

How Open Innovation

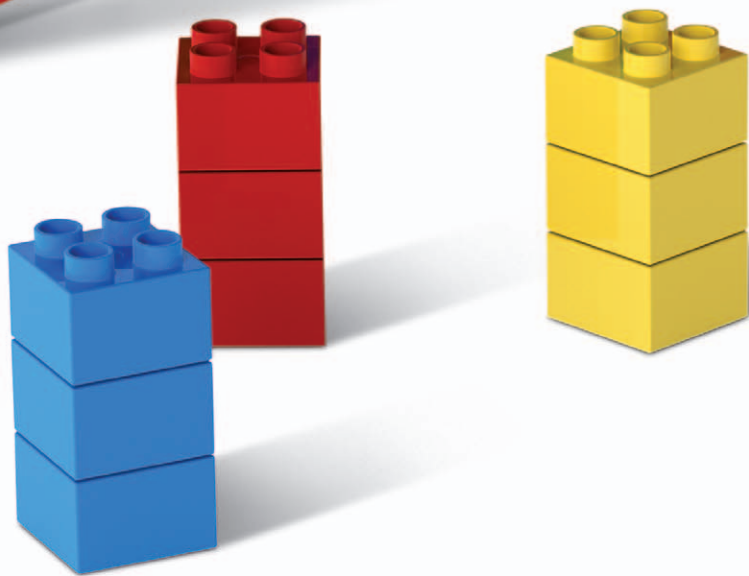
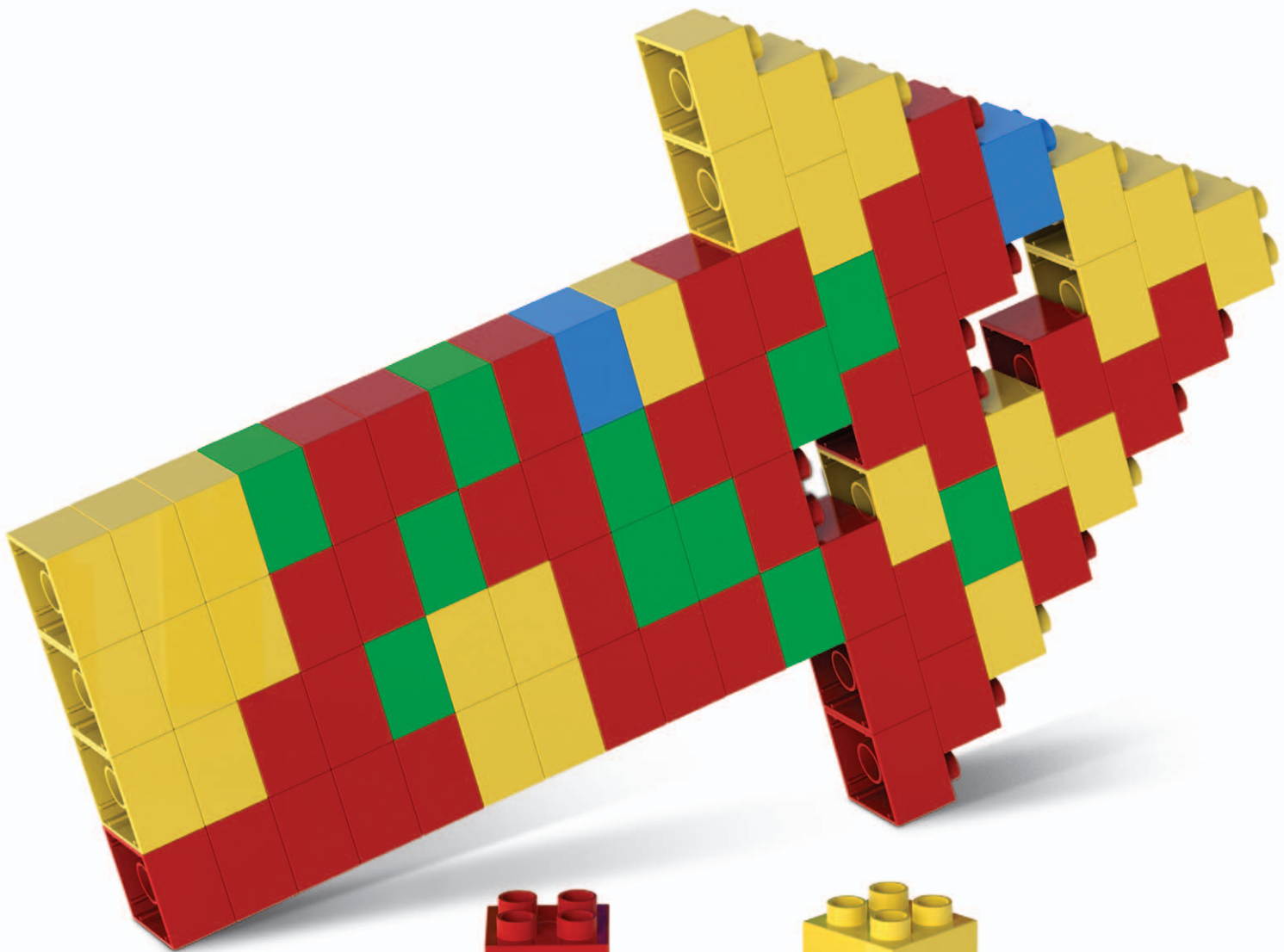
Can Help You Cope in Lean Times

