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Why Companies Should Have Open Business Models

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Using outside technologies to develop products and licensing internal intellectual property to external parties will carry a company only so far. The next frontier in innovation is to open the business model itself.

Henry W. Chesbrough

Innovation is becoming an increasingly open process thanks to a growing division of labor. One company develops a novel idea but does not bring it to market. Instead, the company decides to partner with or sell the idea to another party, which then commercializes it. To get the most out of this new system of innovation, companies must open their business models by actively searching for and exploiting outside ideas and by allowing unused internal technologies to flow to the outside, where other firms can unlock their latent economic potential.

Let's be clear about what is meant by the term *business model*. In essence, a business model performs two important functions: It creates value, and it captures a portion of that value. The first function requires the defining of a series of activities (from raw materials through to the final customer) that will yield a new product or service, with value being added throughout the various activities. The second function requires the establishing of a unique resource, asset or position within that series of activities in which the firm enjoys a competitive advantage.

Open business models enable an organization to be more effective in creating as well as capturing value. They help create value by leveraging many more ideas because of their inclusion of a variety of external concepts. They also allow greater value capture by utilizing a firm's key asset, resource or position not only in that organization's own operations but also in other companies' businesses.

To appreciate the potential of this new approach, consider the following names: Qualcomm Inc., the maker of cellular phone technology; Genzyme Corp., a biotechnology company; The Procter & Gamble Co., a consumer products corporation; and *Chicago*, the musical stage show and movie. This assortment might appear to be random, but they all have something in common: Each required an open business model in which an idea traveled from invention to commercialization through at least two different companies, with the different parties involved dividing the work of innovation. Through the process, ideas and technologies were bought, sold, licensed or otherwise transferred, changing hands at least once in their journey to market.

Qualcomm used to make its own cell phones and base stations but ceased doing so years ago.[1] Now others manufacture those products, and Qualcomm just makes chips and sells licenses to its technologies, period. In fact, every phone that uses its technology is sold by a

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customer of Qualcomm, not by the company itself.

Genzyme licenses technology from the outside and then develops it in-house. The company has turned these external ideas into an array of novel therapies that deliver important cures for previously untreatable rare diseases. It has also built an impressive financial record in an industry in which profits have been difficult to achieve.[2]

Procter & Gamble has rejuvenated its growth through a program called Connect and Develop, which licenses or acquires products from other companies and brings them to market as P&G brands. With early successes like the Crest SpinBrush, Olay Regenerist and Swiffer Dusters, P&G now actively seeks external ideas and technologies through an extensive network of scouts.

Chicago, the often-revived musical, emerged out of a creative extension of a play written decades ago that had gone out of print.[3] Others saw the latent value within the work and revived it multiple times to yield a prize-winning show. And each time the show was revived, it was done by a different owner. A recent revival turned into an Academy Award-winning movie in 2002.

If these ideas were so valuable, then the obvious question is: Why didn't the original owners figure out the best way to take them to market on their own? The answer goes to the very heart of why markets for innovation are so important. Different companies possess different assets, resources and market positions, and each has a unique history.[4] Because of that, companies look at opportunities differently. They will quickly recognize ideas that fit the pattern that has proven successful for them in the past, but they will struggle with concepts that require an unfamiliar configuration of assets, resources and positions. With innovation markets, ideas can flow out of places where they do not fit and find homes in companies where they do.

Innovation Inefficiencies

In many industries, markets for innovation have existed for a long time. In the chemical industry, for instance, compounds have often moved from one company to another.[5] Historically, though, such markets have been highly inefficient. Even now, much of the exchange of technology and its associated intellectual property occurs through a cottage industry of brokers and patent attorneys. Although transactions do occur, the price and other terms of the transactions are difficult to discern. This makes it difficult to determine the overall size of activity and to know what the fair price is for a particular technology.

