# MITSloan
## Management Review

## SLOANSELECT COLLECTION

### WINTER 2011

# Top 10 Lessons on the New Business of Innovation

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## Top 10 Lessons on the New Business of Innovation

**Myth # 2: Build It and They Will Come … The U.K.-based soccer club Ebbsfleet United was bought and run in 2007 by a Web community of 30,000. But by 2010 its paying membership had dwindled to just 800.**

# The 5 Myths of Innovation

Nowadays, goes the theory, innovation is supposed to be done constantly, by everyone in the company, improving everything the company is about — and new Web-based tools are here to help it happen. Is the theory right? Or do the experiences of companies reveal something different?

**BY JULIAN BIRKINSHAW, CYRIL BOUQUET AND J.-L. BARSOUX**

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**THE LEADING QUESTION**
What conventional wisdom about innovation no longer applies?

**FINDINGS**

▶ Online forums are not a panacea for innovation.

▶ Innovation shouldn't always be "open." Internal and external experts should be used for very different problems.

▶ Innovation must be bottom-up *and* top-down — in an approach that's balanced.

HISTORICALLY, MOST MANAGERS equated innovation primarily with the development of new products and new technologies. But increasingly, innovation is seen as applying to the development of new service offerings, business models, pricing plans and routes to market, as well as new management practices. There is now a greater recognition that novel ideas can transform any part of the value chain — and that products and services represent just the tip of the innovation iceberg.[1]

This shift of focus has implications for who "owns" innovation. It used to be the preserve of a select band of employees — be they designers, engineers or scientists — whose responsibility it was to generate and pursue new ideas, often in a separate location. But increasingly, innovation has come to be seen as the responsibility of the entire organization. For many large companies, in fact, the new imperative is to view innovation as an "all the time, everywhere" capability that harnesses the skills and imagination of employees at all levels.[2]

Making innovation everyone's job is intuitively appealing but very hard to achieve. Many companies have put in place suggestions, schemes, ideation programs, venturing units and online forums. (See "A Glossary of Established Drivers of Innovation," p. 45.) However, the success rate of such ap-

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proaches is mixed. Employees face capacity, time and motivation issues around their participation. There is often a lack of follow-through in well-intentioned schemes. And there is typically some level of disconnect between the priorities of those at the top and the efforts of those lower down in the organization.

Moreover, Web-based tools for capturing and developing ideas have not yet delivered on their promise: A recent McKinsey survey revealed that the number of respondents who are satisfied overall with the Web 2.0 tools (21%) is slightly outweighed by the number who voice clear dissatisfaction (22%).[3]

To understand these challenges, and to identify the innovation practices that work, we spent three years studying the process of innovation in 13 global companies. (See "About the Research.") All of these companies embarked on often-lengthy journeys aimed at making themselves more consistently and sustainably innovative. All sought to engage their employees in the process, and all made use of online tools to facilitate and improve the quality and quantity of ideas. Our research allowed us to confirm many of the standard arguments for how to encourage innovation in large organizations, but we also uncovered some surprising findings. (See "Questions That Work — and Don't — in Online Innovation Forums," p. 47 for a summary.) In this article we focus on the key insights that emerged from our research, organized around five persistent "myths" that continue to haunt the innovation efforts of many companies.

## Myth # 1. The Eureka Moment

For many people, it is still the sudden flash of insight — think Archimedes in his bath or Newton below the apple tree — that defines the process of innovation. According to this view, companies need to hire a bunch of insightful and contrarian thinkers, and provide them with a fertile environment, and lots of time and space, to come up with bright ideas.

Alas, the truth is far more prosaic. It is often said that innovation is 5% inspiration and 95% perspiration, and our research bears this out. If you think of innovation as a chain of linked activities — from generating new ideas through to commercializing them successfully — it is the latter stages of the process where ideas are being worked up and developed

in detail that are the most time consuming.[4] Moreover, it is also the latter stages where problems occur. We recently conducted a survey in 123 companies, asking managers to evaluate how effective they were at each stage in the innovation value chain. On average, they indicated that they were relatively good at generating new ideas (either from inside or outside the boundaries of the company), but their performance dropped for every successive stage of the chain. (See "Which Parts of the Innovation Value Chain Are Companies Good At?" p. 48) We are not suggesting that generating ideas is unimportant. But that is not where most companies struggle. Most companies are sufficiently good at generating ideas; the "bottleneck" in the innovation process actually occurs a lot further down the pipeline.

The eureka myth helps explains why so many companies are drawn to big brainstorming events, with names such as ideation workshops and innovation jams.[5] In the course of our research we saw many different types of brainstorming events, and indeed we helped several of the sample companies to put them on. Such events are always valuable: They help to focus the efforts of a large number of people, they generate excitement and interest and they generate some useful ideas.

But even with all these benefits, it's not clear that ideation workshops are the right way to build companywide innovation capability. As an analogy, think of the role that big musical festivals like Live Aid play in the alleviation of poverty. These big events are terrific for raising awareness and money on a one-time basis, but the process of poverty alleviation takes years of hard effort on the part of aid organizations, and the outcomes are achieved long after the memory of the big event has faded. The involvement of the general public in aid work usually ends with the check we write to Live Aid; but for the aid organization receiving the money, that is where the real work starts.

Our research showed that most companies fail to think through the consequences of putting on ideation workshops. The first problem is that they underestimate the amount of work that is needed after the workshop is completed. IBM's 2006 online Innovation Jam, described in more detail below, required a team of 60 researchers to sort through the 30,000 posts received over a 72-hour period. UBS Investment

Bank's Idea Exchange, while conducted on a smaller scale, also involved a great deal of post-event work. As one UBS manager observed: "Preliminary sorting, then scoring and giving feedback on such a large number of ideas took a huge amount of time and effort by category owners and subject matter experts. The ideas coming through were good, but if we are to do it again we need a repeatable, dashboard-style reporting system for quantifying results and keeping the momentum going."

The second, and more insidious, problem with ideation workshops is that they can actually be disempowering if the organization lacks the capacity to act on the ideas generated. We heard quite a few grumbles during the research from individuals who had put forward their bright ideas through a workshop or online forum, but received no response — not even an acknowledgment. If the "funnel" is constricted further down, at the point where ideas get assessed and developed, stuffing new ideas at the top is simply going to exacerbate the problem.

So what should you do? First, be very clear what problem you are trying to solve, and put on an ideation workshop only if you believe that it is a lack of ideas that is holding you back. Second, if you believe that an ideation workshop is the right approach, be prepared to invest a lot of time and effort into the follow-up work. It is sobering to note that successful innovation programs typically take many years to bear fruit: Procter & Gamble's Connect + Develop initiative was piloted and developed over a 10-year period, while Royal Dutch Shell's Gamechanger initiative took more than five years to yield benefits. Alas, many companies lack the continuity in leadership needed to make this type of long-term commitment.

**Takeaway:** Most innovation efforts fail not because of a lack of bright ideas, but because of a lack of careful and thoughtful follow-up. Smart companies know where the weakest links in their entire innovation value chain are, and they invest time in correcting those weaknesses rather than further reinforcing their strengths.

## Myth # 2. Build It and They Will Come

The emergence of second-generation Internet technologies ("Web 2.0") has had a dramatic im-

### A GLOSSARY OF ESTABLISHED DRIVERS OF INNOVATION

There is a growing body of work on the leading-edge practices in innovation management. Consultants and scholars concur on a number of proven conditions that contribute to sustained innovation.[i] These include:

**Shared understanding:** Sustained innovation is a collective endeavor built on a shared sense of what the company is becoming — and what it is *not* becoming. It is also about creating a culture to support innovation — for example, by destigmatizing failure and celebrating successes.

**Alignment:** Besides promoting values that support innovation, organizations also have to address structural impediments (such as silos) and realign contradictory systems and processes. As the group head of innovation in one company told us, "We needed to create an environment where it was 'safe to experiment'; where it was possible to 'pilot' and 'test' ideas before they were subjected to our stringent performance metrics."

**Tools:** Employees need the training, concepts and techniques to innovate. In the memorable words of a decision support manager at 3M, "It doesn't work to urge people to think outside the box without giving them the tools to climb out."[ii]

**Diversity:** Innovation requires a degree of friction. Bringing in outsiders — new hires, experts, suppliers or customers — and mixing people across business units, functions and geographies helps spark new ideas.

**Interaction:** Organizations need to establish forums, platforms and events to help employees build networks and to provide opportunities for exchange and serendipity to happen.

**Slack:** Employees need some access to slack resources, not least in terms of timeout from their regular activities to experiment and develop new ideas. This also requires focus — both personal and organizational — on eliminating non-value-adding activities.

pact on how we share, aggregate and interpret information. The proliferation and growth of online communities such as Facebook and LinkedIn seduce us into assuming that these new means of social interaction will also transform the way we get things done at work.

But for every online community that succeeds, many others fail. Some make a good start but then enthusiasm wanes. For example, MyFootballClub is a U.K.-based website whose 30,000 members bought a soccer club, Ebbsfleet United, in 2007. However, by 2010 its paying membership had dwindled to just 800 people, leading to severe financial difficulties for Ebbsfleet United. Other online community initiatives fail to live up to their founders' hopes. For example, during the transition period before he came into office, President Obama endorsed the idea of an online "Citizen's Briefing Book" for people to submit ideas to him. Some 44,000 proposals and 1.4 million votes were received, but as the *International Herald Tribune* reported, "the results were

quietly published, but they were embarrassing."[6] The most popular ideas — in the middle of an economic meltdown — included legalizing marijuana and online poker, and revoking the Church of Scientology's tax-exempt status.

How does this affect the process of innovation? Unsurprisingly, all the companies we studied had figured out that the tools of Web 2.0 could potentially be very valuable in helping large numbers of people get involved in an innovation process. Most had built some sort of online forum in which employees could post their ideas, comment and build on the ideas of others and evaluate proposals. For example, IBM used space on its corporate Intranet to launch a 72-hour Innovation Jam in 2006, the purpose being to get IBM employees, clients and partners involved in an online debate about new business opportunities. The Innovation Jam attracted 57,000 visitors and 30,000 posts. A rather different example is Royal Bank of Scotland's development of a virtual innovation center in Second Life, which allowed the bank to prototype potential new banking environments and get direct and rapid feedback from employees around the world.

In these and other cases, the implicit logic was: Build it, and they will come. Both IBM and RBS had considerable success in attracting interest, but the overall story was much more mixed. Some online forums really helped to galvanize their company's innovation efforts. Others ended up underused and unloved.

What are the biggest problems with developing online innovation forums? The first is that the forum doesn't take off. It's usually quite straightforward to get people to check out a new site once or twice, but they need a reason to keep coming back. As MyFootballClub found, the risk is that the novelty of an innovation forum will wear out pretty quickly and participation will dwindle. A manager at Roche Diagnostics observed: "Our hope that our internal technology-oriented people would gravitate to using this type of tool was completely unfounded. We really had to push people (via an electronic marketing campaign) to involve them in suggesting solutions to the six problems we identified." Equally, managers at Mars and UBS found their innovation efforts stalling after promising starts. One said: "We probably underestimated the

communications needed. We were good up-front, but learned that continuous communications is vital. We had to counter some skepticism, to create the belief that something would happen."

The second risk is that, like Obama's Citizen's Briefing Book, the ideas that get posted are off-topic, half-baked or irrelevant. All the managers we spoke to acknowledged that they had to work hard to "separate the wheat from the chaff." Many of the ideas put forward were parochial or ill-informed, and few people took the trouble to build on the ideas of others. The notion that the good ideas would be picked up by others and rise to the top rarely worked out.

So what should you do to avoid these problems? The most important point is to understand the types of interaction that occur in online forums, so that you use them in the right way. If you are looking for creative, never-heard-before ideas, and if you want people to take responsibility for building on one another's ideas, then a face-to-face workshop is your best bet. But if you are looking for a specific answer to a question, or if you want to generate a wide variety of views about some existing ideas, then an online forum can be highly efficient. (See "Questions That Work — and Don't — in Online Innovation Forums" for examples.)

**Takeaway:** Online forums are not a panacea for distributed innovation. Online forums are good for capturing and filtering large numbers of existing ideas; in-person forums are good for generating and building on new ideas. Smart companies are selective in their use of online forums for innovation.

## Myth # 3. Open Innovation Is the Future

Any discussion of innovation in large companies sooner or later turns to the issue of "open" innovation — the idea that companies should look for ways of tapping into and harnessing the ideas that lie beyond their formal boundaries. Many companies are now embracing open innovation in its many guises. For example, the Danish toymaker LEGO has been leveraging customer ideas as a source of innovation for years, and some new products are even labeled "created by LEGO fans."[7] And one of P&G's first experiments with online

advertising invited people to make spoof movies of P&G's "Talking Stain" TV ad and post them on YouTube — resulting in over 200 submissions, some of which proved good enough to air on TV.[8]

Our research confirmed that most large companies believe a more open approach to innovation is necessary, but it also underlined that there is no free lunch on offer. The benefits of open innovation, in terms of providing a company with access to a vastly greater pool of ideas, are obvious. But the costs are also considerable, including practical challenges in resolving intellectual property ownership issues, lack of trust on both sides of the fence and the operational costs involved in building an open innovation capability. Open innovation is not the future, but it is certainly part of the future, and the smart approach is to use the tools of open innovation selectively.

Roche Diagnostics was a company that got a lot of value out of open innovation. In 2009 it put in place an experimental initiative to overcome specific technological problems that were preventing certain R&D programs from moving forward. The company identified six technology challenges that needed solving, and it opened the challenges up to the internal R&D community *and* to the external technology community through Innocentive and UTEK (now Innovaro), two well-known technology marketplaces. The manager in charge of the initiative described the outcome thus:

> *Internally, the number of responses to these six challenges was very low. But one very thoughtful response to one of the challenges was brilliant, and paid for the entire experiment. Externally, we used Innocentive and UTEK, and both had a far higher response rate than our internal experiment — more than 10 times the volume of responses, in fact. We offered a $1,500 reward, so this could have been an influencing factor. We received one novel solution, which really made the entire experiment worthwhile, but more than that was our very positive experience of involving external collaborators.*

Roche's experience was the closest thing we saw to a proper experiment that compared the merits of tapping into internal and external communities — and

it really highlighted the value of tapping into the external group. But note that the potential respondents were being asked a very narrow, technology-specific question. Clearly, the external community would have been far less useful for tackling company-specific or situation-specific problems.

What are the downsides or limitations of open innovation? One set of concerns relates to how you handle intellectual property issues. At the time of writing, Roche Diagnostics was still working through the details of the licensing agreement with the person who solved its technological problem, and the transaction and licensing costs were far from trivial. A related issue is that without the strong IP protection that a market-maker like Innocentive provides, external parties are careful with what they will share. IBM discovered this in its Innovation Jam. As one manager recalled, "This Jam was established as an open forum, so anyone can take these ideas and use them. So we felt we were taking a few risks doing this, and perhaps it meant that our clients were quieter in the discussions than

we would have liked. But it was important to make this open in every sense of the word."

A second set of concerns was around how the companies we studied actually used the insights provided by external sources. One European telecom company had a "scouting" unit in Silicon Valley to keep an eye on exciting new startups and emerging technologies, but the scouting team discovered that the only technologies the folks back in Europe were interested in were those that would help them accelerate their current development road map. The really radical ideas, the ones that the scouting unit was putatively looking for, were simply too dissonant for the European development teams to get their heads around.

## WHICH PARTS OF THE INNOVATION VALUE CHAIN ARE COMPANIES GOOD AT?

Originating ideas usually isn't the hardest part of innovating. Most companies are sufficiently good at generating ideas, the "bottleneck" in the innovation process actually occurs a lot further down the pipeline.



How good is your company at the following activities, on a scale of one to five?

A final concern is simply the time it takes to do open innovation properly. Companies such as Procter & Gamble, Intel and LEGO have put an enormous amount of investment into building their own external networks, and they are beginning to see a return, but you shouldn't underestimate the time and effort involved.

**Takeaway:** External innovation forums have access to a broad range of expertise that makes them effective for solving narrow technological problems; internal innovation forums have less breadth but more understanding of context. Smart companies use their external and internal experts for very different types of problems.

## Myth # 4. Pay Is Paramount

A dominant concern when organizations set out to grow their innovation capabilities is how to structure rewards for ideas. A common refrain is that innovation involves discretionary effort on top of existing responsibilities, so we have to offer incentives so people to put in that extra effort. The example of the venture capital industry was mentioned as a setting in which people coming up with ideas, and those backing them, all have the opportunity to become rich.

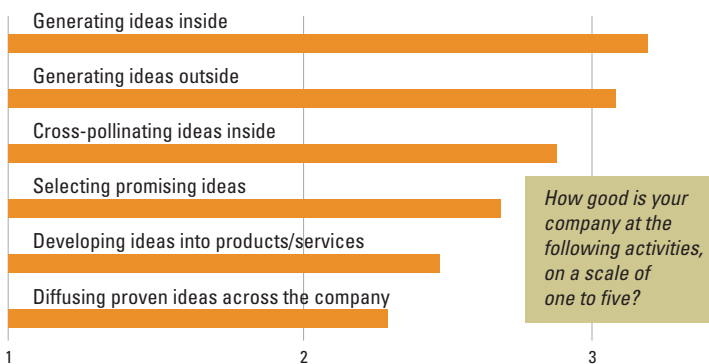But both academic theory and our discussions with chief innovation officers indicate that this is a red herring.

Let's briefly look at the theory. People are motivated by many factors, but extrinsic rewards such as money are usually secondary, hygiene-type factors. The more powerful motivators are typically "social" factors, such as the recognition and status that is conferred on those who do well, and "personal" factors, such as the intrinsic pleasure that some work affords. More specifically, there is evidence from psychology research that individuals view the offer of reward for an enjoyable task as an attempt to control their behavior, which hence undermines their intrinsic task interest and creative performance.[9] Parallel research in behavioral economics suggests that intrinsic motivation is especially likely to suffer when the incentives are large.[10]

All of which suggests that you don't need monetary rewards for innovation. Innovation is intrinsically enjoyable, and it's easy to recognize and confer status on those who put their discretionary effort into it. Our research interviews provided plentiful evidence that this is the case.

Take the experience of UBS. With considerable upheaval at senior levels of the bank, the innovation movement was very much a grassroots effort — built around "UBS Idea Exchange," an online tool. The executive in charge of that effort commented: "We found that employees having an opportunity to put forward their ideas brought huge personal rewards. We learned very clearly (through our experiments) that financial rewards would not have made any difference. People reported that recognition of their ideas was a reward in itself. They wanted to be engaged and to participate. We therefore involved people in presenting their ideas to senior management."

The sentiment was echoed by the head of innovation at Mars Central Europe: "We try to recognize people rather than offer material rewards. We hold a corporate event, biannually, called Make The Difference, where ideas and success stories are celebrated. The Central Europe team is very proud of the fact that we won more awards at this event last year than any other region."

**Takeaway:** Rewarding people for their innovation efforts misses the point. The process of innovating — of taking the initiative to come up with new solutions — is its own reward. Smart companies emphasize the social and personal drivers of discretionary effort, rather than the material drivers.[11]

## Myth #5. Bottom-Up Innovation Is Best

There is a lot of enthusiasm among those writing about innovation, and among those working in R&D settings, for bottom-up activism or "intrapreneurship." The reasoning here is straightforward: Top executives are not close enough to the action to be able to come up with or implement new ideas, so they need to push responsibility for innovation down into the organization. "Let 1,000 flowers bloom" has long been the mantra of big successful innovators like 3M, Google and W.L. Gore.

We wanted to believe this, and we sought out companies that had allowed, or even encouraged, bottom-up processes. We wanted to find cases where dramatic changes had emerged through bottom-up initiatives. But we came back emptyhanded.

Don't misunderstand. There are plenty of examples of successful innovations that started out as below-the-radar initiatives, or as proposals that got rejected by top executives several times. Examples that spring to mind include Ericsson's mobile handset business, Sony's PlayStation and HP's printer business. But, the point is, at some point all these innovation were picked up and then prioritized by top management. Successful innovations, in other words, need both bottom-up and top-down effort, and very often the link is not made.

During the research, we followed several cases of bottom-up innovation in considerable detail: UBS's Idea Exchange, Best Buy's resilience initiative and GlaxoSmithKline's Spark program. These initia-

tives were neither great successes nor outright failures. They were able to demonstrate all sorts of modest successes, but they didn't have the impact that their proponents would have liked either.

We discussed this issue in a workshop in late 2008, and the story that emerged was interesting. An executive working for RBS described the tension he had experienced between a top-down and a bottom-up approach. The company had put in place a range of tools: "Some of these are top-down tools that are owned by senior executives; others are bottom-up tools that we put in place to get involvement from large numbers of people. Top-down we have a group innovation board with senior decision makers and then 12 innovation boards. On a bottom-up basis, each division has its own pipeline, and makes the initial seed investment. Then as costs increase, the idea goes to the innovation board, and if it is approved the board will fund a pilot project, which in turn helps the development of the business plan."

The underlying point, he observed, is that successful innovation requires close attention to both facets: "We've learned that you only get the top-down working if you get the bottom-up right too."

This interplay between direction and empowerment is evident even in a declared bottom-up innovator like Best Buy. The success of the U.S. retailer is strongly tied to the cumulative effect of continuous experimentation and small bets at the level of individual stores.[12] Yet top management plays a significant role in channeling the collective creative energy toward desired areas by framing the innovation challenge in terms of finding new and better ways to service customers (dubbed the "customer centric-cycle") — hence removing the risks of random or ill-focused innovation.

One final aspect of the bottom-up process is how to deal with those whose ideas are turned down. Broad-based innovation actually implies saying no to a lot of people, sometimes repeatedly. How their contributions are acknowledged, the transparency of the decision-making process and how the news is communicated are crucial factors in keeping the ideas coming. Even when their own ideas are rejected, employees also note what happens to the successful ideas of colleagues — and companies should not underestimate the stimulus

of seeing front-line innovators sometimes given the opportunity to *implement* the ideas they generated. Indeed, Whirlpool, an exemplar in democratic innovation, goes one step further: It has established an Innovation E-Space that allows all employees to keep abreast of innovation activities and even to volunteer to work one another's projects.[13] Once again, the interaction between bottom-up and top-down initiatives proves decisive.

**Takeaway:** Bottom-up innovation efforts benefit from high levels of employee engagement; top-down innovation efforts benefit from direct alignment with the company's goals. Smart companies use both approaches, and are adept at helping bottom-up innovation projects get the sponsorship they need to survive.

## Conclusion

Innovation is the lifeblood of any large organization, and many invest enormous amounts of time and effort in fostering distributed innovation programs. Web 2.0 technologies have made it possible to democratize the process even further, and offer ways of consolidating and evaluating radically new ideas.

But there are no quick fixes, panaceas or one-size-fits-all solutions — not surprisingly, since by definition not everyone can be a successful leader in innovation.

In this article we have taken an experience-led approach. Forget what the theory says: What are the experiences of companies putting these new tools for distributed innovation into practice? And the truth proves sobering. Online tools, open innovation communities and big collaborative forums all have their limitations. None is always right or always wrong. The best approach involves careful judgment and a deep understanding of the particular challenges a company is facing. By thinking through the pros and cons of each element, companies can manage their processes better.

*Julian Birkinshaw is a professor of strategic and international management at London Business School. Cyril Bouquet is a professor of strategy at IMD in Lausanne, Switzerland. Jean-Louis Barsoux is a senior research fellow at IMD. Comment on this article at http://sloanreview.mit.edu/52210/, or contact the authors at smrfeedback@mit.edu.*

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# Innovation From the Inside Out

Nurturing a new and lasting idea doesn't result from analyzing market data. Aspiring creators must act on what nonprofits already know: you get the best answers by burying yourself in the questions.

**BY ERIK SIMANIS AND STUART HART**

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**THE LEADING QUESTION**
How can CEOs transform the innovation process itself — and not just the fruits of it — into a source of lasting value?

**FINDINGS**

▶ Create demand by building a social movement, adapting the model nonprofits have used to tap purchasing power in low-income communities.

▶ Let the community pull your company into new markets or products.

▶ Humility can be learned — and must be practiced — if executives are going to be open to act on what they hear.

BEFORE MUHAMMAD YUNUS decided to start the innovative bank that would upend conventional wisdom and deliver affordable credit to the rural poor, he didn't conduct grass-roots market research or consult a global positioning system for the best target markets. Certainly, he knew enough to compile such data; he was, after all, a highly trained economics professor. But the inspiration that led to Grameen Bank's launch in 1976 came not from the depths of an ocean of market data, but from a personal bond and shared vision built by Yunus and the Bangladeshi farmers living in the village adjacent to Yunus's home and university.

That shared vision came into focus as Yunus and the villagers spent time together as a community: in the rice fields in farming projects, in afternoon conversations at roadside tea stalls, and in late-evening dinners and debates. By working together and learning from one another, Yunus's and

the villagers' unique knowledge, insights and perspectives came into creative collision, sowing the seeds for a profitable and scalable village banking model that neither could have conceived of independently. In time, Grameen Bank would profitably serve more than seven million women borrowers across some 75,000 villages of Bangladesh, with annual loan disbursement exceeding $800 million.[1]

More than two decades later, another experiment began taking root. Motivated in part by the success of Grameen Bank, several corporations began to test the theory that an untapped, multitrillion-

dollar consumer market could be found at the "base of the economic pyramid" or BoP — the four billion people with annual per capita incomes below $1,500 (purchasing power parity).[2] One of the companies at the forefront of this movement has been Hindustan Unilever Ltd., formerly known as Hindustan Lever Ltd., the Indian subsidiary of the Dutch consumer products multinational Unilever N.V. In 2000, with $23 million in seed capital, HLL launched Project Shakti (translated as "sacred force" or "empowerment") to tap India's vast, geographically dispersed rural population of villagers. (See "About the Research.")

HLL's strategy consisted of a radically decentralized, door-to-door sales force for HLL's personal care products, such as soaps, lotions and detergent. The sales force was drawn from members of the thousands of small women's savings and loan groups (also known as "self-help groups") established by the Indian government and nonprofit organizations to facilitate small-scale enterprise and gender empowerment across villages. To train these "Shakti entrepreneurs" efficiently, HLL partnered with local nonprofits. Community-based Internet kiosks advertised HLL's products, and a village woman served as a social marketer, conducting demonstrations in schools and other public sites about the importance of personal hygiene practices. By 2007, HLL had expanded the project to cover more than 80,000 villages through a network of 30,000 entrepreneurs.[3]

Today, HLL's Project Shakti, like Grameen, is held up as an example of the kind of holistic business model innovation required to open up vast new markets, including those at the BoP. Familiar buzzwords like disruptive and radical are often invoked to describe the structural changes that these pioneers introduced into their industries' respective business models.

Yet while contemporary innovation frameworks train our sights on the structural similarities of the HLL and Grameen business models, they obscure a crucial dimension on which they differ: *business model intimacy*. Business model intimacy allowed Grameen successfully to overcome tremendous social tensions — and sometimes outright threats — involved in making loans to women living in predominately conservative Muslim villages. Lacking this facet, HLL's Shakti has struggled to hang onto its Shakti entrepreneurs, with turnover rates at one point reaching 50% within three months. Most new value propositions are met with consumer skepticism. But Grameen created a groundswell of demand, literally pulling the business into new villages and allowing Grameen to scale rapidly while growing revenues and profits. Lacking its predecessor's business model intimacy, HLL has followed a resource-intensive push strategy that, despite creating a distribution presence across thousands of villages, banks its profitability hopes on a long-term, general upward trend in rural consumption.

## ABOUT THE RESEARCH

The BoP protocol was launched in 2004 as an action research initiative at the Center for Sustainable Global Enterprise at Cornell University's Johnson School of Management. Our partners in the initiative included University of Michigan's Stephen M. Ross School of Business, William Davidson Institute, World Resources Institute and the Johnson Foundation.

The initial protocol framework was developed in 2004 with the input of a diverse consortium that included leading social entrepreneurs, including Grameen Bank; NGOs skilled in the practice of participatory development, such as World Neighbors and Third World Network; thought leaders across academic disciplines, including business strategy, anthropology and design; and a dozen managers from the project's four corporate sponsors, DuPont, S.C. Johnson, Hewlett-Packard and TetraPak.

In 2005, CSGE partnered with S.C. Johnson to pilot-test the process in Kenya. In 2006, DuPont's Solae subsidiary worked closely with CSGE to implement the process in India. Based on more than two years of combined in-field experience by ourselves and a core team that included Duncan Duke (Cornell), Patrick Donohue (Brinq), Justin DeKoszmovszky (S.C. Johnson), Tatiana Thieme (Cambridge University), Michael Gordon (University of Michigan) and Gordon Enk (Partners for Strategic Change), we revised and adapted the protocol to reflect our learnings.

To continue deepening the theory and practice of embedded innovation, we have established a BoP Protocol Learning Network at CSGE that connects project field teams across current protocol project sites in Kenya (S.C. Johnson), India (DuPont/Solae), Mexico (TWI) and the United States (Ascension Health). In addition, we are developing a BoP Protocol Field Guide containing tools, techniques and project management templates.

Business model intimacy also catalyzed Grameen Bank's rapid and successful diversification over the past decade into entirely new services and industries, ranging from energy and telecommunications to textiles and fisheries. HLL Shakti, on the other hand, is unlikely to grow into anything more than a new distribution channel.

At its foundation, business model intimacy is a kind of relationship in which the identity of a community is fused with that of a company. The glue that binds this shared identity is a jointly constructed vision of a better life and community — a strategic community intent — anchored around a new business. Because fulfillment of this joint vision is intertwined with the business's success, business model intimacy instills a sense of responsibility in the community for the growth and success of the new enterprise.

