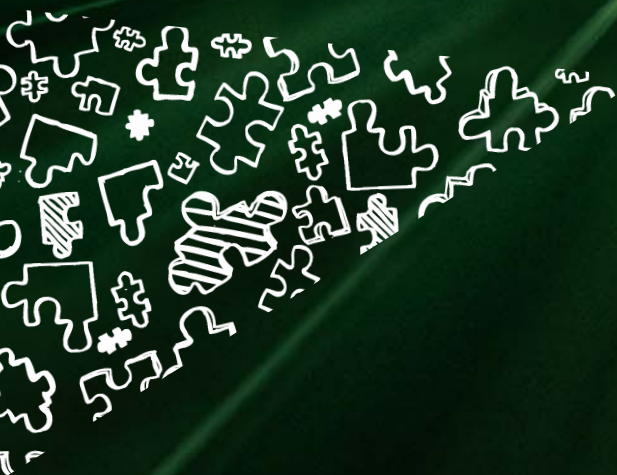
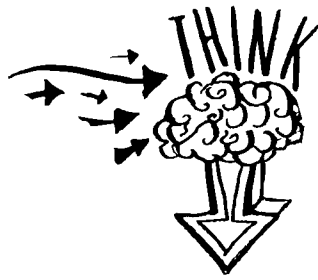


Entrepreneurship and innovation

The keys to global economic recovery



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Executive summary

At a time when entire economies and industries are reeling from the financial crisis, business leaders are struggling to balance the near-term needs of survival with the long-term demand to find new sources of growth. Never has the need to innovate and be entrepreneurial been more urgent. Ernst & Young has been a leader for more than 30 years in serving companies in all stages of development, and we have observed that innovation and entrepreneurship often go hand-in-hand. A large body of academic research and real-world business experience has established a clear connection between entrepreneurship, innovation and economic growth. By developing new products and services, revamping organizational processes or adopting fresh approaches to partnerships, companies can take advantage of the downturn to transform their businesses. Now is the time for policy-makers and business leaders to focus on the long term – by identifying, supporting and inspiring entrepreneurs and innovators at all levels of the economy, in every market. Among our observations:

- ▶ **There's no time like a downturn to take advantage of entrepreneurial thinking.** In a recent Ernst & Young survey, the majority of entrepreneurs said they saw the economic slowdown as the perfect time to pursue new market opportunities. In addition, economists, academics and industry leaders all agree that recessions tend to favor the naturally innovative temperament of entrepreneurs. Some of the world's largest companies were born during a recession. (See p. 2)
- ▶ **The market leaders of today are not necessarily the market leaders of tomorrow.** Dominant corporations are constantly replaced by entrepreneurial-minded enterprises that grow at incredible speed and gain significant market share. Globally, all the major indexes turn over every five years. (See pp. 4-5)

- ▶ **Innovation can – and often must – be disruptive.** Industries, companies and economies all suffer initially as innovation challenges the status quo, but strong organizations embrace shake-ups and ultimately thrive. (See pp. 6-9)
- ▶ **You're never too big to be an entrepreneur!** Large companies are often hampered by institutional structures that may view unconventional ideas or strategies as impractical, unwise or threatening. But large corporations can still innovate successfully if they build and sustain innovation-oriented cultures. (See pp. 11-15)
- ▶ **Government policies that encourage entrepreneurship are most likely to result in increased innovation.** Governments, which are often viewed as most effective when they stay out of the business sector's way, actually play an important role in nurturing and protecting one of their most important engines of growth: entrepreneurs. Effective public policy stokes economic growth. (See pp. 16-17)

Research and experience show that innovation offers a substantial bottom-line benefit: the most innovative companies outperform their industry peers and are the most attractive to shareholders. But innovation needs help. The creative process is stunted whenever ideas, capital or talent can't move freely. Without public or private sector funding and support, even the best ideas can fail – and in this daunting economic environment, failure has grave consequences. We must do everything we can to nurture and stimulate creative thinking across our organizations, teams and processes. Global economic recovery depends on it. ▲



There's no time like a downturn to pursue new market opportunities

The connection between innovation and economic growth is a time-honored one. Beginning with the work of the Nobel Prize-winning economist Robert Solow in the 1950s – itself built on the economic theories of scholars such as Joseph Schumpeter, who coined the phrase “creative destruction” to describe the demise of established organizations and the birth of new ones – and culminating in modern Keynesian and supply-side theories, economic models generally view innovation as a key factor in economic success. “The largest single factor explaining economic growth is ... the ability to extract greater economic value from advances in science and technology,” writes Maryann Feldman, Professor of Business Economics at the University of Toronto and a leading researcher on innovation and economic development, in her research study *The Significance of Innovation* (2004). Feldman makes an important distinction between innovation and invention: “Invention is about discovery and the creation of something novel that did not previously exist. Innovation, on the other hand, carries invention further with the commercial realization of the value of the invention or the receipt of an economic return.” After all, Thomas Edison didn't invent the light bulb: he discovered the filament that could supply light reliably – what was required to make the light bulb commercially viable.

> “When you innovate, you've got to be prepared for everyone telling you that you're nuts.”

Larry Ellison, CEO, Oracle

If innovation is a key stimulant of economic growth, entrepreneurs are synonymous with innovation – and there's no time like a downturn to take advantage of

entrepreneurial thinking. In *Seizing opportunities: a once-in-a-lifetime chance*, an Ernst & Young global survey of mature multinationals and entrepreneur-led companies, conducted in the second quarter of 2009, 67% of the entrepreneurs said they were focused on pursuing new market opportunities, compared to just 19% of the mature companies. “The current market conditions call for creative and unconventional approaches,” said one respondent. “This will be the key to pursuing our dreams and visions as entrepreneurs.” Another respondent observed, “Now is the time to take market share either through sales growth or acquisition. It isn't for the faint-hearted, but there are few golden moments in history like this one to dominate your industry or your competitors.”

Large corporations would be well served to embrace entrepreneurial thinking in their complex organizations. The Ernst & Young survey reveals that the majority of entrepreneurs are looking ahead, focusing on building a robust business platform that will serve them well when market conditions improve. Tactics include:

- ▶ Broadening the customer base
- ▶ Developing new products, services and markets
- ▶ Acquiring strategic businesses or assets
- ▶ Attracting and retaining key people
- ▶ Improving operational efficiency

Many entrepreneurs believe that having a streamlined operating model that maximizes the strategic advantages of people, processes and systems is the best foundation for success. “Deal with the things you've been letting slide,” advises a survey respondent. “Clean up your operational messes. Lose fat, build muscle.” ▲



The market leaders of today are not necessarily the market leaders of tomorrow

Because innovations have sparked broad economic and social change, it is easy to look at them as great, almost autonomous forces that shape the world. In fact, they usually stem from entrepreneurial enterprises. What's notable about today's economy is that entrepreneurial-minded enterprises are growing with incredible speed and quickly entering the ranks of the world's largest corporations.