These strategic moves can reduce the costs of R&D today without sacrificing tomorrow's growth.

| by **Henry W. Chesbrough** and
Andrew R. Garman

HISTORY SHOWS THAT the companies that continue to invest in their innovative capabilities during tough economic times are those that fare best when growth returns. That's how the U.S. chemicals industry overtook Britain's after World War I, how Sears surpassed Montgomery Ward as the leading U.S. retailer after World War II, and how Japanese semiconductor makers outpaced U.S. companies after the downturn of the early 1980s.

In a challenging business climate, focus is crucial. But companies face a real dilemma: how to maintain that focus and manage costs tightly while keeping growth options alive for the future. Deferring or canceling less promising initiatives that might have been pursued in good times allows a business to survive and eventually thrive again. Many companies give attention and resources only to the projects that are most



likely to generate near-term profits, and they end up deciding quickly which initiatives fit best with the company's core business. It's a smart short-term strategy.

The downside of rigorous prioritization, however, is that it halts many potentially promising projects at an early point in their development and leaves them stranded inside the company. Over time, so many projects get abandoned that the company's ability to grow beyond its core business is threatened. If focus is maintained for too long or with too much rigidity, it can become the enemy of growth. When the market recovers, the company lacks a foundation from which to rebound.

Open innovation can play an important part in the solution. By breaking down traditional corporate boundaries, open innovation allows intellectual property, ideas, and people to flow freely both into and out of an organization. To date, much more attention has been paid to the inbound flow, which we call *outside-in open innovation* – outsiders' contributions that enable an enterprise to create offerings whose scale belies its internal capabilities (see "A Better Way to Innovate," HBR July 2003).

However, in lean economic times, it is the often overlooked "inside-out" aspect of open innovation that can best serve a company. *Inside-out open innovation* refers to processes whereby a business places some of its assets or projects outside its own walls.

That not only saves much of the time and money being invested in those projects, but also can nurture new supplier and partner relationships, promote innovative ecosystems, and generate high-margin licensing income (see the exhibit "The Inside-Out Process").

Consider BT (formerly British Telecom), long the leading phone company in Britain. During the 1990s, the company transformed itself into a global telecommunications services firm. After the telecom bubble burst in 2000, BT needed to marshal its resources and refocus. One critical step was to create a process for placing its homegrown technologies and intellectual property in external hands. Since 2003, BT has formed strategic partnerships with venture capital investors

that put their own money into launching spin-off companies (see the sidebar "Inside-Out Venture Capital" on page 74). These spin-offs – including Azure Solutions, Vidus, and Psytechnics – produce telecommunications technologies and services that are key components of larger offerings from BT to its customers. And BT can market these offerings without shouldering the long-term burden of funding, developing, and upgrading them. According to the firm's chief science officer, Mike Carr, "BT needed to focus on being a top provider of network services, not on building hardware and software products. The partnership approach gives us sufficient funds to develop technology right through the marketing process."

In becoming a customer for its previously internal projects and spinning off nonstrategic initiatives to other firms, BT exemplifies two of the five inside-out open-innovation moves that we have identified (see the exhibit "Move Innovation from the Inside Out"). All five allow a company to focus on its core operations today while preserving growth options for tomorrow. Let's examine these moves.