Creating business model intimacy requires changing the way value is understood and the manner in which innovation is practiced. It is not about getting close to the customer through "deeper" consumer research strategies, nor is it a question of mass-customizing products and services to match individual tastes. Business model intimacy is, first and foremost, about cocreating a new community from the ground up, with the company embedded in its foundation. Such vibrant ventures are built on dialogue and joint action, not data and delivery times.

For corporations to generate the long-term, sustainable growth markets of tomorrow, they require a new approach to innovation. This strategy would be based on humility and dialogue — and would ultimately bring corporations together in equal partnership with communities to nurture an embedded form of business.

## Separation Anxiety: Market Versus Society

In 1944, economic historian Karl Polanyi observed in his landmark book *The Great Transformation* that the birth of industrial capitalism was based on a radical shift in how people perceived the relationship between the economy and society.[4] Prior to the 1850s, markets were seen as an important but small part of a diverse economic system that was woven into the social fabric of a community.

## STRUCTURAL INNOVATION PARADIGM

Much of today's innovation relies on the SIP that is focused on fulfilling customer needs with one goal in mind: delivering a product or service that is better, faster and cheaper than the customer can get from any competitor. That aim drives any structural changes.
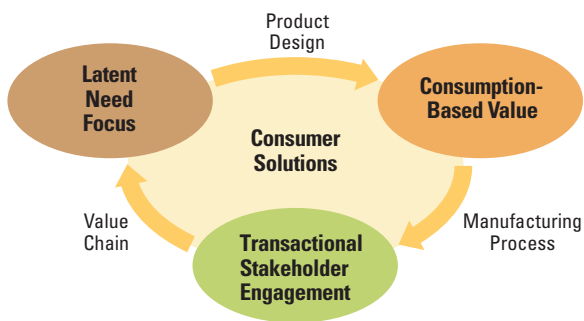


Humans-as-consumers did not exist as a stand-alone identity or category of thought.

Post-1850s, Polanyi observed, the new concept of "market economy" undid this longstanding relationship: Economic life became *disembedded* from society and viewed as a self-contained system consisting of consumers and their needs awaiting fulfillment by producers. Economics as a field came into existence, borrowing its terms (like equilibrium and elasticity) and core conceptual model (supply equals demand) from physics and mechanics, which relied on a closed-system treatment of energy.

In the new market economy, people were buyers or sellers; relationships became transactions. Everything, including people and the environment, served as a production input subject to the laws of supply and demand. In this new context, social welfare was maximized by getting more goods into the hands of more people. The idea of the mass consumer market was born.

In the ongoing effort to serve this mass consumer, today's corporate growth and innovation strategies continue to reflect and reinforce this disembedded logic. Communities are framed as target markets. Ecological systems are treated as natural resources that supply raw materials. People's aspirations for a better life register as market demand. Selling more products to more people is an internal, technical challenge tackled through increasingly sophisticated forms of consumer research, business reengineering and scientific

management. Despite constant advances in innovation practice, this underlying innovation paradigm — which we call "structural innovation" — has remained unchanged since its inception nearly 200 years ago.

## More for Less: Structural Innovation Paradigm

The structural innovation paradigm or SIP is based on solving customer problems and needs "better, faster and cheaper" than competitors through structural changes to a company's business system. Structural changes can be incremental, radical or architectural in nature, and can affect the product design, the manufacturing process and/or the value chain. The end goal of these structural changes of the

### SUSTAINABLE INNOVATION

The effects of today's value-maximizing consumer are felt in another system — the earth's ecological systems. As is often noted, it would require three planet Earths to sustain the human race were all people to consume resources at the level of the United States.[i] Despite the introduction of cleaner technologies and widespread corporate greening initiatives, "better, faster, cheaper" consumers erode these gains by consuming more. Automobile fuel efficiency, for example, increased significantly in the late 1990s, but was offset by an increase in passenger miles traveled.[ii] The same rebound effect is visible in other sectors, from water to waste to energy. The gains from "green" structural innovation — while providing critical short-term relief from global warming and other negative environmental trends — will likely be submerged under a rising tide of "red ocean" consumerism. Embedded innovation practices that instill new consumer mind-sets and habits based on a long view of value are a critical complementary long-term strategy to help create the sustainable economies of tomorrow.

business system is to get less expensive and better-performing products into consumers' hands — the consumer nirvana of better quality at a lower price. SIP is characterized by three attributes: a latent-need focus, consumption-based value and transactional stakeholder engagement. (See "Structural Innovation Paradigm," p. 79.)

**Latent Need Focus.** SIP is driven by the underlying belief that society has unmet needs and wants — some more pressing and "basic" than others, as in the case of the BoP — that await a solution. The socially legitimate role of corporations is to scratch this constant societal itch by probing and ultimately discovering the product offering and business model that, like a skeleton key, matches up with a consumer need and unlocks the door to the latent market.

Creating this key is not always a clear-cut task, as consumer needs are often tangled up with cultural and psychological factors that make it difficult, sometimes even for consumers themselves, to articulate the problem. There are also cost/quality tradeoffs involved in the research. Anthropological approaches tackle this challenge through grass-roots ethnographic methods that, while time-consuming and costly, provide highly contextualized insights into the behavior patterns of a small group of consumers. Open innovation approaches go the opposite route, betting on the power of "crowd wisdom" to come up with the correct key.

**Consumption-Based Value.** With SIP, companies see themselves as competing for customers on the basis of the value contained within products and services, where value is judged by economically rational consumers as a ratio of product quality to price. Products and services are the vehicles that aggregate value generated across a company's network of operations (its value chain) in order to make it available to society. Value is released and experienced when customers consume these end products — hence, the terms customers and consumers are used interchangeably.

Conventional strategic wisdom reinforces this consumption-centric value perspective with generic strategies falling into one of two main camps: cost leadership (lowest price) or differentiation (highest perceived quality). Under a cost leadership strategy, innovation efforts target new sources of production and operational efficiency; within a differentiation strategy, a company's marketing and R&D departments drive the innovation agenda.

**Transactional Stakeholder Engagement.** With SIP, a company's external stakeholders are engaged for the purpose of accessing knowledge, resources and capabilities that lie outside of the company and that can enable it to create "better, faster and cheaper" customer solutions. Knowledge gaps include information and insights into consumer functionality needs. Resource gaps include tangibles such as new technologies and distribution networks, and intangibles like social capital and trust. Capability gaps can be internally oriented, such as efficient supply chain management, or externally oriented, such as managing government contracts.

The nature of the chasm to be filled shapes the nature of the stakeholder engagement. Gaps involving complex capabilities and intangible or tacit resources that are hard to separate from the stakeholder such as social capital and local trust — require intensive, face-to-face collaboration and partnerships. For example, HLL's engagement with local nongovernmental organizations in the Shakti project required close partnerships, as successfully recruiting Shakti entrepreneurs required having trust and good standing with the rural self-help groups. Gaps that involve knowledge and resources that are easily traded and separated from the stakeholder — such as consumer preferences or technology — can be acquired through more arm's-length and impersonal means, such as customer focus groups and technology licensing. Either way, the relationship with stakeholders is transactional in character — each part gives something and receives something in return.

Because of structural innovation's ruthless focus on "giving more for less," corporations have created a level of material comfort in the industrialized world unimaginable at the turn of the 19th century. Homes are bigger, computers are ubiquitous, cars and trucks proliferate. Americans considered middle class in the early 1900s would fall below the U.S. government's current poverty threshold. The producer side of the equation has also profited — structural innovation has generated tremendous corporate wealth. Producer and consumer have been in a symbiotic relationship — until now.

## Where Structural Innovation Crumbles

When companies apply structural innovation — either in the BoP or in traditional consumer markets — the process leads to outcomes that push companies into short-term value capture strategies. One reason for this outcome is that all companies have reached a high level of proficiency in managing innovation, and additional efforts yield diminishing returns. As a recent editorial

opined, "The paradox about innovation is that there's nothing new about it — about the process that is. It happens in cycles, there are proven means of doing it well, and there are well-trodden ways in which to do it wrong."[5] Structural innovation is becoming a baseline capability necessary for achieving competitive parity in the marketplace.

But there is a second, more subtle force that drives this dynamic: SIP instills the same "better, faster, cheaper" mind-set in the company's stakeholders, thereby fostering rational, value-maximizing behavior that undermines commitment to the company and its products. Consider again HLL's Shakti business in which rural women villagers are recruited for door-to-door sales. Shakti represents a unique case, as the project's stakeholders — poor, rural villagers in India — are arguably "unspoiled" by companies competing for a share of their mind and wallets. But in other circumstances, stakeholders would be pushing the company to keep picking up steam.

HLL currently supplies the Shakti ladies with its products packaged in single-use servings (sachets). It would make more sense to provide bulk products that the Shakti women could repackage on site. Doing so would carry multiple benefits, including lowering the product cost to the customer; allowing the women to contribute more value to the final product and thereby command a greater share of the returns; and reducing the growing mountain of sachet packaging waste that has invaded the Indian subcontinent. (For more on the environmental impact, see "Sustainable Innovation.") Yet HLL has been unable to make this seemingly simple change to the business model out of concern that the Shakti saleswomen will adulterate the product and harm the company's brand. *But this concern exists only because there is an absence of shared commitment between HLL and the women partners.* Reciprocity extends only so far as the legal contract that defines their partnership.

Lack of shared commitment has also made scaling up an arduous, costly process. One of the most significant challenges has been high turnover rates among the Shakti entrepreneurs — which have been as high as 50% within a few months. The problem? If the Shakti entrepreneurs cannot generate a desired income after a few months of door-to-door sales, they leave the project for other opportunities. As contractors, the Shakti saleswomen have no reason to invest any sweat equity into realizing a longer-term vision. Structural innovation has turned women into self-interested partners, focused on maximizing their own value. HLL is simply getting back what it put in.

Structural innovation causes the same dynamic at the customer level. By engaging customers as value-maximizing consumers, customers end up embodying this very trait. When a less expensive knockoff surfaces — legal or otherwise — a company can only watch powerlessly as customers switch to the other product. HLL has been on both sides of this dynamic with its detergent business in India. During the 1990s, HLL's competitor Nirma Ltd. siphoned away HLL's customers in the higher-end urban segment with a less expensive product offering. HLL promptly countered with its own structural innovation strategy: It launched a new brand, Wheel, which undercut Nirma's offering in the low end of the urban consumer market. But HLL's gains with Wheel eventually led to ongoing competition, which included a price war with Procter & Gamble Co. in 2003. Interestingly, stalled top-line growth and declining profits driven by this cutthroat competition in its core urban markets was a key factor behind HLL's decision to launch Project Shakti.

Structural innovation, then, although familiar and comfortable, sows the seeds of its own demise. Turning out the next generation of products and

## EMBEDDED INNOVATION PARADIGM

By becoming embedded, companies and communities can jointly build a new, shared identity. That closeness and mutual commitment to one another constitutes business intimacy, which becomes a source of value — and a barrier to competitors.
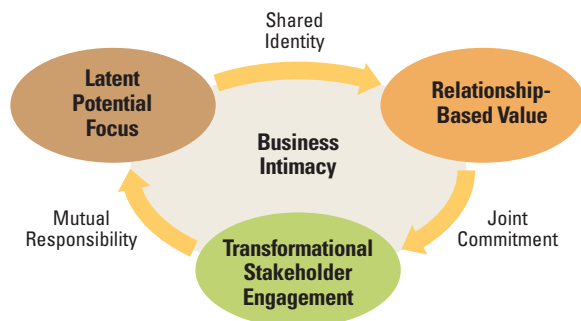
reconfiguring business models are vital for holding onto market positions and sustaining revenues. But the company's competitive positions will remain tenuous, and the innovation treadmill will ratchet up a notch. Out of strategic necessity, the corporation's objective becomes selling as much as it can, and doing it quickly.

## Embedded Innovation Paradigm

To create long-term, sustainable wellsprings of growth, companies must step outside of a structural innovation paradigm and re-embed consumers and producers back into society. With the embedded innovation paradigm or EIP, innovation entails the creation of new communities, where "community" consists of diverse people working together to create and sustain interdependent lives. Innovation isn't enabled by new relationships, it is the relationship.

EIP consists of three core attributes: latent potential focus, relationship-based value and transformational stakeholder engagement. The strategic intent is to establish a durable base of competitive advantage through business model intimacy. (See "Embedded Innovation Paradigm.")

**Latent Potential Focus.** EIP is driven by the underlying belief that a latent potential exists within today's diverse economies, formal and otherwise, for generating an infinite number of new varieties and forms of business enterprise and markets. The socially legitimate role of corporations is to stir the economic pot continually, creating an ever-expanding range of opportunities for people to participate in economies on terms meaningful to them. Expansion, rather than solution, is the name of the game.

Latent economic potential, like energy, infuses all parts of people's lives. Accessing and releasing this potential — much like opening new, alternative sources of energy — requires ongoing exploration, engagement and experimentation with as diverse and wide an array of people and life situations as possible. Just as new energy sources can be found in winds sweeping across the Atlantic or in the photosynthetic process in a plant cell, powerful sources of new economic potential are as likely to be found in an Indian village household as they are in university research labs.

**Relationship-Based Value.** With EIP, value resides in the community of relationships that give

### THE BoP PROTOCOL

In the base of pyramid protocol, the joint creation of a business concept is at the top, but its roots run deep. Incubation proceeds in phases that require such skills as deep listening, cocreation and codesign of a business that generates mutual value.
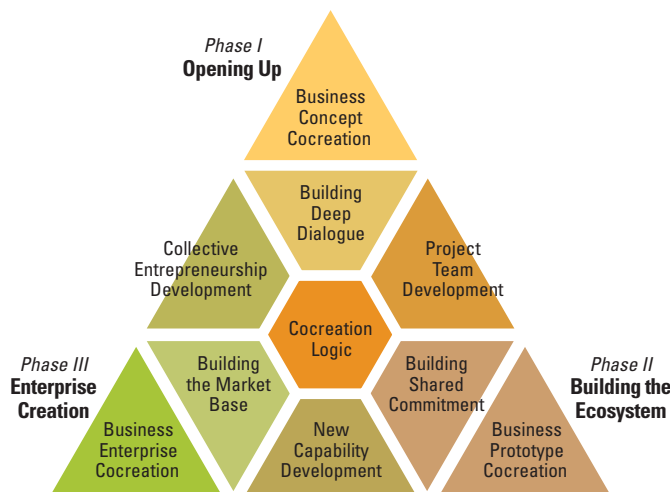


shape to people's identities and sense of belonging. Relationships between people, places and things create the context from which community members define themselves and create their aspirations.

Becoming part of a new community allows people to reinvent themselves; it makes it possible for them to have a different vision of the future. A powerful example of this is found in the United States Armed Forces recruitment campaigns, which highlight that joining the military community brings more than "just a job" — it develops values of fraternity and excellence, it presents opportunities to learn and grow and experience. New communities offer new ways of life, new adventures.

**Transformational Stakeholder Engagement.** With EIP, stakeholder engagement is a transformative process that actively creates new stakeholder behavior, habits and identities necessary for realizing a new enterprise and strategic community intent. Engagement is a personal change process that instills responsibility and commitment in business partners, breeds dedicated customers and creates an ecosystem of people and institutions that embrace the enterprise's values. It makes a new way of thinking and acting natural and second nature.

The kind of personal change targeted in stakeholders shapes the nature of the engagement process. Changes involving people's identities and their underlying system of values require sustained

collaboration and action learning to allow the new identity to sink in and integrate itself into a person's life. For example, Grameen Bank's women owner/borrowers are organized in self-managed lending circles and connected to other such groups to help create sustained support for becoming successful entrepreneurs. Changes entailing habits and routines that are less consequential can be accomplished with more indirect approaches, such as social marketing strategies.

### The Business Case

Consider the case of the Mondragón Corporación Cooperativa of Spain. Founded in 1956 as a small producer of cooking stoves, MCC today is a global business group comprised of approximately 264 companies with more than 100,000 employees operating in the manufacturing, retail and financial sectors.[6] MCC operates 12 applied research centers in areas like photovoltaics and nanotechnology. Its training arm includes the University of Mondragón, a prestigious

cultural and educational activities. To serve the community more broadly (the apprentice school admitted primarily children of employees), he started a community-run training school with the active involvement and support of 600 residents. In time, a group of the school's graduates felt compelled to put into practice the cooperative vision and entrepreneurial values that had spread across the community.

Ultimately, the group appealed to and received support from more than 100 members of Mondragón's community to establish a new company. The resulting cooking stove venture, which opened with 24 worker-members in 1954, was a success. To catalyze other such cooperative ventures, Father José María helped establish in Mondragón today's equivalent of a credit union that channeled the community's savings into the development of new local businesses.

The school, the cooking stove company and the bank were all part of an embedded innovation approach that became cornerstones for a new community. The innovation process underlying

Members of the communities in which Grameen operates refer to the bank's workers as "sisters" and "brothers." Sisters and brothers are not likely to be replaced when a "better offer" comes along. The community acts as a "Neighborhood Watch," dissuading entry by counterfeiters and low-cost knockoffs.

private university satisfying the needs of local companies that has approximately 4,000 students seeking degrees. Revenues in 2007 for the manufacturing and retail businesses — which include the production of automobile parts, electronic components and white goods, and the retailing and distribution of consumer products, food and appliances — reached $17 billion. The company's financial division has more than $16 billion of administered assets.

Like the Grameen family of businesses, MCC emerged as an expression of a shared vision created by Father José María Arizmendiarrieta and residents of the town of Mondragón. MCC was both the catalyst for and the result of a new community.

Sent to Mondragón in 1941 by his bishop, Father José María began teaching about values and principles of cooperation at the apprentice school of a local factory. Father José María worked tirelessly with the young people of Mondragón, organizing sporting,

MCC helped propel a social movement centered on a vision of cooperative entrepreneurship. The growth of MCC could not be held back — any more than it could be planned out.

As Grameen and Mondragón demonstrate, embedded innovation and business intimacy represent a new dimension of value creation that shifts the foundation on which competitive advantage is built. In the near term, it dissuades entry by counterfeiters and low-cost knockoffs by acting as a "Neighborhood Watch" that self-polices the community against companies entering to tap into the new market. The communities in which Grameen operates, for example, refer to the bank's workers as "sisters" and "brothers." Sisters and brothers are not likely to be replaced simply because a "better offer" comes along. Over the long term, business intimacy creates a locally responsive platform from which the business can be propagated in other communities.

The experience of Grameenphone is instructive. A spinoff of Grameen Bank, Grameenphone manages a network of "Phone Lady" entrepreneurs in Bangladesh who sell mobile phone services in the villages. Piloted in 1997 in 950 villages, Grameenphone has revenues of nearly $1 billion and net profits approaching $200 million. Not surprisingly, most of the Phone Lady operators have been previous Grameen Bank borrowers, some with decades of experience with the bank. The business intimacy forged by Grameen Bank with communities across Bangladesh was central in propelling the growth of Grameenphone.

## Bringing Embedded Innovation Down to Earth

To turn theory into practice, in 2003 we and colleagues in partnership with four corporations — S.C. Johnson, DuPont, TetraPak and Hewlett-Packard — launched an initiative to develop and test an embedded innovation process called the base of the pyramid protocol (or, simply, the protocol). As an embedded innovation process, the protocol brings a company together with a community to conceive, launch and coevolve a new business and a new market in that community. While designed with an eye toward the institutional challenges of developing countries, the process is adaptable to the developed world and is currently being used in the United States by Ascension Health, a $9 billion health care company. The Ascension Health project, launched in Flint, Michigan, in 2008, is operated out of the company's transformational development division, an R&D-style team dedicated to incubating alternative business approaches to building healthy communities.

The protocol consists of three interdependent phases of activity that take approximately three years to complete. (See "The BoP Protocol," p. 83.) The three phases include:

**Phase I: Opening Up —** Phase I begins with a company immersion in the community using home stays to build personal rapport and trust, and it culminates with the cocreation of a business concept together with a core team of community partners. The output is an actionable, cocreated business concept and local market "buzz."

**Phase II: Building the Ecosystem —** Phase II begins formalizing a new business organization with the core partners and creates an initial brand and product/service offering through intensive action learning that engages the wider community. The output is a community-tested business prototype and local market champions.

**Phase III: Enterprise Creation —** In Phase III, the company and core partners reach out to an even broader community segment with action learning and small-scale tests to evolve a working business model and build local management capacity sufficient to manage and grow the business independently. The output is a locally embedded business and a committed local market.

The outputs of the process include a self-managed, financially sustainable community business; a proven business model that integrates the company's products and capabilities; and a "seed" market. Together, these form a platform for scaling the venture out to new communities.

Four companies have launched BoP protocol initiatives. (See "Current BoP Protocol Projects.") The first project was initiated in 2005 in Nairobi, Kenya, by consumer products multinational S.C. Johnson & Son Inc. In 2006, Solae LLC, an E.I. du Pont de Nemours and Co. subsidiary in the food and nutrition industry, launched initiatives in a village and an urban slum in India. In addition to Ascension's fledgling effort in Michigan, another new protocol project was launched in 2008 in Mexico by a new venture called The Water Initiative. Learnings from the first three years of the projects are reflected in a fully revised and updated process model.[7]

## Rising Interest and Implications

Embedded innovation is not an innovation panacea, nor a replacement for structural innovation. Rather, it is a powerful complement with a unique value proposition. Structural innovation enables companies to stay competitive in the marketplace *today*, and to respond quickly to competitors. Better products also create important value for consumers and society. But structural innovation has limits. It tethers corporations to an ever-accelerating innovation treadmill from which it is extremely difficult to generate the growth markets of tomorrow. Furthermore, the value-maximizing consumer habits it cultivates are proving more and more environmentally problematic — overconsumption plays a big part in creating many of today's ecological challenges, from global warming to loss of biodiversity.

Embedded innovation picks up where structural innovation leaves off. While it requires more time — though not necessarily more money, as Grameen and MCC demonstrate — to build a foundation of business model intimacy, embedded innovation creates a unique platform for long-term growth and corporate renewal. These are vital components of every company's portfolio of innovation investments, particularly in today's age of shifting industry boundaries, technological discontinuities and escalating global competition.

Embedded innovation opens new horizons of opportunity for both companies and society. Seizing these new opportunities will require a new corporate practice and competence based on dialogue and facilitation, on openness to learning and experimentation, and a constant exercise of humility. As that sensibility spreads, pioneering Grameen Bank will be the one that deserves the credit.

***Erik Simanis*** *is codirector of the BoP Protocol Project at the Johnson School of Management's Center for Sustainable Global Enterprise at Cornell University in Ithaca, New York.* ***Stuart Hart*** *is the Samuel C. Johnson Chair in Sustainable Global Enterprise and a professor of management at the same institution. Comment on this article or contact the authors at smrfeedback@mit.edu.*

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# Strategic Innovation
## and the Science of Learning

Theory-focused planning helps executives pursue ventures so cutting-edge that no road maps exist. The key is learning from strategic experiments.

**Vijay Govindarajan and Chris Trimble**

**E**ntrepreneurship is a competence in only the rarest corporation. Pity, as its absence has led to the death of many revered companies. In an economic environment characterized by dramatic change, the ability to explore emerging opportunities by launching and learning from *strategic experiments* is more critical to survival than ever.

A strategic experiment is a risky new venture within an established corporation. It is a multiyear bet within a poorly defined industry that has no clear formula for making a profit. Potential customers are mere possibilities. Value propositions are guesses. And activities that lead to profitable outcomes are unclear.

Most executives who have been involved in strategic experiments agree that the key to success is learning quickly. In a race to define an emerging industry, the competitor that learns first generally wins. Unfortunately, habits embedded in the conventional planning process disable learning. A better approach, *theory-focused planning,* differs from traditional planning on six counts.

### The Need for Strategic Innovation

In the late 1990s, Corning Inc. began to explore a possibility far beyond its existing lines of business. The strategic experiment, Corning Microarray Technologies (CMT), sought to usher in a new era in genomics research. (See "About the Research.") DNA microarrays, glass slides with thousands of tiny DNA samples printed on their surfaces, were a key piece of experimental apparatus for measuring DNA interactions in large sample sizes. Seeking to disrupt a status quo that offered researchers a devil's choice between time-consuming self-printing and the purchase of an expensive closed-standard system, CMT sought to introduce reliable, inexpensive microarrays as part of a new open-standard system.

With the anticipated explosion in genomics research that followed the completion of the mapping of the human genome,

*Vijay Govindarajan is Earl C. Daum 1924 Professor of International Business and director of the William F. Achtmeyer Center for Global Leadership at Dartmouth College's Tuck School of Business in Hanover, New Hampshire. **Chris Trimble** is an adjunct associate professor of business administration at Tuck and executive director of the Center for Global Leadership. Contact them at vijay.govindarajan@dartmouth.edu and chris.trimble@dartmouth.edu.*

## About the Research

Beginning in 2000, we investigated innovative efforts at 10 corporations. Some efforts were strategic experiments. Others were narrower process or product innovations, and those served as a comparison group. A conclusion from our research is that conventional planning systems disrupted learning within the strategic experiments but did not do so within the comparison group. The strategic experiments in our sample include

**THE NEW YORK TIMES CO.** Formed New York Times Digital to build The New York Times on the Web and Boston.com and created a profitable online news division.

**CORNING INC.** Created Corning Microarray Technologies to mass-produce DNA microarrays for use in genomics research.

**ANALOG DEVICES INC.** Commercialized microelectromechanical systems (MEMS), a new semiconductor technology that adds tiny moving parts to standard chips.

**THE THOMSON CORP.** In partnership with a global consortium of universities, launched Universitas 21 Global, an online university offering an MBA degree in Asia.

**CAPSTON-WHITE.** Sought to commercialize a new line of services for managing fleets of printing and imaging devices within corporations.

**EASTMAN KODAK CO.** Had its subsidiary in India introduce products and services related to digital photography.

The innovative efforts we studied that did not constitute strategic experiments include

**CISCO SYSTEMS INC.** Implemented e-business practices ranging from online sales and service to online coordination of supply networks and online management of employee services.

**UNILEVER.** Introduced (through its subsidiary, Hindustan Lever) a branded salt to rural India, incorporating revolutionary distribution techniques and new formulations to encapsulate iodine.

**NUCOR CORP.** Introduced minimill technology and thin-slab casting technology to the steel industry.

**STORA ENSO NORTH AMERICA.** Launched initiatives to improve the efficiency of interactions within the paper supply chain with platforms for business-to-business commerce.

We conducted semistructured interviews lasting 60 to 90 minutes with as many as 12 executives at each company. Each interview was recorded, transcribed and coded. In addition, archived planning documents were gathered and studied. An in-depth case study was written about each company.

Some important interview questions were What expectations were set for the strategic experiment? By what process were these expectations formed? How and by what process did expectations change? How did perceptions of performance form? What were the primary measures of performance? How and why did perceptions of performance change? When were major strategic changes made? What was the accepted rationale for these changes?

The case studies demonstrate the many ways that conventional planning approaches hinder learning within strategic experiments. The most prevalent pattern in the data was that, within performance-oriented, disciplined-planning cultures, leaders of strategic experiments frequently felt compelled to defend the performance of their fledgling businesses. The criterion was the ability either to meet original expectations or to surpass benchmarks for certain measures commonly accepted in other parts of the organization. The structure of the planning process reinforced such discussion by emphasizing simple comparisons between expectations and outcomes. This internal struggle over performance perceptions overwhelmed the type of debate needed — about underlying theory and whether actual outcomes supported that theory. Among other prevalent patterns: (a) interviewees rarely mentioned key assumptions underlying expectations; (b) historical data, needed to unravel lessons learned, were rarely discussed; and (c) major changes were made only in the context of the annual review.

At Cisco, Unilever, Nucor and Stora Enso North America, there were uncertainties, but the uncertainties were limited, more easily identified and discussed, and more quickly resolved. In one case (Unilever), the uncertainties amounted to nothing more than the values of certain operational parameters within a well-understood business model. The parameters were identified in advance, agreed upon by all executives involved and tested in a straightforward manner. In another case (Cisco), the data necessary to resolve uncertainties were more technical and available in much shorter time frames. Such substantive differences allowed learning to occur despite conventional planning practices.

We also tested and refined our recommendations by asking small teams of executives to use them in a computer-simulated strategic experiment. Several hundred executives from numerous organizations participated. We evaluated the effectiveness of the planning process we advocate by running the simulation twice — before and after introducing our recommendations. Performance was much better in the second run, as measured both by the profitability of the simulated businesses and the quality of the intrateam and classroom discussion during and after the simulation.

CMT expected a robust market. Still, the unknowns were daunting. Would a standard compatible with CMT's product be widely adopted? Would Corning's expertise in adhering tiny quantities of fluid to glass be readily transferred to microarrays? Could CMT lower costs to a point that compelled laboratories to invest in entirely new systems for genomics experimentation?

During recent years of economic malaise, many corporations have decided against such strategic experiments. Only a few have taken significant risks, recognizing that cycles of boom and bust mask a fundamental truth: The world is always changing. The pace of change does not mirror the manic financial markets; it is steadier and surer. Globalization brings new markets, nontraditional competitors and new sources of uncertainty, such as armed conflict in the Middle East and the entry of China into the World Trade Organization. More subtle changes are also important, including the aging of the population in developed economies and the rise of a new middle class in emerging ones. This dynamic environment affects industries new and old, high tech and low tech, in manufacturing and services. Unanticipated opportunities emerge just as imitators neutralize existing competitive advantages.

The life of any business is finite.[1] For companies to endure, the drive for efficiency must be combined with excellence in entrepreneurship. Through the process of strategic innovation, new businesses must emerge before old ones decay. As Ray Stata, chairman of Analog Devices Inc. (ADI), observes, "Everything has a life, and you always have to be looking beyond that life. The primary job of the CEO is to sense and respond … with the benefit of inputs from the organization … and to be an encouraging sponsor for those who see the future."

