



Why an Economic Crisis Could Be the Right Time for Companies to Engage in 'Disruptive Innovation'

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While globalization has witnessed the decline of U.S. dominance in manufacturing, energy and even finance, one thing had long been presumed unassailable: Good old American ingenuity.

Now it appears that's not safe, either. China, whose industries have been envied in the West more for their tenacity than their ingenuity, has established a multi-year framework to become more innovative and, therefore, competitive. So has Singapore. Finland is merging its top business school, design school and technology school to create a multi-disciplinary "university of innovation" next year.

Council members of the National Academy of Sciences and the National Academy of Engineering have "expressed concern that a weakening of science and technology in the United States would inevitably degrade its social and economic conditions and in particular erode the ability of its citizens to compete for high-quality jobs," according to a 600-page report from the National Academies published in 2007 and titled, "Rising Above the Gathering Storm."

The wild card these days is what will happen to innovation -- the advance of progressive ideas in science, technology and business -- now that the world economy is in a tailspin. The conventional wisdom might suggest that business, government and academia will be less willing to invest in the risk-taking and short-term costs that come with the territory of innovating.

Yet Paul J.H. Schoemaker, research director for the [Mack Center for Technological Innovation](#), suggests that, for some companies, the economic crisis can actually provide an innovation platform. "The crisis has multiple impacts," Schoemaker says. "Loss of revenue and profit will at first instill a cost cutting mentality, which is not good for innovation. But if the patient is bleeding you need to stop that first. Then, however, a phase starts where leaders ask which parts of their business model are weak (and perhaps unsustainable) and that, in turn, can lead to restructuring and reinvention."

He also cautions against too much caution -- over-reliance on incremental innovation versus transformative, or "disruptive," innovation. In innovation circles, the two have come to be differentiated as "little i" and "Big I" innovation. "The largest gains in business come from more daring innovations that challenge the paradigm and the organization," Schoemaker says.

The Business of Being Disruptive

While "disruptive innovation" has enjoyed office buzz-phrase status for only about a decade, the idea is quite old: Austrian economist Joseph Schumpeter had it in mind when he borrowed the phrase "creative destruction" to describe his theories of how entrepreneurs sustain the capitalist system.

So just how does an entrepreneur or business go about being "disruptive?" How does one convince investors or top brass of a radical idea's worth?

One person who knows something about bringing disruptive innovations to market is Jeong Kim, president of Bell Labs at Alcatel-Lucent and a successful tech entrepreneur. He offered some suggestions in a recent presentation titled, "Paving the Way for Disruptive Innovation," that was part of the [Executive Master's in Technology Management](#) (EMTM) program's ongoing lecture series: Aligning Emerging Technology and Business.

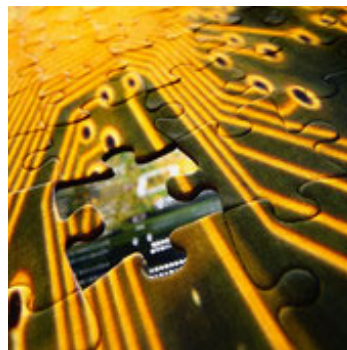
Among the most critical assets one can possess, he says, is company-wide recognition that disruptive innovation is actually important. In a company that's already successful -- or one with layers of bureaucracy that hinder new ideas -- this can prove difficult. The firm also must commit itself to research. "Disruptive research is absolutely critical, especially in the technology space."

Furthermore, it is not enough to simply have brilliant engineers. Without competent management on the business side, the most elegant technology can wind up on the scrap heap of business history, or even worse, usurped by a competitor: "Disruptive innovation is not sufficient," says Kim. "You can [cite] numerous examples of companies that came up with [new] technology but eventually were displaced by somebody else."

In the innovator's lingo, these "somebody else's" are known as "fast followers" -- that is, companies with better funding or sharper management who were able to exploit a technology more quickly and effectively in the marketplace than the original creator. "You like to be the first to develop technologies," Kim says. "But the more flexible, the more innovative in terms of business model that the company is, the longer you can maintain advantage."

