Procter & Gamble's radical strategy of open innovation now produces more than 35% of the company's innovations and billions of dollars in revenue.

CONNECT AND DEVELOP

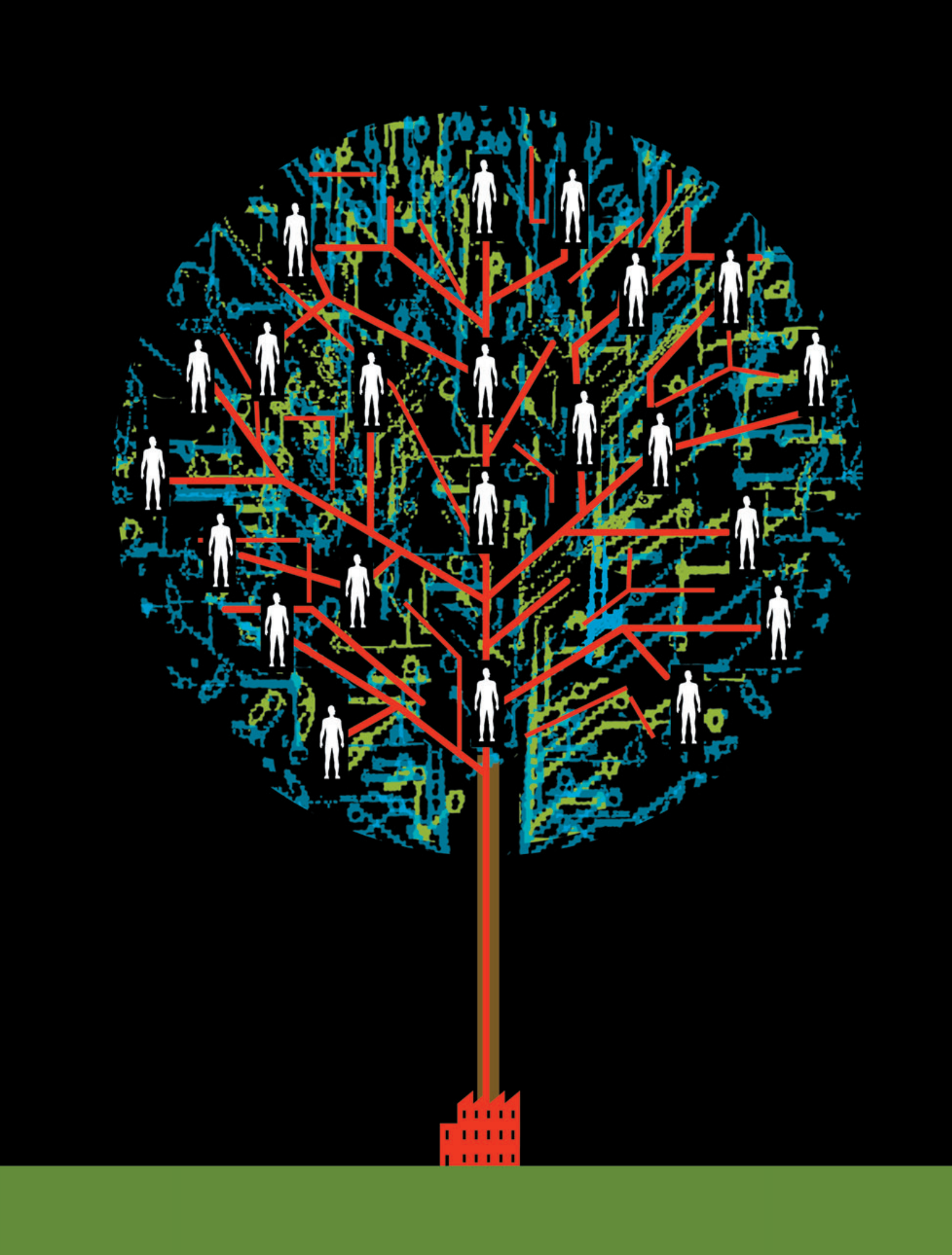
INSIDE PROCTER & GAMBLE'S NEW MODEL FOR INNOVATION

by Larry Huston and Nabil Sakkab

PROCTER & GAMBLE launched a new line of Pringles potato crisps in 2004 with pictures and words – trivia questions, animal facts, jokes – printed on each crisp. They were an immediate hit. In the old days, it might have taken us two years to bring this product to market, and we would have shouldered all of the investment and risk internally. But by applying a fundamentally new approach to innovation, we were able to accelerate Pringles Prints from concept to launch in less than a year and at a fraction of what it would have otherwise cost. Here's how we did it.