Move 1: Become a Customer or Supplier of Your Former Internal Projects

In hard times, companies must make the tough choice either to continue or to stop funding promising projects. Seldom considered is a third choice that offers greater flexibility: Pursue a project as a customer or supplier instead of developing and bringing it to market on your own. The simple idea is that by taking a smaller role in the project, you reduce your costs and your risks. If the project is successfully developed by another firm, you still participate in that success, albeit in a more limited way. For example, Eli Lilly began a project called Bounty Chem to improve its sourcing of external ideas for developing new drugs. The company quickly realized that the project would be more effective if it sourced ideas for lots of other companies, too. So Lilly helped launch what became InnoCentive and was its first customer. Lilly paid only for the services it actually used; the costs and risks of the InnoCentive project were shared by multiple customers and outside investors.

An interesting variation on Move 1 makes sense in situations where three conditions are met: A company has identified a new market or application for a product; the cost of engineering a solution or building a channel to market is high; and the solution doesn't fit with the firm's core strengths. For example, Element Six, a subsidiary

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IDEA IN BRIEF

- » **During tough economic times, placing certain assets and projects outside your company's walls can actually preserve opportunities for future growth while you take the time to shore up the fortress.**
- » **Some inside-out strategies involve opening up projects to investment and development by existing outside firms; others call for spinning off projects as separate ventures that still allow you to retain some equity.**
- » **The inherent cultural, political, and organizational challenges of inside-out open innovation can be met by approaching it holistically and placing it under the leadership of senior executives in strategic roles.**

of De Beers, is the world's leading supplier of diamond supermaterials for industrial applications. The company discovered that an appropriately engineered diamond wafer could be used to create the anode in a small electrolytic device that generates ozone in water at a low cost. (Ozone can be used to help kill waterborne pathogens.) Element Six has a strong core competence in manufacturing diamond wafers but not in engineering and distributing electrolytic devices. In 2009, Element Six created a new company, Electrolytic Ozone, to design, manufacture, and market the devices. The spin-off company will ultimately become a significant purchaser of the parent's diamond wafer product, with the majority of the capital and resources coming from third parties.

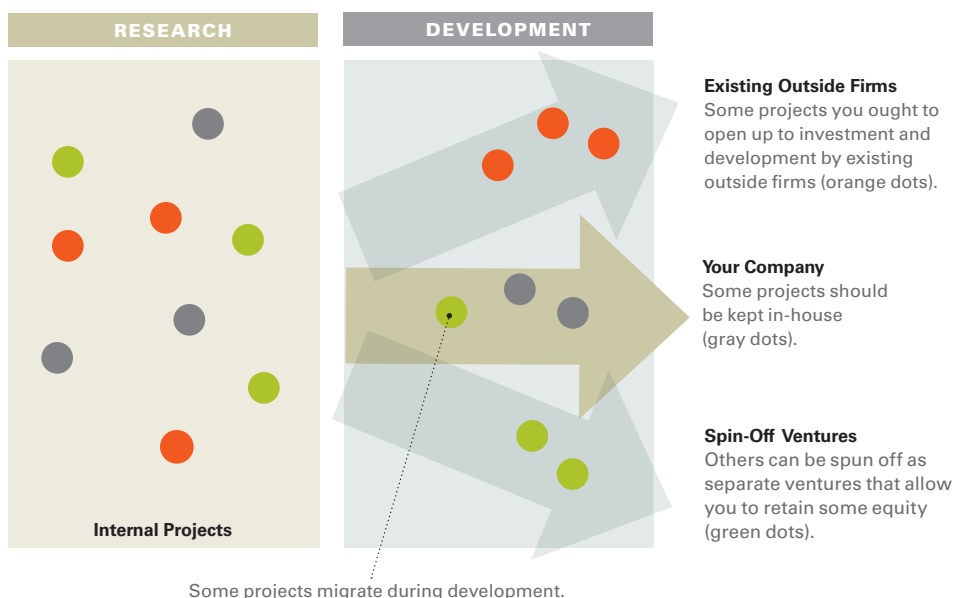
Move 2: Let Others Develop Your Nonstrategic Initiatives

A tough economic period calls for focus and crisp execution and, thus, is an opportune time to eliminate distractions. Simply killing projects that haven't yet proven their potential – or that lie outside the core – is an easy way to refocus, but ending too many of them diminishes the company's long-term growth prospects. A better strategy is to spin off some of those projects to outside investors, perhaps keeping a piece of the action for yourself. If the spin-off fails, you save the additional time and money you would have spent on the project. If it fares well, you have several attractive options: maintaining or increasing your equity position, acquiring the spin-off, or selling your position to other investors.

