly to move beyond a feudal economy, and they needed this group, the samurai, to become a resource rather than an obstacle to peace.

They did something very clever. They took the government's traditional obligation to provide rice to the samurai and instead gave them bonds backed by the government. So if that government goes out of business,



Finding alignment: An image of a 19th century samurai from a collection of albumen silver prints by Kusakabe Kimbei

the warriors wouldn't get very much. Furthermore, they required that banks be capitalized by these bonds. The number of banks in Japan went from 3 to around 150 in 3 years, and many of those banks survive today. In essence, those who had the most potential for being violent were made into bankers. They now had more to lose from violence and political risk.

In so doing, the government aligned the samurai's incentives with the non-samurai. It made the samurai and the non-samurai who invested in these banks share interests and, in many ways, a social life. Instead of fighting wars, the samurai became peaceful protestors, first for samurai rights, and then for broader constitutional rights for Japanese in general. That led to the Meiji constitution.

What is the chief lesson you draw from that? Financial instruments make it possible to do things that would be very hard to do politically. Sharing future risks and reward is more politically palatable than redistributing existing wealth. You

are aligning incentives of disparate groups. And by reducing political risk, you can actually increase the size of the pie. If I have a land investment, it is worth a lot less to me if I think the samurai are going to be rampaging through it than if they're selling me fertilizer.

Was there no similar alignment of interests in India? In my India work, I looked at how Hindus and Muslims created joint businesses, and these had long-term effects on reducing violence. But it was different from Japan because these connections never scaled up. They were small-scale partnerships that entrenched ethnic specialization, so that Muslims did shipping and Hindus did other types of activities. And that reinforces religious and ethnic distinctions.

In Japan, it was the opposite. They started off with the ethnically delimited samurai bonds, even while they were abolishing the samurai class and its privileges. But, because the merchant class had to buy into the banks with gold and

the samurai bought in with bonds, the two groups worked together to create a bigger pie, and it ultimately ceased to matter over time who had invested with bonds and who with gold.

You have been advising the World Bank on reducing political risk. How do you see using financial approaches today? I think there's a big potential for melding financial approaches with the use of corporations. People often focus on civil society as the way of solving these issues. But a big part of what we teach at the business school is how to create organizations where people have a share in and can benefit from one another's efforts. In essence, we can create organizations that can act in parallel with civil society.

What can be done about ethnic violence after a revolution or war? Iraq is a good example. One thing that could have been anticipated was that Iraq had fought a large number of wars, and they had a big, organized group of veterans, mainly Sunni. When the U.S. disbanded the Iraqi army, they did not pay sufficient attention to helping those veterans adjust to domestic life. You took this organized minority group that could see that they were no longer going to be in power and put them on the street. To a large extent, these veterans became the backbone of the insurgency.

This is something societies have dealt with time and again in, I think, a somewhat more foresighted fashion than in Iraq. One interesting example, which is kind of counter-intuitive, is what the Allies did in Indonesia at the end of the Second World War. They took Japanese soldiers who'd surrendered and continued to use them as the police force until they could replace them gradually over time. They were providing these guys with an ability to reintegrate with the society, instead of throwing them out on the street.  $\Delta$ 

Saumitra Jha is an assistant professor of political economy at Stanford GSB.

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On 65 square miles along the Red Sea in Saudi Arabia, a new city rises in the desert. Announced in 2005 with construction starting in 2007, King Abdullah Economic City is expected to have a population of about

2 million by 2030. "Building a city of this scale is difficult enough, but building a city of this scale by the private sector is unprecedented," says Fahd Al-Rasheed, CEO and managing director of KAEC, a publicly listed Saudi company. A 2005 MBA graduate of the Stanford GSB, he is responsible for overseeing all aspects of the development. "The hardest part was figuring out the business model and more specifically, in a city with this complexity, what we do and what we don't do. For example, do we invest ourselves in utilities or do we outsource, via concession, to someone else? If we do outsource, on what legal and commercial terms? The answer to these questions, across every sector, determined how the business model looked, and that was a complicated process that took us literally a few years."

Building plans also have changed because of evolving global thinking on sustainability and prevention of natural disasters, says Al-Rasheed.

"In the past year we revamped our master plan, and instead of building water canals, culverts, and other civil infrastructure we let nature take its course. For example, storm ways are now all natural and follow the path already paved by rain over centuries rather than be redirected elsewhere," he says.

"We are landscaping with local plants and making [the storm ways] into walkways and equestrian trails. And guess what? It was a win-win situation. It is now much cheaper to build the city. It is far more flood protected. And the residents will get more public space."  $\Delta$ 



On the rise: The city's "industrial valley," as it looked in July 2012, with the seaport beyond (left); the city master plan (top) includes a seaport, an industrial valley, an educational zone, a central business district, residential neighborhoods, and an area for resorts on the sea; the business park at Bay La Sun.

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"As the founder,
you have to be able to visualize the
full potential of the company and the
brand — to see it in your own mind
so that you can build a

#### road map

to the long-term vision, and start to work out how to get there."

— **Beth Cross**, founder and CEO of Ariat International, a maker of footwear and apparel for riders and the equestrian lifestyle Read more: http://stnfd.biz/hpWV9

"It doesn't yet look like Silicon Valley because an

#### evolution

needs to take place for that, but you get glimpses of the same.

I think it won't be long before there are very, very big success stories coming out from India, which would change lot of things."

— Garth Saloner http://stnfd.biz/hpX41

"I like to consider failures

# noble experiments." - Chip Conley,

founder of Joie de Vivre hotels http://stnfd.biz/hpWSK

#### **EXCHANGE**

"Industry-level change inevitably requires a company to fundamentally

### rethink

its strategy and business model. It must transform itself in terms of what it does and, even more fundamentally, how it does it."

- Robert A. Burgelman and Andrew S. Grove

"Strategic Dynamics: Three Key Themes." Read more: http://stnfd.biz/hpWL9

"If you build a

# polished prototype,

others will see flaws. If you build a rough prototype, they will see potential."

— Baba Shiv

Read more: http://stnfd.biz/hpZbH

# What is power?

"Power to me is change and the ability to create change in the most positive way."

— fashion designer **Tory Burch**, speaking at Stanford GSB in January Follow our speakers in real-time twitter.com/StanfordBiz "The difference between

# an inventor and an entrepreneur

is that an inventor comes up with an idea.

An entrepreneur is able to take the idea and turn that into an opportunity."

— Andy Rachleff, lecturer in strategic management and experienced venture capitalist.

Watch more: http://stnfd.biz/hpX2u



MBA Classes of '98, '03, '08, and '12

If you have questions or would like to help with the reunion, please contact: Kathleen Lehman at reunions@gsb.stanford.edu