Despite some commonalities, strategic innovation differs from technological or product innovation. New technologies do not always yield successful products, nor are new products always strategically significant. Furthermore, some companies, such as Southwest Airlines Co., succeed through innovative strategies alone — without much innovation in either the underlying technologies or the products and services sold to customers.

A strategic innovation is a creative and significant departure from historical practice in at least one of three areas.[2] Those areas are design of the end-to-end value-chain architecture (for example, Dell Inc.'s direct-sales model); conceptualization of delivered customer value (IBM Corp.'s shift from selling hardware and software to selling complete solutions); and identification of potential customers (Canon Inc.'s pioneering focus on developing photocopiers for small offices rather than large corporations).

Strategic innovation involves exploring the unknown to create new knowledge and new possibilities. It proceeds with strategic experiments to test the viability of new business ideas.

## The Learning Imperative

In hindsight, executives involved with strategic experiments would no doubt agree on this: If there is one thing you can expect, it is that your initial expectations are wrong.[3] For example, when AT&T consulted McKinsey & Co. in the mid-1980s for advice on the cellular-telephone market, the company concluded that the worldwide potential was 900,000 units. Today, 900,000 new subscribers become mobile-phone users every three days.[4] When information is scarce and the future unknowable, intelligent people may make poor judgments. The error magnitudes for market-potential estimates are often measured in multiples rather than percentages. Establishing an expenditure level that is even in the right ballpark is nearly impossible on the first go-round.

To improve initial expectations and resolve the many unknowns associated with any new business, management teams must learn.[5] That learning must come through trial and error. The alternative — sufficient research, study and analysis to generate the perfect plan — is not practical for strategic experiments.

How does one learn by trial and error? Scientists have given us the scientific method: Design an experiment, predict outcomes on

> **A strategic innovation breaks with past practice in at least one of three areas: value-chain design, conceptualization of customer value and identification of potential customers.**

the basis of a hypothesis, measure outcomes, compare outcomes to predictions, and draw conclusions about the hypothesis based on the comparison. The last step is at the heart of the learning process.

In the ideal, scientific experiments meet five criteria: (1) results are available quickly, (2) results are unambiguous, (3) experiments can be isolated from outside influences, (4) experiments are inexpensive, and (5) they are repeatable. But strategic experiments are hardly ideal. They meet none of those criteria. Feedback may not be available for years, results are ambiguous, key variables cannot be isolated, and the experiments are too expensive to repeat.

This does not mean there is a better framework for ensuring timely learning, only that learning as strategic experiments proceed is difficult. Hence, many executives cultivate an experiment-and-learn attitude in themselves and among colleagues.

Still, lessons are not magically revealed, even to those with open minds. Learning requires conscious effort. It is an active pursuit,

and the planning cycle provides the natural context for it. Alas, conventional planning approaches create barriers to learning.

## The Conventional Planning Mind-Set

Understandably, executives view a rigorous financial-planning process as a crucial asset and are loath to alter it. A performance-oriented culture, one that holds people accountable for the numbers in the plans, is frequently touted as a hallmark of successful companies.[6] Even corporations that give leaders of strategic experiments freedom to create entirely different organizations — with different leadership styles, hiring practices, values and operating assumptions — often insist that budgeting and performance reviews fall under the established planning system.

Although conventional planning systems do not create barriers to learning for all types of innovation, planning approaches can and should be altered within strategic experiments.[7] The bedrock assumptions underlying conventional planning approaches do not apply. Historically, planning and control systems were designed to *implement a proven strategy* by ensuring *accountability* under the presumption of *reliable predictability.*[8] Planning systems for strategic experiments, by contrast, should be designed to *explore future strategies* by supporting *learning,* given the unpleasant reality of *reliable unpredictability.*

The difference between those opposing mind-sets becomes clear in the evaluation of outcomes. The first step in evaluating an outcome is to compare it to the prediction made in the plan. Any disparity can be explained in one of two ways: either the strategy was improperly implemented or the prediction was wrong. If the former holds true, someone must be held accountable. But if the prediction was wrong, future expectations must be adjusted given the new information. An accountability mind-set is so ingrained in many corporations that disparities between predictions and outcomes are almost always attributed to management performance. The performance expectation (the prediction) is sacred.

In a mature business, that is reasonable. But a presumption of reliable predictability is not an appropriate premise for planning within strategic experiments. When the future is unknowable, the foremost planning objective must be *learning,* not *accountability.* Certainly, managers must be accountable, but on a more subjective basis. How quickly are they learning? How quickly are they responding to new information?

Despite reliable unpredictability, predictions must be made. Learning follows from the diligent analysis of disparities between predictions and outcomes, with specific attention to the *stories, models* or *theories* upon which the predictions are based. Theory-focused planning provides the needed structure for such analysis. It leads to improved theories and improved predictions — proof that learning is happening. Better predictions, in turn, lead to better choices about strategy and funding levels.

A conventional planning mind-set, however, can derail a strategic experiment. For example, Corning Microarray Technologies encountered several unexpected barriers to getting to market. No supplier could make DNA shipments in the necessary quantities with sufficient quality and reliability. In early trials, processes for manufacturing microarrays failed to meet quality and reliability standards generally accepted for Corning products.

That should have resulted in reconsideration of early choices about the manufacturing process and reevaluation of expectations. However, operating under the presumption of reliable predictability and within a culture that emphasized numbers, the general manager felt pressure to turn around a business he saw as underperforming. No time for reevaluation; only an urgency to work harder. Tensions escalated as the team failed to catch up. Finally, senior management stepped in, replaced several managers, reset expectations (of financial results, time to market and quality) and revisited basic questions about the approach to manufacturing microarrays.

## Six Changes Make Theory-Focused Planning Work

Theory-focused planning requires six alterations to the conventional planning process. The first three changes relate to *building* a theory to make predictions (the forward-looking part of planning).

**Change No. 1: Level of Detail** Instead of demanding a lot of detail, limit focus to a small number of critical unknowns.

In planning for an established business, incorporating details such as revenue breakdowns by product line or by region is useful. Fine-grained comparisons between predictions and outcomes can help isolate and resolve problems. But such detail is unrealistic for a strategic experiment. The unknowns are too great. Further, the lessons are not in the details but in a handful of *critical unknowns* that can make or break a business.

Critical unknowns generally fall into three categories: market, technology and cost unknowns. For example, there were many unknowns for ADI when, in the early 1990s, it pursued the commercialization of a new semiconductor technology, microelectromechanical machines (MEMS) — chips with tiny moving parts. However, three unknowns were clearly the most crucial:

- *Most critical market unknown:* The most promising early application for MEMS was in new systems for launching automotive air bags. But would automakers risk a new approach?

- *Most critical technology unknown:* Could MEMS be manufactured at levels of reliability sufficient for an automotive-safety application?

- *Most critical cost unknown:* Could manufacturing yields be improved to levels consistent with other semiconductor manufacturing processes?

No amount of a priori analysis could resolve those unknowns, only experimenting and learning.

ADI's conventional planning did not emphasize a small number of critical unknowns. Like most corporations' planning, it focused on detailed projections of revenues, margins and profitability; planning discussions revolved around evaluations of those metrics. In spite of that, the critical unknowns were eventually resolved favorably, and today MEMS is profitable. Still, with a planning system that supported learning, the major uncertainties could have been resolved sooner, with fewer crises.

**Change No. 2: Communication of Expectations** Instead of focusing on the predictions themselves, focus on the theory used to generate the predictions and the theory's underlying assumptions.

Traditionally, predictions are recorded as numbers — usually precise ones. (More sophisticated plans for new ventures may include a range or perhaps a best-case, expected-case and worst-case scenario.) But in planning for a strategic experiment, the focus should be on the assumptions underlying the predictions, not on the predictions themselves. The most clearly communicated and detailed item in any plan for a strategic experiment should be a thorough description of the theory used to generate the predictions. Without a shared story about how a strategic experiment is expected to work, a management team cannot learn. Managers will not come to the same conclusions as new information is revealed.

Currently, the theory and its underlying assumptions are lost between the time when predictions are made and the time when those predictions are compared with outcomes, usually months later. The culprit is the ubiquitous spreadsheet. When you open a spreadsheet, you immediately see numbers — that is, the predictions themselves. To understand the logic behind those numbers, you would have to dig deep into the underlying equations. And after a few weeks, even the person who built the spreadsheet would find that difficult.

One approach to telling a story about how a business is expected to work is the *influence* or *bubble-and-arrow* diagram, which shows how multiple variables influence outcomes. (See "Drawing Influence Diagrams.") The influence diagram should convey how each major category of spending — such as research, product development, manufacturing, marketing and sales — ultimately affects revenues. The most important spending categories to include are those directly related to the critical unknowns. If possible, each bubble on the diagram should represent something measurable. Thus, a framework is established for gathering evidence that confirms or contradicts each cause-and-effect relationship.

In 2001, Thomson Corp.'s Thomson Learning launched its own strategic experiment — Universitas 21 Global (U21G). Pursued in pa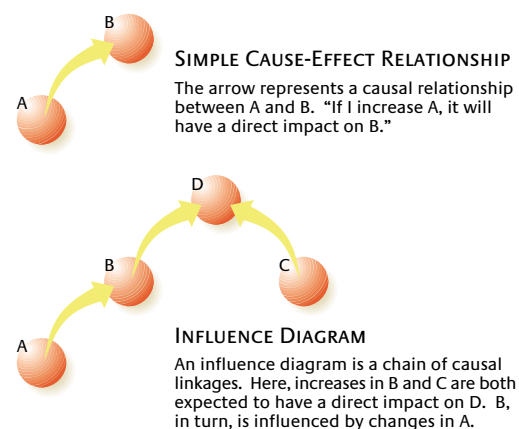rtnership with a worldwide consortium of universities, U21G ushered in a new era in higher education. U21G was conceived as a university with no campus and no classrooms. All operations were to be conducted completely online. When it opened in May 2003, U21G offered only an MBA degree and recruited from a few major Asian cities. But its leaders expect to add new programs and expand across the continent within a few years.

For U21G, faculty salaries will be a significant expense, and the effect of student-to-faculty ratio on student satisfaction in the online environment is a critical unknown. Theoretically, online learning offers the opportunity for a single faculty member to reach a wider audience. However, students may be more demanding of faculty than at a traditional university, seeking personal responses to e-mail on issues such as career advice or clarification of course concepts. What assumption can one make about adding extra faculty?

The relationship between the two factors is unknowable in advance. It cannot be extrapolated from experience at traditional institutions: It must be discovered. As the U21G provost commented, "We have a lot of experimentation to do ... to offer online instruction in ways that allow us to have a higher student-to-faculty ratio without sacrificing quality. I cannot say what the student-to-faculty ratio will be. I can only speculate." More is unknown than simply the appropriate student-to-faculty ratio to achieve high student satisfaction. The very nature of the relationship is unknown.[9]

## Drawing Influence Diagrams

Learning from strategic experiments requires building and then testing a theory. For a management team to learn together, the theory must be recorded, shared and later revisited. A good communication technique for capturing the essence of a theory — cause-and-effect relationships — is the influence diagram.*



**SIMPLE CAUSE-EFFECT RELATIONSHIP**
The arrow represents a causal relationship between A and B. "If I increase A, it will have a direct impact on B."



**INFLUENCE DIAGRAM**
An influence diagram is a chain of causal linkages. Here, increases in B and C are both expected to have a direct impact on D. B, in turn, is influenced by changes in A.

* The influence diagrams in each exhibit were created with *ithink* software from High Performance Systems, Inc., Lebanon, New Hampshire.

An influence diagram can capture a basic hypothesis about the relationship, as well as a theory of how student satisfaction ultimately affects revenues. The theory can be stated as follows: Adding faculty reduces the student-to-faculty ratio, which increases student satisfaction, which enhances the perceived attractiveness of U21G in the market, which leads to higher enrollments and higher revenues. The diagram also can show how increases in other major budget categories related to critical unknowns might have an impact on revenues — for instance, how an increase in sales and marketing spending might increase perceived product attractiveness and therefore enrollments. (See "Predicting an Uncertain Future.")

**Change No. 3: Nature of Predictions**  Instead of making specific numerical predictions for specific dates, predict the trends.

In a typical planning cycle, managers are asked to agree to a top-line number and a bottom-line number for the following year. For a strategic experiment, there is a better approach. Because any single-point prediction is certain to be wrong, and because new ventures are dynamic, it makes more sense to focus on trends. The rate and direction of change of a performance measure is usually a more important piece of information than its current value.

An easy way to incorporate the prediction of trends into plans is to supplement influence diagrams with trend graphs. Because such graphs represent many predictions over small intervals of time, they may appear to ask a great deal of planners. But the predictions do not require nearly the same level of accuracy as plans for a mature business. The *shape* of the curve is what is important. Simply choosing whether weeks, months or quarters is the right label for the x-axis (time) and estimating the magnitude of expected change (is a 10% change expected, a doubling, an increase by a factor of 10?) for the y-axis (the performance measure) is good enough. The purpose of graphing expected trends is to provide a quick warning if the actual trend is significantly different. If it is, say, a different direction or much faster or slower than expected, a change in strategy may be necessary.

To understand how combining influence diagrams with trend predictions results in a more complete theory, consider how U21G might have predicted the performance trends that could follow an increase in faculty. Clearly, an increase will immediately decrease student-to-faculty ratio. Beyond that, the supposition is that it will initially *decrease* student satisfaction — if new faculty struggle in the online environment for a while. It is the *shape* of the plot of actual outcomes over time, rather than any single student-satisfaction score, that will demonstrate if this worse-

Influence diagrams capture cause and effect, but a set of predictions is also needed to drive learning because analysis of disparities between predictions and outcomes is the critical learning step. Strategic experiments are highly uncertain. As a result, predictions can be made in the form of trend graphs, rather than numbers for specific dates.



INFLUENCE DIAGRAMS IDENTIFY BASIC HYPOTHESES ABOUT ACTIONS AND OUTCOMES.

TREND GRAPHS ENHANCE STORIES. THEY MAKE HYPOTHESES ABOUT EXPECTED OUTCOMES EXPLICIT FOR LATER TESTING.
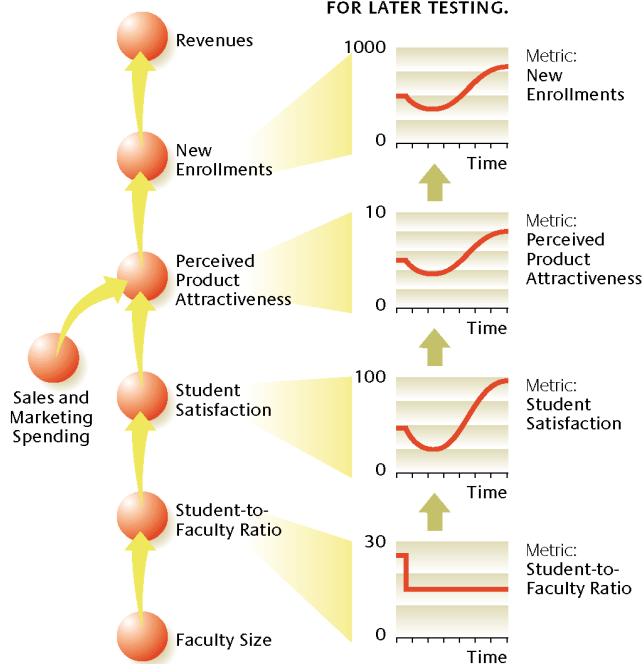
before-better hypothesis is correct. To evaluate the long-term impact of increased faculty, U21G would have to wait for the trend to play out. The remaining trend graphs, for perceived product attractiveness and enrollments, indicate a theory that the market reaction is not instantaneous — information about student satisfaction may be absorbed slowly by the market.

The second set of changes to traditional planning relate to *testing* the theory by comparing the predictions with actual outcomes (the evaluative part of planning).

**Change No. 4: Frequency of Strategic Reviews**  Instead of reviewing outcomes annually to reevaluate fundamental business assumptions, do so monthly — or more frequently as necessitated by new information.

In mature businesses, outcomes may be reviewed as often as weekly. However, such reviews are generally quick status checks to identify any variances that require immediate attention for getting back on plan. For most corporations, it is only during the

major annual planning cycle that the strategy of the business is reconsidered. Between planning periods, management teams focus on execution.

If learning as quickly as possible is a primary goal in managing a new venture, the strategy itself — in particular, the critical unknowns highlighted on the influence diagram — must be reevaluated at least monthly. Leaders must be prepared to make major course changes at each review. To many, a monthly strategic review will seem onerous. But the time required for each review is much less than for the typical annual-planning exercise because it addresses only the critical unknowns.

More frequent strategic reviews would have been particularly helpful to a multinational corporation we will call Capston-White, which launched a venture to commercialize services for managing printing, imaging and copying assets within large organizations. After about two years, the management team decided that to be credible, the company needed a wide range of offerings, from maintenance to complex consulting services. Outside advisers confirmed the validity of the one-stop-shop strategy, and additional resources were committed.

Tremendous hiring followed, plus construction of a sophisticated IT system to support the expected growth. However, the most critical assumption — whether the market was really ready for expanded service — was not quickly tested. IT executives — the potential customers — *claimed* they were interested in managing their printing and imaging assets more sensibly, but in reality they had more pressing concerns. One executive associated with the venture explained: "If you asked CIOs in the late 1990s,

**Change No. 5: Perspective in Time** Instead of reviewing only current-period outcomes, consider the history of the strategic experiment in its entirety and look at trends over time.

If the format for predicting is a trend graph, then the same format for reporting outcomes must be used. But in many corporations, little previous history is considered during planning reviews. Often only the results from the most recent period are reported, along with year-to-date figures. If historical data are used at all, they go into a regression analysis to forecast revenues.

But lessons are embedded in history. Each performance measure identified on the influence diagram should be plotted over time. Updated plots should be regularly compared with predicted trends. In that way, rates of change are readily visible, and the shape of each plotted curve enhances intuition as predictions are updated. Companies can avoid the dangerous mind-set that one finance executive described: "With new ventures, you have to have a short memory, because you know you are going to fail a lot."

**Change No. 6: Nature of Measures** Instead of relying on a mix of financials and nonfinancials to measure outcomes, focus on leading indicators.

Traditional plans emphasize financial outcomes. But financial outcomes are highly ambiguous in new ventures — profitability, for example, is many years away, and precision about the magnitude of early losses is difficult. To learn as quickly as possible, plans for strategic experiments should emphasize leading indicators, which provide the first clues to whether the assumptions in the plan are realistic. (See "From Verbal Theory to Diagrams.")

> When higher-level executives finally turned to the strategic experiment and made the necessary changes, the cost was much higher than it would have been with more frequent reviews.

they were concerned with two big things, the Y2K bug and the euro. Plus they were worried about getting a hot new Internet infrastructure up and running." So the new service offerings did not attract customers as expected.

Nonetheless, driven by a culture of accountability to the plan and by an assumption of reliable predictability, the venture's general manager kept investing heavily, expecting imminent growth despite all evidence to the contrary. The annual planning rhythm and the small size of the venture relative to the corporation caused the disappointing revenues to escape bold action from senior management for nearly two years. When executives finally made dramatic budget cuts and changes in leadership, the cost was much higher than it would have been with more frequent reviews.

With an influence diagram, it is easy to identify the leading indicators: they are the measures closest to the bottom and closest to the bubbles for key budget categories. For example, the influence diagram for U21G indicates that student-to-faculty ratio and student satisfaction are leading indicators.

For New York Times Digital (NYTD), the online subsidiary of the New York Times Co., a critical unknown was the extent to which online readership would cannibalize subscriptions to the paper's print version. Naturally, the possibility created tension between NYTD and the newspaper. To resolve the issue, NYTD conducted substantial research and discovered the unexpected. As one NYTD executive explained: "The Web opened up a whole new audience for discovery and sampling. Nobody comes on the Web and reads the whole paper in one sitting. It is a different kind

For many, trying to draw an influence diagram immediately is challenging. Instead, a written narrative of how a business is expected to work can be created, then studied for cause-and-effect statements that can be readily translated into a diagram. For example, Corning might have described its theory about how the Microarray Technologies venture was expected to work as follows:

"We must combine our own expertise in precision glass manufacturing and the control of tiny quantities of fluid with outside knowledge of biotechnology. If we can do this effectively, we should be able to develop an outstanding process for manufacturing microarrays. Product reliability will be high, and costs will be low enough that we can offer significant value to potential customers, who otherwise must create their own microarrays or purchase expensive closed systems for experimentation. Provided that we can encourage the adoption of open standards that are consistent with our product design, the market should find our product highly attractive, and we should achieve rapid revenue growth."

The corresponding influence diagram (at right) is not a complete description of the business. Instead, it focuses on the critical unknowns described above.
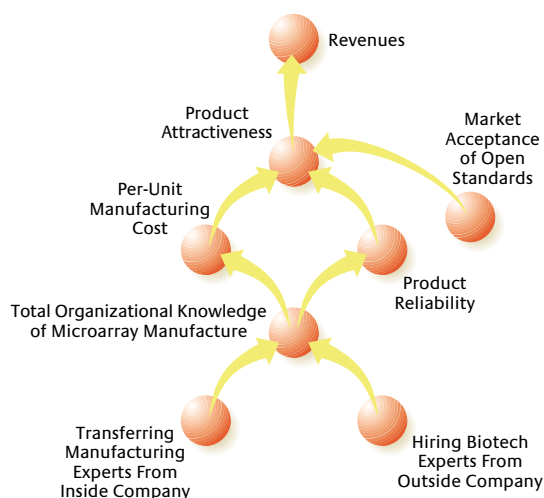


of experience. So we were able to use the Web site as a vehicle to generate subscriptions to the newspaper."

NYTD closely monitored a leading indicator of its contribution to the corporation's overall performance: subscription gains and losses attributable to NYTD. Soon it was clear that gains outweighed losses. New readers from outside the New York metropolitan area were subscribing to the newspaper after sampling it online. Soon the Web site became the newspaper's second most important source of new subscriptions.

## Sailing Over the Edge of the Known World

Theory-focused planning is appropriate when more is unknown than known — when an industry is just emerging, no business model is established, and the uncertainties are so large that not even the basic nature of the relationships between activities and outcomes is clear. In this context, planning must support the objective of *testing* a strategy through experimentation. Reliable predictions are not possible.

Theory-focused planning represents a significant departure from conventional planning practices, starting with the idea that planning within strategic experiments must emphasize learning, not accountability. Unfortunately, corporations often become disciplined followers of planning protocols that do the opposite — they emphasize accountability over learning.

To establish a context for learning, theories that generate predictions must be explicitly shared, recorded and later revisited. Influence diagrams and performance-over-time graphs are two excellent tools that support the process. Additionally, learning is

most likely to occur when the planning process focuses on critical unknowns, demands monthly strategic-change reviews, includes history going back to the venture's inception, and emphasizes leading indicators.

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porate Venturing: Creating New Businesses Within the Firm" (Boston: Harvard Business School Press, 1993).

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**6.** See K.A. Merchant, "Rewarding Results: Motivating Profit Center Managers" (Boston: Harvard Business School Press, 1989); and J.A. Maciariello and C.J. Kirby, "Management Control Systems: Using Adaptive Systems To Attain Control" (New York: Pearson Education, 1994).

**7.** This notion has also been advanced by R.G. McGrath and I.C. MacMillan, "Discovery-Driven Planning," Harvard Business Review 73 (July-August 1995): 44-54. Theory-focused planning is based on the same premise — that conventional planning is inappropriate when more is unknown than known. However, it differs in most particulars. The discovery-driven planning approach is appropriate when the industry being entered is established, the business model well known, and the uncertainties for the venture can be reduced to identifiable operational parameters. Theory-focused planning is appropriate when the industry is emerging, the business model is experimental, and the uncertainties so great that the basic nature of the relationships between activities and outcomes is unknown.

**8.** See, for example, R.N. Anthony and V. Govindarajan, "Management Control Systems," 11th ed. (New York: McGraw-Hill, 2004), which focuses on the use of planning and control systems to implement (as opposed to test) strategies. Within this context, there have been several important developments in the field of management planning and control. One example is the value in combining financial measures ("outcome measures") and nonfinancial measures ("performance drivers") in evaluating the performance of managers, a development that goes as far back as the "measurement project" at General Electric Co. in the 1950s. See Anthony, "Management Control Systems," 557-564. The notion of blending financial and nonfinancial measures in the context of implementing strategies has been refined by others. See, for example, J.K. Shank and V. Govindarajan, "Strategic Cost Management: The New Tool for Competitive Advantage" (New York: Free Press, 1993) for a development of the concept of "key success factors," or R.S. Kaplan and D.P. Norton, "The Balanced Scorecard: Translating Strategy Into Action" (Boston: Harvard Business School Press, 1996). Our objective in this article is to redefine planning and control for a different purpose — testing a highly uncertain strategy through experimentation and learning, when a priori predictions of the future are not possible.

**9.** Again, refer to McGrath and MacMillan's concept of discovery-driven planning (DDP). In this example, DDP would be appropriate if the question were whether the necessary student-to-faculty ratio is 10:1. But for Universitas 21 Global, the question is much more fundamental: To what extent does student-to-faculty ratio have an impact on student satisfaction? Theory-focused planning is designed to facilitate resolution of this type of unknown.

# The 12 Different Ways for Companies to Innovate

Companies with a restricted view of innovation can miss opportunities. A new framework called the "innovation radar" helps avoid that.

**Mohanbir Sawhney,**

**Robert C. Wolcott**

**and Inigo Arroniz**

**F**aced with slow growth, commoditization and global competition, many CEOs view innovation as critical to corporate success. William Ford Jr., chairman and CEO of Ford Motor Co., recently announced that, "[f]rom this point onward, innovation will be the compass by which the company sets its direction" and that Ford "will adopt innovation as its core business strategy going forward."[1] Echoing those comments, Jeffrey Immelt, chairman and CEO of General Electric Co., has talked about the "Innovation Imperative," a belief that innovation is central to the success of a company and the only reason to invest in its future.[2] Thus GE is pursuing around 100 "imagination breakthrough" projects to drive growth though innovation. And Steve Ballmer, Microsoft Corp.'s CEO, stated recently that "innovation is the only way that Microsoft can keep customers happy and competitors at bay."[3]

But what exactly is innovation? Although the subject has risen to the top of the CEO agenda, many companies have a mistakenly narrow view of it. They might see innovation only as synonymous with new product development or traditional research and development. But such myopia can lead to the systematic erosion of competitive advantage, resulting in firms within an industry looking more similar to each other over time.[4] Best practices get copied, encouraged by benchmarking. Consequently, companies within an industry tend to pursue the same customers with similar offerings, using undifferentiated capabilities and processes. And they tend to innovate along the same dimensions. In technology-based industries, for example, most firms focus on product R&D. In the chemical or oil and gas industries, the emphasis is on process innovations. And consumer packaged-goods manufacturers tend to concentrate on branding and distribution. But if all firms in an industry are seeking opportunities in the same places, they tend to come up with the same innovations. Thus, viewing innovation too narrowly blinds companies to opportunities and leaves them vulnerable to competitors with broader perspectives.

In actuality, "business innovation" is far broader in scope than product or technological innovation, as evidenced by some of the most successful

*Mohanbir Sawhney is the McCormick Tribune Professor of Technology and the Director of the Center for Research in Technology & Innovation at Northwestern University's Kellogg School of Management in Evanston, Illinois. **Robert C. Wolcott** is a fellow and adjunct professor and **Inigo Arroniz** is a postdoctoral fellow at the Center for Research in Technology & Innovation. They can be reached at mohans@kellogg.northwestern.edu, r-wolcott@kellogg.northwestern.edu and i-arroniz@kellogg.northwestern.edu.*

companies in a wide range of industries. Starbucks Corp., for example, got consumers to pay $4 for a cup of latte, not because of better-tasting coffee but because the company was able to create a customer experience referred to as "the third place" — a communal meeting space between home and work where people can unwind, chat and connect with each other. Dell Inc. has become the world's most successful personal computer manufacturer, not through R&D investments but by making PCs easier to use, bringing products to market more quickly and innovating on processes like supply-chain management, manufacturing and direct selling. And Google has become a multibillion-dollar goliath not because it has the best search engine, but because it pioneered "paid search" — the powerful concept that vendors would be willing to pay Google to match consumers with relevant offerings as a byproduct of free searches the consumers conduct.

Conversely, technological innovation in the laboratory does not necessarily translate into customer value. For instance, high-definition television is a radically new innovation from a technological perspective, requiring new recording, transmission and receiving equipment, communication frequencies and programming. But the result — an incremental improvement in picture sharpness — is of limited value to the general consumer. One of the most technologically advanced computers ever created was the NeXT Cube, developed by Steve Jobs' company NeXT Computer, Inc. The product featured a host of technological advances, including clickable embedded graphics and audio within e-mail, object-oriented programming, magneto-optical storage and an innovative operating system. But the NeXT Cube was a commercial flop. Few compatible software applications were available, and consumers balked at the prospect of switching to a radically new system.

## Defining Business Innovation

To avoid innovation myopia, we propose anchoring the discussion on the customer outcomes that result from innovation, and we suggest that managers think holistically in terms of all possible dimensions through which their organizations can innovate. Accordingly, we define business innovation as the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system. This definition leads to the following three important characterizations.

**Business Innovation is About New *Value,* Not New *Things*.** Innovation is relevant only if it creates value for customers — and therefore for the firm. Thus creating "new things" is neither

necessary nor sufficient for business innovation.[5] Customers are the ones who decide the worth of an innovation by voting with their wallets. It makes no difference how innovative a company thinks it is. What matters is whether customers will pay.