According to Ernst & Young research, the major global market indexes have undergone dramatic changes in the past five years. For example, the Global Forbes 2000 has experienced a 51% turnover; the HDAX (Germany), 50%; the FTSE 350 (UK), 50%; the KOSPI 200 (South Korea), 49%; and the Bombay 200 (India), 91%.

Using the US as an example – the once-touted global entrepreneurial hotbed – the Russell 3000 (the top 3000 public companies by market capitalization) turned over 59%: more than half changed their market position in the same five-year time period!

According to Ernst & Young research, in the past five years, 86% of the Fortune 1000 new entrants have come from the Russell 2000 or are new public companies. Our research also shows that approximately 50% to 60% of all IPOs in the US are VC- and PE-backed companies.

Clearly, this market dynamic is a “food chain” – and not recognizing the importance of feeding and nurturing each part of the business cycle could be detrimental to maintaining market leadership and national competitiveness.

The two key questions to ask are:

- ▶ Who will be the market leaders of tomorrow?
- ▶ If you are a market leader, how do you stay there?

Learning from history

The history of entrepreneurship can yield many useful lessons. In “Innovation Lessons from the 1930s,” a paper written for *The McKinsey Quarterly* in December 2008, just as the worst of the turmoil was rocking the financial markets, Harvard Business School professor Tom Nicholas suggests that “even the deepest downturns can create huge opportunities for companies with money and ideas.” He cites the cases of DuPont, Hewlett-Packard, Polaroid and Radio Corporation of America, all of which discovered or developed major new technologies during the Depression years and beyond.

Innovators may even perform better than usual in uncertain economic times, says Bob Buder, a former research fellow at the Massachusetts Institute of Technology and founder of Xconomy.com, an information website for business and technology leaders. “Not only is there a lot of high-tech innovation going on, but I think it's accelerated since the crash,” he says. “Certainly, the intensity of it has increased in every field you can think of. People innovate all the time; it's just the human condition. But in a crisis, people rally and do things with more intensity, more creativity and more camaraderie. The stakes are very evident, so the intensity of innovation increases.”

Venture capitalists agree that the entrepreneurial floodgates open wider during economic declines. “Tough economic times do generate more innovative ideas because you have people who are fleeing the corporate environment and branching out on their own,” says Michael Peck, Managing Partner for Open Prairie Ventures. “When people are forced into the marketplace through layoffs or economic disruption, that's when you tend to see an entrepreneurial spirit emerge. Entrepreneurs are, by nature, innovative. So during recessions,

you see more entrepreneurship and therefore more innovation.” Open Prairie Ventures invests in early-stage agricultural technology, life sciences, information technology and wireless communications companies and currently has two funds with investments in about 20 companies, most of which have not yet begun earning revenue. The company typically invests between US\$2 million and US\$8 million.

Experience shows that entrepreneurs should not give up on start-ups in a down economy. Many companies with billion-dollar market capitalizations were started during a recession, including such major consumer brands as Starbucks, Intuit, PetSmart, Microchip Technology, Onyx Pharmaceuticals and Nuance Communications. In addition, countless other start-ups were acquired and have made other companies stronger.

Nor were the early 1990s unique for producing recession-beating companies. The slowdown between 2000 and 2003 also produced current market leaders, not just in the US but also in Europe, China and Israel. These “downturn babies” have market capitalizations measured in the billions or hundreds of millions of dollars. In Europe, biopharmaceuticals dominate; in China, these companies center on such traditional, regional venture capital-backed industries as technology, consumer goods and industrial technologies. In Israel, they cluster around medical devices and technology.

In addition, the Ewing Marion Kauffman Foundation analyzed data from the U.S. Census, the Fortune 500 list of the largest US companies and the Inc. 500 list of America’s fastest-growing companies. In a research study released in June 2009, the foundation presents three main findings:


- ▶ While recessions and bear markets often lead to short-term declines in business formation, they do not seem to have a significantly negative impact on the formation and survival of new businesses.
- ▶ More than half of the companies on the 2009 Fortune 500 list, and just under half of those on the 2008 Inc. list, were founded during a recession or bear market.
- ▶ Job creation from start-ups is less volatile and less sensitive to downturns than job creation in the entire economy.

“Each year, new firms steadily re-create the economy, generating jobs and innovations,” says Dane Stangler, a senior analyst at Kauffman who conducted the research. “These companies may be invisible, or may one day grow into household names. But they are always there, allowing people to create their own economic futures.”

The study estimates that, as in most other years, the US economy will produce between 400,000 and 700,000 start-ups annually in 2008 and 2009. While not all of them will succeed, many will create not only jobs, but also innovations that spur economic growth. “When a large, established company announces deep layoffs, it’s front-page news,” says Stangler. “When two or three dozen new firms hire four, six or eight people at a time for several years, it mostly goes unnoticed. Only when those companies grow large enough do they begin to appear in the public consciousness – even though they have been regenerating the economy for several years. Every generation of start-ups is, often invisibly, both a renewal and restructuring of the economy.” ▲

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The power of disruption

The term “disruptive innovation,” now standard in the business lexicon, was coined by Harvard Business School Professor Clayton Christensen to refer to an unexpected product or service that revolutionizes a market through drastic improvements in price or quality. Disruptive innovation is often the turning point for businesses in an industry undergoing significant change, as described by Christensen in his 1997 book, *The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail*. Personal computer manufacturers, for example, initially were dismissed by the mainframe and minicomputer industries. But PCs ultimately replaced mainframes. More recently, internet services such as Craig’s List have wrought havoc on newspapers’ once-profitable classified advertising business. Innovation can create businesses – but it can also destroy them.

➤ “Business is all about innovation, and I don’t think you can work innovatively without taking risks. Risk-taking is an inherent part of the leadership process. You shouldn’t become an entrepreneur if you don’t want to take risks.”

Kumar Mangalam Birla, Chairman, Aditya Birla Group, India

There are numerous ways that companies both large and small can leverage disruption for bottom-line gains, however. In “Jumpstarting Innovation: Using Disruption to Your Advantage” (HBS Working Knowledge paper, September 2007), Harvard Business School Professor Lynda Applegate notes, “Disruptions in the business environment cause economic shifts that destabilize industries, companies, and even countries. They allow new entrants or forward-thinking established players to introduce innovations – in products, markets, or processes – that transform the way companies do business and consumers behave.”