That point gives rise to the question: What is the best business model for fostering innovation? As it turns out, numerous decision-making tools exist to help firms systematically manage an innovation program, says Schoemaker, co-author of a book titled, *Wharton on Managing Emerging Technologies*.

According to Schoemaker, when it comes to innovating, the analogy is to firing a shotgun, not a rifle. Given the high failure rate of innovative projects, companies are smart to develop an array of possible situations and contingencies, rather than pin all their hopes on one plan. "Sticking to our knitting" might appear to be a sound business cliché -- it worked for a lot of companies that survived the dot.com era. But Schoemaker and other innovation gurus advocate looking at areas adjacent to one's main business as fertile soil for innovative breakthroughs.



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Old-fashioned, linear approaches that rely on standard measurement schemes are often outdated if relied upon solely. "By examining a company's growth gap, developing scenarios, exploring adjacencies and venturing more into blue oceans, companies can reap greater benefits," Schoemaker says. ("Blue ocean" is innovator-speak for unrealized, and therefore uncontested, markets.) "The investment approach, however, has to emphasize more of an options and portfolio strategy rather than static NPV (Net Present Value valuation method)."

Wharton management professor [Mary Benner](#) sees the "stick to our knitting" syndrome as impinging on large companies' ability to react to competitive threats. "I find that firms' innovation into radically new technologies or new markets can seem to shareholders and securities analysts like too great a departure from their expectations for these firms. Investors and analysts often prefer that firms maximize shareholder value by 'sticking to their knitting.' The result is that large firms, particularly those expected to have stable, predictable earnings and dividend payments -- i.e., "income stocks" -- are not likely to be rewarded by the stock market for entering new technologies or undertaking radical innovation, and instead may be punished by reductions in stock price and market value."

A prime example she has found in her own research, she noted, is Verizon Communications, the giant telecommunications firm. Stock analysts questioned Verizon's large capital outlays on FiOS, a high-volume fiber-optic network intended to counter a "triple-play" threat to its business posed by Comcast's cable television, high-speed Internet and voice-over-Internet phone service.

"Recent research suggests the stock market is not good at valuing intangibles, uncertain innovation or technological change," Benner says. "What this means for large, publicly traded firms is that they may face a disadvantage in engaging in radical innovation, and this innovation may instead take place in venture capital-funded startups."

Indeed, outsourcing of innovation itself could turn out to be the wave of the not-so-distant future. "Particularly in the pharmaceutical area, there has been a focus on how firms acquire innovation that has been undertaken by small, privately funded firms such as biotech startups," Benner says. "It may be that the locus of much really radical innovation is shifting outside of the large organizations to small start-ups."

That points to a "big trend" emerging in product development, so called "Open Innovation," according to Wharton marketing professor [George S. Day](#), co-director of the Mack Center for Technological Innovation and co-author of *Wharton on Managing Emerging Technologies*. Open Innovation, also known as "crowdsourcing," entails collaborating with partners to solve business problems.

The archetype of that model is Waltham, Mass.-based InnoCentive. It matches corporate "seekers" who have science, engineering and business problems with amateur "solvers" worldwide. The "solvers" then compete -- for bragging rights and often token rewards -- to provide the best answers to the corporate problems. "Most companies are not looking for a big innovation they can knock out of the ballpark," Day says. Rather, they want a relatively quick fix for a specific piece of a larger puzzle.

For firms that want the "secret sauce" to always come from in-house, previous success can present a huge roadblock to innovation, according to Kim. The problem is that success creates a virtual construct, a paradigm of "How to Do Things," inside of which new thinking cannot flourish. Kim calls it "The Curse of Knowledge." Cross-discipline teaming "is one way of breaking the Curse of Knowledge," he says. Another is "experience pairing," or matching a senior employee with an individual who has considerably less experience, but a fresh perspective on how to solve problems.