**Business Innovation Comes in Many Flavors.** Innovation can take place on any dimension of a business system. The Home Depot Inc., for example, innovated by targeting "do it yourselfers," an underserved customer segment. JetBlue Airways Corp. has succeeded in the U.S. domestic airline market by offering a better customer experience that includes live satellite television, leather seats and fashionably clad flight attendants. And Cisco Systems Inc. has improved its margins through process innovations, such as the company's ability to close its quarterly financial accounts on the same day that its quarter ends.

**Business Innovation is Systemic.** Successful business innovation requires the careful consideration of all aspects of a business. A great product with a lousy distribution channel will fail just as spectacularly as a terrific new technology that lacks a valuable end-user application. Thus, when innovating, a company must consider all dimensions of its business system.

## A 360-Degree View

The question then immediately arises: How many possible dimensions of business innovation are there, and how do they relate to each other? For three years, we have examined that issue in depth with a group of leading companies, including Motorola, Chamberlain Group ADT, Sony, MicroSoft and ConocoPhilips. (See "About the Research," p. 76.) Based on discussions with managers leading innovation efforts at these companies and a comprehensive survey of the academic literature on the topic, we have developed, validated and applied a new framework called the "innovation radar." This tool presents and relates all of the dimensions through which a firm can look for opportunities to innovate. Much like a map, the innovation radar consists of four key dimensions that serve as business anchors: (1) the offerings a company creates, (2) the customers it serves, (3) the processes it employs and (4) the points of presence it uses to take its offerings to market. Between these four anchors, we embed eight other dimensions of the business system that can serve as avenues of pursuit. Thus, the innovation radar contains a total of 12 key dimensions. (See "The Innovation Radar," above and "The 12 Dimensions of Business Innovation," p. 78.)

The innovation radar displays the 12 dimensions of business innovation, anchored by the offerings a company creates, the customers it serves, the processes it employs and the points of presence it uses to take its offerings to market.
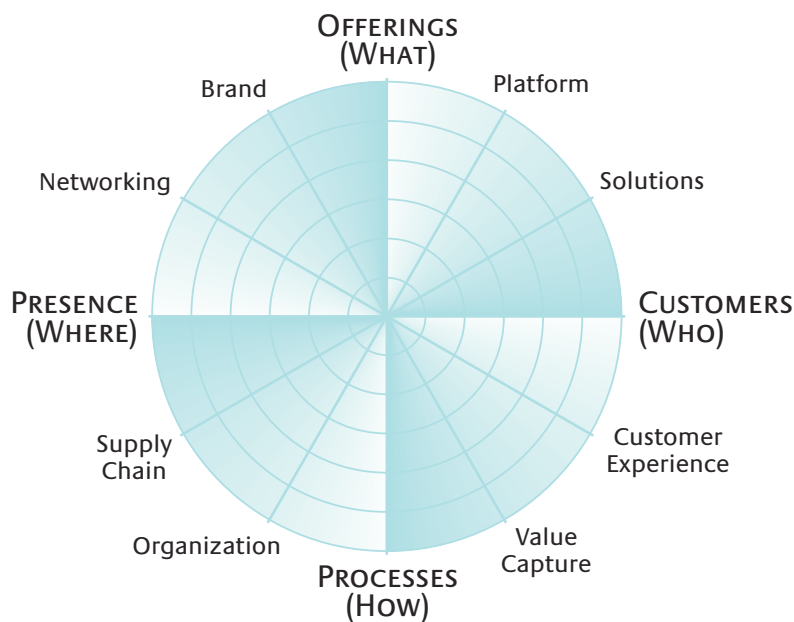


**Offerings** Offerings are a firm's products and services. Innovation along this dimension requires the creation of new products and services that are valued by customers. Consider the Procter & Gamble Company's Crest SpinBrush. Introduced in 2001, the product became the world's best-selling electric toothbrush by 2002. A simple design and the use of disposable AA batteries translated into ease of use, portability and affordability. Moreover, Procter & Gamble's no-frills approach enabled the Spin-Brush to be priced at around $5, substantially cheaper than competing products.

**Platform** A platform is a set of common components, assembly methods or technologies that serve as building blocks for a portfolio of products or services. Platform innovation involves exploiting the "power of commonality" — using modularity to create a diverse set of derivative offerings more quickly and cheaply than if they were stand-alone items. Innovations along this dimension are frequently overlooked even though their power to create value can be considerable. Platform innovation, for example, has allowed Nissan Motor Co. to resurrect its fortunes in the automotive industry. The company has relied on a common set of components to develop a line of cars and sport utility vehicles with markedly different styles, performance and market positioning. Nissan uses essentially the same small engine block (a

## The 12 Dimensions of Business Innovation

| Dimension | Definition | Examples |
|---|---|---|
| **Offerings** | Develop innovative new products or services. | • Gillette Mach3Turbo razor<br>• Apple iPod music player and iTunes music service |
| **Platform** | Use common components or building blocks to create derivative offerings. | • General Motors OnStar telematics platform<br>• Disney animated movies |
| **Solutions** | Create integrated and customized offerings that solve end-to-end customer problems. | • UPS logistics services Supply Chain Solutions<br>• DuPont Building Innovations for construction |
| **Customers** | Discover unmet customer needs or identify underserved customer segments. | • Enterprise Rent-A-Car focus on replacement car renters<br>• Green Mountain Energy focus on "green power" |
| **Customer Experience** | Redesign customer interactions across all touch points and all moments of contact. | • Washington Mutual Occasio retail banking concept<br>• Cabela's "store as entertainment experience" concept |
| **Value Capture** | Redefine how company gets paid or create innovative new revenue streams. | • Google paid search<br>• Blockbuster revenue-sharing with movie distributors |
| **Processes** | Redesign core operating processes to improve efficiency and effectiveness. | • Toyota Production System for operations<br>• General Electric Design for Six Sigma (DFSS) |
| **Organization** | Change form, function or activity scope of the firm. | • Cisco partner-centric networked virtual organization<br>• Procter & Gamble front-back hybrid organization for customer focus |
| **Supply Chain** | Think differently about sourcing and fulfillment. | • Moen ProjectNet for collaborative design with suppliers<br>• General Motors Celta use of integrated supply and online sales |
| **Presence** | Create new distribution channels or innovative points of presence, including the places where offerings can be bought or used by customers. | • Starbucks music CD sales in coffee stores<br>• Diebold RemoteTeller System for banking |
| **Networking** | Create network-centric intelligent and integrated offerings. | • Otis Remote Elevator Monitoring service<br>• Department of Defense Network Centric Warfare |
| **Brand** | Leverage a brand into new domains. | • Virgin Group "branded venture capital"<br>• Yahoo! as a lifestyle brand |

3.5-liter V6) to power its upscale models of a midsize sedan (Altima), large sedan (Maxima), luxury sedans (Infiniti G and M series), minivan (Quest) and sports coupe (350Z). Clever modifications of the common engine allow the production of anywhere between 245 and 300 horsepower, creating enough distinctiveness between the vehicles while gaining efficiency advantages.

**Solutions** A solution is a customized, integrated combination of products, services and information that solves a customer problem. Solution innovation creates value for customers through the breadth of assortment and the depth of integration of the different elements. An example here is Deere & Co., which has combined an array of products and services (including mobile computers, a Global Positioning System-based tracking system and software) to provide an end-to-end solution to farmers who

need to improve their sowing, tilling and harvesting, as well as manage the business aspects of their operations more effectively.

**Customers** are the individuals or organizations that use or consume a company's offerings to satisfy certain needs. To innovate along this dimension, the company can discover new customer segments or uncover unmet (and sometimes unarticulated) needs. Virgin Mobile USA was able to successfully enter the U.S. cellular services market late by focusing on consumers under 30 years old — an underserved segment. To attract that demographic, Virgin offered a compelling value proposition: simplified pricing, no contractual commitments, entertainment features, stylish phones and the irreverence of the Virgin brand. Within three years of its 2002 launch, Virgin had attracted several million subscribers in the highly competitive market.

**Customer Experience** This dimension considers everything a customer sees, hears, feels and otherwise experiences while interacting with a company at all moments. To innovate here, the company needs to rethink the interface between the organization and its customers. Consider how the global design firm IDEO, headquartered in Palo Alto, California, has helped health care provider Kaiser Permanente to redesign the customer experience provided to patients.[6] Kaiser has created more comfortable waiting rooms, lobbies with clearer directions and larger exam rooms with space for three or more people and curtains for privacy. Kaiser understands that patients not only need good medical care but also need to have better experiences before, during and after their treatments.

**Value Capture** refers to the mechanism that a company uses to recapture the value it creates. To innovate along this dimension, the company can discover untapped revenue streams, develop novel pricing systems and otherwise expand its ability to capture value from interactions with customers and partners. Edmunds.com, the popular automotive Web site, is a case in point. The company generates revenues from an array of sources, including advertising; licensing of its tools and content to partners like *The New York Times* and America Online; referrals to insurance, warranty and financing partners; and data on customer buying behavior that are collected through its Web site and sold to third parties. These various revenue streams have significantly increased Edmunds' average sales per visitor.

**Processes** are the configurations of business activities used to conduct internal operations. To innovate along this dimension, a company can redesign its processes for greater efficiency, higher quality or faster cycle time. Such changes might involve relocating a process or decoupling its front-end from its back-end. That's the basis of the success of many information technology services firms in India, including companies like Wipro Infotech and Infosys Technologies Ltd. that have created enormous value by perfecting the model of delivering business processes as an outsourced service from a remote location. To accomplish this, each process is decomposed into its constituent elements so that cross-functional teams in multiple countries can perform the work, and the project is coordinated through the use of well-defined protocols. The benefits are flexibility and speed to market, access to a competitive pool of talent (the highly educated and relatively low-cost Indian knowledge worker) and the freedom to redirect resources to core strategic activities.

**Organization** is the way in which a company structures itself, its partnerships and its employee roles and responsibilities. Organizational innovation often involves rethinking the scope of the firm's activities as well as redefining the roles, responsibilities and incentives of different business units and individuals. Thomson Financial, a New York City-based provider of information and technology applications for the financial services industry, transformed its organization by structuring around customer segments instead of products. In this way, Thomson was able to align its operational capabilities and sales organization with customer needs, enabling the company to create offerings like Thomson ONE, an integrated work-flow solution for specific segments of financial services professionals.

**Supply Chain** A supply chain is the sequence of activities and agents that moves goods, services and information from source to delivery of products and services. To innovate in this dimension, a company can streamline the flow of information through the supply chain, change its structure or enhance the collaboration of its participants. Consider how the apparel retailer Zara in La Coruña, Spain, was able to create a fast and flexible supply chain by making counterintuitive choices in sourcing, design, manufacturing and logistics. Unlike its competitors, Zara does not fully outsource its production. Instead it retains half in-house, allowing it to locate its manufacturing facilities closer to its markets to cut product lead times. Zara eschews economies of scale by making small lots and launching a plethora of designs, allowing it to refresh its designs almost weekly. The company also ships garments on hangers, a practice that requires more warehouse space but allows new designs to be displayed more quickly. Thanks to such practices, Zara has decreased the design-to-retail cycle to as short as 15 days and is able to sell most merchandise at full price.

> **Organizational innovation often involves rethinking the scope of the firm's activities as well as redefining people's roles, responsibilities and incentives.**

**Presence** Points of presence are the channels of distribution that a company employs to take offerings to market and the places where its offerings can be bought or used by customers. Innovation in this dimension involves creating new points of presence or using existing ones in creative ways. That's what Titan Industries Ltd. did when it entered the Indian market with stylish quartz

## Innovation Profiles of Four Leading Latin American Banks

Benchmarking the innovation radars of competitors can reveal the relative strengths and weaknesses of each company.
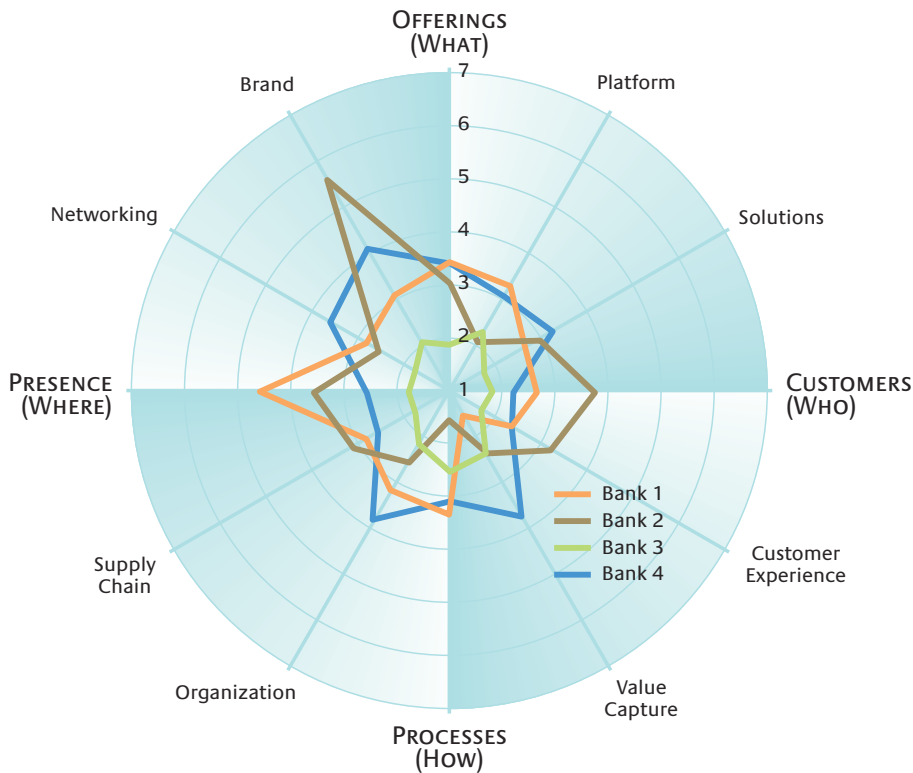


wristwatches in the 1980s. Initially, Titan was locked out of the market because the traditional watch retailing channels were controlled by a competitor. But the company took a fresh look at the industry and asked itself the following fundamental question: Must watches be sold at watch stores? In answering that, Titan found that target customers also shopped at jewelry, appliance and consumer electronics stores. So the company pioneered the concept of selling watches through free-standing kiosks placed within other retail stores. For service and repair, Titan established a nationwide aftersales network through which customers could get their watches fixed. Such innovations have enabled Titan not only to enter the Indian market but also to become the industry leader.

**Networking** A company and its products and services are connected to customers through a network that can sometimes become part of the firm's competitive advantage. Innovations in this dimension consist of enhancements to the network that increase the value of the company's offerings. Consider how Mexican industrial giant CEMEX was able to redefine its offerings in the ready-to-pour concrete business. Tradition-

ally, CEMEX offered a three-hour delivery window for ready-to-pour concrete with a 48-hour advance ordering requirement. But construction is an unpredictable business. Over half of CEMEX's customers would cancel orders at the last minute, causing logistical problems for the company and financial penalties for customers. To address that, CEMEX installed an integrated network consisting of GPS systems and computers in its fleet of trucks, a satellite communication system that links each plant and a global Internet portal for tracking the status of orders worldwide. This network now allows CEMEX to offer a 20-minute time window for delivering ready-to-pour concrete, and the company also benefits from better fleet utilization and lower operating costs.

**Brand** are the symbols, words or marks through which a company communicates a promise to customers. To innovate in this dimension, the company leverages or extends its brand in creative ways. London-based easy-Group has been a leader in this respect. Founded by Stelios Haji-Ioannou, easyGroup owns the "easy" brand and has licensed it to a range of businesses. The core promises of the brand are good value and simplicity, which have now been extended to more than a dozen industries through various offerings such as easyJet, easyCar, easyInternetcafé, easyMoney, easyCinema, easyHotel and easyWatch.

## Putting the Innovation Radar to Work

The various examples of Nissan, Virgin, Edmunds.com and others help illustrate the many possible avenues of innovation, but companies can reap greater value by thinking of those dimensions as intertwined within a business system. Consider Apple Computer Inc. Its famously successful iPod is more than a nifty product. It is also an elegant solution for customers (simple, integrated buying and consumption of digital music), content owners (secure pay-per-song model for legal music downloads) and its manufacturer (the discovery of new growth markets). With respect to the innovation radar, Apple attacked not only the offerings and platform dimensions but also the supply chain (content owners), presence (portability of a cus-

tomer's *entire* collection of music, photos and videos), networking (connecting with Mac or Windows computers), value capture (iTunes), customer experience (the complete iPod experience) and brand (extending the Apple brand).

In our current research, we are investigating how companies can use the innovation radar to construct a strategic approach to innovation. Specifically, the radar could help a firm determine how its current innovation strategy stacks up against its competitors. Using that information, the company could then identify opportunities and prioritize on which dimensions to focus its efforts. For example, we have worked with a top global bank to benchmark its innovation profile against that of its top three competitors in a major Latin American country. (See "Innovation Profiles of Four Leading Latin American Banks," p. 80.) Such analyses can reveal the strengths and weaknesses of each company as well as any promising opportunities, particularly those overlooked by the industry as a whole.[7]

Traditionally, most firms' innovation strategies are the result of simple inertia ("this is what we've always innovated on") or industry convention ("this is how everyone innovates"). But when a company identifies and pursues neglected innovation dimensions, it can change the basis of competition and leave other firms at a distinct disadvantage because each dimension requires a different set of capabilities that cannot be developed or acquired overnight. And innovating along one dimension often influences choices with respect to other dimensions. Brand innovation, for example, might require concurrent innovations along the dimensions of customer experience, offerings and presence. As such, selecting and acting on dimensions that define a firm's innovation strategy requires a deliberate, portfolio-based approach that must be communicated clearly within the company as well as to external constituents. All of that takes considerable effort and time. So, for instance, when Enterprise Rent-A-Car Co. began placing rental car locations in the neighborhoods where people lived and worked rather than at airports (thus innovating

**When a company is able to identify and pursue neglected innovation dimensions, it can change the basis of competition, leaving other firms at a distinct disadvantage.**

along the dimensions of customers and presence), entrenched competitors Hertz Corp. and Avis Corp. found it difficult to respond.

As we continue to expand our database of radar profiles, we will be able to test a broad set of hypotheses. For example, our research to date supports the notion that successful innovation strategies tend to focus on a few high-impact dimensions, rather than attempting a shotgun approach along many dimensions at once. Ultimately, the innovation radar could guide the way companies manage the increasingly complex business systems through which they add value, enabling innovation beyond products and technologies. In doing so, the framework could become an important tool for corporate executives, entrepreneurs and venture capitalists — anyone seeking growth through innovation.

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**4.** Organization-theory researchers have shown that firms competing in the same markets begin to look increasingly similar through a process referred to as "isomorphism." See, for instance, M.T. Hannan and J. Freemen, "Organizational Ecology" (Cambridge, Mass.: Harvard University Press, 1989).

**5.** Joseph Schumpeter's seminal work in this area identifies "new combinations" of existing things as fundamental to the definition and accomplishment of innovation. See J. Schumpeter, "The Theory of Economic Development" (Cambridge, Mass.: Harvard University Press, 1934).

**6.** B. Nussbaum, "The Power of Design," Business Week, May 17, 2004, 86.

**7.** The challenge is figuring out which of the radar dimensions might mean the most to customers and why. Customer value is often not apparent when a company is attempting to innovate in areas traditionally neglected by an industry. There might be few precedents to validate the firm's beliefs and assumptions, and customers are often unable to provide helpful feedback regarding a new direction. However, it is this uncertainty that provides significant opportunity. Researchers have discovered numerous practical insights regarding conquering the inherent risk involved in innovation. See, in particular, R.G. McGrath and I. MacMillan, "The Entrepreneurial Mindset: Strategies for Continuously Creating Opportunity in an Age of Uncertainty" (Boston: Harvard Business School Press, 2000); and S.H. Thomke, "Experimentation Matters: Unlocking the Potential of New Technologies for Innovation" (Boston: Harvard Business School Press, 2003).

# The Era of **Open Innovation**

Companies are increasingly rethinking the fundamental ways in which they generate ideas and bring them to market — harnessing external ideas while leveraging their in-house R&D outside their current operations.

**Henry W. Chesbrough**

In the past, internal R&D was a valuable strategic asset, even a formidable barrier to entry by competitors in many markets. Only large corporations like DuPont, IBM and AT&T could compete by doing the most R&D in their respective industries (and subsequently reaping most of the profits as well). Rivals who sought to unseat those powerhouses had to ante up considerable resources to create their own labs, if they were to have any chance of succeeding. These days, however, the leading industrial enterprises of the past have been encountering remarkably strong competition from many upstarts. Surprisingly, these newcomers conduct little or no basic research on their own, but instead get new ideas to market through a different process.

Consider Lucent Technologies, which inherited the lion's share of Bell Laboratories after the breakup of AT&T. In the 20th century, Bell Labs was perhaps the premier industrial research organization and this should have been a decisive strategic weapon for Lucent in the telecommunications equipment market. However, things didn't quite work out that way. Cisco Systems, which lacks anything resembling the deep internal R&D capabilities of Bell Labs, somehow has consistently managed to stay abreast of Lucent, even occasionally beating the company to market. What happened?

Although Lucent and Cisco competed directly in the same industry, the two companies were not innovating in the same manner. Lucent devoted enormous resources to exploring the world of new materials and state-of-the-art components and systems, seeking fundamental discoveries that could fuel future generations of products and services. Cisco, on the other hand, deployed a very different strategy in its battle for innovation leadership. Whatever technology the company needed, it acquired from the outside, usually by partnering or investing in promising startups (some, ironically, founded by ex-Lucent veterans).

*Henry W. Chesbrough is an assistant professor at Harvard Business School in Boston. He can be reached at henry@chesbrough.com. His book, "Open Innovation: The New Imperative for creating and Profiting from Technology" (Harvard Business School Press, 2003), provides a detailed description of the open innovation model.*
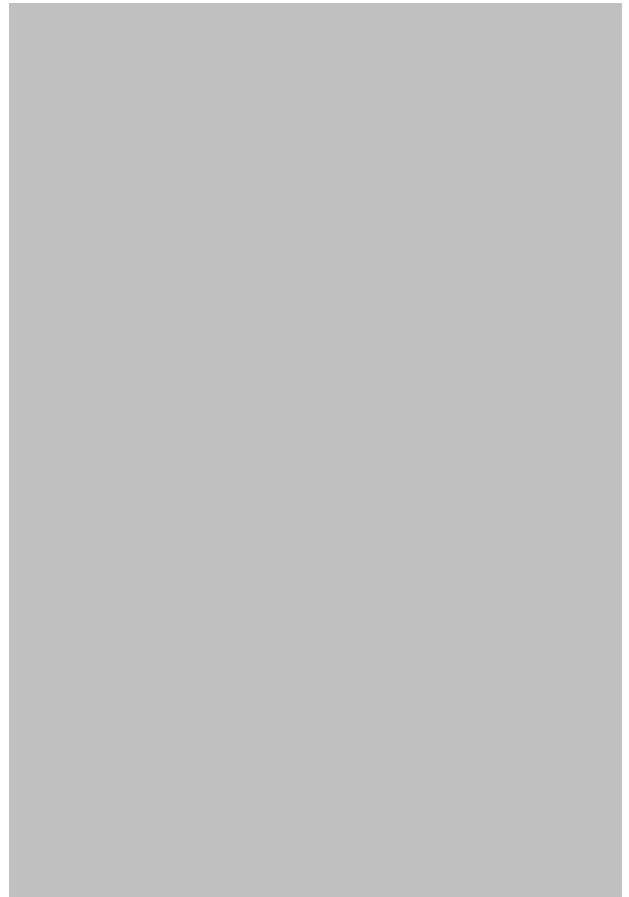
In this way, Cisco kept up with the R&D output of perhaps the world's finest industrial R&D organization, all without conducting much research of its own.

The story of Lucent and Cisco is hardly an isolated instance. IBM's research prowess in computing provided little protection against Intel and Microsoft in the personal computer hardware and software businesses. Similarly, Motorola, Siemens and other industrial titans watched helplessly as Nokia catapulted itself to the forefront of wireless telephony in just 20 years, building on its industrial experience from earlier decades in the low-tech industries of wood pulp and rubber boots. Pharmaceutical giants like Merck and Pfizer have also watched as a number of upstarts, including Genentech, Amgen and Genzyme, has parlayed the research discoveries of others to become major players in the biotechnology industry.

## From Closed to Open

Is innovation dead? Hardly, as punctuated by the recent advances in the life sciences, including revolutionary breakthroughs in genomics and cloning. Then why is internal R&D no longer the strategic asset it once was? The answer lies in a fundamental shift in how companies generate new ideas and bring them to market. In the old model of *closed innovation,* firms adhered to the following philosophy: *Successful innovation requires control.* In other words, companies must generate their own ideas that they would then develop, manufacture, market, distribute and service themselves (see "The Closed Innovation Model"). This approach calls for self-reliance: If you want something done right, you've got to do it yourself.

For years, the logic of closed innovation was tacitly held to be self-evident as the "right way" to bring new ideas to market and successful companies all played by certain implicit rules. They invested more heavily in internal R&D than their competitors and they hired the best and the brightest (to reap the rewards of the industry's smartest people). Thanks to such investments, they were able to discover the best and greatest number of ideas, which allowed them to get to market first. This, in turn, enabled them to reap most of the profits, which they protected by aggressively controlling their intellectual property (IP) to prevent competitors from exploiting it. They could then reinvest the profits in conducting more R&D, which then led to additional breakthrough discoveries, creating a virtuous cycle of innovation.

For most of the 20th century, the model worked — and it worked well. Thanks to it, Thomas Edison was able to invent a number of landmark devices, including the phonograph and the electric light bulb, which paved the way for the establishment of General Electric's famed Global Research Center in Niskayuna, New York. In the chemical industry, companies like DuPont established central research labs to identify and commercialize a stunning variety of new products, such as the

synthetic fibers nylon, Kevlar and Lycra. Bell Labs researchers discovered amazing physical phenomena and harnessed those discoveries to create a host of revolutionary products, including transistors and lasers.

Toward the end of the 20th century, though, a number of factors combined to erode the underpinnings of closed innovation in the United States. Perhaps chief among these factors was the dramatic rise in the number and mobility of knowledge workers, making it increasingly difficult for companies to control their proprietary ideas and expertise. Another important factor was the growing availability of private venture capital, which has helped to finance new firms and their efforts to commercialize ideas that have spilled outside the silos of corporate research labs.

Such factors have wreaked havoc with the virtuous cycle that sustained closed innovation. Now, when breakthroughs occur, the scientists and engineers who made them have an outside option that they previously lacked. If a company that funded a discovery doesn't pursue it in a timely fashion, the people involved could pursue it on their own — in a startup financed by venture capital. If that fledgling firm were to become successful, it could gain additional financing through a stock offering or it could be acquired at an attractive price. In either case, the successful startup would generally *not* reinvest in new fundamental discoveries, but instead, like Cisco, it would look outside for another technology to commercialize. Thus, the virtuous cycle of innovation was shattered: The company that originally funded a breakthrough did not profit from the investment, and the firm that *did* reap the benefits did not reinvest its proceeds to finance the next generation of discoveries.

In this new model of *open innovation,* firms commercialize external (as well as internal) ideas by deploying outside (as well

### The Closed Innovation Model

In closed innovation, a company generates, develops and commercializes its own ideas. This philosophy of self-reliance dominated the R&D operations of many leading industrial corporations for most of the 20th century.
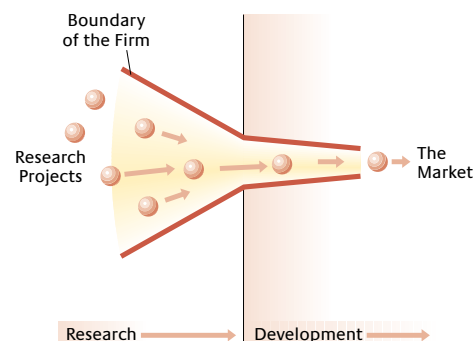
as in-house) pathways to the market. Specifically, companies can commercialize internal ideas through channels outside of their current businesses in order to generate value for the organization. Some vehicles for accomplishing this include startup companies (which might be financed and staffed with some of the company's own personnel) and licensing agreements. In addition, ideas can also originate outside the firm's own labs and be brought inside for commercialization. In other words, the boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two (see "The Open Innovation Model").

At its root, open innovation is based on a landscape of abundant knowledge, which must be used readily if it is to provide value for the company that created it. However, an organization should not restrict the knowledge that it uncovers in its research to its internal market pathways, nor should those internal pathways necessarily be constrained to bringing only the company's internal knowledge to market. This perspective suggests some very different rules (see "Contrasting Principles of Closed and Open Innovation," next page). For example, no longer should a company lock up its IP, but instead it should find ways to profit from others' use of that technology through licensing agreements, joint ventures and other arrangements. (Also see David Kline's article, "Sharing the Corporate Crown Jewels," p. 89.)

One major difference between closed and open innovation lies in how companies screen their ideas. In any R&D process, researchers and their managers must separate the bad proposals from the good ones so that they can discard the former while pursuing and commercializing the latter. Both the closed and open models are adept at weeding out "false positives" (that is, bad ideas that initially look promising), but open innovation also incorporates the ability to rescue "false negatives" (projects that initially seem to lack promise but turn out to be surprisingly valuable). A company that is focused too internally — that is, a firm with a closed innovation approach — is prone to miss a number of those opportunities because many will fall outside the organization's current businesses or will need to be combined with external technologies to unlock their potential. This can be especially painful for corporations that have made substantial long-term investments in research, only to discover later that some of the projects they abandoned had tremendous commercial value.