Applegate goes on to recommend key factors that companies must consider when faced with disruptive business conditions:

- ▶ **Technology** – important emerging technologies and how are they being used elsewhere to create proprietary advantage
- ▶ **Business models** – new business models that can be adapted or adopted to deliver radical improvements in ways of doing business
- ▶ **Industry dynamics** – fragmented industries where significant value can be delivered through consolidation
- ▶ **Globalization** – events in another part of the world that can be adopted or adapted to a specific company’s environment



- ▶ **Regulatory, macroeconomic, political and societal factors** – impending (or early) shifts in regulation, political power or society that threaten to disrupt entrenched power bases and provide opportunities for new entrants

Disruptive innovation also means going all out to change the status quo. While incremental change can often be effective in other areas of organizational transformation, it doesn't work in the case of innovation, says Paul J. H. Schoemaker of the University of Pennsylvania's Wharton School. He emphasizes that "the largest gains in business come from more-daring innovations that challenge the paradigm and the organization."

Innovation is critical to maintaining and sustaining market leadership. When considering the lifecycle of a business and its various stages (start-up, rapid growth, mature, stagnant), it is important to note that organizations approaching the mature/stagnant categories must constantly innovate to sustain high demand, high margins and high shareholder value. A recent study by Ernst & Young of market outperformers revealed that sales quality (high sales margin) is more important than sales growth. It is, in fact, how investors spot a winner. ▲

Breaking the mold

The following are some examples of disruptive technologies and companies, according to Harvard Business School Professor Clayton Christensen:

Technologies

- ▶ Peer-to-peer networking, disrupting traditional distribution mechanisms
- ▶ MPEG audio and video compression (e.g., MP3), disrupting physical media
- ▶ Personal computers (PCs), disrupting other media devices (TV, stereo)
- ▶ Cell phones, disrupting PCs and digital cameras
- ▶ Smaller-sized hard drives, disrupting traditional hard drives
- ▶ Mini steel mills, disrupting large vertically integrated steel mills
- ▶ Renewable and distributed energy (solar, biomass, etc.), replacing energy from fossil fuels
- ▶ WiFi and organically grown networks

Companies

- ▶ Amazon.com, disrupting traditional brick-and-mortar retail
- ▶ Dell Direct, disrupting the whole PC industry with its direct-to-consumer model
- ▶ eBay, disrupting traditional retail systems and introducing online auction model
- ▶ Intel, disrupting traditional computer manufacturing
- ▶ Intuit, disrupting business services with personal financial software (QuickBooks, Quicken, TurboTax)
- ▶ FedEx, disrupting the traditional package distribution model

Interview: managing innovation effectively

Very few innovations happen by chance. In fact, orderly development processes are more likely to result in new products and services, as Stefan H. Thomke, Professor of Business Administration at Harvard Business School explains to Gregory Ericksen, Ernst & Young's Global Vice Chair for Strategic Growth Markets.

Gregory Ericksen: Why is innovation important?

Stefan H. Thomke: Organizations have only two ways to grow. They can buy other companies or grow organically. To grow organically, again there are only two ways. They can try to squeeze more sales out of an existing portfolio of products or services. That's a dangerous proposition because first, your products will become stale – competitors will enter the market with newer products and your margins will decline over time. This can happen quickly: some products' lifecycles are only 12 to 16 months long. The other way to grow organically is to come up with new products and services – you have to innovate.

Gregory Ericksen: Where does innovation originate?

Stefan H. Thomke: Innovation usually starts with an individual or company that has a problem to solve. In his book *Sources of Innovation*, my colleague Eric von Hippel of MIT says there are basically two sources of innovation: manufacturers and users. According to the conventional wisdom, innovation usually starts with manufacturing – with a company that's making something. But actually it often starts with users: those who face a problem which they must solve by themselves. The users' solutions often are adopted later by manufacturers. So user-innovators are people who benefit from an innovation by using it; manufacturer-innovators are companies that benefit from an innovation by manufacturing and selling it.

Gregory Ericksen: Your research examines the impact of new technologies on the economics of innovation. Can you elaborate on this?

Stefan H. Thomke: The theme of all of my research is the role of experimentation and design in the development of products and services. I've looked at the changing economics of experimentation, which has become much less costly today than in the past because of technological advances such as computer modeling. A simple example is the use of electronic spreadsheets in the financial services industry. Spreadsheets are basically a modeling tool that let you experiment by changing variables: "What happens to the return on my investment if interest rates go up by two basis points?" That's a simple example, but if you extrapolate to other industries, using much more powerful tools, you can imagine the impact.

Look at the automotive industry's efforts to build safer cars. Ten to 15 years ago, car companies developed lots of prototypes to verify that a car was safe. Not only were they expensive, but the cost of making changes to a product rises exponentially with each stage of development – some people say by a factor of 10, although I think it's more. If you made radical design changes near the end of the development process, it can cost millions of dollars. So traditionally, high-fidelity testing has not happened until late in the process, and as a result, it has been

difficult to experiment with different designs once the initial prototype is made.

But today's computer simulation technology lets us ask fairly radical questions at a much earlier stage. For example, "If I move a particular component, what impact would that have on safety?" This allows us to experiment at an earlier phase of product design, thereby changing the way in which innovation takes place. To get the maximum benefit, however, companies must rethink how the product development process works. You can't throw new technology into an old-fashioned process. If you have simulation tools that let you make design changes further upstream – but you don't use them until late in the game – that's no good. For example, today we can perform simulated crash tests much earlier, even though the traditional process of developing new-model cars doesn't call for those tests until the later stages of development. To be effective, the process has to adapt to the technology.

Gregory Ericksen: If you had to sum it up, what would you say we have learned about innovation – what works and what doesn't?

Stefan H. Thomke: There is a persistent myth that innovation is largely about serendipity. While some great innovations do come about by chance, this approach to innovation generally doesn't work. What we've learned is that like almost everything else, innovation has to be nurtured, funded and managed to make it repeatable and predictable. Many organizations understand this, but there's still the myth of the crazy scientist accidentally discovering something weird and producing a huge breakthrough. We do see such stories from time to time, but most products and services are not developed that way. ▲

Interview: looking for game changers

Disruptive innovations are usually the product of nonbelievers. Matthew Szulik, Chairman of Red Hat, Inc., a software company based in Raleigh, N.C., threw convention to the winds when he bet the company on providing an open-source, Linux technology-based alternative to the Microsoft Windows operating system platform. Open source gives users the freedom to develop software for any application they choose because the code is freely available over the internet. Maria Pinelli, Americas Director for Strategic Growth Markets at Ernst & Young, speaks with Szulik, winner of Ernst & Young's 2008 Entrepreneur Of The Year® Award, about how he brought this novel and seemingly improbable business idea to market.