One obvious caveat is that spinning off projects means sharing the upside value with third parties. In a downturn, that makes sense: The outflow of

The Inside-Out Process

WHEN YOU PLACE some of your internal projects outside the company's walls, you can reduce R&D costs without relinquishing related growth opportunities. Each project will take a unique path to its most strategically sensible destination. Your job is to chart the course.



scarce funds to support "freed" projects is reduced or eliminated. However, when a project succeeds, management may need to be reminded that the spin-off kept options alive and that owning part of something is better than owning all of nothing.

Spin-offs, of course, face demanding survival challenges. They have to find outside sources of capital, recruit talented leaders and staff, and ultimately attract customers. These are difficult tests that many projects will not pass. However, those that do will develop with others' time and money, not yours. Consider Lucent's experience with an internal project that eventually became Lucent Digital Video. Initially, management viewed the technology as being ahead of its time and, therefore, too small to be of strategic interest. So the

A company may abandon so many projects that its **ability to grow beyond its core business** is threatened.



company spun it off as a separate venture. Once up and running, the venture demonstrated that China and other key markets in the developing world had a pressing need for technology that would help them accommodate future digital traffic. Moreover, many of those markets were buying Lucent equipment alongside the venture company's digital video encoders. As a result, Lucent eventually decided to reacquire the company.

The odyssey of Lucent Digital Video illustrates how you can get an unexpected dividend from this kind of spin-off. Having off-loaded the burdens of funding and managing the project, Lucent was able to profit from the market's "second opinion," which revealed the project's true strategic value. If Lucent had kept the project inside, it probably wouldn't have identified the opportunity so quickly.

Move 3: Make Your IP Work Harder for You and Others

Many companies own lots of intellectual property (IP) that delivers no direct financial benefit because it sits on the shelf. A valuable inside-out open-innovation move is to put that IP to work in other companies.

One recent example comes from CH2M Hill, a \$6 billion environmental services company. With partner ADA Technologies, it codeveloped valuable patents describing an inexpensive and effective way to control mercury emissions from coal-fired power plants. Neither partner is a product company, so they both contributed IP to a new product-based start-up funded by outside investors. This mercury-control technology will be jointly marketed by CH2M and the start-up, thereby complementing CH2M's utility-service offerings to its customers (and using the principle of Move 1).

Royal Philips Electronics, of the Netherlands, has done something similar. A global leader in consumer electronics, Philips has sought to restructure in response to intense, low-cost competition from Asian manufacturers. It has spun off its semiconductor business and now focuses on the health care and wellness markets. This strategic shift stranded many internal ideas and IP assets originally developed for the legacy electronics business, and the company is using them to make several open-innovation moves. It's capitalizing on the more than 60,000 patents in its portfolio to earn hundreds of millions of euros annually from licensing (Move 3).

Move Innovation from the Inside Out

FIVE OPEN-INNOVATION MOVES

provide a framework for getting the greatest value from your research initiatives – now and in the future.

Move 1: Become a customer or supplier of your former internal projects

IF your business is pursuing an important capability that it can neither afford to develop itself nor acquire on the open market, *and* others in or beyond your industry also covet the capability...

THEN join with those others to fund, develop, and launch it as an independent business, and become its first customer.

EXAMPLE Eli Lilly turned an internal project whose goal was to create a superior process for sourcing ideas and expertise for new-drug development into an independent venture that eventually became InnoCentive.

Move 2: Let others develop your nonstrategic initiatives

IF your business is refocusing on its core activities *and* you've identified adjacent, complementary initiatives that drain too much attention, time, and capital but that might attract outside interest and investment...

THEN spin them out to investors who can take over the development burden. Others will fund the progress, and you can keep some equity in case they make it big. You can even reacquire the best ventures.