An incredible opportunity to innovate disruptively lies in the problem of information overload, says Kim. Knowledge is being created at a far faster rate than any one human can ever hope to assimilate. The flip side is that we constantly filter out vast stores of data because we are bombarded with information like never before in history.

To prove his point, Kim showed audience members a movie clip that repeated an old psychology experiment. Two teams, one dressed in white, the other in black, dribbled basketballs and passed them back and forth. Audience members were told to count the number of passes made by the black-shirted players. A few of the students missed the person in the gorilla suit who nonchalantly walked through the middle of the scene, because they were not looking for it. "I can assure you that all of you saw the gorilla. But some people processed it, stored it, some people missed it. You were looking for a particular thing."

Seven Hours of Whitewater Rafting

The term "disruptive technology" went viral in the late 1990s after the release of Harvard Business School professor Clayton Christensen's book, *The Innovator's Dilemma*. But in practice, Bell Laboratories has served as an incubator of paradigm-shifting, "disruptive" innovations since its creation in 1925 as a joint venture of AT&T and Western Electric.

Researchers at northern New Jersey-based Bell Labs have won six Nobel Prizes and take credit for an inventory of innovations: The photovoltaic cell, the silicon-based transistor, statistical process control, the UNIX operating system, the C programming language, digital cell phone technology and wireless local area networks are just a few of the better-recognized innovations that have taken shape there.

Today, Kim said, Bell Labs researchers are working on similarly ground-breaking technologies. They are developing, for instance, a liquid sensor that can be transformed to any shape by applying voltage -- Kim envisions it being used as a zoomable lens. The division is also using nanotechnology to create 3-D images. "You have seen, in science fiction movies, 3-D holographic movie images? It can be done. It can be done using these technologies today. It's just not very cost effective."

Kim offered a case study from Alcatel-Lucent -- Lucent Technologies at the time -- on how to inject a spirit of disruptive innovation into an existing and stagnant culture. Lucent's optical networking division was severely underperforming and the company fired the unit's top managers. "I was really convinced that the reason I was put in there was that nobody else would do it, and they needed somebody to blame," says Kim.

The division was moribund: Financial results were disappointing and morale was low. Kim shook up the management team and took the survivors to an off-site retreat that featured whitewater rafting. "First thing they do is say, 'Why are we doing this ...?' After a while, they get really bored." The exercise, intended to foster teamwork and cooperation, was designed with the help of a psychologist. Instead of cooperating, the managers began splashing one another with their oars, "like little kids."

But the exercise-psychology experiment wasn't over at the end of the rafting run. "After six or seven hours of whitewater rafting like this, they were tired." That evening over dinner, people let their "at-work" guardedness down and spent time learning about one another.

The next day included all the off-site strategizing and white board sessions one might expect, but Kim says the interaction was more genuine and productive than if they had met as they were previously, a grouping of near strangers. In the first quarter following that meeting, he says, the group posted revenues of \$510 million, \$560 million the next quarter, then \$730 million, then \$970 million. The point, he adds, is that "teamwork is so critical for the success of a company."

Kim's advice for jumpstarting disruptive innovation is not exactly revolutionary, though it can seem exceedingly rare when many companies still think quarter-to-quarter and employees take a similarly short-ranged view.

Not even storied Bell Labs, it seems, is immune from the pressure to produce quickly exploitable technology. In a shock to the science world, Alcatel-Lucent all but shuttered its funding for the Lab's basic physics research over the summer. Company officials said the move was done to align the Lab more closely with the parent company's commercial pursuits in wireless, optics, networking and computer science. Or, as Alcatel-Lucent spokesman Peter Benedict told *Wired* Magazine in August, "In the new innovation model, research needs to keep addressing the needs of the mother company."

Basic research investigates the most fundamental of scientific questions and has no direct commercial application. At the same time, it has laid the groundwork for most of the modern technological conveniences we enjoy today, including commercial aviation, the GPS system and lasers.

"You have to make an investment in capital, human knowledge and networking," says Kim. "That's the way to get ahead."

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