Maria Pinelli: What was your biggest initial hurdle in getting Red Hat off the ground?

Matthew Szulik: In 1998, no one believed a company could make money by giving away free software. They thought I was the dumbest guy in the world. I remember taking Red Hat public and having people ask me, "When are you going to give up this gimmick?" Yet when I led Red Hat's IPO in 1999, it had the eighth-biggest first-day gain on Wall Street.

Maria Pinelli: What do you believe gave you a leg up on the competition?

Matthew Szulik: Our biggest competitive advantage is that we were not contaminated by traditional thinking. Our business customers pay annual subscriptions for support and training. They design their own software and are not locked into using any particular proprietary software for upgrades. Red Hat software is public. This makes rapid innovation possible, using open process and public forums.

Maria Pinelli: You've come a long way in 10 years.

Matthew Szulik: Yes, we now have 3,000 people in 60 offices worldwide and about 400 major enterprise customers. In 2006 we acquired JBoss, an open-source middleware company. Since 2007, our market share has increased and we've posted record profits. Our sales in 2007 were US\$523 million.

Market-leading companies started in economic downturns

1939: William Hewlett and David Packard started HP in a garage in Palo Alto, Calif.

1975: Bill Gates and Paul Allen founded Microsoft during the recession of the mid-1970s.

1980: Mitch Kapor founded the Lotus Corporation.

1983: Len Bosack and Sandra Lerner started Cisco Systems in their living room.

Maria Pinelli: What's next for Red Hat? How will you maintain your commitment to innovation?

Matthew Szulik: We're dedicated to using open-source software for social change. Red Hat sponsors the Fedora Project, a community-supported initiative to promote the rapid progress of free and open software. Many Fedora Project innovations are developed by Red Hat employees along with community members, and are included in new releases of Red Hat Enterprise Linux. We also sponsor the One Laptop per Child program, which furnishes laptops to disadvantaged kids. I am a frequent and active advocate for the potential of open source before the North Carolina legislature and US Congress. Our open-source community has helped create thousands of new jobs and improve education. ▲

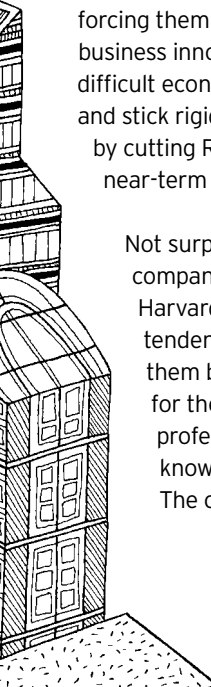
“You will find that in periods of deep economic pain and recession, it usually has been a fantastic time for entrepreneurship.”

creativity





You're never too big to be an entrepreneur!



For large, established companies, innovation can be a double-edged sword. Some corporations such as 3M and Hewlett-Packard have built their corporate culture around innovation. But for many others, innovation arrives as an outside threat as more nimble competitors disrupt established corporations' growth and profitability, forcing them to adapt or cede share. In a severe recession, this normal churn of business innovation and disruption accelerates and becomes more volatile. In difficult economies, companies often turn inward: they focus on cutting costs and stick rigidly to strategic plans. Firms may sacrifice new product development by cutting R&D and shelving plans for products that have little chance of a near-term profit.

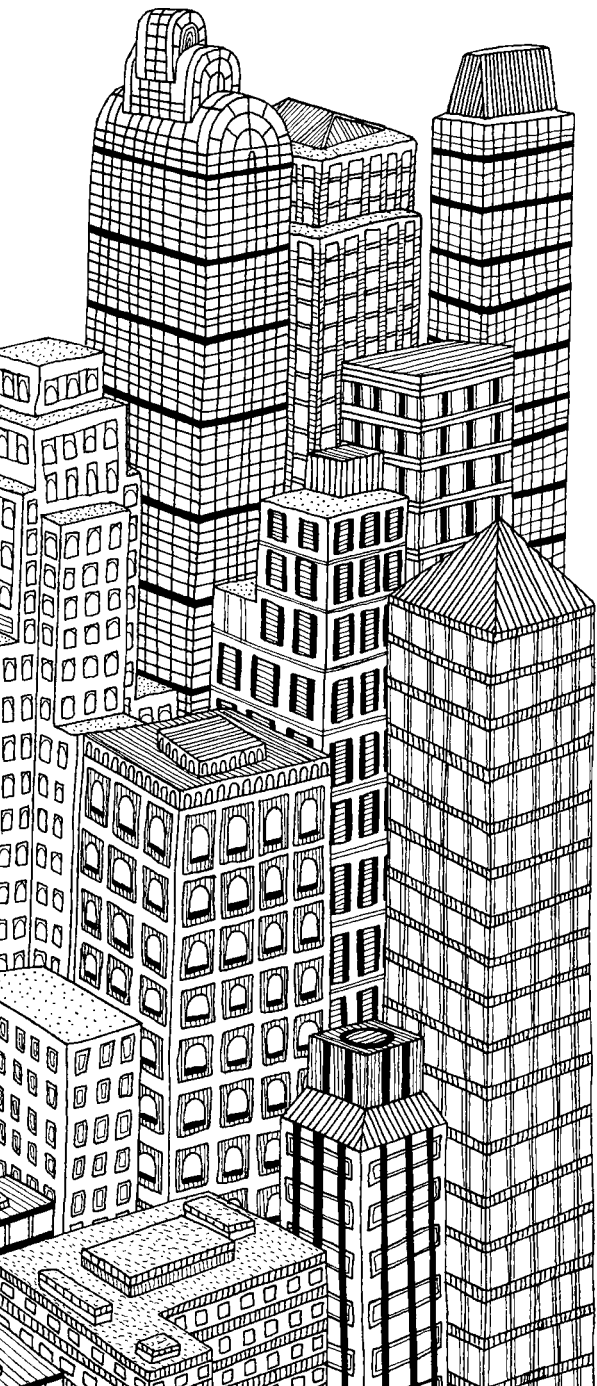
Not surprisingly, one of the major impediments to innovation at large companies is their tendency to overvalue their own products and strategies. Harvard Business School professor Michael Norton demonstrated this natural tendency by giving volunteers an assignment to create origami and then had them bid on the origami in an auction. Participants were willing to pay more for their own origami than for others' work – even when it was produced by professional artisans. Norton dubbed this the “IKEA effect,” after the well-known retailer that sells many of its furniture products in do-it-yourself kits. The concept helps explain how a once-innovative company like Polaroid

might hang on to an outmoded product even when faced with more innovative outside competition.