And, of course, in highly inefficient markets a good deal of potentially valuable trade in innovation does *not* occur. The costs are so high and the potential value so difficult to perceive that innovation often sits "on the shelf," unused. One way to quantify this waste is to look at a company's patent utilization rate — the number of patents that the firm uses in its business divided by the total number of patents that it owns. In an informal survey, I have found that companies utilize less than half of their patented technologies in at least one of their businesses. The range I've heard is between 5% and 25%. Thus, in my admittedly unscientific sampling, somewhere between 75% and 95% of patented technologies are simply dormant.

Rising Costs, Shorter Times

An important factor spurring the process of open innovation is the rising cost of technology development in many industries.

Case in point: the soaring cost of building a semiconductor fabrication facility, or "fab." In 2006, Intel Corp. announced two new fabs, one in Arizona and the other in Israel. Each was estimated to cost more than $3 billion. Just 20 years ago, a new fab would have cost about 1% of that. Another example is pharmaceutical drug development. Investment in a successful product has risen to well over $800 million, up more than ten-fold from just a decade earlier. Even the consumer products industry is feeling the pressure. P&G estimates that its Always brand of feminine hygiene pads, which cost $10 million to develop a decade ago, would set the company back anywhere from $20 million to $50 million today, according to Jeff Weedman, who is responsible for external business development at P&G.

The rising costs of technology development would imply that only the big will get bigger, with everyone else falling behind. But there's a second force at play: the shortening life cycles of new products. In the computer industry during the early 1980s, for example, hard disk drives would typically ship for four to six years, after which a new and better product became available. By the late 1980s, the expected shipping life had fallen to two to three years. By the 1990s, it was just six to nine months.

In pharmaceuticals, the expected shipping life of new drugs while they enjoy patent protection has shortened because of longer testing procedures and quicker entry by manufacturers of generics. And in the largest market segments, successful drugs must often contend with a number of rival products. For example, at least five statin prescription drugs are currently being sold, all of them aimed at addressing elevated cholesterol levels and heart disease.

As a result of both trends — rising development costs and shorter product life cycles — companies are finding it increasingly difficult to justify investments in innovation. (See "The Economic Pressures on Innovation.") Open business models address both effects. It attacks the cost side of the problem by leveraging external research-and-development resources to save time and money in the innovation process. Consider P&G's [6] Pringles Print initiative, through which the company now offers Pringles with pictures and words printed on each chip. To bring that product to market, P&G found and adapted an ink jet technology that a bakery in Bologna, Italy, used to print messages on cakes and cookies. P&G developed Pringles Print at a fraction of the cost and brought it to market in half the time than it would have taken had the company done all the work internally.

Open business models also attack the revenue side. P&G, for instance, is creating new brands by licensing technologies from other companies around the world, resulting in products like the SpinBrush, a battery-operated toothbrush, which generated first-year sales of $200 million. And P&G is also getting money from licensing its technologies to other firms.

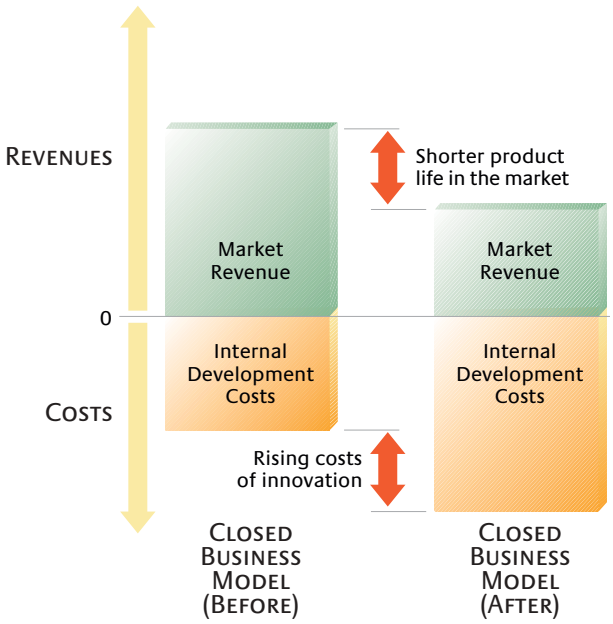
The combination of leveraged cost and time savings with new revenue opportunities confers powerful advantages for companies willing to open their business models. (See "The New Business Model of Open Innovation," p. 27.) The development costs of innovation are reduced by the greater use of external technology in a firm's own R&D process. This saves time as well as money. And the firm no longer restricts itself to the markets it serves directly. Now it participates in other segments through licensing fees, joint ventures and spinoffs, among other means. These different streams of income create more overall revenue from the innovation. The result is that innovation becomes economically attractive again, even in a world of shorter product life cycles.