Back in 2002, as we were brainstorming about ways to make snacks more novel and fun, someone suggested that we print pop culture images on

NICK LOWNDES



Pringles. It was a great idea, but how would we do it? One of our researchers thought we should try ink-jetting pictures onto the potato dough, and she used the printer in her office for a test run. (You can imagine her call to our computer help desk.) We quickly realized that every crisp would have to be printed as it came out of frying, when it was still at a high humidity and temperature. And somehow, we'd have to produce sharp images, in multiple colors, even as we printed thousands upon thousands of crisps each minute. Moreover, creating edible dyes that could meet these needs would require tremendous development.

Traditionally, we would have spent the bulk of our investment just on developing a workable process. An internal team would have hooked up with an ink-jet printer company that could devise the process, and then we would have entered into complex negotiations over the rights to use it.

Instead, we created a technology brief that defined the problems we needed to solve, and we circulated it throughout our global networks of individuals and institutions to discover if anyone in the world had a ready-made solution. It was through our European network that we discovered a small bakery in Bologna, Italy, run by a university professor who also manufactured baking equipment. He had invented an ink-jet method for printing edible images on cakes and cookies that we rapidly adapted to solve our problem. This innovation has helped the North America Pringles business achieve double-digit growth over the past two years.

From R&D to C&D

Most companies are still clinging to what we call the invention model, centered on a bricks-and-mortar R&D infrastructure and the idea that their innovation must principally reside within their own four walls. To be sure, these companies are increasingly trying to buttress their laboring R&D departments with acquisitions, alliances, licensing, and selective innovation outsourcing. And they're launching Skunk Works, improving collaboration between marketing and R&D, tightening go-to-market criteria, and strengthening product portfolio management.

But these are incremental changes, bandages on a broken model. Strong words, perhaps, but consider the facts: Most mature companies have to create organic growth of 4% to 6% year in, year out. How are they going to do it? For P&G, that's the equivalent of building a $4 billion business this year alone. Not long ago, when companies were smaller and the world was less competitive, firms could rely on internal R&D to drive that kind of growth. For generations, in fact, P&G created most of its phenomenal growth by innovating from within – building global research facilities and hiring and holding on to the best talent in the world. That worked well when we were a $25 billion company; today, we're an almost $70 billion company.

By 2000, it was clear to us that our invent-it-ourselves model was not capable of sustaining high levels of top-line growth. The explosion of new technologies was putting ever more pressure on our innovation budgets. Our R&D productivity had leveled off, and our innovation success rate – the percentage of new products that met financial objectives – had stagnated at about 35%. Squeezed by nimble competitors, flattening sales, lackluster new launches, and a quarterly earnings miss, we lost more than half our market cap when our stock slid from $118 to $52 a share. Talk about a wake-up call.

The world's innovation landscape had changed, yet we hadn't changed our own innovation model since the late 1980s, when we moved from a centralized approach to a globally networked internal model – what Christopher Bartlett and Sumantra Ghoshal call the transnational model in *Managing Across Borders.*

We discovered that important innovation was increasingly being done at small and midsize entrepreneurial companies. Even individuals were eager to license and sell their intellectual property. University and government labs had become more interested in forming industry partnerships, and they were hungry for ways to monetize their research. The Internet had opened up access to talent markets throughout the world. And a few forward-looking companies like IBM and Eli Lilly were beginning to experiment with the new concept of open innovation, leveraging one another's (even competitors') innovation assets – products, intellectual property, and people.

As was the case for P&G in 2000, R&D productivity at most mature, innovation-based companies today is flat while innovation costs are climbing faster than top-line growth. (Not many CEOs are going to their CTOs and saying, "Here, have some more money for innovation.") Meanwhile, these companies are facing a growth mandate that their existing innovation models can't possibly support. In 2000, realizing that P&G couldn't meet its growth objectives by spending more and more on R&D for less and less payoff, our newly appointed CEO, A.G. Lafley, challenged us to reinvent the company's innovation business model.