Ultimately, large businesses face an inherent challenge: in reaching their scale, they have developed large institutional structures that view most unconventional approaches or ideas as impractical, unwise or threatening. This cultural bias against change, says Columbia Business School Professor Rita Gunther McGrath, finds shape in a mindset that would like to view markets as predictable and

▶ “During a downturn, people tend to get more serious about innovation. When things are going well, you're tempted to make little tweaks; you don't have the driving force to really change things. When your back's against the wall, you're more likely to be innovative.”

Dave Dreiling, owner, GTM Sportswear; Ernst & Young Central Midwest Region Entrepreneur Of The Year®, 2007



manageable. The notion that there is something out there that can't be foreseen is often dismissed outright by large companies – until it is too late.

Large enterprises can nurture and maintain innovation in four ways:

- ▶ **Accept uncertainty.** Gunther McGrath argues that traditional, data-driven planning and forecasting don't function in an uncertain economic environment. Hugh Courtney, author of *20/20 Foresight: Crafting Strategy in an Uncertain World*, recommends that companies discard their process of creating annual strategic plans and make decisions in real time, focusing on market intelligence as it comes in. The biotech industry, for example, has always operated with a high degree of uncertainty, and has developed a business model that incorporates the notion of taking multiple avenues to potential success. "With no certainty, companies take the opportunity to think of possible outcomes in a structured, disciplined way," he says.
- ▶ **Use innovation to reshape business practices.** Amar Bhidé, author of *The Venturesome Economy: How Innovation Sustains Prosperity in a More Connected World*, believes that while in the US Silicon Valley entrepreneurs often become superstars, large companies in mainstream industries (such as Walmart) don't get the credit they deserve for their truly innovative solutions in operations and supply chain management. Walmart revolutionized the retailing industry with its introduction of point-of-sale inventory management.
- ▶ **Deploy human capital strategically.** In tough economic times, as weaker competitors abandon unprofitable ventures, stronger companies can leap ahead by encouraging their employees to innovate. During the Great Depression, DuPont allowed Wallace Carothers, one of its star scientists, to set aside his day-to-day duties so that he could pursue innovative projects. Thanks to this freedom, Carothers developed nylon, the first synthetic fabric, and a major source of future profits for DuPont. During the 1969-70 recession, Hewlett-Packard committed its researchers to building the pocket calculator – at the time thought to be an almost impossible task. The innovation helped HP build and own a major product category for years to come.
- ▶ **Adopt an inclusive approach to building a global workforce.** Taking advantage of diverse backgrounds, skills and ways of seeing the world creates the kind of conversations that favor innovation. A recent Ernst & Young report, *Groundbreakers: using the strength of women to rebuild the world economy*, discussed the findings of a wide spectrum of research showing that diverse groups tend to be more innovative and perform better on complex tasks than homogeneous groups, and that diversity constitutes a key strategic advantage for companies that want to design a new product or enter a new market. Henry Chesebrough,

University of California (Berkeley) professor and author of the term “open innovation,” says the ability of multinational companies to tap into global talent and customer pools is a major advantage. “The most important advantage is the ability to listen to, and learn from, customers in new markets,” says Chesebrough.

> “We hear it daily across the global business community: the only way out of this crisis is to innovate our way out.”

Gail Fosler, President, The Conference Board

Larger, well-capitalized corporations can innovate simply by buying it. This is particularly true in the area of R&D, which typically is handled internally. Large companies are discovering that in addition to building a strong internal research function, they need to seek innovation through partnerships, joint ventures, licensing, investing directly in emerging companies and setting up their own venture capital funds and business units. Intel Capital, a unit of Intel, is the largest venture capital firm in the world. IBM has an active and large venture capital relations program, giving it access to the innovation pipeline. These programs serve large companies as well as emerging ones, as they give large companies access to fresh thinking and emerging companies access to capital, distribution and market presence. ▲





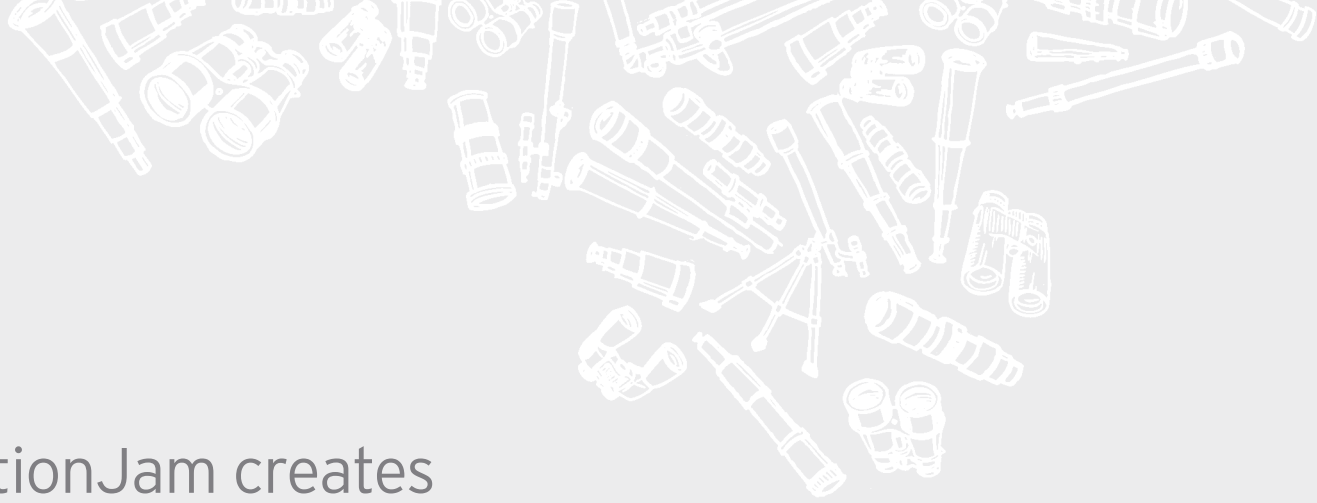
Case studies

Automotive partnership revs up open-source computing platform

Not all companies can fully embrace open innovation. The auto industry, with its enormous development costs, lengthy product cycles and fierce global competition, is an example where the sharing of information and technology is limited. Car companies, however, buffeted by the double blows of gyrating fuel prices and a worldwide slump in demand, are being forced to fundamentally rethink the way they do business. Resources are limited, costs must be contained, and yet customers still desire new, cutting-edge products.

BMW might be unwilling to share its technology for, say, its hydrogen engines, but it has moved toward open innovation in another key area. In 2008, the company announced that it was looking for partners to develop an open-source computing platform to allow outside suppliers to provide “info-tainment” applications (i.e., information-based media content or programming that also includes entertainment content) for its vehicles. Just a year later, the company unveiled GENIVI, the open-source software platform developed in partnership with Delphi, General Motors, Intel, Wind River and others.