The classic example is Xerox and its Palo Alto Research Center (PARC). Researchers there developed numerous computer hardware and software technologies — Ethernet and the graphical user interface (GUI) are two such examples. However, these inventions were not viewed as promising businesses for Xerox, which was focused on high-speed copiers and printers. In other words, the technologies were false negatives[1] and they languished inside Xerox, only to be commercialized by other companies that, in the process, reaped tremendous benefits. Apple Computer, for instance, exploited the GUI in its Macintosh operating system while Microsoft did the same in its Windows operating system.

## How Prevalent Is Open Innovation?

This is not to argue that all industries have been (or will be) migrating to open innovation. At this point, different businesses can be located on a continuum, from essentially closed to completely open. An example of the former is the nuclear-reactor industry, which depends mainly on internal ideas and has low labor mobility, little venture capital, few (and weak) startups and relatively little research being conducted at universities. Whether this industry will ever migrate towards open innovation is questionable.

At the other extreme, some industries have been open innovators for some time now. Consider Hollywood, which for decades has innovated through a network of partnerships and alliances between production studios, directors, talent agencies, actors, scriptwriters, independent producers and specialized subcontractors (such as the suppliers of special effects). The mobility of this workforce is legendary: Every waitress is a budding actress; every parking attendant has a screenplay he is working on.

Many industries — including copiers, computers, disk drives, semiconductors, telecommunications equipment, pharmaceuticals, biotechnology and even military weapons and communications systems — are currently transitioning from closed to open innovation. For such businesses, a number of critically important

### The Open Innovation Model

In the new model of open innovation, a company commercializes both its own ideas as well as innovations from other firms and seeks ways to bring its in-house ideas to market by deploying pathways outside its current businesses. Note that the boundary between the company and its surrounding environment is porous (represented by a dashed line), enabling innovations to move more easily between the two.
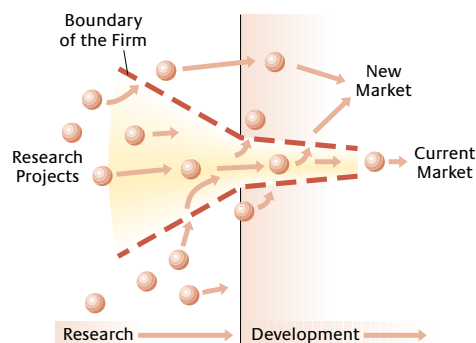
## Contrasting Principles of Closed and Open Innovation

| Closed Innovation Principles | Open Innovation Principles |
|---|---|
| The smart people in our field work for us. | Not all of the smart people work for us* so we must find and tap into the knowledge and expertise of bright individuals outside our company. |
| To profit from R&D, we must discover, develop and ship it ourselves. | External R&D can create significant value; internal R&D is needed to claim some portion of that value. |
| If we discover it ourselves, we will get it to market first. | We don't have to originate the research in order to profit from it. |
| If we are the first to commercialize an innovation, we will win. | Building a better business model is better than getting to market first. |
| If we create the most and best ideas in the industry, we will win. | If we make the best use of internal *and* external ideas, we will win. |
| We should control our intellectual property (IP) so that our competitors don't profit from our ideas. | We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model. |

\* This maxim first came to my attention in a talk by Bill Joy of Sun Microsystems over a decade ago. See, for example, A. Lash, "The Joy of Sun," The Standard, June 21, 1999, http://thestandard.net.

innovations have emerged from seemingly unlikely sources. Indeed, the locus of innovation in these industries has migrated beyond the confines of the central R&D laboratories of the largest companies and is now situated among various startups, universities, research consortia and other outside organizations. This trend goes well beyond high technology — other industries such as automotive, health care, banking, insurance and consumer packaged goods have also been leaning toward open innovation.

Consider Procter & Gamble, the consumer-product giant with a long and proud tradition of in-house science behind its many leading brands. P&G has recently changed its approach to innovation, extending its internal R&D to the outside world through the slogan "Connect & Develop."[2] The company has created the position of director of external innovation and has set a goal of sourcing 50% of its innovations from outside the company in five years, up from an estimated 10% this year.[3] This approach is a long way from the "not invented here," or NIH, syndrome that afflicts many large, successful industrial organizations. Recently, P&G scored a huge success with SpinBrush, an electric toothbrush that runs on batteries and sells for $5. The idea for the product, which has quickly become the best-selling toothbrush in the United States, came not from P&G's labs but from four entrepreneurs in Cleveland.

P&G also tries to move its own innovations outside. Recently, the company instituted a policy stating that any idea that originates in its labs will be offered to outside firms, even direct competitors, if an internal business does not use the idea within three years.[4] The goal is to prevent promising projects from losing momentum and becoming stuck inside the organization. (Also see David Kline's article, "Sharing the Corporate Crown Jewels," p. 89.)

## The Different Modes of Innovation

Indeed, many companies have been defining new strategies for exploiting the principles of open innovation, exploring ways in which external technologies can fill gaps in their current businesses and looking at how their internal technologies can spawn the seeds of new businesses outside the current organization. In doing so, many firms have focused their activities into one of three primary areas: *funding, generating* or *commercializing innovation.*

### Funding Innovation

Two types of organizations — *innovation investors* and *benefactors* — are focused primarily on supplying fuel for the innovation fire. The original *innovation investor* was the corporate R&D budget but now a wide range of other types has emerged, including venture capital (VC) firms, angel investors, corporate VC entities, private equity investors and the Small Business Investment Companies (SBICs), which provide VC to small, independent businesses and are licensed and regulated by the U.S. Small Business Administration. Their capital helps move ideas out of corporations and universities and into the market, typically through the creation of startups. In addition to financing, innovation investors can supply valuable advice for helping startups avoid the common growing pains that afflict many fledgling firms.

With the recent economic downturn and the implosion of numerous dot-com firms, innovation investors have understandably turned somewhat gun-shy. However, though it seems these players are down, they are hardly out. VCs currently have about $250 billion in capital under management, of which $90 billion is idle.[5] When the economy rebounds, innovation investors will likely spot and fund new developments in areas like genomics and nanotechnology, which will likely spur the next economic wave of innovation.

*Innovation benefactors* provide new sources of research funding. Unlike investors, benefactors focus on the early stages of research discovery. The classic example here is the National Science Foundation (NSF), an independent agency of the U.S.

government. Through its awards and grants programs, the NSF provides about 20% of federal support for academic institutions to conduct basic research. The Defense Advanced Research Projects Agency (DARPA) has also been a key benefactor, particularly for the early work in much of the computer industry.

Some companies are devoting a portion of their resources to playing the role of benefactor. By funding promising early-stage work, they get a first look at the ideas and can selectively fund those that seem favorable for their industry. An interesting development with innovation benefactors is the possible rise in philanthropy from private foundations, especially those backed by wealthy individuals. For example, the billionaire Larry Ellison, chairman and CEO of software giant Oracle, has founded an organization that provides about $50 million annually for basic research in cancer, Parkinson's and Alzheimer's diseases as well as other disorders. Interestingly, the foundation was set up specifically for early exploration — research so embryonic that scientists aren't able to obtain funds through traditional grants, such as those awarded by the NSF.

### Generating Innovation

There are four types of organizations that primarily generate innovation: *innovation explorers, merchants, architects* and *missionaries. Innovation explorers* specialize in performing the discovery research function that previously took place primarily within corporate R&D laboratories. Interestingly, a number of explorers evolved as spinoffs of laboratories that used to be a part of a larger organization. Just a year ago, for example, PARC became a separate, independent entity from Xerox. Similarly, Telcordia Technologies was formed from the divestiture of the Bell System and is now home to about 400 researchers with a broad range of expertise, from software engineering to optical networking.

An interesting development with explorers has been taking place with the major government labs, such as Sandia National Laboratories, Lawrence Livermore National Laboratory and the MIT Lincoln Laboratory. In the aftermath of the end of the Cold War, these organizations have been seeking new missions for their work and much of their basic research is finding applications in commercial markets. Consider Lincoln Laboratory, which has conducted radar and other defense research since the 1950s. Technology developed there for missile detection has recently been adapted to cancer treatment, enabling microwave energy to be focused more effectively at tumors.

*Innovation merchants* must also explore, but their activities are focused on a narrow set of technologies that are then codified into intellectual property and aggressively sold to (and brought to market by) others. In other words, innovation merchants will innovate but only with specific commercial goals in mind, whereas explorers tend to innovate for innovation's sake. For the merchants, royalties from their IP enable them to do more

research in their areas of focus. Indeed, such companies rise and fall with the strength of their IP portfolios.

One example of an innovation merchant is Qualcomm, which conducts extensive internal research on telecommunications, including code division multiple access (CDMA), a standard for wireless technology. Originally, Qualcomm manufactured cellular phones and software products such as the Eudora e-mail program, but today it focuses on licensing its CDMA technology and producing the associated chipsets for use by other cell-phone manufacturers. Qualcomm currently boasts more than 100 licensees, including Motorola, Nokia and Kyocera.

*Innovation architects* provide a valuable service in complicated technology worlds. In order to create value for their customers, they develop architectures that partition this complexity, enabling numerous other companies to provide pieces of the system, all while ensuring that those parts fit together in a coherent way. Boeing, for example, will engineer the overall design of an aircraft like the 747, after which companies like GE can then develop and manufacture the jet engines and other constituent parts. Innovation architects work in areas that are complex and fast-moving, which disfavors the "do-it-yourself" approach. To be successful, innovation architects must establish their systems solution, communicate it, persuade others to support it and develop it in the future. They must also devise a way to capture some portion of the value they create, otherwise they will find it impossible to sustain and advance their architecture.

For example, the dramatic rise of Nokia in wireless communications has been due, in part, to the strong lead it took in establishing the global system for mobile communication (GSM) technology as a standard for cellular phones. Accomplishing that required working closely with a number of other companies, as well as the governments of many European countries. Specifically, Nokia research helped define the now-accepted standards for moving GSM from a narrow- to broad-bandwidth spectrum and the company pushed hard to establish that technology: It willingly licensed the research to others and partnered with companies (including competitors) to develop the chipsets necessary for implementing the standard.[6] Those efforts have helped Nokia to become the world's dominant supplier of wireless-phone handsets, controlling nearly 40% of the global market.

*Innovation missionaries* consist of people and organizations that create and advance technologies to serve a cause. Unlike the innovation merchants and architects, they do not seek financial profits from their work. Instead, the mission is what motivates them. This is characteristic of many community-based nonprofits and religious groups but also occurs in the software industry. (Also see Georg von Krogh's article, "Open-Source Software Development," p. 14.) Here, user groups help define how a particular software program will evolve. These organizations, which include professional programmers as well as hobbyists, not only

identify bugs (and possible ways to fix them), but additionally might even create a "wish list" of potential features that the next generation of a software product might include.

The evolution of the computer operating system Linux exemplifies this approach. Originally developed by Linus Torvalds, Linux has advanced over the years thanks to the arduous efforts of an informal network of programmers around the world. The software is freely available to anyone, and it has become a viable alternative to commercial offerings such as Microsoft Windows NT.

### Commercializing Innovation

Lastly, two types of organization are focused on bringing innovations to market: *innovation marketers* and *one-stop centers*. *Innovation marketers* often perform at least some of the functions of the other types of organization, but their defining attribute is their keen ability to profitably market ideas, both their own as well as others'. To do so, marketers focus on developing a deep understanding of the current and potential needs in the market and this helps them to identify which outside ideas to bring in-house. Most of the drugs that are currently in Pfizer's pipeline, for instance, originated outside the company.

Another example of an innovation marketer is Intuit, which sells personal financial software products such as the popular Quicken program. For a number of years, Intuit has been able to keep Microsoft at bay — one of the very few companies that can make that claim — by maintaining close and disciplined interactions with its customers to gain in-depth knowledge about their needs. In keeping with the innovation marketer's role, Intuit has become adept at identifying and adapting outside technologies to satisfy those needs. In this way, the company has consistently

> **Useful knowledge has become widespread, and ideas must be used with alacrity. If not, they will be lost.**

been able to profit from innovations it did not discover. For example, it acquired two of its popular products — TurboTax (a tax-preparation program) and QuickBooks (small-business accounting software) — from the outside and enhanced both programs to meet its customers' needs.

*Innovation one-stop centers* provide comprehensive products and services. They take the best ideas (from whatever source) and deliver those offerings to their customers at competitive prices. Like innovation marketers, they thrive by selling others' ideas, but are different in that they typically form unshakable connections to the end users, increasingly managing a customer's resources to his or her specifications. For example, the Web site for Yahoo!

enables people to shop, send e-mail, manage their personal finances, hunt for jobs and keep up-to-date on current events.

While Yahoo! targets consumers, other one-stop centers are focused on business-to-business interactions. IBM's Global Services division, for instance, sells IT solutions to other companies, and interestingly, will install and service hardware and software from any vendor, including IBM's competitors. In other words, it will provide the best solution to its customers, regardless of the origin of those products.

ALTHOUGH MANY COMPANIES are focusing on just funding, generating or commercializing innovation, some are continuing to do all three. As mentioned earlier, industrial powerhouses like GE, DuPont and AT&T (with Bell Labs) were the exemplars of this approach in the United States during the 20th century, and the success of those corporations has cast the mold for most central R&D organizations. To this day, a number of companies, called *fully integrated innovators,* continue to espouse the closed innovation credo of "innovation through total control."

IBM in the mainframe computer market is one such example. Thanks to the company's T.J. Watson Research Center and its other internal R&D labs, virtually all of the value-added components inside an IBM mainframe computer come from IBM itself. This includes the semiconductor circuits that power the main processing unit, the disk storage, the high-speed circuitry that routes signals, the tape backup storage, the operating system and the different application programs. To accomplish that, IBM must manage technology advances in both hardware and software within different internal divisions, coordinating future releases of software and new versions of hardware to assure its customers of continued improvements in price and performance.

IBM's mainframe business raises an important point: A corporation can deploy different modes of innovation in different markets. Specifically, IBM is a one-stop center for consulting services and a fully integrated innovator with respect to mainframes. Another important point is that competing modes can coexist in the same industry. In pharmaceuticals, for example, Merck has remained a fully integrated innovator while Pfizer is becoming an innovation marketer. It remains to be seen which of those modes (or perhaps another) will dominate.

All of the different modes will evolve in an open innovation environment, and future ones will probably emerge as well. One possible development is the rise of specialized intermediaries that function as brokers or middlemen to create markets for IP.[7] More than likely, there won't be one "best way" to innovate, although some modes will face greater challenges than others.

Fully integrated innovators, for instance, have become an endangered species in many industries. As ideas spill out of the central R&D labs of large corporations, the other modes of innovation are in a position to profit from them. In fact, these other modes have risen in prominence in response to the perceived limitations of fully integrated innovators. Much of IBM's innovation, for instance, has been migrating from the fully integrated mode toward the one-stop center approach.

The explorer mode depends on external sources of funding because of the considerable resources and uncertainty of conducting long-term research. Outside of the life sciences, this support has dwindled substantially in the past decade, making a number of explorers vulnerable. Recent societal concerns, such as for "homeland security" in the United States, may supply a new impetus for government funding, and already many explorers are making the transition. Sandia National Labs, for instance, is currently developing robots for disabling bombs. It is questionable, however, whether new security research missions will fit with the strengths and abilities of the current explorers or whether a new cadre of them will arise instead.

Innovation merchants also face significant challenges. Although the concept of supplying innovation to a "marketplace for ideas" is attractive in theory, it is devilishly tricky to accomplish. For one thing, merchants must determine how best to gain access to the complementary assets that might be needed to commercialize an innovation. Another issue is that the laws for IP protection are ill-defined at best, making it risky for merchants to limit their revenue stream solely to the marketing of their IP.

Innovation architects encounter a different set of challenges in their roles of organizing and coordinating complex technologies. Although ideas are plentiful, that very abundance can make it extremely difficult to create useful systems. Furthermore, innovation architects, through the harnessing of a broad network of companies, must balance the creation of value with the need to capture a portion of that value. Boeing, for instance, is able to do so by acting as the systems assembler for its aircraft. With other technologies, however, the means by which innovation architects can benefit from their roles is not so straightforward.

Several of the modes of innovation rely on a continued supply of useful ideas and technologies from the outside. Although university research is now more abundant and of higher quality than in the past, the flow of that knowledge into the commercial sector faces several obstacles. Such research is necessarily filtered through the silos of academic departments and that process tends to discourage cross-discipline breakthroughs. In addition, universities are now allowed to patent their discoveries, and although the change has benefited professors (who are able to form their own commercial ventures), it has also taxed the efforts of companies, particularly small firms, to profit from that source of innovation.

## Long Live Open Innovation

Today, in many industries, the logic that supports an internally oriented, centralized approach to R&D has become obsolete. Useful knowledge has become widespread and ideas must be used with alacrity. If not, they will be lost. Such factors create a new logic of open innovation that embraces external ideas and knowledge in conjunction with internal R&D. This change offers novel ways to create value — along with new opportunities to claim portions of that value.

However, companies must still perform the difficult and arduous work necessary to convert promising research results into products and services that satisfy customers' needs. Specifically, the role of R&D needs to extend far beyond the boundaries of the firm. Innovators must integrate their ideas, expertise and skills with those of others outside the organization to deliver the result to the marketplace, using the most effective means possible. In short, firms that can harness outside ideas to advance their own businesses while leveraging their internal ideas outside their current operations will likely thrive in this new era of open innovation.

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# What to Do Against Disruptive Business Models (When and How to Play Two Games at Once)

Fighting against a disruptive business model by rolling out a second business model is one option for companies to consider. But to make that work, you need to avoid the trap of getting stuck in the middle.

**BY CONSTANTINOS C. MARKIDES AND DANIEL OYON**

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**THE LEADING QUESTION**
Should companies adopt a second business model in their main market?

**FINDINGS**

▶ Responding to a disruption by adopting a second business model in the same market can be an effective strategy.

▶ Your second business model should be different from your existing one and different from that of the disrupter.

▶ Keep the two separate enough to avoid conflicts, but leverage potential synergies.

INCREASINGLY, ESTABLISHED companies in industries as diverse as airlines, media and banking are seeing their markets invaded by new and disruptive business models. The success of invaders such as easyJet, Netflix and ING Direct in capturing market share has encouraged established corporations to respond by adopting the new business models alongside their established ones. Yet, despite the best of intentions and the investment of significant resources, most companies are unsuccessful in their efforts to compete with two business models at once.

According to Michael Porter and other strategy theorists, managing two different business models in the same industry at the same time is challenging because the two models (and their underlying value chains) can conflict with each other.[1] For example, airlines selling tickets through the Internet to fight back against their low-cost competitors risk alienating existing distributors (the travel agents). Similarly, established newspaper companies that offer "free" newspapers to respond to new entrants risk cannibalizing their existing customer base. By attempting to compete with themselves, Porter argued, companies risk

**George Clooney pitches Nestlé's Nespresso products, a new unit designed to reach affluent coffee drinkers.**

paying a significant straddling cost: damaging their existing brands and diluting their organizations' cultures for innovation and differentiation.[2]

His view was that a company could find itself "stuck in the middle" if it tried to compete with both low-cost and differentiation strategies.[3]

## The Case for Separate Units

The primary solution proposed to solve this problem is to keep the two business models (and their underlying value chains) separate in two distinct organizations. That is the "innovator's solution" that Clayton Christensen proposed and that has been supported by others.[4] Even Porter has accepted this organizational solution.[5] The rationale for this approach is straightforward: Managers at the established company who feel that the new business model is growing at their expense would want to constrain or even kill it. By keeping the two business models separate, you prevent the company's existing processes and culture from suffocating the new business model. The new unit can develop its own strategy, culture and processes without interference from the parent company.

Sensible as this argument seems, the separation solution is not without problems and risks. Perhaps the biggest problem is that you can't exploit the synergies between the established company and the separate unit.[6] In recognition of the need to exploit the synergies, some academics have suggested an alternative: the creation of separate business units that are linked by a number of integrating mechanisms. Several studies have now identified a number of integrating mechanisms that successful companies have put in place to exploit synergies (see "How to Integrate Separate Units").[7]

## Why Separation May Not Be Enough

Although the idea of creating separate business units has received a lot of attention, this approach by itself does not ensure success. In fact, there are many examples of companies that have pursued this strategy and failed (such as British Airways with its Go Fly subsidiary and KLM with its Buzz subsidiary) while other companies, such as Nintendo and Mercedes, have succeeded in playing two games without creating separate units.

We have also found that competing successfully with two different and conflicting business models involves more than creating a separate unit. Several years ago, we studied the experiences of 68 companies that faced the challenge of competing with dual business models.[8] Our main finding was that only a handful of companies that created separate units were successful in playing two games. Many had created separate units and still failed, suggesting that separation in itself was not enough to ensure success.

If separation is not sufficient, what else should companies do? From 2007 to 2009, we studied 65 companies that attempted to compete with dual business models in their markets (see "About the Research"). By comparing the experiences of the businesses that did so successfully with those that failed, we have identified five key questions that companies need to consider if they are to improve the odds of success in competing with dual business models in the same industry.

### Question #1: Should I enter the market space created by the new business model?

Despite popular perception, the markets that get created by new business models are not necessarily more attractive than existing markets. Nor are the new customers who are attracted to the new business models the kinds of customers that established corporations should necessarily pursue. For example, consider the huge market that Internet brokerage created in the United States. There's no question that it's a big and growing market. But is it a market that all established brokers ought to go after? Probably not. Consider Edward D. Jones & Co. L.P., one of the leading companies in the U.S. retail-brokerage industry. As John Bachmann, a former partner, commented: "You will not buy securities over the Internet at Edward Jones. That's going to be true as far as I can see into the future.… If you aren't interested in a relationship and you just want a transaction, then you could go to E*Trade Financial Corp. if you want a good price. We just aren't in that business."[9]

The decision to enter the market space that a new business model has created is not (and should not be) automatic. Before jumping in, an established company needs to assess the "attractiveness" of the new market and whether it's a market worth

competing in. Whether or not the new market is attractive will depend not only on its size and growth rate but also on the business's competences and the likelihood it would succeed in the new market. Appearances can be deceiving. Established corporations should approach the decision the same way they approach the decision to diversify into another market. They must assess not only if the new market is attractive in general but whether, given their own bundle of core competences, it is attractive to *them*. That involves asking whether their competences can be applied in the new market in a *unique* way.[10] The corporate graveyard is littered with companies that moved into what appeared to be attractive markets, only to discover that the markets were filled with mines.

Many established companies assume that the new markets are just extensions of the old market. For example, how different can the low end of the airline market and the established airline market be? Aren't they simply two segments of the same market? The answer is emphatically no! The fact is that the new markets are substantially different from the established markets — they are made up of different customers looking for different value attributes. As a result, they require different key success factors and draw on different skills. For an established company, moving into a newly created market represents a risky diversification move and should be evaluated as such.

That doesn't mean that established corporations can ignore an invading business model — they can't. But they don't necessarily have to adopt it. One potential response is to invest in the existing company to make the traditional business strategy more competitive relative to the new business model. Alternatively, the established company can counterattack the business model innovators by introducing a new business model of its own — a "disrupt the disrupter" strategy. There are several options available to a company to respond to an invading business model; adopting the new model is just one of them.[11] (See "What to Do When Your Business Model Is Disrupted." p. 29.)

**Question #2:** **If I do enter the new market space, can I do it with my existing business model or will I need a new one?**

If an established corporation decides to exploit the

newly created market that a new business model has created, the second question is: "Can I serve the new customers with my existing business model or do I need a new one?" The answer is subjective, and companies from the same industry facing the same disruption have answered in totally different ways. However, the importance of asking (and answering) this question cannot be overemphasized. It can save an established business an enormous amount of money and time.

### ABOUT THE RESEARCH

We spent two years (2007-2009) exploring the question: "How could a company compete successfully with two business models in the same industry?" We started by identifying 80 companies whose industries had been invaded by a disruptive business model in the last 15 years. Fifteen of these companies chose to ignore the market space created by the new business model, while 65 chose to enter it. These 65 companies formed the basis for our analysis. For each, we prepared a detailed case study based primarily on archival data, industry publications and other public sources. The cases emphasized the main differences between the established company's primary business model and the disruptive business model that invaded its market. They also described in detail how the established company attempted to adopt the disruptive business model and how successful it was in doing so. Some corporations had entered the new market space using their existing business model, while others chose to develop a new one.

Based on this initial analysis, we identified 23 companies that had entered the new market space successfully and 42 that entered and failed. We then attempted to identify consistent themes that differentiated the successes from the failures. Once the initial "results" were compiled, we arranged for field trips and detailed interviews with nine companies (Nestlé, Edward Jones, Edipresse, Circle Health, Waitrose, Guardian Media, Shire Pharma, Reuters and Tesco). The purpose was to communicate our initial findings and receive feedback from senior executives.

During 2009, the research was further refined in an iterative process of application, testing and adaptation. Feedback from our academic colleagues, classroom discussions and further interviews with executives at our sample companies allowed us to identify the five key questions that this article discusses.

Consider Internet banking and the new markets it has created in retail banking. Should an established bank try to serve the new market by adding online distribution to its existing business model? Or does Internet banking require an alternative business model? Most established banks have treated Internet banking as just another distribution method. But the Dutch bank ING Groep N.V. has taken a distinctly different approach. In creating a separate unit called ING Direct and allowing it to develop its own business model and culture, ING has concluded that Internet banking is more than just another distribution channel, something that

requires its own dedicated business model.

Companies are being asked to make similar decisions in other industries. Consider the emergence of price-sensitive customers in the auto industry. To tap into the low end of the market, established carmakers are weighing whether to sell new brands to the low end using their existing business model or develop a separate business model. With the exception of India's Tata Motors Ltd., most car companies have chosen to stay with the existing business model. Airlines are weighing a similar issue: Should they develop separate business models to serve price-conscious consumers (as Southwest Airlines and easyJet have done), or can they cater to this market segment by offering cheap seats and no frills on their existing planes? Many airlines (including Continental, BA, KLM and United) began with the former, but now most are shifting to the latter.

In making this decision, the question is: Do the new customers represent an entirely different market requiring a different set of value chain activities, or are they just another *segment* that can be served with the existing business model? The way most banks approached Internet banking suggests that they looked at the new customers as just another segment that could be served with their existing business models. On the other hand, banks like ING (with ING Direct) and HSBC (with First Direct); airlines like Singapore Airlines (with SilkAir) and Qantas (with Jetstar); and various companies including Tata Motors (with the Nano) and Dow Corning (with Xiameter) have all looked at price-conscious customers not just as another segment but as a fundamentally different *market* that required a dedicated business model.

Obviously, there is no "right" way to look at the new customers — a lot depends on how aggressive a company wants to be. Consider Nestlé S.A. To reach affluent coffee drinkers, Nestlé created a new unit called Nespresso and gave it the freedom to develop its own business model. Nespresso operates more like a luxury-goods manufacturer than a high-volume consumer goods company. Nestlé has since developed a new line of coffee makers for discerning coffee drinkers at the low end of the spectrum. But rather than create another business model, it manages the new line (called Dolce Gusto) as part of the established Nescafé division. Same

company, similar products, different organizational decisions on the same challenge!

The issue of whether a new set of customers is another segment or a different market is so subjective that some companies treat it both ways. In the United Kingdom, Waitrose Ltd. treats home distribution of groceries as both a segment and a market. On the one hand, it offers home delivery through its existing supermarkets. On the other hand, a new unit called Ocado Ltd. caters to the needs of online customers using a targeted business model.

Why does a company decide to treat new customers as a totally different market rather than as another segment of the existing market? Two important considerations are the size of the new market and its growth potential. The bigger the new market, the more likely the company is to be aggressive and to attack it as a separate market. Another compelling reason to approach it as a different market is that the new market is so strategically distinct from the existing market that the business model doesn't apply. Still another reason may be that serving both established and new customers with one business model may be so difficult that another solution is necessary.[12]

However, the most important factor is top management's attitude toward the newly created market. A recent academic study found that new markets are made up of two types of customers: customers of the established companies that desert it for the new value proposition, and new customers entering the market for the first time.[13] Therefore, the question that all established companies need to answer is: Is my goal to limit the cannibalization of my *existing* market or to exploit the *new* one? If the goal is to pursue the new opportunity aggressively (rather than defend against the threat), the company will likely choose to approach it as a new market that requires its own business model.[14]

### Question #3: If I need a new business model to exploit the new market, should I simply adopt the invading business model that's disrupting my market?

Once a corporation decides to enter a new market using a new business model, it faces a make-or-break issue: exactly what business model to adopt. The temptation is to mimic the business model of the disrupters — after all, if that business model worked

Nintendo developed the Wii specifically to target families, a strategy that caught the disrupters (Sony and Microsoft) by surprise.

for *them*, surely it will work for us. Our research suggests that this is a trap. By adopting the same business model as the invader, established companies end up competing with their disrupters head-on. They try to beat them at their own game by being *better* than them. Unfortunately, this strategy almost always falls short.

Established companies that succeed in entering the new markets do so by developing radically different business models — different from the one that the disrupters are using and different from the one it employs in its established market. They follow the same logic that disrupters used to attack *them*. The disrupters succeeded in attacking the main market because they used a disruptive business model. If the established corporations want to have the same success, they also need to utilize a disruptive business model to enter the market that the disruptive business model has created. In a sense, they need to "disrupt the disrupter," as Nintendo did in response to Sony and Microsoft in the video games console market. Instead of targeting teenagers and young men as Sony and Microsoft did, Nintendo developed the Wii specifically to target families. Instead of emphasizing functionality, speed and superior graphics (as the PlayStation and Xbox did), the Wii stressed ease of use and simplicity. It was a strategy that caught the disrupters (Sony and Microsoft) by surprise and catapulted Nintendo to industry leadership.