Open Experiments

What can companies do to partake more fully in the benefits of open innovation? The short answer is that they need to develop the ability to experiment with their business models. Developing that capability requires the creation of processes for conducting experiments and for assessing their results. Although that might seem obvious, many companies simply do not have such processes in place. In most organizations, no single person short of the chief executive officer bears responsibility for the business model. Instead, business unit managers

The Economic Pressures on Innovation

The left bar shows expected revenues far in excess of development costs. But as development costs rise and as product life cycles become shorter, the net result (right bar) is that companies are finding it harder to justify their innovation investment.



In the past, IBM's semiconductor copper-on-insulator process technology would have likely been kept under wraps. But with the company's new approach to IP, the technology has been widely — and profitably — licensed.

(who are usually posted to their jobs for just two to three years) tend to take the business model for granted. For them, running risky experiments in which the payoffs may not emerge for three or more years is not a high priority.

Companies also face certain constraints. Many firms, for example, are understandably hesitant to launch experiments that might risk the reputation of an established brand. The same is true for companies with respect to their distribution channels, manufacturing strategies and so on. But some companies have developed tactics to work around such limitations. Consider, for instance, a food manufacturer that is exploring ways to provide healthier but shelf-stable foods and snacks in high school vending machines. To experiment with different products without risking any damage to its consumer brand, the manufacturer has created a "white box" brand that is not advertised, is not supported and has no obvious connection to the company. Similarly, Google Inc., the online search company, has established a separate Web site (www.SearchMash.com) that allows the firm to get consumer feedback on new approaches to user interfaces. Other ways of exploring are through spinning off companies or investing in startups. By observing how well a small organization does with a particular business model, a company can obtain much useful information about the viability of that model.

How Three Companies Do It

To understand how an organization can open its business model, consider the recent efforts of IBM, P&G and Air Products and Chemicals, three companies that operate in different industries with vastly different technologies and products. Each used to function with a very internally focused, closed business model. And each has since migrated to a business model that is substantially more open.

IBM Much has been written about the arrival of Lou Gerstner, former CEO at IBM, and the subsequent changes to the company's business model under his direction.[7] But the journey that IBM took to get to its new business model has not been widely reported. In the beginning of its transformation, IBM shrank its bloated overhead structure and staunched the company's financial bleeding by implementing a massive layoff and write-off of corporate assets. After that radical, short-term surgery, groups within IBM began to search fervently for new revenue sources.

In the semiconductor business, one experiment was to offer IBM's own semiconductor lines as a foundry for other companies' products. For example, chips from Transmeta Corp. of Santa Clara, California, were launched at IBM. In addition, IBM established a research alliance with Toshiba Corp., Chartered Semiconductor Manufacturing Ltd. of Singapore and other firms to share the high costs and significant risks of developing leading-edge semiconductor processes. Now IBM breaks even (or even makes a little money) in an area where the company had been losing tens of millions of dollars each year.[8]

IBM also rethought its whole approach to managing intellectual property, especially with respect to patents and technology. Shifting from a defensive approach (focused on preventing the leakage of IP) to an offensive one (focused on licensing IP to outside parties), the company was able to generate significant new revenues. Case in point: IBM's semiconductor copper-on-insulator process technology, which provides higher-speed circuitry with greater manufacturing reliability. In the past, this technology would have likely been kept under wraps at IBM. But with the company's new approach to IP, it has been widely — and profitably — licensed to companies such as Intel, Motorola (now Freescale Semiconductor of Austin, Texas) and Texas Instruments.