The partnership builds on BMW’s strength in building fuel-efficient engineering, and helps bring the company creative capabilities in delivering dashboard information and entertainment. The company found no shortage of willing partners in this venture. Software firm Wind River is already hard at work developing a Linux-based automotive prototype, and countless software companies are expected to jump in to create applications for this potentially huge global market. ▲



IBM's InnovationJam creates marketplace of ideas

Decades before the term was coined, IBM embraced open innovation, unbundling its software from its hardware products in 1969. Years later, IBM actively promoted the open Linux operating system, and created alphaWorks, an online site where outside programmers could refine and develop applications for IBM's programs.

With its yearly "InnovationJam," IBM has taken open innovation even further. "Jam" is what IBM calls its massive parallel online conferencing system, which it has long used to communicate with its far-flung workforce. Several years ago IBM expanded on the idea and created the InnovationJam, a giant multi-day brainstorming session on chosen topics where participants from inside and outside the company could exchange ideas in moderated discussion groups. The 2006 InnovationJam, in which 46,000 people participated, focused on helping IBM bring products to market.

Did it work? A Massachusetts Institute of Technology study by researchers Osvold M. Bjelland and Robert Chapman Wood looked at whether the 2006 Jam delivered on its goal of producing marketable new product ideas. Bjelland and Chapman found that while viable products such as smart healthcare payment systems and real-time language translation did emerge from the Jam sessions, it took intensive human and computer analysis of the mountains of verbiage produced by the sessions to come up with those products. The Jam's greatest contribution to product innovation was in the way the event brought together ideas that could be combined into major initiatives. Out of the 2006 Jam emerged the broadest initiative ever undertaken by IBM: "Big Green" – IBM's new unit dedicated to emerging environmental business.

Edward Veban, IBM's Vice President for Technology and Innovation Programs, describes idea generation as the easy part – the "darling star-child" of innovation.

The hard part comes when those ideas must be advanced, refined, combined with other ideas and supported during their long journey to market. IBM's experience with InnovationJam suggests how a variety of ideas can be harnessed to accelerate product development in a fast-changing world. ▲

User-designed software spurs LEGO® innovations

Consumer products companies have by and large embraced open and user-driven innovation, but a few firms have really pushed the envelope. LEGO®, the Danish manufacturer of building sets for children, has for decades made interactive, customizable products. As the company increased the sophistication of its product line, it gained greater numbers of adult, technologically savvy customers. In 1998 LEGO introduced MINDSTORMS®, which are programmable robots that the company had developed using work begun at the Massachusetts Institute of Technology. Within weeks, users had reengineered the software and developed new programs for the robots. LEGO encouraged these innovations, and MINDSTORMS became the best-selling product in the company's history. When it came time to build the next-generation MINDSTORMS product, LEGO collaborated directly with its customers and now makes MINDSTORMS software code available to everyone.

In 2005, LEGO extended its open innovation efforts to its less technologically advanced products, unveiling the LEGO Factory, a website where children can design LEGO creations online and then order customized kits based on the designs so they can build them at home. Users can also submit their designs to the company, in the hopes that LEGO will choose their creations to mass produce. ▲

To promote and protect: government's role

Individual government policies toward entrepreneurship and innovation vary widely, but the consensus among policy-makers and academics is that without a favorable market and regulatory environment, innovation cannot stoke economic growth. "History shows that [the] synergistic process of innovation is best cultivated in a competitive economic environment with open markets that reward the development of new products and services," notes a 2009 report from The Conference Board. "The regulatory environment plays no small role in innovation. Policies that protect firms or industries can result in reduced incentives for entrepreneurs to invest in innovative ideas and for large firms to invest in R&D because they no longer face the competitive pressure to constantly improve their product in order to improve (or maintain) their market share."

> Seventy-nine percent of Americans say entrepreneurs are critically important to job creation, ranking higher than big business, scientists, and government.

Kauffman Poll: Entrepreneurship and Economic Recovery, March 2009

Governments, which are often viewed as most effective when they stay out of the business sector's way, actually play an important role in nurturing and protecting one of their most important engines of growth: entrepreneurs.

Here are some ways governments can help:

- ▶ **Strengthen and invest in education systems.** Innovation requires a well-educated, competitive labor market, brimming with both skills and ideas.
- ▶ **Encourage businesses to connect with global, cross-border markets.** The point is most relevant for entrepreneurs launching a start-up or expanding an existing business so they can consider the largest possible market for their services or goods.
- ▶ **Cultivate confidence in capital markets.** Governments are responsible for creating conditions that attract foreign investors. Adopting a financial reporting language (such as IFRS) that can be understood by investors around the world will go a long way to ensuring a common language. The reform provides a vehicle for tapping international capital flows that can benefit business activity at home and boost growth – especially when attracting capital for initial public offerings.
- ▶ **Simplify procedures and requirements.** Burdensome processes can create roadblocks that increase the cost of doing business. This is an entry barrier for many nascent and growing businesses. No government can afford this during a time of economic downturn or recovery.
- ▶ **Champion robust R&D programs.** This is especially beneficial in the increasingly active areas of energy (such as cleantech) and scientific research.

- ▶ **Allow for failure.** If an attempt at innovation does not succeed, does the tax code allow for the business to write it off?
- ▶ **Encourage sound public/private partnerships.** It only behooves the government, universities and business sector to work together in the spirit of innovation.
- ▶ **Make the tax framework friendly to innovation.** Different countries will develop different approaches that can include tax credits for new workers, immediate expensing of capital assets and making tax credits available to lenders to lower the cost of finance.

The Organisation for Economic Co-operation supports this point of view and points to six elements that favor entrepreneurship: regulatory framework; market conditions; access to finance; R&D and technology; entrepreneurial capabilities; and culture. In fact, no single economic stakeholder can be counted on to develop all the elements of a successful entrepreneurial economy. It is essential for regulators, businesses and other stakeholders to encourage venture capital and other sources of funding. They must also create intellectual capital through partnerships with leading universities and research centers and support innovators with fair and pro-growth tax and legal systems. Finally, legal, accounting and banking advisers must understand and adapt to the needs of entrepreneurs. ▲