To appreciate why established companies need to adopt a business model that is different from the one that the disrupters use, we need to remember, as Christensen pointed out, that the new markets created by the invading disruptive business model are different from the established market.[15] That has a serious implication for established companies: Moving into these markets represents a fundamental new market entry and to succeed, businesses need to abide by the cardinal rules of successful market entry.

The most important rule is to adopt a strategy that breaks the rules of the game in that market.[16] There are many high-profile examples that support this generalization, including Canon's success in entering the copier market, IKEA's entry in the furniture retail business, Southwest's entry in the airline market and Enterprise's entry in the car rental market.

## WHAT TO DO WHEN YOUR BUSINESS MODEL IS DISRUPTED

Although many companies respond to disrupters by launching a new business model, that is not the only option.

| ESTABLISHED COMPANY | DISRUPTER | RESPONSE |
|---|---|---|
| **Continental Airlines** | Southwest Airlines | Set up a separate subsidiary called Continental Lite to compete in the low-cost market |
| **Nestlé** | Starbucks | Created a new division called Nespresso to create and compete in the "home" market |
| **Edward Jones** | Internet brokerage | Decided not to enter this market with a dedicated business model |
| **Edipresse** | Free newspapers | Launched its own free daily paper |
| **SMH** | Seiko and Timex | Formed a separate unit to launch Swatch |
| **British Airways** | easyJet | Created a separate unit called Go Fly to compete in the low-cost market |
| **AXA Investment Managers** | Index trading | Acquired Rosenberg Group and moved into quantitative fundamental equity management with a hybrid business model |
| **Guardian Media Group** | Online news | Set up an Internet business to provide its content online for free |
| **Waitrose** | Online distribution | Set up an online distribution arm (Waitrose Direct) and created a new company called Ocado to compete in this market |
| **Nintendo** | Sony, Microsoft | Developed the Wii and targeted a different customer segment |
| **Estée Lauder** | Body Shop | Developed the brand Origins to move into the natural cosmetics area; acquired Aveda to move into herbal-based cosmetics |

Enterprise, which began more than 50 years ago as Executive Leasing, entered a young market that was dominated by Hertz and Avis. Rather than compete with Hertz and Avis for business travelers, Enterprise targeted the replacement market (for example, customers whose cars were being repaired). Rather than operating out of airports, it located its offices in downtowns. Instead of using travel agents, it used insurance companies and body shop mechanics. And instead of requiring the customer to pick up the car, Enterprise brought the car to the customer. In short, Enterprise built a business model that was fundamentally different from the ones utilized by its established competitors.

That suggests that if an established player (1) has decided to enter the market space that the invading disruptive business model has created on the periphery of the main market; and (2) has decided to use a business model that is different from the one it's using in the established market, *then* it should design a business model that is fundamentally different from the one the disrupters employ. Although that will not guarantee success, it *will* increase the probability that the established company will compete with its disrupters successfully.

### Question #4: If I develop a new business model, how separate should it be organizationally from the existing business model?

Once an established company has decided to enter the newly created market space by using its own disruptive business model, it must determine how separate the new and established business models should be. We found that asking "Should we separate the new business model or should we keep the two together?" is the *wrong* way to approach it. A more useful question is, "Which activities do I operate separately and which can I operate together?"

The logic for this approach is straightforward. Proponents of running two separate operations point to the benefits of keeping the two business models apart, the most important being that it allows the new unit to develop its own strategy, culture and processes without interference from the parent. It permits the new unit to manage its business without being swayed by people who might worry about cannibalization threats and channel conflicts. While these benefits are real, separation is by no means cost-free. Perhaps the biggest cost is not being able to exploit synergies between the two businesses. We think there has to be a balance: separate enough to avoid conflicts but not so separate as to prevent exploitation of synergies. That balance can be only achieved if the corporation thinks creatively about what activities to separate and what not to.[17]

This decision on the appropriate degree of separation must be made for at least five areas:

**Location.** Should the separate unit be located close to the parent company or somewhere else?

**Name.** Should the separate unit adopt a name similar to the parent name (as Nestlé did with Nespresso) or should the name be totally different (as BA did with Go Fly)?

**Equity.** Should the unit be a wholly owned subsidiary of the parent or should the parent own only a certain percentage of the equity?

**Value chain activities.** Which value chain activities should the unit develop on its own and which should it share with the parent? Frequently, companies allow the new unit to develop its own dedicated customer-facing activities while sharing back-office functions with the parent. That, however, may not always be the best solution, so companies should examine this on a case-by-case basis.

**Organizational environment.** Should the unit be allowed to develop its own culture, values, processes, incentives and people, or should some of these be shared with the parent? Many organizations allow a unit to develop its own culture while having some common shared values. But that also needs to be considered on a case-by-case basis.

Obviously, there are no "right" answers. Contrary to what many academics have proposed, separate units don't need to have their own names or their own distinct value chain activities. We know of many companies that did not do this and yet succeeded in operating two different and conflicting strategies at the same time. The trick is to find the company-specific answers that enable the corporation to separate the unit but not isolate it. In that way, it succeeds in balancing unit independence while helping it with the skills, knowledge and competences of the parent company.

### Question #5: Once I create a separate unit, what are the unique challenges of pursuing two business models at once?

In addition to deciding which activities to separate and which to keep the same, the business must also decide how to manage the separate unit to exploit potential synergies and achieve true ambidexterity. Several academics have explored this issue and, as a result, we now have a long list of ideas and suggestions on what companies ought to be doing.[18]

In an earlier research project, we explored this issue ourselves.[19] Specifically, we examined 42 companies that had created a separate unit to compete in the new market. Of these, 10 were successful, while 32 failed. We compared the two groups on three dimensions: (1) the amount of strategic, financial and

operational autonomy given to the unit (measured on a scale of 1 to 5, with high scores implying that decision-making autonomy was granted to the unit) (2) differences in the culture, budgetary and investment policies, evaluation systems and rewards relative to the parent (measured on a scale of 1 to 6 with high scores implying that these policies were very different) (3) whether the new unit was managed by a new CEO and (4) whether the new CEO came from outside the company or was transferred internally.

We found that successful companies gave much more operational and financial autonomy to the separate units than unsuccessful companies. They also allowed the units to develop their own cultures and budgetary systems, and to have their own CEOs. These are all policies consistent with the notion that the new units need freedom to operate as they see fit. However, we also found that autonomy did not come at the expense of synergies: The parent still kept close watch over the strategy of the unit; cooperation between the unit and the parent was encouraged through common incentive and reward systems; and the CEO tended to be transferred from inside the organization to facilitate closer cooperation and active exploitation of synergies.

Our results and those of other researchers suggest that there are many tactics that companies can use to manage the two business models effectively. But rather than prescribing a laundry list of steps companies can take, we prefer to suggest a way of thinking that managers can apply to their specific circumstances.

One of the most fundamental principles of management is that the underlying organizational environment creates the behaviors in a company.[20] By "organizational environment," we mean four things: the *culture* of the company, which includes its norms, values and unquestioned assumptions; its *structure*, comprising not only its formal hierarchy but also its physical setup as well as its systems (information, recruitment, market research and the like); the *incentives*, both monetary and nonmonetary ones; and finally, the *people*, including their skills, mind-sets and attitudes. These four elements create the organizational environment that supports and promotes the behaviors that we want in a company.



Estee Lauder responded to The Body Shop's entry into the market by developing Origins, their own natural cosmetic line.

That suggests that to develop an organization that's capable of competing with dual business models (what we call an "ambidextrous organization"), we must first ask and answer the question: "What kind of culture, structures, incentives and people do we need to put in place in our organization to promote and encourage ambidextrous behaviors on the part of our employees?" There are many possible answers. Every company aspiring to manage two business models at the same time must ask the question and find the answers that are appropriate for its own specific context and circumstances.

***Constantinos C. Markides*** *is the Robert P. Bauman Professor of Strategic Leadership at London Business School.* ***Daniel Oyon*** *is a professor of management at HEC, Université de Lausanne, in Switzerland. Comment on this article or contact the authors at smrfeedback@mit.edu.*

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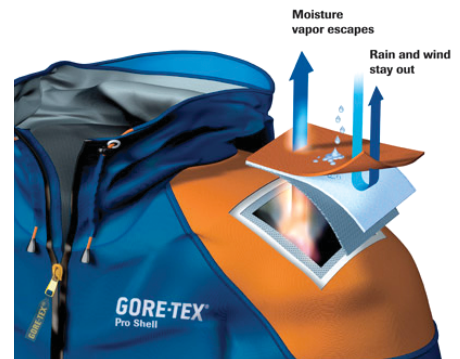
# How to Manage Outside Innovation

## Should external innovators be organized in collaborative communities or competitive markets? The answer depends on three crucial issues.

**BY KEVIN J. BOUDREAU AND KARIM R. LAKHANI**

**?** **THE LEADING QUESTION**
Should companies organize outside innovation through collaborative communities or competitive markets?

**FINDINGS**

▶ Communities are useful when an innovation problem involves cumulative knowledge, continually building on past advances. Markets are effective when an innovation problem is best solved by broad experimentation.

▶ In general, communities are more oriented toward the *intrinsic* motivations of external innovators (the desire to be a part of some larger cause, for instance), whereas markets tend to reward *extrinsic* motivations (such as through financial compensation).

TO APPRECIATE THE important role that outside innovators can play, look no further than Apple Inc.'s wildly successful iPhone. Thousands of external software developers have written complementary applications for the iPhone that have greatly enhanced its value, transforming the product into a blockbuster that has become the center of a thriving business ecosystem. Of course, the fundamental concept of "open innovation"[1] — relying on outsiders both as a source of ideas and as a means to commercialize them — is hardly new, but companies have struggled with precisely *how* to open up their product development to the external world. For starters, many executives have little idea how to motivate and manage outside innovation. Specifically, should external innovators be organized as a *collaborative community* or as a *competitive market*?

Collaborative communities are perhaps best known through the Linux Foundation's Linux and through other open-source software efforts that are governed loosely by social norms and "soft" rules to encourage open access to information, transparency, joint development and the sharing of intellectual property. A remarkable aspect of communities is that members are often willing to work for free.[2] Competitive mar-

kets are strikingly different. Rather than collaborating, external innovators in a market will develop multiple competing varieties of complementary goods, components or services. Customers then choose from among the different offerings. The classic example here is the multibillion-dollar video game industry, where companies (Nintendo Co., for example) develop a hardware console (Wii) and encourage third-party businesses to write game software for that platform. In a market, external innovators are busy focusing on their own economic interests, which often results in fierce competition — and little cooperation — among them.

The Linux Foundation and Medtronic Inc., a manufacturer of medical devices, rely heavily on outside communities (of software developers and physicians, respectively) for their product innovations. In contrast, W.L. Gore & Associates Inc., the developer of Gore-Tex, a waterproof and breathable fabric, depends on an external market of innovators.

Because the dynamics of communities and markets are so dramatically different (see "Markets Versus Communities"), companies need to consider carefully which approach makes the best sense for their objectives. From our research, we have identified three critical issues that managers should take into account when making that decision. Specifically, the discussion must look at: (1) the type of innovation that will be shifted to external innovators, (2) the motivations of those individuals and (3) the nature of the platform business model. An in-depth analysis of those issues reveals that the choice between collaborative communities and competitive markets is not as obvious — nor as clear-cut — as it might first appear.

## What Type of Innovation?

When the technology and consumer preferences of a product are well understood, then a company can simply conduct internal development or engage in traditional contracting for that work.[3] But when the technology, design and innovation approaches have yet to be established or when customer needs are highly varied or not yet fully understood, then opening up the innovation to the external world can have considerable advantages. That is particularly so when the company can separate a distinct part of the innovation process at arm's length for outsiders to work on in order to take advantage of the diverse

wealth of their knowledge and ideas. But the basic question remains: What's the better way to tap into that external resource, through collaborative communities or competitive markets? The answer in large part depends on how diverse knowledge should be managed so that it can best be applied to the sort of innovation problem at hand.

If the innovation problem involves cumulative knowledge, continually building on past advances, then collaborative communities have inherent advantages. Communities are naturally oriented toward solutions that depend on integrating skills, knowledge and technologies that transcend an individual contributor's purview. In fact, successful communities necessarily have knowledge-sharing and dissemination mechanisms designed into them.[4] They also tend to converge on common norms with a culture of sharing and cooperation, broad agreement on a technology paradigm and common technical jargon to support productive collaboration.[5]

Consider the Semiconductor Research Corp., a Durham, North Carolina-based nonprofit consortium established in 1982 to accumulate fundamental knowledge in silicon technology and semiconductor manufacturing. With members from industry, government and academia, SRC collectively sets research priorities and coordinates the collaborative work stemming from those goals, with the resulting knowledge made available to everyone in the consortium. Operating in this collaborative, community-based fashion, SRC has become the driver of research coordination and knowledge dissemination for the U.S. chip industry, and the organization has been credited with discovering many of the basic building blocks of semiconductor research that have kept the U.S. industry competitive. Other examples of community development include the Linux operating system, the Mozilla Firefox Web browser, the Apache Web server and other open-source technology projects — as well as much older successes such as the creation of cotton spinning, the steam engine and the airplane.[6] These disparate examples illustrate how participants can learn from and build upon the discoveries of others by "standing on the shoulders of giants" — in which the "giant" is collective knowledge. In such innovation initiatives, the community participants work with technologies or components that are closely related, thereby creating a foundation for subsequent efforts.

## MARKETS VERSUS COMMUNITIES

The dynamics of markets and communities are inherently different. Markets, for instance, tend to be governed by arm's-length, contractually oriented relationships, whereas communities typically consist of more informal interactions.

| COMPETITIVE MARKETS | COLLABORATIVE COMMUNITIES |
|---|---|
| ■ External innovators supply variants of mix-and-match, substitutable components. | ■ Possible contributions of external innovators range from mix-and-match offerings to coproduction. |
| ■ Governance is formal with orientation toward arm's-length, rule-based, contractually oriented and market relationships. | ■ Governance is informal with orientation toward highly socially embedded, norm-based interactions. |
| ■ External innovators primarily have competitive relationships among one another. | ■ External innovators primarily have cooperative relationships among one another — with a substantial amount of technology sharing and deliberate spillovers. |
| ■ Profit motive is central to driving distributed innovation. | ■ A range of extrinsic and intrinsic motivations may drive external innovators' activities. |
| ■ Value capture by the platform owner is possible through direct contracting and licensing with external innovators. | ■ Value capture by the platform owner might occur only through enhanced demand for the platform that is driven by the external innovation. |

If, however, the innovation problem is best solved by broad experimentation across a set of technical approaches or customer groups, then competitive markets have natural advantages.[7] In a mature collaborative community, members tend to make assumptions about what work has — and has not — been "done" (as exemplified by Wikipedia's ongoing issues, for instance). But that's much less the case with competitive markets, which tend to encourage experimentation, foster diversity and spur regular "creative destruction."[8] Because markets foster competition, pitting participants against one another, innovators will take actions to maintain their proprietary interests as they engage in their own work. When their efforts are successful, the benefits will accrue to them as individuals. Thus, participants have natural incentives to differentiate, to search for novel solutions and to protect rather than share their knowledge — and this helps maintain heterogeneity in the pool of people working on a problem. (But this is not to suggest that communities have a limited capacity for creativity. We simply wish to emphasize that the incentive structure and institutional context of competitive markets encourages different approaches and points of view.)

Take, for example, InnoCentive.com, a so-called broadcast search Web site through which "seekers" (companies) post scientific or technical problems for "solvers" (about 150,000 scientists and other professionals from a range of disciplines and countries) to tackle. When posting a problem, a seeker stipulates a time frame for solving it and a cash prize for the winning solution. Solvers who are interested in working on the problem then do so in isolation from both other solvers and from the seeker. By the end of 2008, some 80 companies had posted more than 700 problems in biology, chemistry, physics, math, engineering, computer science, business and more; of those, about one-third were solved. Three points are worth noting here. First, a seeker typically comes to InnoCentive because it has not been able to solve a problem on its own. Second, InnoCentive works carefully with the seeker to define the problem such that a diverse set of solvers can tackle it and so that a solution *can* be identified. And finally, many winning solutions come from solvers in fields not ostensibly connected to the problem. For instance, the winning



**WHAT MOTIVATES EXTERNAL INNOVATORS?**
The wide range of motivations that draw outside innovators to participate in a project can be classified into two broad categories: extrinsic and intrinsic. As a simple approximation, markets tend to favor the former, and communities are more oriented toward the latter.

Extrinsic Motivations — Intrinsic Motivations

Money, Signaling and Career Concerns, Status, Reputation, Fun and Enjoyment, Professional and Personal Identity, Reciprocity, User Need, Learning and Skills Development, Autonomy, Intellectual Challenge

Open Markets ← → Open Communities
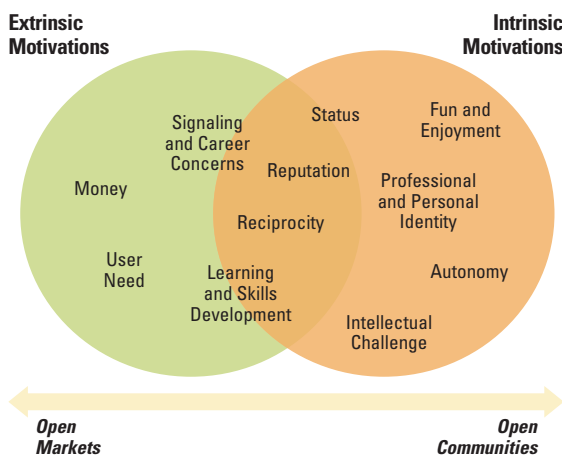
solution for how to separate oil and water once they had frozen together into a viscous mass came from a scientist whose primary field was nanotechnology.[9]

Ultimately, the nature of the innovation (that is, the definition of the problem) and the approaches to realizing (solving) it are interrelated. Knowledge of InnoCentive's pool of solvers enables the Web site to shape the different challenges to take advantage of the available diversity. In comparison, SRC rightly realized that its challenge was beyond the capability of any one company, university or government agency because it was seeking fundamental knowledge that would need to be aggregated by collaborative efforts. Similarly, open-source developers start projects knowing that they can integrate the knowledge and pre-existing technical solutions of a wide range of community members.

## What's the Motivation?

Executives also need to consider why external innovators would be drawn to participate in the innovation process in the first place. Past research has shown that the motivations of outsiders who engage in open innovation can be surprisingly heterogeneous, but the wide range can be classified into two categories: extrinsic and intrinsic. As a simple approximation, competitive markets tend to favor the former, and collaborative communities are more oriented toward the latter (see "What Motivates External Innovators?").

One of the simplest forms of extrinsic motivation is financial — a direct return on investment or money generated from sales. Third-party companies that develop software for the Nintendo Wii platform, for example, are clearly driven by the potential profits of their efforts. But motivation can also come from a less direct or obvious means. People might want to acquire certain skills by participating in the innovation process, or they could desire to advance a technology because they themselves use it.[10] In the medical device industry, for example, established companies like Medtronic, Stryker and Boston Scientific rely on individual physicians (that is, users) for working prototypes of new products or for concrete suggestions for improvements to existing products and treatments. Moreover, the benefits of engaging in open innovation might be more long term. Participation in open innovation can help establish one's reputation, build relationships or signal one's talents to a wide group of innovators (and potential employers). SAP Aktiengesellschaft, the German software developer, taps into that set of motivations in its open network through which volunteers provide solutions to customer inquiries. The platform now boasts more than 1 million members, and a large fraction of the problem solvers are up-and-coming consultants from emerging markets who are keen to establish their reputations and generate goodwill among SAP customers. Thus, value is generated for the customers and the entrepreneurial consultants, as well as for the SAP software.

But people can also be strongly motivated by purely intrinsic considerations.[11] Sometimes, the simple enjoyment of the innovation task itself can be a powerful factor, particularly when what appears to be "work" is not perceived to be work at all. Indeed, as evidenced by the success of open-source software projects, Wiki contributions, "citizen journalism" services and other similar efforts, self-determined tasks that are inherently interesting or intellectually challenging can attract tremendous participation from outsiders, especially when the contributors feel that they are part of some larger cause. In fact, a calculation of the direct and indirect monetary returns of participation reveals that such external innovators will often work for free — or for a *loss* for their services. In addition to the work itself, another type of intrinsic motivation is the status

and identity that participants can gain through their interactions with others in collaborative efforts.

Given that diversity of motivations, a company needs to consider carefully when deciding between a competitive market and a collaborative community because the choice will affect the types of external innovators who participate[12] and the level of effort and investment they devote to the innovation process. Moreover, managers must implement the right organizational mechanisms to tap into the motivations of the desired participants; otherwise, their efforts could be counterproductive. Specifically, communities require mechanisms that facilitate and encourage knowledge exchange and interactions among members, which will then engender a culture of sharing (and learning), a sense of affiliation (as well as identity and status), a norm of reciprocity (and other types of norms regarding conduct, participation, work quality and effort) and perhaps even personal relationships among the participants.[13]

Markets, in contrast, require the implementation of formal and competitive mechanisms that will tend to discourage most of a community's essential qualities (for instance, knowledge sharing). In one sense, markets need to discourage those external innovators who are willing to work for free; profit-seeking individuals otherwise might be dissuaded from investing and participating.[14] (On the other hand, communities must establish mechanisms to prevent profit seekers from skimming communal knowledge to make a buck; otherwise, the community will unravel.) In addition, markets require mechanisms to ensure the direct flow of income to external innovators. Such mechanisms do not exist in collaborative communities, but they are essential in competitive markets and should not be taken for granted.

## What's the Business Model?

Whether a company's product is a computer operating system, a social network, a motorcycle, a kitchen appliance or even a board game, the decision to open it to external innovation means that the product will be transformed into a *platform*. And to generate revenues from that platform, executives need to think about the nature of the accompanying business model. Here, a basic question affecting the choice between markets and communities is "who sells to whom?" This issue is

**The Google Inc. Android relies on a competitive market of innovation for its hardware and a collaborative community for its software.**

particularly important to external innovation as it determines who will typically control the direction of technology development, the income streams and the end-customer relationship (and, conversely, how much autonomy is enjoyed by the external innovators). With the who-sells-to-whom distinction in mind, platform business models can be divided into three categories: integrator, product and two-sided[15] (see "Three Platform Business Models").

In the *integrator* platform model, the platform is wedged between external innovators and customers. In other words, the platform's owner sells to customers, conferring upon the company a relatively high degree of control. For example, by inserting itself between iPhone software developers and consumers, Apple is able to monitor and directly control transactions with customers, taking 30% of revenues. The company is also in a position to shape development, for instance, by vetoing applications that it considers to be "off-brand" or otherwise undesirable. Moreover, Apple's iTunes Store is itself a means of regulating and "owning" interactions with iPhone users. Given this position of considerable power, Apple could, in theory, go even further by assuming outright possession of externally developed innovations (that is, taking 100% control of the income stream) or by dictating technical specifications while directly integrating software into the iPhone, thus acting as a systems integrator.[16] (This was, in fact, Apple's original strategy.)

Companies have less control with the *product* platform model, in which external innovators build "on top" of a foundation technology and then sell the resulting products to customers. The platform owner might directly contract with the external innovators and have some additional control over them through the technical design of the core technology, but it is the external innovators (and not the platform owner) who directly transact with the end-users. Thus, the external innovators typically have more control than they would in the integrator business model. They generally have, for instance, greater freedom to set prices and to retain the residual rights of control over their technical developments, thus providing them with more entrepreneurial autonomy. Consider Gore-Tex, a waterproof and breathable fabric developed by W.L. Gore & Associates Inc. More than 89 companies have licensed the core technology and brand to create

## THREE PLATFORM BUSINESS MODELS

When a company opens up its product to outside innovation, the product becomes a platform. To generate revenues from that platform, executives need to think about what type of business model makes the most sense. In the integrator platform model, the company incorporates outside innovations and sells the final products to customers. In the product platform model, external innovators build "on top" of the platform and sell the resulting products to customers. Finally, in the two-sided platform model, external innovators and customers are free to transact directly with one another as long as they also affiliate with the platform's owner. For examples of each type of business model, see "Examples of Alternative Platform Business Models," p. 74.
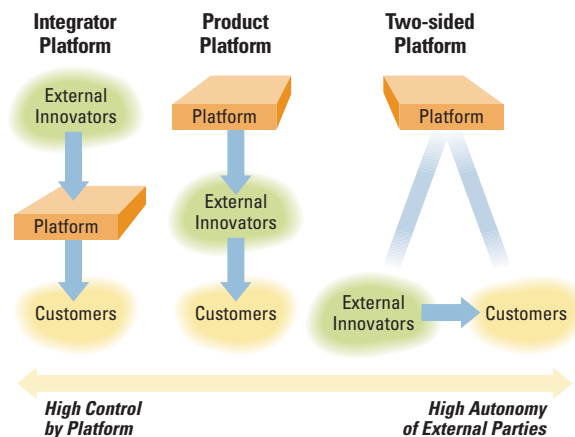


hundreds of products for a variety of applications, including outerwear, shoes and medical implants. Similar to Intel Corp.'s "Intel Inside" strategy for its microprocessors, Gore provides the core technology (and rules for its use), and the licensees innovate on that platform and sell their applications to customers.

In the *two-sided* (or multisided) platform model, external innovators and customers are free to transact directly with one another as long as they also affiliate with the platform owner. In such cases, the platform facilitates the transactions and interactions between the two parties, although the external innovators do not need to interact directly with the platform owner during the design, development and manufacturing of a new product. Nevertheless, the platform owner can still impose some degree of control over external innovators by, for instance, issuing to them various rules and regulations as a condition for their affiliation.[17] Users of Facebook.com, the social networking Web site, for example, interact directly with third-party applications (called "widgets") that might reside on a separate technical infrastructure even though the interactions are enabled by the Facebook platform. Here, external innovators are free to determine the revenue

model that best supports their investments, whether it's advertising supported or fee based. Nonetheless, the widget developers must still abide by certain contractual and technical rules imposed by Facebook Inc., such as limiting access to user information.

All three types of platform business models can succeed with either a market or community (see "Examples of Alternative Platform Business Models"), but executives should remember that *both* of those approaches are inherently predisposed to platforms of minimal control. External innovators prefer autonomy, discretion in design and direct customer access so that their distributed knowledge, entrepreneurial energy and initiative can be applied in ways that they deem best. In a competitive market, profit-seeking innovators might be particularly wary of getting locked into a platform whose owner could later change the rules of the game

(for instance, by charging higher licensing fees or commissions).[18] In a collaborative community, members might be concerned that their work could be coopted or used in ways that they did not intend.

Collaborative communities have the clearest disadvantages in working with a high-control platform. Communities often reject the concentration of power and control per se as part of their norms. Furthermore, they frequently resist the very types of ad hoc formal contracting mechanisms that might otherwise serve to protect them from expropriation.[19] Instead, they tend to favor self-organization, informal relationships and transactions based on reciprocity and fairness. Of course, those attributes encourage information sharing and aggregation, but they are less effective for offering formal protections. The risk is that community members might be more reluctant to participate and share their efforts if they have to live in the shadow of a large, powerful, profit-seeking platform vendor.

But there are exceptions. For example, a company might be able to get away with imposing tight controls over external innovators (even a collaborative community of them) when its platform has a monopoly position in the market, leaving people with little choice but to comply. And past studies have shown that control and power can be successfully wielded over outside innovators *if* credible commitment mechanisms can be put into place to convince them that their efforts won't be exploited. A company could, for instance, open its platform by transferring key intellectual property into the public domain or by making the platform compatible with competing systems. Of course, measures that relinquish control could undermine a company's ability to wield control constructively in the first place. For that reason, a business might prefer to use other mechanisms (for example, relying on trust, a reputation for fairness, contractual commitments and a variety of organizational practices[20]) to assure external innovators that it will not abuse its power, all while retaining the discretion to exercise some control for constructively orchestrating the surrounding innovation ecosystem.

## The Next Generation

In developing an open strategy, executives will often have to reconcile tensions that emerge in trying to address each of the three basic issues: What's the

## EXAMPLES OF ALTERNATIVE PLATFORM BUSINESS MODELS

Markets and communities can both be effective with all three types of platform business models (integrator, product, and two- or multisided).

| | INTEGRATOR PLATFORM | PRODUCT PLATFORM | TWO-SIDED (OR MULTISIDED) PLATFORM |
|---|---|---|---|
| **COMPETITIVE MARKETS** | ■ Apple Inc. iPhone (application store)<br>■ InnoCentive.com (scientific problem solving)<br>■ Local Motors Inc. (car design)<br>■ Ryz (shoes)<br>■ TopCoder Inc. (software code) | ■ Cloud computing initiatives (Amazon.com Inc. and Google)<br>■ Gore-Tex<br>■ Personal computer platforms and hardware "OEMs"<br>■ Google Android (hardware development) | ■ SAP (third-party applications)<br>■ Facebook Inc. (advertisers and widget developers)<br>■ Most Web portals, yellow pages<br>■ eBay Inc., Craigslist Inc.<br>■ Big Idea Group (innovation hunts)<br>■ Video games on consoles |
| **COLLABORATIVE COMMUNITIES** | ■ Threadless.com (T-shirts)<br>■ Google Android (software development of operating system) | ■ Video game "modders" (such as Valve Corp.'s Half-Life platform)<br>■ Linux and open-source development (such as TiVo Inc. and Motorola Inc.'s use of Linux)<br>■ Medical device companies and physicians (user innovators)<br>■ Wikipedia | ■ Apple Inc. iPhone ("jail breakers")<br>■ Big Idea Group (insight clubs)<br>■ Communispace Corp. (product feedback and innovation communities)<br>■ SAP (developer network)<br>■ Statacorp Lp (statistical software module development) |

innovation, what's the motivation of external innovators and what's the business model? One advanced solution is to apply a market model to certain external innovators and a community design to others. In such a "mixed" approach, the challenge is to determine how the principles of open innovation described earlier might apply to individual groups of external innovators in different ways and then to construct the appropriate business model and open strategy accordingly. Take, for example, Microsoft Corp., which has traditionally been hostile to the entire open-source model. But Microsoft now realizes that important technological innovations can be developed in conjunction with the open-source community. So the company has assigned formal executive responsibilities for open-source strategy and has established a staff to assist with outbound and inbound open-source software. A recent effort that illustrates the mixed approach is Microsoft's SharePoint, a server product that has traditional market-based competitors working on certain segments while an open-source community addresses other segments.