Other experiments were being conducted in the software area. In the 1990s, IBM had been losing market share to UNIX (controlled by The Open Group) and Microsoft Windows NT operating systems, and the company was aware that these products had key strategic importance in determining the direction of new technologies and architectures for enterprise computing. And enterprise computing was IBM's bread and butter.

It was in this context that some IBM programmers and managers were evaluating the Linux operating system. Linux by itself would hardly solve IBM's revenue problems. (Because the code base was available to anyone basically for free, it lacked the ability to generate income for IBM the way that Windows NT had done for Microsoft.) But Linux did offer IBM a way to cut development costs while still maintaining some control over the operating system. IBM now spends about $100 million on Linux development each year, just a fraction of what it used to spend on a proprietary operating system.[9] (The rest of the more than $800 million needed to develop and maintain Linux for commercial purposes comes from other companies involved in the Open Source Development Labs.)

Through SpinBrush and similar deals, P&G was able to tap into cost-effective means for spurring innovation. According to vice president Larry Huston, the goal was to double innovation capacity at no increase in costs.

As a testament to IBM's commitment to open innovation, the company recently donated 500 of its software patents to the open source community. The intent was to increase the "intellectual commons" available for the further development of open source software. The donation will likely be followed by additional ones from IBM and has already elicited copycat gifts from Computer Associates of Islandia, New York, and Sun Microsystems Inc. On a related note, Nokia Corp. of Finland has announced that it will not enforce its patents against open source developers.

P&G In the late 1990s, Durk Jager, the CEO of P&G, started a number of initiatives designed to restore the company's growth. Although many of them were helpful in rethinking P&G's business, they created significant disruptions in the day-to-day running of the company and also took time to bear fruit. To make matters worse, P&G's existing businesses began to slip. During 1999 and the first part of 2000, the company missed a number of consecutive quarterly earnings forecasts, causing its stock to plunge from more than $110 per share to half that amount in less than half a year. On June 8, 2000, Jager departed and A.G. Lafley, who was running P&G's North American beauty care business, was brought in to replace him.

Lafley worked with Gil Cloyd, P&G's chief technology officer, to get the company to accelerate its growth by opening its innovation process to external sources of technology. Under the Connect and Develop initiative, Lafley proclaimed that in five years P&G would receive half of its ideas from the outside and, to achieve that ambitious target, he formed an R&D team under the leadership of Larry Huston, the vice president of R&D innovation and knowledge. The SpinBrush toothbrush was an early success from that initiative. Technology scouts at P&G had learned about the SpinBrush technology and convinced the company to acquire it from Dr. Johns Products Ltd., a Cleveland start-up.

Through SpinBrush and other similar deals, P&G was able to tap into a cost-effective means of spurring its innovation activities. According to Huston,[10] "I set a goal with my boss to double our innovation capacity at no increase in costs." At the start of that initiative, P&G had roughly 8,200 people working on innovations: 7,500 inside the company, 400 with suppliers and around 300 external people. Now, according to Huston, P&G has increased that number to about 16,500. "We still have 7,500 internally," says Huston, "but now we have 2,000 with suppliers and 7,000 virtual and extended partners."

Air Products and Chemicals Many of Air Products' offerings are mature industrial chemicals, yet this $7.4 billion company has quietly refashioned itself into a leader in innovation. The primary impetus for that transformation was a proposed merger in which Air Products and a competitor, L'Air Liquide S.A. of France, were jointly planning to acquire British Oxygen, formally known as The BOC Group. But, as it turned out, the deal fell through. Air Products realized, though, that it didn't need the merger to implement some new ideas for a novel way to innovate and compete.