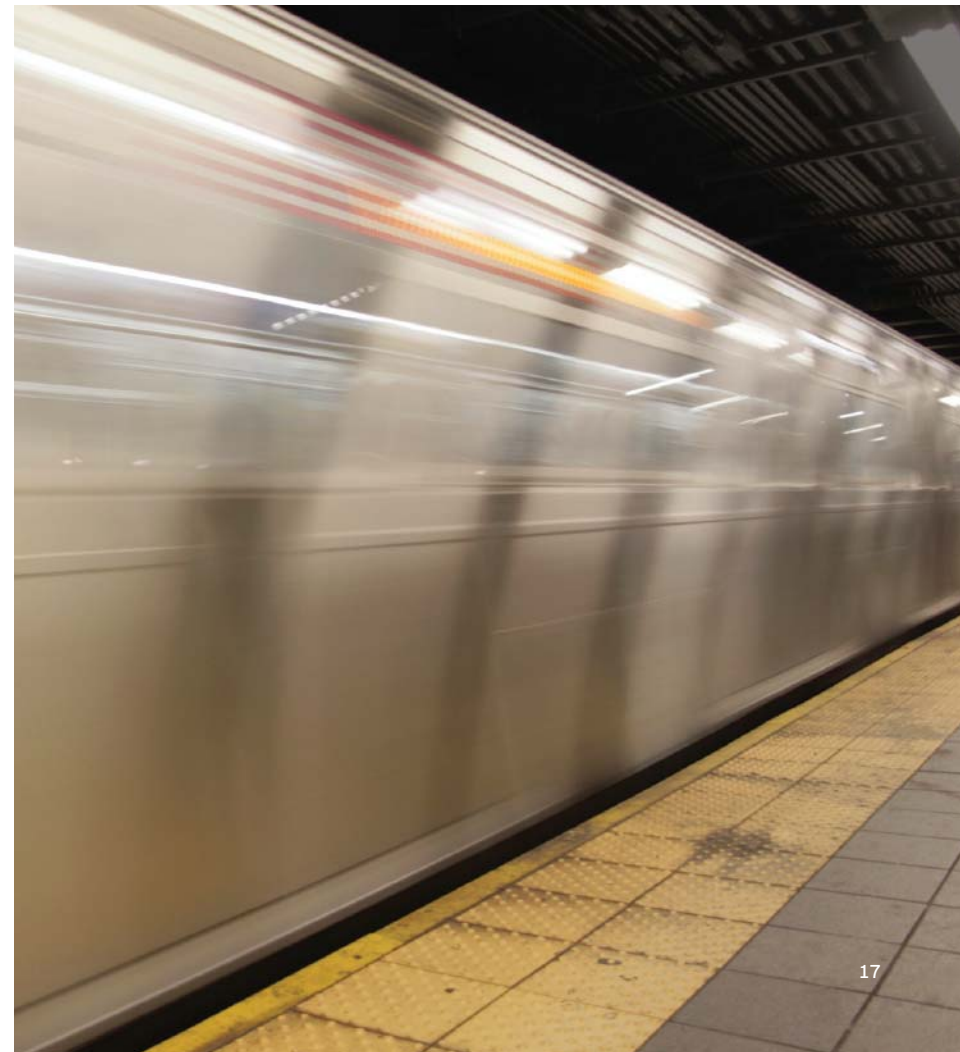
Worldwide entrepreneurial activity

The Global Entrepreneurship Monitor, a program initiated by Babson College and the London Business School to assess entrepreneurial activity around the world (www.gemconsortium.org/default.aspx), explores the link between economic growth and entrepreneurship. The 2008 report discusses this positive relationship in terms of the diverse phases of economic development that vary from country to country:

- ▶ **Factor-driven economies** (economies relying on unskilled labor and natural resource extraction) will need to focus on institution-building, infrastructure and the provision of such basic services as healthcare.
- ▶ **Efficiency-driven economies** (growing economies in need of improving production processes and quality) will be most concerned with such priorities as domestic and/or foreign market size, financial market sophistication and labor market efficiency.
- ▶ **Innovation-driven economies** (the most-advanced stage in which businesses compete primarily on the basis of innovation) will have needs related to entrepreneurship-specific education and research and development.

▶ “Our model doesn’t focus directly on innovation, seeing risk in a more sophisticated way ... For example, we invested in a company that disinfects drinking water using ultra-violet light. They were trying to prove the conventional wisdom wrong, which made it a risky project. But they’ve shown that there is market demand, and they now have 300 small water treatment plants serving villages across India, as well as operations in Ghana and the Philippines.”

Yasmina Zaidman, Director, Knowledge and Communications, Acumen Fund



Interview: innovation and public policy

Public policy is not always friendly to innovation. During severe economic crises, governments often turn to policies that restrict or close the doors to what innovators need most: an open flow of people, goods, services and ideas. To better understand how public policy can help or hurt entrepreneurship, Steve Howe, Ernst & Young's Americas Area Managing Partner, spoke with Robert Litan, a former senior official in the Clinton Administration and now Vice President for Research and Public Policy at the Ewing Marion Kauffman Foundation as well as Senior Fellow in Economic Studies at the Brookings Institute.

Steve Howe: Have you observed a trend during this recession toward governments enacting protectionist measures?

Robert Litan: We don't see a rampant problem with protectionism during the current recession, but it is happening. One example would be the "Buy America" provisions inside the US stimulus bill. We're certainly not moving forward toward more openness; future trade talks are dead, and the only measures we're seeing around the world are countries tightening up their borders. Trade has fallen like a stone.

"Restoring the US banking system to health should be the country's highest economic priority."

Steve Howe: How do protectionist measures hurt small and start-up businesses? Don't such businesses typically focus on trade issues when they get bigger?

Robert Litan: Lots of technology businesses are created when larger, multinational companies outsource some portion of their business. Protectionism is a big concern for those businesses. Also, many successful high-growth companies are global from day one. Entrepreneurs need a global footprint, and in this internet age, if political leaders raise barriers in the physical world, commerce will be interrupted in the virtual world as well.

Steve Howe: A major focus of policy-makers has been on solving the credit and financial crisis. How will this help entrepreneurs and start-up businesses?

Robert Litan: Bank financing is very important for small businesses. They typically rely heavily on secured lending. As long as the US banking system is weak, this will impede the ability of small firms to grow. Restoring the US banking system to health should be the country's highest economic priority. We need a better system for regulating and resolving systemically important financial institutions, and the US Congress is taking this up. The danger is if a regulatory system is put in place that is too inflexible or sets unrealistically high capital and liquidity standards. But Congress is taking its time with this, and I think the chances are good that they'll come up with a constructive set of reforms.

Steve Howe: As policy-makers turn to reforming financial market regulations, what are the greatest needs, and the greatest risks, especially as they affect start-ups?

Robert Litan: Financial innovations have their virtues. Widespread securitization of mortgages and other instruments and the development of derivatives, for example, have allowed firms to hedge risks. But during the financial crisis we've suffered from dangerous innovation, just as we might in the world of medicine if an unsafe pharmaceutical product were widely distributed. The one thing that should be learned from the crisis is that not all innovation is constructive. We need an approach that allows markets to go ahead with new products, with the caveat that regulators can step in when necessary. ▲

Interview: a 'micro-investment' approach to innovation

Innovation is what happens when a person or group changes how people organize themselves, live their lives and see the world. So says John Wolpert, an ex-IBM executive and serial entrepreneur who runs Team upStart, a consultancy that helps big companies develop entrepreneurial talent and test new business opportunities.