A company might also choose to implement a "nested" strategy, in which aspects of markets and communities are combined to achieve certain trade-offs. Consider TopCoder.com, a Web site that hosts ongoing competitions to connect talented programmers with companies that need software modules developed. On the one hand, TopCoder's network of more than 180,000 developers competes fiercely to win the prize money associated with particular software modules. But after a competition is over, members collaborate actively in teaching one another the ins and outs of various successful approaches that can be used to solve tough programming problems. Given the inherent conflicts that can arise between markets and communities, mixed and nested approaches typically come with significant costs and considerable risks, and they should be deployed only with much caution and the appropriate attention to governing mechanisms.

A crucial thing to remember is that a company's innovation strategy does not have to be cast in stone. That is, managers can evolve the strategy in ways that make the most sense for their particular business. Consider, again, the dramatic success of the iPhone. At its launch, the iPhone had just a few software applications that were either designed by Apple or by a small, select group of trusted partners. Company executives claimed at that time that they had no plans to allow others to create new features and applications. Soon, however, outside innovators had self-organized on the Internet to share tips on how to hack into the iPhone in order to create all of the "missing" applications. In a matter of just a few months, this community had written more than 100 applications that were not originally anticipated by Apple. Execs of the company wisely decided not to squash that external (and unauthorized) innovation but instead to evolve it by implementing a formal "third-party development" program. In addition to establishing the tools and interfaces that the outside innovators should use as well as facilitating the technology, Apple defined a set of licensing terms and a revenue-sharing plan. Moreover, the company augmented its iTunes Store to act as the exclusive distribution channel. The original community of external innovators was thus transformed into a highly centralized marketplace — under Apple's control.

The key lesson is that a company should develop a strategy that, at a given time, matches the nature of its innovation, the motivations of the innovators and the business model of its platform. A late entrant in a market might, for example, choose to establish a collaborative community of external innovators simply because most capable profit-seeking individuals have already been locked into an incumbent platform. Or managers at a company in a mature market might decide at some point to collaborate with "user innovators" in order to push further the technical frontier of their platform. In other words, a company needs to tailor its particular approach to the context of its specific business. "Opening up" the innovation process is necessarily about carefully designing a set of mechanisms to govern, shape, direct and even constrain external innovators; it is not about blindly giving up control and hoping for the best.

*Kevin J. Boudreau is an assistant professor of strategy at the London Business School. **Karim R. Lakhani** is an assistant professor and Richard Hodgson Fellow at the Harvard Business School. Comment on this article or contact the authors at smrfeedback@mit.edu.*



The multibillion-dollar video game industry would not exist without a thriving market of third-party businesses to write game software for particular hardware platforms.

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# Finding the Right Job For
# **Your Product**

Most companies segment their markets by customer demographics or product characteristics and differentiate their offerings by adding features and functions. But the consumer has a different view of the marketplace. He simply has a job to be done and is seeking to "hire" the best product or service to do it. Marketers must adopt that perspective.

**Clayton M. Christensen,
Scott D. Anthony,
Gerald Berstell
and Denise Nitterhouse**

T he market segmentation scheme that a company chooses to adopt is a decision of vast consequence. It determines what that company decides to produce, how it will take those products to market, who it believes its competitors to be and how large it believes its market opportunities to be. Yet many managers give little thought to whether their segmentation of the market is leading their marketing efforts in the right direction. Most companies segment along lines defined by the characteristics of their products (category or price) or customers (age, gender, marital status and income level). Some business-to-business companies slice their markets by industry; others by size of business. The problem with such segmentation schemes is that they are static. Customers' buying behaviors change far more often than their demographics, psychographics or attitudes. Demographic data cannot explain why a man takes a date to a movie on one night but orders in pizza to watch a DVD from Netflix Inc. the next.

Product and customer characteristics are poor indicators of customer behavior, because from the customer's perspective that is not how markets are structured. Customers' purchase decisions don't necessarily conform to those of the "average" customer in their demographic; nor do they confine the search for solutions within a product category. Rather, customers just find themselves needing to get things done. When customers find that they need to get a job done, they "hire" products or services to do the job. This means that marketers need to understand the jobs that arise in customers' lives for which their products might be hired. Most of the "home runs" of marketing history were hit by marketers who saw the world this way. The "strike outs" of marketing history, in contrast, generally have been the result of focusing on developing products with better features and functions or of attempting to decipher what the average customer in a demographic wants.

This article has three purposes: The first is to describe the benefits that executives can reap when they segment their markets by job. The second is to describe the methods that those involved in marketing and new-product development can use to identify the job-based structure of a market. And, finally, the third is to show how the details of business plans become coherent when innovators understand the job to be done.

## Hiring Milkshakes

A "job" is the fundamental problem a customer needs to resolve in a given situation. To illustrate how much clearer the path to successful innovation can be when marketers segment

*Clayton M. Christensen* is the Robert and Jane Cizik Professor of Business Administration at the Harvard Business School. *Scott D. Anthony* is the president of Innosight LLC, a Watertown, Massachusetts-based innovation consulting company. *Gerald Berstell* is a Chicago-based customer case researcher who owns a full-service market research and strategy firm focused on revitalizing declining established products and relaunching failed new products. *Denise Nitterhouse* is an associate professor in the School of Accountancy and Management Information Systems of DePaul University in Chicago, Illinois. Comment on this article or contact the authors through smrfeedback@mit.edu.

and whether they consumed it on the premises or drove off with it. He was surprised to find that 40% of all milkshakes were purchased in the early morning. These early-morning customers almost always were alone, they did not buy anything else and they consumed the milkshakes in their cars.

The researcher then returned to interview the morning customers as they left the restaurant, each with a milkshake in hand, and essentially asked (but in language that they would understand), "Excuse me, but could you please tell me what job you were needing to get done for yourself when you came here to hire that milkshake?" Most of them, it turned out, bought their shakes for similar reasons: They faced a long, boring commute and needed something to keep that extra hand busy and to make the commute more interesting. They weren't yet hungry but knew that they'd be hungry by 10 a.m.; they wanted to consume something now that would stave off hunger until noon. And they faced constraints: They were in a hurry, they were wearing work clothes and they had, at most, one free hand.

When the researcher asked what other products the customers might hire to do this job, it turned out the milkshake did the job better than any of its competitors. Bagels were dry; with cream cheese or jam, they resulted in sticky fingers and gooey steering wheels. Donuts didn't carry people past the 10 a.m. hunger attack. Bananas didn't last long enough to solve the boring-commute problem. In contrast, it took 20 minutes to suck a viscous milkshake through a thin straw, hands remained clean and stomachs were satisfied until lunch. It didn't matter that the milkshake wasn't a particularly healthful food because that wasn't the job it was being hired to do.

Once it was understood which jobs the customers were trying to do, it became very clear which attributes of the milkshake would do the job even better and which improvements were irrelevant. How could they better tackle the boring-commute job? Make the shake even thicker, so it would last longer, and swirl in tiny chunks of fruit — not to make it healthy, because customers didn't hire the milkshake to become healthy. But adding the fruit could make the commute more interesting — drivers would occasionally suck chunks into their mouths, adding a dimension of unpredictability and anticipation to their monotonous morning routine. Just as important, they could move the dispensing machine in front of the counter and sell customers a prepaid swipe card so that they could dash in, gas up, and go without getting stuck in the drive-through lane.

by job, consider an example from the fast-food industry, where companies historically have segmented their markets along the traditional boundaries of product and customer categories.

When a fast-food restaurant resolved to improve sales of its milkshake,[1] its marketers first defined the market segment by product — milkshakes — and then segmented it further by profiling the customer most likely to buy a milkshake. Next, they invited people who fit this profile to evaluate the product. Would making the shakes thicker, more chocolaty, cheaper or chunkier satisfy them more? The panelists gave clear feedback, but the consequent improvements to the product had no impact on sales.

Then a new researcher spent a day in a restaurant documenting when each milkshake was bought, what other products the customers purchased, whether they were alone or with a group

Understanding the job and improving the product on dimensions of the experience so that it does the job better would cause the company's milkshakes to gain share against the real competition — not just competing chains' milkshakes but donuts, bagels, bananas and boredom. This would grow the category, which brings us to an important point: Job-defined markets are generally much larger than product category–defined markets. Marketers who are stuck in the mental trap that equates market size with product categories don't understand who they are competing against from the customer's point of view.

## Cars Or Offices On Wheels?

Automakers and their market analysts segment their markets into product categories such as subcompacts, compacts, midsize and full-size sedans; SUVs and minivans; light versus full-size trucks; sports cars and luxury cars. They segment their customers along extraordinarily sophisticated demographic and psychographic dimensions as well. Yet the failure of these practices is glaring, because these segmentation schemes don't reflect the jobs that customers hire a car to do. Millions, for example, hire a car primarily to be a mobile office. Most models sell fewer than 100,000 units per year, and their makers struggle to sustain premium pricing for any of the features that add cost to their cars. And yet, no company has designed a car that is optimized to do the mobile-office job that these millions of people need it to do. If the job were the unit of analysis for carmakers, it's easy to see how they could differentiate a family of products in ways that mattered for those who hire a car to be their mobile office. The same customers who resist premium prices for features that are irrelevant to this job gladly would pay for electrical outlets, wireless access to the corporate customer relationship management database, a hands-free phone, a big-screen BlackBerry, docking stations, fold-out desks and organizing systems — all of which could differentiate the car on dimensions that would merit premium pricing.[2] After test-driving model after model, many buyers who need to do this job conclude that there is little differentiation across the products in this market. But the products are consummately differentiable.

## The Job of Differentiation

One of the most powerful benefits of segmenting markets by job and then creating products or services to do a job perfectly is that it helps companies escape the traditional *positioning paradigm* in which so many are trapped. The positioning paradigm posits that products in most markets can be mapped on a couple of axes, along which competitors have sought to differentiate themselves. In furniture retailing, for example, breadth of selection might be the metric on one axis, and quality of furniture might be measured on the other. The relative position of various

automakers' products can be similarly mapped. One axis might be product category (compact, mid-size, SUV, etc.), while the other might map the degree of luxury in interior features and décor. Differentiation-conscious marketers within the conventional positioning paradigm search for a vacant spot on such maps into which they can position new products.

The problem with the positioning paradigm is that even when marketers find open spaces into which unique products can be slotted, customers often don't value the differentiation, and competitors find it easy to copy. The starting point on such maps of differentiation typically is occupied by products that have only the basic functions that customers need. "Disruptive" companies in that minimalist position then move "up-market" in pursuit of profit, copying features and functions of competitors' higher-priced products. When this happens, features that once defined a differentiated, augmented product become expected in all products. This forces marketers to search for yet more "unique" features with which to augment their offering.[3] A punishing fact of life on this treadmill is that when once-unique features of an augmented product become commonly expected, companies are saddled with the costs of providing those features but cannot sustain premium pricing for offering them. The root reason for this entrapment is the pervasive practice of positioning products in categories that are defined by the properties of products, so that "better" is achieved by copying features and stretching functionality.

When a company begins to view market structure by job, however, it can break away from the traditional treadmill of positioning and differentiate itself on dimensions of performance that are salient to jobs that customers need to get done. This differentiation seems to stick much longer. In furniture retailing, for example, most companies have been trapped in the traditional positioning paradigm whose axes variously measure breadth of selection, style and quality/price. However, it seems there are at least two fundamentally different jobs that arise in customers' lives. One happens

> When the once-unique features of an augmented product become commonly expected, companies are saddled with the costs of providing those features but cannot sustain premium pricing.

in the lives of people who have graduated from their starter home and now need to equip their longer-term residence with furniture they will keep for the rest of their lives. Retailers that customers hire to do this job indeed must offer broad selection and enduring style and quality. Their customers are quite willing to wait the two to three months often required for delivery of such furniture. The other job arises among customers who have just moved into a bare apartment or starter home.

The market position of IKEA International A/S is based on this latter job. Its in-stock, take-it-home-and-assemble-it-yourself kits are seen as valuable features by its customers, not as inadequacies that are tolerated in order to get discount pricing because they need furniture now. Those customers also value IKEA's racks of kitchen utensils, linens and other home decorations, because the job is to outfit and decorate the dwelling. To accommodate the many customers who are young couples, in-store child care is a crucial aid in getting the job done. Without this package, IKEA could only help customers do a piece of their job. For its customers, the IKEA experience is delightfully different from a visit to a retailer that is trapped in the traditional positioning paradigm, attempting to appeal to a lower-income "demographic" by selling lower-quality furniture.[4]

Sometimes the job a customer needs done is "aspirational." The need to feel a certain way — perhaps macho, pampered or prestigious — arises in many of our lives on occasion. In such situations it often is the brand itself, more than the functional dimensions of the product, that does the job. When we find ourselves needing to do one of these jobs, we can hire a branded product — Gucci, Louis Vuitton, Virgin and so on — the very purpose of which is to provide such experiences.

## The Real Competition: Other Job Candidates

Although most marketers view their competitors as those who make the same category of products, this is generally only a small subset of the "job candidates" that customers consider hiring. Consider, for example, a job that arises millions of times on morning subway trains and buses. Crowded commuters want to pass the time productively. A free, single-section, easily folded newspaper called *Metro* has been positioned for this job and is read daily by tens of millions of people. It does not simply compete against the major metropolitan dailies; it competes against conversation with strangers, paperback novels, iPods, mobile phones, BlackBerries and boredom.

Automakers are not competing only with other automakers to fill the "my-car-is-my-office" job. They are competing against companies that help people be productive when they're not in home or company workspaces; such companies are Starbucks Corp.; Franklin Covey Co., a developer of time-management and productivity seminars and products, headquartered in Salt Lake City, Utah; Research in Motion

Ltd., developer of the BlackBerry and e-mail products, based in Waterloo, Ontario; and mobile-phone service providers. Even as automakers struggle to sustain premium prices for the feature-laden cars they introduce every year, customers whose cars are their primary offices show a remarkable willingness to pay very high prices for the services that carmakers aren't offering, just to help them get this job done.

Because segmenting by job clarifies who the other job candidates really are, it helps marketers to compare the strengths and weaknesses of each of the products that compete, in the customer's mind, for the job and to derive the attributes and experiences that would be required to do the job perfectly. Marketers who segment by product and customer category just can't see as clearly the competition that comes from outside their product category and therefore are not in an informed position to compete effectively.

> **The jobs that customers are trying to get done cannot be deciphered from purchased databases, but rather from watching, participating, writing and thinking.**

## Doing the Job of Finding the Job

How can marketers figure out the jobs-to-be-done segmentation scheme in their markets? The jobs that customers are trying to get done cannot be deciphered from purchased databases in the comfort of marketers' offices. It requires watching, participating, writing and thinking. It entails knowing where to look, what to look for, how to look for it and how to interpret what you find.

**Where to Look** There is a hierarchy that consists of places where researchers who are seeking opportunities to generate new growth might look for jobs that customers need doing. The first step in the hierarchy is the current customer base. Peter Drucker got it right: "The customer rarely buys what the business thinks it sells him."[5] Companies almost always find that their customers are using their product for different jobs than the company had intended. Often they learn that the product does one of these quite well, but they see customers force-fitting it for other jobs, putting up with its inefficiencies because it's their only option. Such situations are opportunities to modify the product and its marketing

mix so that it can compete more effectively and gain share against job candidates in other product categories.

In the second step of the hierarchy are people who could be your customers but are instead buying competing products to get their jobs done. Subtle differences that seem inconsequential when comparing products within a category can be very important when the job is the unit of analysis. The third step in the hierarchy of growth opportunities is exploring disruption. Disruptions take off when "nonconsumers" are trying to get the job done and simply are constrained from good solutions by the complexity and cost of existing products.

**When the customer is a business.** If your customer is a business, the job it needs to do is generally obvious: Make money. Selling a product to an organization that helps it make more money in the way it is structured to do so is a great way to justify premium pricing. This often isn't as easy as it seems, however, because most employees in customer companies have a limited, local understanding rather than a companywide perspective about how money is made.

Hill-Rom Co., a medical equipment company in Batesville, Indiana, grew its share of the hospital bed market by figuring out how to understand what drove its customers' profitability even more astutely than the customers did. Like most companies, Hill-Rom employees made contact with its customers' employees at many levels. Its senior executives visited with the senior hospital administrators, the company deployed its market researchers to work as orderlies on hospital wards, salespeople called on purchasing people, service technicians interacted with hospitals' maintenance staffs and employees in the financial departments of each company negotiated on how and when to pay for their purchases of beds. Unlike most companies, however, Hill-Rom convened regular meetings of all employees who had contact with specific customers' employees in order to piece together an insightful view of the levers the company could affect that would improve its customers' profitability.

> **The problem with focusing on customer needs is that a customer needs different things at different times. The job is a more stable focus because it exists independently from the customer.**

One key insight from these meetings was that nurses, who account for a significant share of hospitals' operating costs and whose interactions with patients strongly influence perceptions of the quality of care, were spending inordinate time on tasks unrelated to nursing — picking up things from the floor that patients had dropped and solving television problems, for example. By adding features and functions to their beds that obviated many non-nursing tasks, Hill-Rom differentiated its beds in ways that helped hospitals make more money. Hospitals readily paid premium prices to get those improvements. These insights did not come from segmenting markets by small, medium and large hospitals. They came from understanding the job — the levers that drive hospitals' profitability.[6]

As Hill-Rom discovered, developing a multidimensional perspective on a corporate customer's profit engine pays off. A question to a person involved in a business-to-business purchasing process is as simple as, "How did you decide that you were paying an acceptable price for this purchase?" and can yield useful insights about the levers that drive the customer's profit engine.

**When the customer is an individual.** Understanding the jobs-based structure of markets where the user is an individual entails different techniques than when the customer is an organization. The research methods that work best depend upon the customer's position along a spectrum. One extreme comprises situations where the job is "knowable," such as with milkshakes and mobile-office automobiles, in which commonly available products are being employed every day, and yet suppliers haven't deciphered what customers are really hiring their products to do. At the other extreme are ill-defined situations in which neither the company nor the customer can articulate the job to be done.

**How to Look** Marketers seeking to understand the jobs-based structure of individual customer markets must act like investigative reporters who have a set of tools at their disposal that includes surveys, interviews, observations, participation and experimentation.

**Interviews and surveys.** When the job is knowable, researchers actually can use relatively conventional market-research tools such as customer interviews and surveys. Although skillful use of these tools is important, even more crucial is defining the unit of analysis to which the tools should be applied. The objective is always to understand the situation, not the customer. This is a critical distinction. Some marketers with whom we've discussed this concept have asked, "How does your notion differ from 'needs-based' segmentation?" The difference is the unit of analysis. The problem with focusing on customer needs is that a customer finds herself needing different things at different times. In contrast, the situation, or the job, is a simpler, more stable

point of focus because it exists independently — disembodied, as it were — from the customer. Although there may be a correlation between customers with particular characteristics and the propensity to purchase particular products, it is the job that causes the purchase to occur.

Another reason it is so important to understand the situation that precipitated purchase is that this yields insight not just into the functional dimensions of the job to be done but into the emotional factors as well: fear, fatigue or frustration; anxiety or anger; panic, pride or pain; and so on. Products don't engender emotions. Situations do. Hence, to provide the set of functional, emotional and social experiences in purchase and use that are required to do the job completely, it is the situation rather than the customer that must be the fundamental unit of marketing analysis.

**Observation.** In the middle of the spectrum between "knowable" and "ill-defined" are instances in which customers know what jobs they need done, but there is no product or service designed to do it yet. In such instances, customers engage in compensating behaviors to "make do" with what's available. Marketers can sometimes identify these compensating behaviors simply by observing the consumer in context. Such observation is particularly critical when a new technology is developed, often for a purpose in another industry, and marketers are searching for opportunities to import it into other jobs. Sony Corp.'s legendary cofounder Akio Morita was in such a situation. The transistor had been developed by Bell Laboratories — an innovator in telecommunications equipment, based in Murray Hill, New Jersey — for telecommunications. Where else could it be used? Morita had a policy of never relying on quantitative market data to guide new-product development as he led the company between 1950 and 1980, because data doesn't exist for new applications of a technology. Instead, he and his associates just watched what people were trying to do and tried to imagine how applying the company's electronics miniaturization technology could make it easier and more affordable for more customers to do those jobs. Morita's success rate for new products was much higher than the 25% success rate for products whose launch is guided by more quantitatively sophisticated market-research methods.[7]

**Empathic observation of compensating behaviors.** When the situation is particularly murky, marketers will need to participate in the particular context themselves in order to peel away the compensating behaviors and work-arounds that mask the underlying job needing to be done. Hill-Rom used the technique of *empathic discovery*[8] to understand how the work of individual nurses affected hospital economics as its market researchers worked as hospital orderlies. This method also enabled The

Procter & Gamble Co.'s marketers to see that using a dustpan was compensating behavior, leading to the development of its Swiffer floor-cleaning system.

Sometimes compensating behaviors with a job lurking beneath them quite literally knock on the door, enshrouded within an idea for a new product or service. As an example, an inventor approached the Big Idea Group of Manchester, New Hampshire, a developer of new products, with a card game he had created. The chief executive officer of BIG, Mike Collins, sensed from his experience that the game wouldn't sell. Instead of sending the inventor away, however, he asked, "What caused you to develop this game?" The inventor had a ready answer: "I have three young children and a demanding job. By the time I get home from work and we finish dinner, it's 8 o'clock and the kids need to go to bed — but I want to have a fun experience with them. What am I going to do? Set up Monopoly or Risk? I need some fun games that we can set up, play and put away in 15 minutes. There just isn't a game designed to do this."

Bingo. Though his solution to the job was mediocre, the valuable insight was the job itself — something that arises in the lives of millions of busy parents every evening. It was then a straightforward job for a team of experienced game developers to work with this man to create a very successful line of "12 Minute Games" that are now sold nationwide. Marketers who frame their role as searching for good product ideas generally are not nearly as productive as those who are searching for jobs.

The intuition that comes from living with the problem is a key reason why many of the most successful software products are developed by people who had been on the "user end," living with or working around the inadequacies of prior products. It is the organizing concept behind MIT professor Eric von Hippel's highly successful *lead user* methodology.[9]

**Coevolution.** In some situations, marketers and engineers have a sense that a new technology has the potential to unleash new applications, but potential customers cannot even articulate what jobs they might want done if technology were to make it possible. In these situations, the company and its customers must discover the product and the job together. This requires that the company get into the market quickly with a very flexible product and discover, along with customers, value-adding ways to use it. For example, in the late 1990s, the emerging technology of *telematics* presented a number of intriguing potential applications: It conceivably could give drivers maps to their destinations, inform them about shops in the area that sold products they might want to buy, help police find vehicles in case of theft or accident, enable hands-free telephone calling, collect and interpret data on engine wear and on and on. Though many automakers were paralyzed by their inability to know exactly what applications and features consumers would want, General Motors Corp. got into the market

quickly with OnStar, an in-vehicle safety and security system that is a flexible, configurable product platform with a minimal fixed cost. OnStar's marketers then paid careful attention to the circumstances their customers were in when they signed up for the service and those they were in when they used the service. After a couple of years of coevolution, a major job had become clear: "I want peace of mind that if something unfortunate happens, my loved ones and I will be taken care of." By focusing on doing that job, OnStar has become a highly profitable, rapidly growing differentiated service that GM provides to millions of its customers.

In many ways, coevolution is as much an "innovation process" as it is a research method. It creates its own data. When it is undertaken, interviews, observation and empathic participation all can be used to figure out the job.

**Synthesizing Insights** At this point, the written and electronic records from the customer interactions described above — be they interviews, surveys, observation, participation or coevolution — need to be distilled into a "situation case" that describes the situation the customer found herself in when the product was hired or used.[10] A situation case begins with a description of the chronological trail of events, experiences and thought processes that led to the purchase decision. Good situation case researchers work like investigative reporters or detectives tracking down the whole story behind the specific events of purchase and use. They build their cases through a combination of the methods summarized above, often discovering the unexpected.

Generally, about 25 situation cases constitute critical mass. These cases then can be grouped by the similarity of the situations described. The result often is that most of the cases fall into a glaringly large group that represents a significant job that lots of people have. There usually are a few smaller groups of cases and a few "outliers." For each group, a summary then can be distilled describing the job the customers in those cases were trying to get done when they hired the product and how frequently the job seems to arise in the lives of those customers.

Once defined, this helps the researchers to understand what other "job candidates" were considered as potential hires. This defines the real competition in the customer's mind. They can then describe the "hiring criteria" that were used when comparing the candidates. These are the experiences, features and functions that constituted the basis for hiring one product over another. This analysis can be included in the summary and is often best constructed as a table, with the job candidates listed in the left column and the required experiences in purchase and use arrayed across the top. Each box of the resulting grid will contain descriptions of how well each competing product provides each experience.

From these can be gleaned the next element of the summary: an assessment of the deficiencies and constraints that future product and service innovations need to alleviate in order to

> **Coevolution is as much an innovation process as it is a research method. It creates its own data. Interviews, observation and empathic participation all can be used to figure out the job.**

grow the market — a collection of "help wanted" signs posted by customers, as it were. This not only provides the agenda for future new-product development projects but also gives a sense for whether competitors can more readily eliminate those constraints. Glaring "help wanted" signs signal significant opportunity. If there aren't significant "help wanted" signs, it's a signal that the products of one or more competitors already are doing that job well.

Purchased databases and customer questionnaires can be used to segment markets by product and customer characteristics and to define new products with better attributes than existing ones. But they cannot yield differentiating insights about the job-based structure of a market. This understanding can only emerge from techniques like those described above.

### Configuring the Marketing Mix and Business Plan

Entrepreneurship researcher Amar Bhide once surveyed about 400 entrepreneurs,[11] about half of whose ventures had failed. Of those who had succeeded, 93% reported that the strategy that led to their success was largely different from what they originally had planned. Indeed, most successful new ventures iterate toward or converge upon a viable strategy. It is rare to get it all right at the outset. In a similar vein, about 75% of all new products and services that established companies introduce into their markets fail to reach viable, profitable scale and are withdrawn.[12] In many of these instances, the managers killed underachieving products without ever understanding what their real job potential was. Situation case studies enable managers to see that a product in crisis may be a product that is valued in ways other than originally foreseen and may signal different opportunities for success.

Though our research on this issue is still in process, it appears that the precipitating event that allows the winning strategy of an emerging company to coalesce is the clarification of a job that customers need to get done for which its product is being hired. It is only when the job is well-understood that the business model and the products and services required to

do it perfectly become clear. Then, and only then, can the company "take off."[13]

Once a job is clarified, the business-planning process should delineate the functional, emotional and social experiences that the customer will require in purchase, use and after-sale follow-through. The "Four Ps" of marketing — Promotion, Product, Price and Place — offer a useful way to structure the business plan to ensure success. Forensic analyses of new-product failures often reveal that marketers have cobbled these four factors together in inconsistent ways. As the examples below illustrate, understanding the product's job and its real competitors makes it much easier to get the Four Ps right.

**Promotion: Communicating to Those Who Need to Do the Job** When a product does a job well, it unlocks the potential for marketers to create a *purpose brand*. A purpose brand links customers' realization that they need to do a job with a product that was designed to do it. During the early years after a product's launch, when volumes are small, word-of-mouth advertising is far more cost-effective than media advertising. Positive word-of-mouth advertising only can be achieved after customers have used a product that did the job well. A very long list of powerful brands, including FedEx, Starbucks, Google, BlackBerry, craigslist.org, QuickBooks, TurboTax and OnStar, were built in just this way with minimal advertising at the outset. Because each is associated with a clear purpose, these brands pop into customers' minds when they need to do the jobs that these products and services were optimized to do. Our ongoing research into the history of today's valuable brands suggests that almost all of them took root as a purpose brand.[14]

A clear purpose brand acts as a two-sided compass. On one side, it guides customers to the right products. The other side guides the company's product designers, marketers and advertisers, giving them a sense of "true north" as they develop and market new and improved versions of their products. A good purpose brand clarifies which features and func-

> A purpose brand links customers' realization that they need to do a job with a product that was designed to do it. It clarifies which features and functions are relevant to the job and which are not.

tions are relevant to the job and which "improvements" will prove irrelevant. The price premium that the brand commands is the wage that customers are willing to pay the brand for providing this guidance on both sides of the compass.

Without a specific purpose for their product, marketing executives must attempt brand building through expensive advertising. The high fixed cost of building new brands through advertising deters many companies from attempts to build new brands at all, so they acquire and consolidate brands instead. Managers ensnare themselves in this trap because of the way they have been taught to segment markets.

Positioning products to do specific jobs also helps companies target their advertising more efficiently. When a chain of scuba-diving shops marketed its diving classes and products to a "demographic" — primarily people who subscribed to scuba-diving magazines and who lived in ZIP codes near their stores — it struggled to succeed. When the company decided to find out what situations its customers had found themselves in when they decided to "hire" its scuba classes, it realized that many of them were engaged couples planning wedding trips to tropical climes, suggesting that the company should be buying mailing lists from *Brides* instead of *Dive* magazine.