To that end, John Tao, a 30-year veteran of Air Products, began to change the company's approach to licensing its technology. At first, he simply asked the CEO for six months to benchmark how other firms were managing their intellectual assets so that he could develop an out-licensing program for Air Products. Tao had a reason for starting small. "I didn't ask for large amounts of money on purpose," he explains. "I thought that if I requested a lot of money before we knew what we were doing, I would be [making] the program … an easy target for some future cost-cutting meeting." Fortunately, Tao was able to score some early successes, including the licensing of a burner technology for reducing nitrous oxide emissions from industrial combustion.

Air Products has also changed its process for developing technologies for its own business. It has shifted from doing all the research and commercialization activity in-house to a model in which the company partners with others. An example of that is Air Products' approach to nanotechnology, in which the company has developed powerful ways to manipulate nanoscale particles in different materials. But instead of commercializing these technologies on its own, the company has partnered with the E.I. duPont de Nemours Co. and a small German firm, Nanogate Technologies. According to Martha Collins, technology director for Air Products, "The keys to successful nano projects are alliances and partnerships in the spirit of open innovation."[11]

Managerial Implications

Each of the three companies began the journey toward a more open business model with a shock or challenge to the status quo. For IBM, the shock was so severe that the company was nearly broken up. In the case of P&G, its stock had fallen in half and a new CEO

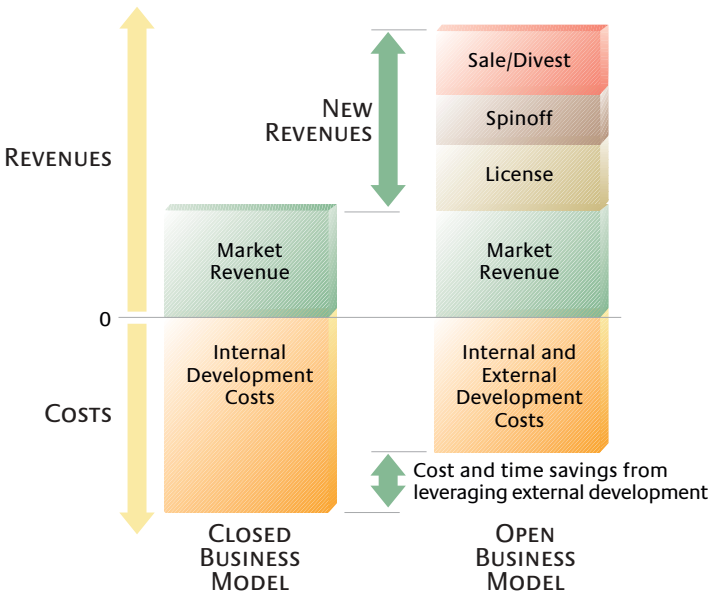
had been brought in. Air Products did not face the brutal financial adjustments that IBM and P&G did, but a potential merger triggered a deep self-examination of how the company did business.

Generally speaking, making fundamental changes to a company's business model requires clear commitment and support from the top. P&G is the prime example here, as CEO Lafley strongly and explicitly endorsed the Connect and Develop approach to innovation. Lacking that kind of support, the Air Products approach of starting small provides a subtler way to effect change. Either way, the important thing is to build and maintain momentum by continually supplying evidence that supports the transformation and shows that the company is heading in the right direction. This requires repeated experimentation in which the firm pursues new sources of revenue and business value and collects critical information from the market about the potential value of those ideas and technologies. The results then bolster the shift toward the new approach. At P&G, for example, the early successes of the SpinBrush and Swiffer products provided ample proof within the company that Connect and Develop could generate strong bottom-line results.

Of course, experimentation only yields value when a company is able (and willing) to act on the information that the experiments generate. Larry Huston's early success at P&G with insourcing external products showed that there was money to be made, but it was Gil Cloyd and A.G. Lafley who realized that this new logic could transform P&G's business model and boost its overall growth rate.[12] Air Products' experience to date is helping the company to rethink how it might finance the high fixed capital investments needed in the industrial chemicals business. As Gus Orphanides, director of licensing at Air Products, explains, "We used to be a huge [capital expenditure] company, perhaps spending $1 billion a year for a $6 billion company. We started to ask ourselves, 'Are we getting enough of a return on our shareholders' capital?' " Today, Air Products is actively seeking creative ways to share those costs with other firms.