Wolpert's career has focused on how to innovate in big companies – a task he calls “an ultimately unsolvable problem.” Mainly that's because innovation causes people to reorganize themselves in some way. Most people dislike change, and big corporations can be especially resistant to it, even if they like the way it sounds: the political costs of failure are just too great.

To break down this resistance, Wolpert frames the issue in terms of HR and people development. Although it can be useful to ask employees for suggestions and ideas (the core of many internal innovation programs), it is more powerful to give entrepreneurial employees the opportunity to prove the value of a new business idea. “You take a kid who wants to start a new business, give her a team of three and almost no money, and pair her with mentors both inside and outside the company,” Wolpert says. Employees are split into teams, housed together in an apartment to facilitate around-the-clock team development, and given 10 weeks to show “proof of concept” – to demonstrate that the idea works and should be pursued.

“If the project bears fruit, great,” says Wolpert. “If not, you still have employees who love the company because they got the chance to do something

entrepreneurial. For big companies, it's an approach that managers can embrace.” He has done this for several large companies, including retailer Best Buy, which ran four test projects last year. One project is being considered as a potential spin-out, while another has become a new business line called Best Buy Studio, a provider of web-design consulting for small businesses.

Breaking down boundaries

Innovation projects, especially those requiring large investments, can be a hard sell for companies these days. Many have become extra cautious as a result of the financial crisis and are taking longer to assess new venture opportunities. Not the best approach, says Wolpert, who believes companies should maintain or increase the speed at which they make their accept/reject decisions, while sharply reducing the time and money allocated to any given opportunity. “Focus on being small and fast. Give small project teams three months and less than US\$75,000 to demonstrate the next step. Then take the survivors to the next round, giving them six months and US\$500,000 to US\$1 million.” This micro-investment approach reduces risk levels and allows the company, in effect, to make more mistakes, eliminating what doesn't work so as to find out more quickly what does.

One key to micro-investment success is to make sure that no single individual or group monopolizes decision-making power. On any given day, one particular decision-maker may fail to see the value in what is actually a worthy project, so it's a good idea to have at least 10 different deciders. “You need an ecosystem of approval and funding,” says Wolpert.

Another approach that deserves more attention: cooperative innovation between two or more organizations. “We'll never have consistent, sustainable innovation in companies until we cross the boundaries between firms,” says Wolpert. Right now, innovation programs within a single company have an average lifespan of about five years, according to researchers, such as Henry Chesbrough at the University of California (Berkeley). They tend to get killed off or reorganized, often after the program's founder or internal champion leaves the company. Surprisingly, this sometimes happens even when a program is making money. “Innovation is tiring,” Wolpert says. “Ultimately there's a fatigue factor.”

That's particularly true in times of austerity. But linking two organizations together smooths out the boom-bust dynamic found within single companies. “What happens,” Wolpert asks, “when an innovation program is also the company's way of building deeper relationships with potential partners, stakeholders who can supply insights, resources and know-how? Decision-makers find it very difficult to close that point of access – whether or not they really 'get' the program's innovation agenda. We saw this at IBM with the alphaWorks program, which allows people outside the company to see and even collaborate on prototype technology IBM was developing. Eventually there were 350,000 people from other companies using the program each month. At some point they began providing valuable insight into what we had to do to get their firms excited about our potential new products. Shutting down alphaWorks would have been like tearing off your own arm.” ▲

The way forward

Research into innovation and entrepreneurship has produced a wealth of insight into the policies and programs that best promote and create innovative companies, societies and markets. Among these many insights are a few critical principles that private organizations, governments and business leaders around the world must heed if we are to revitalize our global economy:

- ▶ **Innovation often involves destruction, and an economic downturn can provide unexpected opportunities.** This insight is controversial, because industries with built-up capital investment, employees and other stakeholders will by definition respond to external innovation by focusing on what would be lost. Indeed, history is replete with examples of ideas, technologies and entire industries that are usurped – often with painful short-term consequences. Especially in periods of economic weakness, it is tempting to resist this natural process of creative destruction. Yet to resist it actively, through subsidies of failing or inefficient industries, may invite not only greater inefficiency and economic stagnation but also deter the innovation critical to long-term economic growth. Innovators depend on society's appetite for constant improvement. It's essential to not inhibit that process.
- ▶ **Don't choose future winners based on past performance.** Innovators are not machines – some of their best ideas may come after multiple failures. Past successes are no indication of future results. In any organization, it is tempting to open one's ears only to the innovation ideas of those who have succeeded in the past. But truly entrepreneurial leaders want to be challenged to prove themselves all over again. And remember: the market leaders of today are not necessarily the market leaders of tomorrow!
- ▶ **The larger the organization, the bigger the payoff will be for an innovative culture.** When a company or institution is young, fresh thinking is

encouraged. Later, as the business hits maturity, it tends to focus on managing growth rather than finding new sources for it. That's when leaders have to go the extra step to identify good ideas and to push them forward despite an absence of testing and data to back them up. Large companies and organizations have to work the hardest at building innovative cultures, but by doing so, they can build their competitive edge for generations. They can afford to spread their bets among more ideas, scale up successful ideas fast and support new ideas in ways small entrepreneurs only dream about.

- ▶ **Government policies that encourage entrepreneurship are most likely to result in increased innovation and resultant economic growth.** In times of economic weakness, the calls to raise up walls to capital, labor and goods get louder – and nothing could be worse for innovation than to heed those calls. Entrepreneurs in today's global economy depend on being able to find capital, production, talent and customers across borders. To deny them that capability is like denying them oxygen. The most innovative societies are often those with the most political freedoms.
- ▶ **Recognize and reward innovation.** It's difficult enough to conceive new business plans or technologies, secure funding, hire the right talent, build the right processes and see the plan through to market leadership. After all that, and given the likelihood of failure, we should offer regulations, a tax system and protections for intellectual and private property that are equal to our desire for more innovation. Too often entrepreneurs are castigated for succeeding in outsized ways. Yet behind each success are dozens, if not hundreds of failed attempts. And each success is the inspiration for some future innovation that will benefit all of society. ▲



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For more information, please contact
Katie Johnston, +1 201 872 7194
katie.johnston@ey.com

Editors: James Gaynor, Andrea Mackiewicz,
Rama Ramaswami
Researcher: Winter Wright
Creative Director: Cheryl Overby