EXAMPLE Lucent Digital Video was built upon technology that Lucent initially judged to be nonstrategic. Putting it up for adoption helped Lucent focus on its core. Once investors proved there was a strong global market for digital video encoders, Lucent brought the technology back inside.

The online exhibit “The Birth of a Company from the Inside Out” illustrates how BT used relationships within its business ecosystem to spawn a firm called Texert. View it at textert.hbr.org.

It has also embraced incubation, launching more than 20 new ventures. Some of these – including Liquavista, Silicon Hive, and priv-ID – are potential future suppliers (Move 1) and have attracted external investment (Move 2). According to Ronald Wolf, a senior business development manager at Philips Corporate Technologies, “The goal [of incubation] is to transform new ideas that otherwise would have been left unused into successful businesses for Philips. This allows us to extract more value from our R&D efforts.”

Developing this internal capability, though time-consuming, can generate significant income that – apart from legal costs – flows directly to the bottom line. At scale, this flow can be substantial, though it varies by industry. IBM often reports licensing income of \$1 billion or more and spends roughly \$6 billion annually on R&D. John Tao, formerly of Air Products and now VP of open innovation at Weyerhaeuser, estimates that once a chemical company (or a company in a related industry) establishes a licensing process, 15% or more of R&D is a reasonable target for licensing income.

Putting unused IP assets to work also generates new business possibilities in the form of further dis-

coveries and growth options. Assets kept on the shelf create no new value, and their value-generating potential diminishes over time, as competing approaches emerge and as the people who developed the IP leave for new jobs or retirement. However, companies should be aware that stranded technology, once liberated, may turn into competition. A project that could become a substitute for one of the company’s current offerings might better be left on the shelf. Bear in mind, though, that internal managers sometimes overstate competitive threats and underestimate the complementarities and learning that liberating a project might yield. You should manage these stranded assets at the corporate rather than the business-unit level, so that concerns about minor competitive risks don’t thwart additional growth opportunities.

Move 3 also has a potential “blowback” bonus: The external success of previously unused technology can prompt managers to reconsider their assessment of its prospects. For example, Air Products developed an industrial burner, based on large-scale vortex technology (LSV), which decomposes the by-products of a chemical process. Although LSV was pioneered for internal use, the company’s plant

Move 3: Make your IP work harder for you and others

IF a lot of your company’s intellectual property sits on a shelf and generates no direct financial benefit *and* you understand that its value, to you and to others, will dissipate unless it is continually developed...

THEN let outside partners benefit from what you’ve created, continue its development, and pay you licensing fees. Many businesses recover 10% to 20% of their annual R&D spending in this way.

EXAMPLE Faced with intense competition in the semiconductor business, Royal Philips Electronics shifted its strategic focus, stranding a wide range of innovation initiatives. It has developed a thriving licensing business around its more than 60,000 patents and has spun out nearly two dozen new ventures.

Move 4: Grow your ecosystem, even when you are not growing

IF your company is an active innovator, continually engaging with its customers, collaborators, industry experts, trade associations, and others to identify future opportunities...

THEN build on your ecosystem of potential innovation partners. Be like Major League Baseball general managers, who always know which team will be interested in which player at what price.

EXAMPLE Unilever has an incubation process that develops ideas either for internal placement in suitable business units or for potential spin-off as turnkey ventures. One spin-off, a purveyor of personalized wellness counseling called MiLife, delivers added value as a platform for advertising Unilever products.

Move 5: Create open domains to reduce costs and expand participation

IF your internal ideas are likely to attract interest from valuable outside communities, potentially creating breakthrough advances or even changing the game within your industry...

THEN consider establishing open domains that either exchange information and ideas or provide shared facilities and services.

EXAMPLE Philips turned its R&D facility in the Netherlands into an open campus, home to more than 7,000 researchers from a dozen other companies. Once a cost center and now a profit center, the campus expands the company’s ecosystem and encourages knowledge sharing among the tenants.



managers chose not to invest the money to retrofit it in their plants. So Air Products licensed the technology to another company, which managed to sell it successfully to customers who then used it to advantage. Air Products' plant managers are now adopting LSV technology.