The New Business Model of Open Innovation

To offset the trends of rising development costs and shorter product life cycles (left bar), companies must experiment with creative ways to open their business models by using outside ideas and technologies in internal product development and by allowing inside intellectual property to be commercialized externally (right bar).



Making the Transition

When building a new business model, companies must figure out what to do with their existing model. Praising a new business model can inadvertently suggest that the current one is somehow obsolete. But the traditional business model can continue to play an important role. P&G, for instance, still develops its own brands and invests substantially in its internal technologies.

Managing the coexistence of a new business model alongside an existing one can be tricky. Indeed, when Durk Jager of P&G tried to push too many change initiatives at once, P&G did begin to transform itself but lost the operational discipline to deliver the quarterly earnings numbers that investors expected. Nevertheless, as successful experiments begin to point the way toward a new and more effective business model, the company must undergo a final phase in its transformation. In this stage, the firm will scale up the model, bringing it into high volume across the organization and its customers. The process entails at least two essential elements.

First, the business model must be adjusted or rebuilt to handle significant volume. Many business models that work well when only a small number of highly trained people are involved can easily break down when new layers of administration are needed to manage a much larger number of more general workers. If certain processes cannot be automated or standardized, the model may not be able to handle large increases in activity without resulting in a severe degradation of quality. IBM faces this concern in its global consulting business. The skills of its services personnel differ from those of its product and technology people, and IBM now needs many more of the former (specifically, people who can translate customer IT requirements into specific solutions from IBM) and fewer of the latter (device physicists and polymer chemists).

Second, the business model must obtain "buy in" from important constituencies before being rolled out across the company. Scaling up a business model requires

much more funding and far greater organizational commitment than a small experiment does, and those resources must come from somewhere. This often creates "losers" in the organization — groups whose budgets are cut to free up resources to support the new business model. Because of that, the scaling-up process can encounter tremendous internal resistance. That's why John Tao's approach of starting small at Air Products made so much sense. The initial program required few resources and minimal management attention, thus it triggered little conflict with other parts of the organization. Of course, as the program continued to expand, it led to greater competition for resources. Now, though, Tao's efforts have an established history of bringing in new revenues, which have been shared with the associated business units. This additional income has minimized any internal resistance because there's now a bigger pie to share, and Tao's proven track record has given him more clout in the discussions over how to divide that pie.

MANY ORGANIZATIONS HAVE ENCOUNTERED the type of upheaval that IBM, P&G and Air Products faced, but few have engaged in the breadth of experimentation that those companies did as they searched for a new business model.[13] Indeed, it takes courage and vision to try out new ideas during a time of financial difficulty. Yet absent such experiments, companies could easily fall into a cycle of slowing revenues, leading to head count and expense reductions, which trigger further business declines, resulting in still more cuts. One need only look at Ford Motor Co. and General Motors Corp. in the automotive industry — companies whose market shares have been in a slow, inexorable retreat since the oil shocks of the 1970s — to see this vicious cycle in action.[14] The alternative solution of opening up a company's business model may not be easy, but if diligently pursued, it provides a potential pathway to greater innovation activity and increased growth.

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1. See D. Mock, "The Qualcomm Equation: How a Fledgling Telecom Company Forged a New Path to Big Profits and Market Dominance" (New York: Amacom, 2005) for a very helpful, in-depth study of the company. Mock had access to key leaders in the company, including those who were there at the beginning and have since retired.

2. A very recent book — G.P. Pisano, "Science Business: The Promise, the Reality, and the Future of Biotech" (Boston: Harvard Business School Press, 2006) — shows that the biotechnology industry in which Genzyme participates has had very few companies that could make a profit. Genzyme is one of only three companies (the others being Amgen Inc. of Thousand Oaks, California, and Genentech Inc. of San Francisco) out of more than 100 biotech firms that have demonstrated the ability to sustain profits in this treacherously difficult industry.