We knew that most of P&G's best innovations had come from connecting ideas across internal businesses. And after studying the performance of a small number of products we'd acquired beyond our own labs, we knew that external connections could produce highly profitable innovations, too. Betting that these connections were the

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key to future growth, Lafley made it our goal to acquire 50% of our innovations outside the company. The strategy wasn't to replace the capabilities of our 7,500 researchers and support staff, but to better leverage them. Half of our new products, Lafley said, would come *from* our own labs, and half would come *through* them.

It was, and still is, a radical idea. As we studied outside sources of innovation, we estimated that for every P&G researcher there were 200 scientists or engineers elsewhere in the world who were just as good – a total of perhaps 1.5 million people whose talents we could potentially use. But tapping into the creative thinking of inventors and others on the outside would require massive operational changes. We needed to move the company's attitude from resistance to innovations "not invented here" to enthusiasm for those "proudly found elsewhere." And we needed to change how we defined, and perceived, our R&D organization – from 7,500 people inside to 7,500 *plus* 1.5 million outside, with a permeable boundary between them.

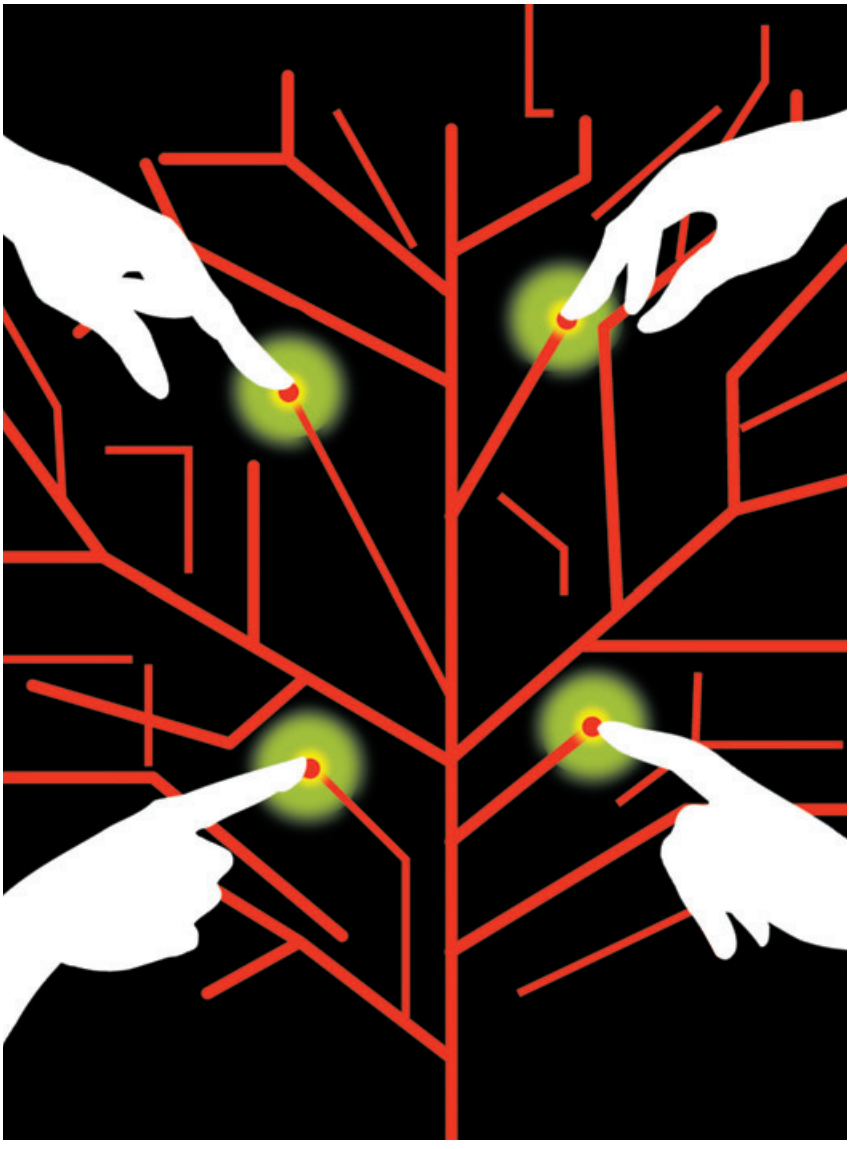
It was against this backdrop that we created our *connect and develop* innovation model. With a clear sense of consumers' needs, we could identify promising ideas throughout the world and apply our own R&D, manufacturing, marketing, and purchasing capabilities to them to create better and cheaper products, faster.