The LSV example raises the further point that before a company adopts inside-out moves, business-unit managers enjoy an exclusive right to either use or reject the fruits of internal R&D – and suffer no ill effects from that decision. Once the moves have been implemented, however, business units that don't use internal technology may lose it to an outside party. If it later succeeds, managers will face the uncomfortable task of explaining why they rejected it. Ironically, therefore, inside-out moves can prompt more-thoughtful evaluation – and may even catalyze greater use – of internally developed technology.

Move 4: Grow Your Ecosystem, Even When You Are Not Growing

Ecosystems offer a variety of partners, allies, researchers, and other resources to innovative companies. And firms with active R&D programs continually generate technology options that may eventually prove valuable. However, options that don't align closely with a company's core businesses can be hard to preserve in tough times. Luckily, some might prosper outside the company but within its ecosystem.

Unilever, the global consumer products and health care company, has developed a series of ecosystem-related innovation processes. It frequently uses incubators to nurture promising projects that have commercial potential but aren't ready for one of its businesses. The offspring of its incubators can either be adopted by a Unilever business that sees a good fit or seek outside funding for further commercialization. That choice benefits R&D staffers, who see more paths for their work to get to market and have an impact on the world. Plus, the company adds a new, friendly partner to its ecosystem.

One recent Unilever incubation project that migrated outside the company was MiLife, a business that delivers personalized wellness and weight-loss coaching to consumers via wearable devices that are linked to the internet. The capital for this spin-off came from New Venture Partners and from Unilever's own venture capital fund, Unilever Ventures. John Coombs, the managing director of Unilever Ventures, says, "Once the basic model is proven, future market collaborations between MiLife and core Unilever brands are expected."

SAP, a long-established company renowned for its deep internal integration of enterprise software, has also evolved substantial external ecosystems around its technologies. It created EcoHub, a marketplace for ecosystem solutions that are certified and supported by SAP and its partners. Both the company and the partners benefit from having an

Inside-Out Venture Capital

THE PROCESS of winning internal IP and innovation initiatives can be a new source of deals for venture capital firms. As companies focus during a downturn, they may choose to jettison market-ready technologies that require additional funding and entrepreneurial expertise. From the venture capitalist's perspective, the requirements shift from traditional, entrepreneur-led selection of investments to finding attractive

technologies and technologists and nurturing them in pursuit of the right markets. Moreover, venture capitalists must learn to make this shift in a true partnership with the parent corporation.

A small but growing number of venture capitalists have seized this opportunity to focus on such inside-out ventures. New Venture Partners, in New Jersey, is one of the pioneers. Formerly a business unit of Lucent, where

it served as an internal venture capital fund to spin out Bell Labs, NVP became independent in 2001. Since then, it has worked closely with Lucent, BT, Philips, Intel, IBM, Unilever, Telstra, and other firms to create independent companies. Corporate venture capital funds are also supporting some of these spin-offs, such as those of Intel, Unilever, and Siemens.

Other venture capitalists that have worked on inside-out deals include Blueprint

Ventures, of San Francisco (staffed by former executives of Intel's corporate venture capital group); Pequot Ventures (now FirstMark Capital), based in New York; and Burrill & Company, also of San Francisco, which has a fund for life sciences companies. Such firms can be valuable allies for businesses that wish to refocus their internal activities and put capital and expertise into projects that might otherwise wither on the vine.

open forum that accelerates the discovery of new capabilities and elicits insights about marketplace needs. A related creation is the SAP Developers Network, an online community where any SAP developer or power user can ask fellow members for support with an SAP software problem. The person with the problem awards points to the person who solves it, and SAP posts at regular intervals the names of the 200 contributors who have earned the most points. Developers often include their point totals on their résumés as proof to prospective employers of their facility with SAP software. At very little cost to SAP, this network provides both solutions to its customers and business opportunities to its ecosystem partners.

By engaging with your ecosystem during a downturn, you become a preferred partner for innovative opportunities that emerge from the many parties surrounding your business and its value chain. When growth returns to the market, companies that have pursued only cost cutting may find themselves at the back of the line.

Move 5: Create Open Domains to Reduce Costs and Expand Participation

Bringing internal ideas and projects out into an open domain has the practical benefit of shifting costs outside as well. More important, open domains stimulate participation in those projects by a much wider community and, potentially, accelerate progress that advances the overall market.