**Products That Do the Job Perfectly** When marketers segment by product or customer characteristics, they frequently find themselves offering features or improving on dimensions of performance that are irrelevant to the job. For example, as digital photography threatened Eastman Kodak Co. with disruption in the early 1990s, Kodak's executives — having framed their market around photography — began to prepare the company for this transition by investing billions of dollars in a megapixel and megazoom digital imaging race that it was not well-positioned to win. In about the year 2000, however, Kodak executives realized that while some customers hired their cameras for the job of preserving high-quality images for posterity, a much larger group sought simply to entertain themselves, to share fun moments with family and friends. The result was the Kodak EASYSHARE camera, an affordable product with a great purpose brand. Understanding the job for which the product was meant to be hired allowed Kodak to eschew the expensive improvements that didn't matter in favor of relatively simple ones that did. By making it simple to attach images to e-mail, Kodak's product easily proved itself to be better than enclosures in first-class mail, phone calls with no images and cumbersome up- and downloading procedures. Kodak's share of the U.S. digital camera market grew from 8% to 28%.[15]

**Is the Price Right?** Unless marketers understand what other job candidates they're competing against from the customer's per-

spective, they cannot ensure that the price — the third element of the marketing mix — is right. They cannot know whether their offering is over- or underpriced. For example, to carry out its mission of educating people about the city's rich architectural heritage, the nonprofit Chicago Architecture Foundation started conducting boat tours that passed by the architectural master-pieces lining the Chicago River. Their initial target customers were "affluent people with high education levels and a strong interest in architecture," and they advertised in media serving that demographic. After the boat tour's lackluster first season, a researcher joined a cruise the next spring and asked passengers why they were taking the cruise. A surprising number were doing it to entertain visitors from out of town. Architecture, as it turns out, was a minor part of the cruise's appeal to this audience. CAF found that its cruise was actually less expensive than many alter-native ways one could entertain visitors, and it was able to boost prices accordingly.

**Placement** When marketers have defined the set of experiences in purchase and use that need to be provided in order to do the job perfectly, the necessary product placement becomes obvious. Recall that to optimally do the job of making the morning commute interesting, the milkshake-dispensing machine had to be placed in front of the counter and equipped with a prepaid swipe-card system. Instant service was an important experience to offer customers hurriedly heading for work. This had not been clear to the managers when they had classified the milkshake as simply another item on the menu.

Consider another illustration. A maker of boxed drinks, whose products were a mixture of 40% fruit juice and 60% flavored sugar water, had placed its products in the boxed drink section of super-markets, juxtaposed with competing products that were 100% fruit juice. Though the pure juice products were much more expensive, sales of the juice/water drinks were languishing. When interviewed about their pur-

chases, customers, who were mostly parents, revealed that the job they were trying to get done had a functional dimension — to put a healthy drink in their children's school lunches — and an emotional dimension — to feel like they were taking good care of their children. When pitted against the job candidates that contained 100% juice, the mixture drink simply wasn't qualified; it rarely got hired. The company then had its drink placed in another location in the supermarket, in snack foods, and sales improved markedly. When compared to the job candi-dates in the snack aisle, a drink that had 40% real fruit juice solved the emotional component of the "good parent" job much better than the competing candidates.

## Sizing Up the Situation

The logic of segmenting markets by job is not new; many market-ers will say that they already know many of the concepts. In fact, marketing guru Ted Levitt taught us 30 years ago that customers "don't want a quarter-inch drill. They want a quarter-inch hole!"[16] If that logic seems compelling, then why are product categories and customer categories the default modes of segmentation in nearly all companies? A core reason why marketers in most com-panies say one thing (that they know markets ought to be segmented by job) and yet do another (they segment by product and customer category) is rooted in the easy availability of the latter sort of data.[17]

The good news is that when companies understand who they are up against in the mind of the customer, they can piece together the real size of the market in which they compete. Because job candidates are drawn from many product catego-ries, the salient size of most markets is usually much larger than is calculated by summing the sales within a product cat-egory, meaning that potential for growth is greater. Indeed, many mature products on the trajectory of sustaining im-provement that seem to have been commoditized — products for which improved performance does not result in improved pricing or market share — actually turn out to be immature, not-good-enough products with lots of scope for differentia-tion and premium pricing once the job and its associated hiring criteria are understood.

In our studies of the factors that make innovation a high-risk, high-expense proposition, we have concluded that working to understand the job to be done is one of the most important ways to limit both risk and expense. Quite possibly, the root reason why innovation is so failure-ridden is not that the outcomes are intrinsically unpredictable but rather that some of the fundamental paradigms of marketing that we fol-low in segmenting markets, building brands and understanding customers are broken. The odds of getting it right will be much higher when we frame the market's structure to mirror the ways that customers experience life.

> Quite possibly, the root reason innovation is so failure-ridden is not that outcomes are intrinsically unpredictable but rather that some of the fundamental paradigms of marketing are broken.

## REFERENCES

**1.** The descriptions of the product and company in this example have been disguised.

**2.** There are other job segments in the auto industry. The key reason why DaimlerChrysler AG's early minivans were such a hit with customers was, we believe, that they were positioned on a job that arose in the lives of families — to interact easily and safely with each other while traveling together from here to there. Creating a job-focused product does not guarantee a perpetual monopoly, of course, and other automakers ultimately introduced their own minivans. It is noteworthy, however, that it took competitors years to introduce performance-competitive minivans. Because they were organized by product category rather than job, the minivans just didn't fit with the way they were structured or thought about in the market. As a result, Chrysler's market-share leadership persisted for over a decade. Another job that people hire a car to do is to express care and love for a spouse or a child. No car has the features and associated services bundled with it to do this job well.

**3.** See T. Levitt, "Marketing Success Through Differentiation – of Anything," Harvard Business Review 58 (January-February 1980): 2-9 for a classic description of the augmented product concept. Harvard Business School professor Youngme Moon has written and taught extensively about the concepts in this section, and we thank her for "augmenting" our own understanding of this phenomenon through her articles, cases and teaching notes.

**4.** IKEA founder Ingvar Kamprad had a partial, intuitive sense of what some fraction of furniture buyers needed to do when they walked into a store. As he and his associates started the company and tried to help their customers, understanding of the job coalesced piece by piece. IKEA executives probably do not articulate their strategy as being focused on this job — most likely this insight resides in a tacit, cultural understanding. Our hope is that by articulating this model of jobs-to-be-done segmentation and illustrating it with companies like IKEA, whose strategies de facto mirror this model, we might help students and managers who weren't blessed with the intuition (and luck) of Kamprad to deliberately find opportunities such as these.

**5.** P.F. Drucker, "Managing For Results" (New York: Harper & Row, 1964), 94.

**6.** These methods are recounted in C.M. Christensen, "Hospital Equipment Corporation," Harvard Business School case no. 9-697-086 (Boston: Harvard Business School Publishing, 1997).

**7.** This information was provided by Michael Schulhof, former Sony board member and CEO of Sony Corp. of America for 20 years, during an interview in New York City in 2001.

**8.** Leonard, William J. Abernathy Professor of Business Administration Emerita at Harvard Business School, called this method empathic design. See D. Leonard and J. Rayport, "Spark Innovation Through Empathic Design," Harvard Business Review 75 (November-December 1997): 102-113.

**9.** See E. von Hippel, "Democratizing Innovation" (Cambridge, Massachusetts: The MIT Press, 2006). This is the latest in a stream of insightful work from von Hippel.

**10.** The customer case-research method is described in detail in two articles by G. Berstell and D. Nitterhouse: "Looking 'Outside the Box:' Customer Cases Help Researchers Predict the Unpredictable," Marketing Research 9, no. 2 (summer 1997): 5-13, describes the research process; and "Asking All the Right Questions: Exploring Customer Purchase Stories Can Yield Surprising Insights," Marketing Research 13, no. 3 (fall 2001): 14-20, lays out the questions and interviewing approaches that customer case researchers use to develop case studies.

**11.** A. Bhide, "The Origin and Evolution of New Businesses" (New York: Oxford University Press, 2000).

**12.** For one such estimate, see D. Leonard-Barton, "Wellsprings of Knowledge" (Boston: Harvard Business School Press, 1995).

**13.** In many ways, this is a key message of high-tech marketing consultant Geoffrey A. Moore's books. He contends that instead of selling a "product" at the outset, emerging companies need to find a customer who will pay a lot of money to the company to solve a critical problem for him. Then, and only then, does it have the privilege of "crossing the chasm." In addition to his landmark book, "Crossing the Chasm: Selling High-Tech Products to Mainstream Customers" (New York: HarperBusiness, 1999), Moore's other book that describes this most clearly is "Living On the Fault Line: Managing For Shareholder Value in Any Economy" (New York: CollinsBusiness, 2000).

**14.** This branding dimension of the jobs-do-be-done theory is described more fully in C.M. Christensen, S. Cook and T. Hall, "Marketing Malpractice: The Cause and the Cure," Harvard Business Review 83 (December 2005): 74-83.

**15.** Unfortunately, subsequent to the educational experiences that in 1999 to 2000 enabled Kodak's management team to take the digital business in this direction, Antonio Perez was brought in as the new chief executive officer after the retirement of CEO Dan Carp. With a more conventional mindset and no understanding of the problem of disruption, Perez combined Kodak's film and consumer digital businesses into a single business unit. By 2006, the company's share had dropped to an unprofitable 12%.

**16.** T. Levitt, "Marketing Myopia," Harvard Business Review 53 (September-October 1975): 26-180.

**17.** We thank our friend Armando Luna, vice president of corporate marketing for Blue Cross and Blue Shield of Florida, for teaching us about the origins of market-segmentation theory, which we summarize here in our own language: The theory of market segmentation has its roots in economic theory relating to monopolistic competition; see W. Alderson, "Marketing Behavior and Executive Action" (Homewood, Illinois: Irwin, 1957); and H.J. Claycamp and W.F. Massy, "A Theory of Market Segmentation," Journal of Marketing Research 5, no. 4 (November 1968): 388-394. The concepts of product differentiation and differential advantage emerged from this background and underpinned early market-segmentation theory. Because most economists' analytical tools consist of techniques for analyzing large data sets, market researchers with this training spent their careers trying to show relationships between the attributes of customers and their buying behaviors. They would conclude that the variables or characteristics in the regression equations whose coefficients were statistically significant comprised the salient boundaries for dividing consumers into groups. The availability of data and the tools of analysis, in other words, shaped the insights to be sought. In the process, many marketers have forgotten what the theory of market segmentation was based upon from the beginning: that different people have varying needs that change from time to time.

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# Why Companies Should Have
# **Open Business Models**

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

**Henry W. Chesbrough** *is the executive director of the Center for Open Innovation at the Haas School of Business, University of California, Berkeley. He is the author of the recently published* Open Business Models: How to Thrive in the New Innovation Landscape *(Harvard Business School Press, 2006) and the earlier* Open Innovation: The New Imperative for Creating and Profiting from Technology *(Harvard Business School Press, 2003). He can be reached at chesbrou@haas.berkeley.edu.*

vival 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.

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 re-

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

## 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.



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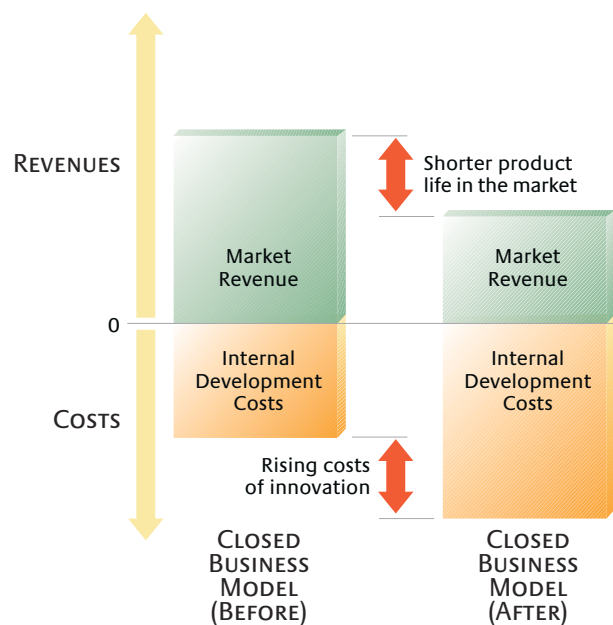
> **In the past, IBM's semiconductor copper-on-insulator process technology would have likely been kept under wraps. But with the company's new approach to IP, the technology has been widely — and profitably — licensed.**

(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 exter-

nal 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.

## 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

### 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).
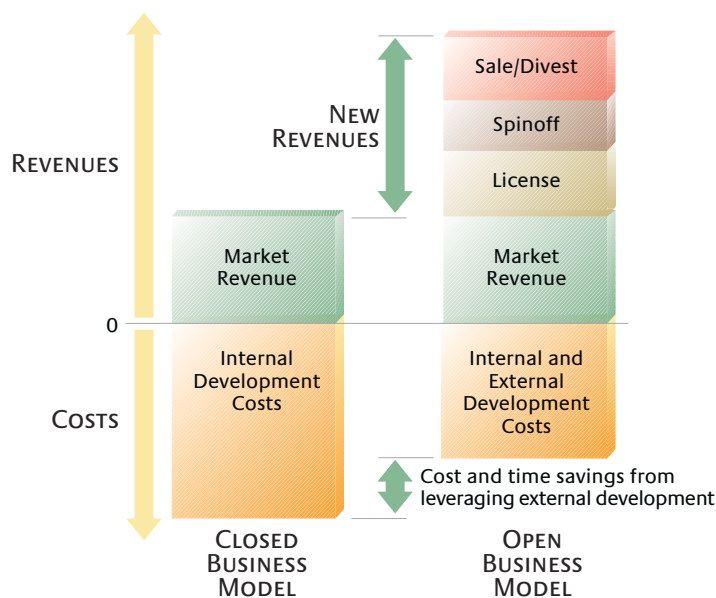
much more funding and far greater organizational commitment than a small experiment does, and those resources must come from somewhere. This often creates "losers" in the organization — groups whose budgets are cut to free up resources to support the new business model. Because of that, the scaling-up 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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**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.

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**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.

# The Four Ways IT Is Revolutionizing Innovation

MIT Sloan School of Management economist and digital business expert Erik Brynjolfsson tells how the rising data flood and the emerging tools for analyzing it are changing the ways innovation gets done.

**INTERVIEW BY MICHAEL S. HOPKINS**

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**THE LEADING QUESTION**
How are IT advances changing innovation?

**FINDINGS**

▶ Tech advances aren't just innovations in themselves, they're enabling a new process for innovating.

▶ The real power is combining these new innovation processes — measurement, experimentation, sharing and replication — in sequence.

▶ Leading companies using business analytics have faster cycle times, more flexibility and a higher metabolism for processing information.

THERE'S ALWAYS BEEN a performance gap between companies that embrace technology and companies that resist it — what IT innovation thinker Erik Brynjolfsson calls the productivity gap between "leaders and laggers."

What's new, though, is that while the gap was fairly steady for decades, in 1995 it suddenly started to widen — and is widening still. Credit the rise of systems like enterprise resource planning, the expanding use of the Internet and the fact that every dollar buys incrementally more computerization.

Brynjolfsson found not only that the leader-vs.-lagger gap has grown in the past decade but also that it has grown the most in IT-intensive industries. Why? Because the leaders are capitalizing on technology advances to pioneer a whole new innovation paradigm, based on the ways they measure, experiment with, share and replicate information.

In a conversation with *MIT Sloan Management Review* editor-in-chief Michael S. Hopkins, Brynjolfsson, the director of the MIT Center for Digital Business and the Schussel Family Professor at the MIT Sloan School of Management, talks about how smart companies have learned to tap the flood of data created by information technology and process it with what he calls a "higher information metabolism" and how they're changing the ways that innovation gets done.

Harrah's, the world's largest casino company, based in Las Vegas, has developed a culture of experimentation with analytics that has propelled it to the top of its industry.

**Your research and work with the MIT Center for Digital Business focuses on the ways that information technology is linked to innovation. Let's start with your big picture overview.**

In the long run, our competitive advantage and all of our living standards depend on innovation, and I would argue that for our era, the most important driver of innovation is information technology. Thanks to Moore's law, the adjusted power being delivered, for instance, by computers has grown tremendously. That directly has led to quantifiable increases of productivity.

Information technology is also a catalyst for complementary changes: It's what economists call a "general purpose technology" that sets off waves of complementary innovations in things like business processes, new ways of reaching customers, new ways of connecting to suppliers, internal organization to the company. These complementary changes are often 10 times as large as the size of the initial investments in the IT itself and have profound and long-lasting effects on our ability to create goods and services.

But there's a factor that has not been studied very much and, frankly, is not very well understood. And that is the possibility that IT can *change the innovation process itself*.

This is something that we haven't seen much in the economic literature. But when I go and visit companies, I see it happening all the time in the 10% or 20% of businesses that are on the leading edge. And the way that they've been changing innovation is, I think, a harbinger for some more profound changes in the economy as a whole.

**Is it that companies are using information technology to measure what they do in especially *smart ways*?**

Yes, but it's not just measurement. IT is setting off a revolution in innovation on four dimensions simultaneously: measurement, experimentation, sharing and replication. Each of these is important in and of itself, but, more profoundly, they reinforce each other. They magnify the impact of each other. Improved measurement makes experimentation much more valuable, which in turn becomes more valuable still if you can share those results to the other locations. And, ultimately, if those results are important,

you want to be able to scale those results up.

By doing all four of these changes together, companies are, in essence, creating a new kind of R&D.

**Let's go through those one by one. The first, you've said, is measurement.**

It's more like radically improved measurement, through the use of what I call nano data. That includes clickstream data, Google [Inc.] trends, detailed e-mail data, the billions and trillions of bits of information that are thrown off by enterprise planning systems. Even without any conscious effort on the part of the designers, this information is just *generated*. But by studying these data very carefully, companies can have much better knowledge of their customers, of their business processes, of their product quality and of the defects of their supply chains. The field of business intelligence has been tapping into this explosion of data.

**If companies are measuring information, then they have the means to use IT to experiment with things like how they're selling to their customers. You say that's the second category of IT-driven innovation.**

Yes. IT-based experimentation is most obvious in companies like Amazon.com [Inc.], which regularly conducts what it calls "A/B experiments," tests of its Web pages that deliver different versions of the same page at the same time to different visitors, monitoring customer experience and follow-through. Google, similarly, does 200 to 300 experiments on any given day. But it's also quite common in catalog companies, like credit card companies and direct mail companies, and even in mainstream brick-and-mortar companies like the casino chain Harrah's [Entertainment Inc.].

The big advantage of an experimental approach that uses IT is that you can get at causality in a way that you can't with just pure measurement and observation. And that, of course, is the gold standard for being able to have actionable knowledge about what's really happening in your business, what innovations are paying off and which ones aren't.

**I'll ask you about that Harrah's example in a minute. Let's first talk about the other two dimensions you mentioned: sharing and replication.**

> What we're going to see in the coming decade are companies whose whole culture is based on continuous improvement and experimentation — not just of specific processes, but of the entire way the company runs. I think this revolution can be fairly compared to the scientific revolution that happened centuries ago. — **ERIK BRYNJOLFSSON**

A third thing that's changed a lot in businesses over the past five to 10 years is the way that companies can share not only data, but insights. The Internet and information technology are uniquely well designed for this kind of sharing, of course.

An example is what happened spontaneously at Cisco Systems [Inc.], where the central IS department did not support Macintosh computers. There were about 10,000 users of Macs, and they set up their own wiki internally to share tips and tricks on things like how to install new software and how to get their Macs to work with the company's Linux printers. This creation of a wiki shows how not just big innovations but smaller ones, like figuring out how to network with a printer more quickly, can be easily shared.

We often think of grand innovations, like the invention of the light bulb, as what drives economic growth. But equally important, and perhaps more important, are the 1,001 small innovations that regular business managers and line workers do every day at their jobs. If we can find more effective ways of sharing those micro-innovations with one another so that each person doesn't have to reinvent the wheel or reinvent the printer routine, then we're much more likely to be able to get a faster, more steady pace of economic growth — and improved competitive advantage for the companies that make that easy.

**The fourth change is replication. What do you mean by that?**

IT makes it dramatically easier to replicate and scale up innovations once they've been identified. The first three approaches help companies find and share new innovations, but then IT makes it possible to take that innovation and copy it many times.

Now, the most obvious examples are innovations that are made of bits, like software and music and Web pages. Those get replicated thousands, hundreds of thousands, millions of times, and that

process of replication has obviously completely changed those industries.

However, what we also see is that *business processes themselves* can be replicated by leveraging information technology. A nice example is what Andrew McAfee at our Center for Digital Business described in his study of CVS [Caremark Corp.]. The company implemented an improved business process for prescription drug ordering at one of its pharmacies, which improved customer satisfaction significantly. But what happened next is what's really important. Mangers took that business process and embedded it in an enterprise information technology system, and then they replicated it to 4,000 other pharmacies in 4,000 other CVS stores within a year.

We're seeing that not just in retailing but also in manufacturing, in banking, in industry after industry.

**Let's go back to Harrah's. You say it's an example of an offline company — not an Amazon, but a business with staff people who interact, in person, with customers in the real world — that has used IT in all four ways to drive innovation. What is Harrah's doing now that it wasn't doing before?**

The CEO there, Gary Loveman, was a Ph.D. student here at MIT with me. And I think he's an exemplar of a new kind of senior executive that we're going to be seeing in the coming years. Gary has created a culture where employees at Harrah's are regularly doing business experiments and carefully measuring their results through their information systems. The successful findings are shared with business managers at other locations and then scaled up to become part of corporate policy going forward.

When he first came to Harrah's, it was, frankly, sort of a second-tier, also-ran casino company. But it did have a great deal of data. Most of that data was not being used effectively, and he brought a culture of experimentation and analytics that has propelled Harrah's to being the leading casino company.

How did he do it? Well, he's really good with numbers. And while a lot of his competitors were working on having fancier fountains and more incredible spectacles in Las Vegas, Gary was checking through the numbers to see what was really driving profitability. This kind of analysis is something that he has spread not just into the CEO suite, but throughout the company.

In fact, when he came to speak at my MBA class last year, he told me that there were really just two things that could get you fired from Harrah's. One is if they catch you stealing from the company. The other is if they catch you running an experiment without a proper control group. Now, that kind of culture, of taking experimentation and methodology that seriously, is something new — and something that IT makes a lot more feasible.

So, Harrah's runs dozens of experiments. For instance, they will see whether different kinds of discounts and coupons can entice people that normally come for two days to come for three days, or get people who normally bet the $5 machines to bet the $25 machines. They bring experimentation to figure out what work practices can get their waiters and waitresses to serve customers more effectively and get higher customer satisfaction scores. This is a mentality that they bring to every aspect of their business.

**It's interesting that Loveman studied at MIT before he became CEO at Harrah's. What kinds of training or changes in attitude do you think this "new kind of senior executive of the future" will need?**

One of the things that I see changing is a shift from a lot of long-term planning. Instead, there's more *sense and respond*: Experiment so that you can learn about what your customers' needs are, what the supply chain changes are that could make a difference, how to redesign your products.

This is a mentality that requires much quicker cycle times. It requires people from the organization to be flexible and nimble. It requires a much higher *information metabolism*.

You have to have really high-quality, intelligent people working for you who are getting the data they need to be able to make rapid decisions and then propagate the effects of those decisions equally rapidly.

You know, to be successful at this experimentation approach requires a unique set of skills, one that hasn't been that common among most types of managers, and one that, frankly, we at business schools need to work harder at bringing together. Specifically, these managers need knowledge of business analytics, the way to understand the numbers to drive the statistics and to design intelligent experiments — but also deep knowledge of the business itself, to know how to ask the right questions.

In coming years, I think the real bottleneck will be finding people who combine those sets of skills, who can design experiments that get at genuine business problems in a way that can be analyzed through controlled business experiments. That's something that we don't see a whole lot currently.

**In theory, companies have had access to data and have been doing experiments forever. Isn't the big problem — let's call it the big challenge — that there's just so much information that it's hard to know where to start?**

I think so. Most companies have just been overwhelmed with the flood of data that's been created by their information systems. Much of that data arrives almost accidentally, when they install, say, a new enterprise resource planning system. Suddenly billions of bits of information are generated about their operations, about their customers, about their suppliers. And most of it just gets *stored*, never used, never looked at again.

Gary describes coming to Harrah's as finding a gleaming new F-16 [Fighting Falcon], but with no pilot. Just all this wonderful data that had nobody to steer it and take advantage of it. And I think that's more the norm than the exception at companies as they implement information systems. The original systems often have very specific operational goals, but ultimately, the data that they generate may be *even more important* if it leads to innovations and changes in business practice.

What we're going to see in the coming decade are companies whose whole culture is based on continuous improvement and experimentation — not just of specific processes, but of the entire way the company runs. I think this revolution can be fairly compared to the scientific revolution that happened centuries ago. Great revolutions in science have

Erik Brynjolfsson's recently published *Wired for Innovation* is an essential guidebook to the digital economy.

almost always been preceded by great revolutions in measurement. Management historically has not had that kind of careful measurement or experimentation. But it's time that we catch up.

**Sounds like a massive opportunity. Where do companies start?**

Well, like I've described, companies are going to have to nurture a mentality of experimentation, an expertise in how to run those kinds of business experiments and an infrastructure that makes it possible to replicate and scale up successful innovations.

Paradoxically, this leads to a simultaneous centralization and decentralization of decision making. On one hand, the opportunities for innovation and experimentation need to be decentralized, because only the people who are on the spot are going to have the local, specific knowledge to know what kinds of experiments are likely to be valuable. On the other hand, to be truly successful, companies will have to find ways to embed the resulting innovations into a platform that can be scaled up and replicated. That's easy to do in digital companies like Amazon or Google and a little harder to do, say, in retail or manufacturing companies, but it can be done through the aid of enterprise information technology. Many business processes can be embedded in these systems. And when you find a better way of managing that process, if it can be leveraged or even fully embedded in a business process, it can be replicated. So, centralization of those parts of the business, with decentralization of the discovery phase.

We've started calling these companies "digital organizations." For my book with Adam Saunders, *Wired for Innovation* [MIT Press, 2009], we identified their characteristics through a survey of several hundred companies. Over time, I think we'll be able to get more nuance on when companies are likely to be most successful. But we've summarized what we know so far in this book.

**What will be most difficult?**

I think we're furthest along in having a platform for replicating and scaling up the experiments. Enterprise resource planning systems are a great example of that.

The skill set is one that we're in the process of

working on. Frankly, it's going to take a generation to fully work its way through. It's not just knowledge of the experimental design and the mathematics to handle statistics and to understand what the data are saying. It's also a culture of creativity to be able to bring together those kinds of hard skills with the flash of insight, the aha moment that comes from really knowing your business, knowing your customers and bringing those two together. That is, unfortunately, a fairly rare combination. It's one that I think we at business schools can do more to teach and bring to businesses.

Changing culture is probably the most difficult challenge. It requires a tolerance for failure and a desire to have employees try new things. [Software engineer] Greg Linden, who was at Amazon for a while, has said that genius is the fruit of a thousand failures. That's different than the old mentality of figuring out all the possibilities and then locking in on one. Instead, it's an approach of rapidly prototyping many different options, seeing which ones pan out and using the information infrastructure to get the feedback quickly. Cutting the losses quickly, pruning the failures and then ramping up the successes.

### What do you see as the biggest impediments for companies?

The reality is that most organizations are like a finely tuned watch. My watch has got little gears inside of it. It's a mechanical watch. If I wanted to make this a digital watch, I suppose I could open it up and get some integrated circuits from a digital watch and kind of put them in there one by one. But that would not make this keep better time. That's not the way to create a digital watch from an analog watch.

Yet many people think that you can take an existing organization that's based on 20th-century principles and add some of the elements of successful digital organizations one by one and get a more successful digital organization. I wish that were true, but in most cases that only makes things worse.

What's required is an understanding of how all these components fit together. Half the battle is understanding that changing just an incentive system or a hiring practice or a technology infrastructure by itself is unlikely to lead to desired results unless all the other components are also matched together.

Now, trying to change that many things simultaneously is a daunting task. What companies can do

to manage the scope a bit is to reduce the dimensions of change on some other dimensions. They can focus on a particular geography or a particular product line.

### Have you seen this work in real time?

Yes. One company I worked with wanted to change the way its factories ran from a 20th-century Taylorist approach to what they called modern manufacturing. It involved changes on a dozen specific practices that they had identified, from incentive systems, training and inventory flow to product mix and technology. Eventually, they implemented the new technology and business practices in a new location, isolated from the old work force and old physical surroundings. They got the new system to work quite well in this new location, and over time, they back-propagated it to their other locations and were able to get the new system to work throughout the entire organization. But it was something that required them to, on one hand, make lots of changes simultaneously, and, on the other hand, isolate those changes from the rest of the organization so that they could focus on them to get them to work.

I really think that the way that companies implement business processes, organizational change and IT-driven innovation is what differentiates the leaders from the laggers. Rather than leveling the playing field, IT is actually leading to greater discrepancies. In most industries, the top companies are pulling further away from the companies in the middle and the bottom of the competitive spectrum. Rather than having a compression, we're seeing a growing spread in performance on multiple dimensions.

We're in a period of tremendous change and turbulence. People have called this the Great Recession. But it's been said, "In chaos, lies opportunity." And when historians look back on this era, I think many people will call it not just the Great Recession, but perhaps the Great Restructuring because of the way that businesses are changing how they're working and because of the central role that IT has in driving some of those changes.

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Management Review