The model works. Today, more than 35% of our new products in market have elements that originated from outside P&G, up from about 15% in 2000. And 45% of the initiatives in our product development portfolio have key elements that were discovered externally. Through connect and develop – along with improvements in other aspects of innovation related to product cost, design, and marketing – our R&D productivity has increased by nearly 60%. Our innovation success rate has more than doubled, while the cost of innovation has fallen. R&D investment as a percentage of sales is down from 4.8% in 2000 to 3.4% today. And, in the last two years, we've launched more than 100 new products for which some aspect of execution came from outside the company. Five years after the company's stock collapse in 2000, we have doubled our share price and have a portfolio of 22 billion-dollar brands.

According to a recent Conference Board survey of CEOs and board chairs, executives' number one concern is "sustained and steady top-line growth." CEOs understand the importance of innovation to growth, yet how many have overhauled their basic approach to innovation? Until companies realize that the innovation landscape has changed and acknowledge that their current model is unsustainable, most will find that the top-line growth they require will elude them.

Where to Play

When people first hear about connect and develop, they often think it's the same as outsourcing innovation – contracting with outsiders to develop innovations for P&G. But it's not. Outsourcing strategies typically just transfer work to lower-cost providers. Connect and develop, by contrast, is about finding good ideas and



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bringing them in to enhance and capitalize on internal capabilities.

To do this, we collaborate with organizations and individuals around the world, systematically searching for proven technologies, packages, and products that we can improve, scale up, and market, either on our own or in partnership with other companies. Among the most successful products we've brought to market through connect and develop are Olay Regenerist, Swiffer Dusters, and the Crest SpinBrush.

For connect and develop to work, we realized, it was crucial to know exactly what we were looking for, or where to play. If we'd set out without carefully defined targets, we'd have found loads of ideas but perhaps none that were useful to us. So we established from the start that we would seek ideas that had some degree of success already; we needed to see, at least, working products, prototypes, or technologies, and (for products) evidence of consumer interest. And we would focus on ideas and products that would benefit specifically from the application of P&G technology, marketing, distribution, or other capabilities.

Then we determined the areas in which we would look for these proven ideas. P&G is perhaps best known for its personal hygiene and household-cleaning products – brands like Crest, Charmin, Pampers, Tide, and Downy. Yet we produce more than 300 brands that span, in addition to hygiene and cleaning, snacks and beverages, pet nutrition, prescription drugs, fragrances, cosmetics, and many other categories. And we spend almost $2 billion a year on R&D across 150 science areas, including materials, biotechnology, imaging, nutrition, veterinary medicine, and even robotics.

To focus our idea search, we directed our surveillance to three environments:

Top ten consumer needs. Once a year, we ask our businesses what consumer needs, when addressed, will drive the growth of their brands. This may seem like an obvious question, but in most companies, researchers are working on the problems that they find interesting rather than those that might contribute to brand growth. This inquiry produces a top-ten-needs list for each business and one for the company overall. The company list, for example, includes needs such as "reduce wrinkles, improve skin texture and tone," "improve soil repellency and restoration of hard surfaces," "create softer paper products with lower lint and higher wet strength," and "prevent or minimize the severity and duration of cold symptoms."

These needs lists are then developed into science problems to be solved. The problems are often spelled out in technology briefs, like the one we sent out to find an inkjet process for Pringles Prints. To take another example, a major laundry need is for products that clean effectively using cold water. So, in our search for relevant innovations, we're looking for chemistry and biotechnology solutions that allow products to work well at low temperatures. Maybe the answer to our cold-water-cleaning problem is in a lab that's studying enzymatic reactions in microbes that thrive under polar ice caps, and we need only to find the lab.

Adjacencies. We also identify adjacencies – that is, new products or concepts that can help us take advantage of existing brand equity. We might, for instance, ask which baby care items – such as wipes and changing pads – are adjacent to our Pampers disposable diapers, and then seek out innovative emerging products or relevant technologies in those categories. By targeting adjacencies in oral care, we've expanded the Crest brand beyond toothpaste to include whitening strips, power toothbrushes, and flosses.