3. The story behind *Chicago* originated with Maurine Dallas Watkins, a Chicago-based journalist who covered the crime beat in that city when the murder of Walter Law occurred. Watkins reported the subsequent trial and afterwards she wrote a play, *Chicago,* about those events. The play was performed on Broadway in 1926 and made into a silent movie in 1927. It was revived by Bob Fosse in 1975 and revived again by Harvey Weinstein in 1997. The 2002 movie version of *Chicago* won six Academy Awards. Sources: Wikipedia, http://en.wikipedia.org/wiki/Maurine_Dallas_Watkins (last accessed April 26, 2006) and interview with Richard Kromka, Silicon Ventures investor event, Santa Clara, California, March 16, 2004.

4. The ideas in this paragraph are inspired by D. Teece, G. Pisano and A. Shuen, "Dynamic Capabilities and Strategic Management," Strategic Management Journal 18, no. 7 (1997): 509-533. This article is both a critique of academic scholarship into business strategy and a presentation of a concept called *dynamic capabilities* that describes how firms adapt their strategies to changing markets and technologies.

5. A. Arora, A. Fosfuri and A. Gambardella, "Markets for Technology: The Economics of Innovation and Corporate Strategy" (Cambridge, Massachusetts: MIT Press, 2001).

6. L. Huston and N. Sakkab, "Connect and Develop: Inside Procter & Gamble's New Model for Innovation," Harvard Business Review 84, no. 3 (March 2006): 58-66. This article provides an in-depth look at P&G's innovation process, with some tantalizing anecdotal evidence of business results.

7. Gerstner's own account of his years at IBM can be found in L.V. Gerstner, Jr., "Who Says Elephants Can't Dance?: Inside IBM's Historic Turnaround" (New York: HarperCollins, 2002).

8. Interview with Joel Cawley, IBM vice president of corporate strategy, at his office in Armonk, New York, on October 7, 2005.

9. Ibid.

10. Larry Huston's remarks were made in a talk he delivered at the Mack Technology Center at The Wharton School, the University of Pennsylvania, on May 14, 2004.

11. Collins' quote and the information on nanotechnology at Air Products are taken from J. Teresko, "From Confusion to Action," Industry Week (Sept. 1, 2005) available at www.industryweek.com/ArticleID=10650.

12. Other people at Procter & Gamble who deserve credit for this insight include Nabil Sakkab, who preceded Gil Cloyd as P&G's CTO, and Durk Jager, who preceded A.G. Lafley as CEO.

13. It is ironic but true that companies blessed with significant internal R&D capabilities that routinely conduct tremendously complex experiments running into many millions of dollars have little or no capability of conducting even simple experiments on the business model that supports that internal R&D. A great introduction to these issues is contained in S.H. Thomke, "Experimentation Matters: Unlocking the Potential of New Technologies for Innovation" (Boston: Harvard Business School Press, 2003). If companies became more capable of experimentation with their business models on a routine basis, there would be less need for a crisis to trigger the experiments that companies like IBM or P&G made.

14. Although both Ford and General Motors have been creative in developing sales incentives (such as employee pricing, zero-percent financing, Keep America Rolling and so on) or long-term research projects (including hydrogen vehicles), neither company seems to be any stronger relative to its competitors, even after many years of cost-cutting. The companies' market shares have declined dramatically, and Toyota is poised to become the largest automotive company in the world in 2008. There was a reprieve during the 1990s, thanks to the innovations of the sport utility vehicle and the minivan, which temporarily boosted United States manufacturers' margins and sales. But these innovations were soon copied, and the underlying weaknesses of the United States auto industry were again exposed. As of this writing, it is likely that the financial condition of these mainstays of United States industrial strength will weaken much further before any lasting improvement is made.

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