Merck successfully executed this move with its Merck Gene Index project. Given the rapid progress in sequencing of the human genome, the company realized that many young biotech companies might try to patent key parts of the genome. Such patents would block the ability of Merck and other pharmaceutical companies to develop new drugs for genetically based conditions. Notwithstanding Merck's considerable resources, however, the cascade of information from human genome research dwarfed the ability of any single organization to patent it all. Merck's solution was to fund a variety of university-based human genome research projects and then publish all of the findings. (Many biotech firms initially rely on university research for basic technology.) The Merck Gene Index became part of the public domain, where everyone can use it but no one can patent specific gene sequences and thereby block further drug development.

Philips did something similar with its High Tech Campus in Eindhoven. A decade ago, the Dutch campus was a key internal R&D facility with more

The People Side of Inside-Out Moves

COMPANIES SHOULD RECOGNIZE the human costs of moving ideas and projects out the door – good people are often let go along with the assets they've created. There can be considerable long-term value in keeping many of your departing employees either provisionally connected to the company or active within the surrounding ecosystem.

Spinning off a venture, rather than laying off employees outright, is a good way to avoid the high emotional and economic costs of severance while boosting morale for remaining and departing workers alike. In BT's spin-off of Azure Solutions, the company's human resources team worked hard to ensure that several hundred employees would retain the same compensation they'd had at BT and would have an opportunity to take stock options in the new venture; it also addressed trade unions' concerns through negotiation. In effect, employees could make their future career with the new organization.

In 2001, Cisco weathered a serious downturn after the telecommunications market collapsed. But it found creative ways to handle involuntary separations. For example, it offered many employees 30% of their salary, with benefits, for six to 12 months. Some accepted this program in order to take jobs with nonprofit and social ventures where, in several cases, Cisco provided coaching and mentoring, in part to maintain ties with its former employees. Workers gained a longer runway – and suffered much less trauma – for their departure from the company.

Cisco also earned considerable goodwill and enhanced its reputation as a great place to work. When its market came back, some of the separated workers rejoined the company because they still felt connected to it. Cisco even managed to attract worthy applicants who hadn't participated in the program but had heard about it.

Cisco's method is, of course, not the only way to turn unavoidable layoffs into an opportunity. Consider, for example, giving departing employees training grants to help them acquire new skills or improve existing ones. The concept comes in many flavors, but the basic point is to impress upon talented people who must nonetheless depart the company that you are holding out opportunity for a continuing relationship.


than 1,500 employees, and supporting the operation was expensive. In 2004, as part of embracing open innovation, Philips invited other companies and their R&D teams onto the campus, which went from being a cost center to a revenue center. The space is now shared by more than 7,000 people from 15 companies, including ASML, Bekaert, IBM, and NXP. Philips also embarked on a broad series of collaborations with these other companies, sharing many ideas that had previously been discussed only internally. The campus today is an innovation hub, winning support for its activities from the government of the Netherlands. Philips has done this with little additional spending; and it collects rent from the companies that use the facilities.

Putting Inside-Out Moves into Practice

Despite the clear advantages of inside-out open innovation, you should not underestimate the difficulty of developing a program for doing it. There are inevitable cultural, political, and organizational challenges to face. For example, internal and external channels will compete for the fruits of R&D, and you'll have to manage that tension. You'll also have to coordinate and harmonize the various roles and interests of your company's technical, marketing, finance, and legal functions. Intellectual property must regularly be inventoried, analyzed, and classified into assets to be either retained for further development or offered to the outside world. You'll need to evaluate a range of financial structures in order to identify the best combination of expense reduction today and upside potential tomorrow. You'll also need to negotiate with outside parties, including investors, allies, partners, customers, and suppliers.

And don't forget about human resources challenges. Inside-out open innovation often involves letting go some of the employees who are working on the initiatives you decide to spin off. Once a downturn is in full swing, companies may cut

so deeply that they lose some of their high performers. A thoughtful organization will want to handle that process with care (see the sidebar "The People Side of Inside-Out Moves").

Taken together, these are complicated activities that should be approached holistically, under the leadership of senior executives in strategic roles. If that sounds challenging, it is. But negotiating a downturn without mortgaging your future is worth the pain and effort. Darwin taught us that it's neither the strongest nor the most intelligent species that survive; it's those that adapt best to changes in the environment. Inside-out open innovation will enable your organization to become more agile and responsive as it copes with tough times. 

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