Technology game boards. Finally, in some areas, we use what we call technology game boards to evaluate how technology acquisition moves in one area might affect products in other categories. Conceptually, working with these planning tools is like playing a multilevel game of chess. They help us explore questions such as "Which of our key technologies do we want to strengthen?" "Which technologies do we want to acquire to help us better compete with rivals?" and "Of those that we already own, which do we want to license, sell, or codevelop further?" The answers provide an array of broad targets for our innovation searches and, as important, tell us where we shouldn't be looking.

How to Network

Our global networks are the platform for the activities that, together, constitute the connect-and-develop strategy. But networks themselves don't provide competitive

advantage any more than the phone system does. It's how you build and use them that matters.

Within the boundaries defined by our needs lists, adjacency maps, and technology game boards, no source of ideas is off-limits. We tap closed proprietary networks and open networks of individuals and organizations available to any company. Using these networks, we look for ideas in government and private labs, as well as academic and other research institutions; we tap suppliers, retailers, competitors, development and trade partners, VC firms, and individual entrepreneurs.

Here are several core networks that we use to seek out new ideas. This is not an exhaustive list; rather, it is a snapshot of the networking capabilities that we've found most useful.

Proprietary networks. We rely on several proprietary networks developed specifically to facilitate connect-and-develop activities. Here are two of the largest ones.

Technology entrepreneurs. Much of the operation and momentum of connect and develop depends on our network of 70 technology entrepreneurs based around the world. These senior P&G people lead the development of our needs lists, create adjacency maps and technology game boards, and write the technology briefs that define the problems we are trying to solve. They create external connections by, for example, meeting with university and industry researchers and forming supplier networks, and they actively promote these connections to decision makers in P&G's business units.

The technology entrepreneurs combine aggressive mining of the scientific literature, patent databases, and other data sources with physical prospecting for ideas – say, surveying the shelves of a store in Rome or combing product and technology fairs. Although it's effective and necessary to scout for ideas electronically, it's not sufficient. It was a technology entrepreneur who, exploring a local market in Japan, discovered what ultimately became the Mr. Clean Magic Eraser. We surely wouldn't have found it otherwise. (See the exhibit "The Osaka Connection.")

The technology entrepreneurs work out of six connect-and-develop hubs, in China, India, Japan, Western Europe, Latin America, and the United States. Each hub focuses on finding products and technologies that, in a sense, are specialties of its region: The China hub, for example, looks in particular for new high-quality materials and cost innovations (products that exploit China's unique ability to make things at low cost). The India hub seeks out local talent in the sciences to solve problems – in our manufacturing processes, for instance – using tools like computer modeling.

Thus far, our technology entrepreneurs have identified more than 10,000 products, product ideas, and promising technologies. Each of these discoveries has undergone a formal evaluation, as we'll describe further on.

Suppliers. Our top 15 suppliers have an estimated combined R&D staff of 50,000. As we built connect and develop, it didn't take us long to realize that they represented a huge potential source of innovation. So we created a secure IT platform that would allow us to share technology briefs with our suppliers. If we're trying to find ways to make detergent perfume last longer after clothes come out of the dryer, for instance, one of our chemical suppliers may well have the solution. (Suppliers can't see others' responses, of course.) Since creating our supplier network, we've seen a 30% increase in innovation projects jointly staffed with P&G's and suppliers' researchers. In some cases, suppliers' researchers come to work in our labs, and in others, we work in theirs – an example of what we call "cocreation," a type of collaboration that goes well beyond typical joint development.

We also hold top-to-top meetings with suppliers so our senior leaders can interact with theirs. These meetings, along with our shared-staff arrangements, improve relationships, increase the flow of ideas, and strengthen each company's understanding of the other's capabilities – all of which helps us innovate.

Open networks. A complement to our proprietary networks are open networks. The following four are particularly fruitful connect-and-develop resources.

Leading Connect and Develop

The connect-and-develop strategy requires that a senior executive have day-to-day accountability for its vision, operations, and performance. At P&G, the vice president for innovation and knowledge has this responsibility. Connect-and-develop leaders from each of the business units at P&G have dotted-line reporting relationships with the VP. The managers for our virtual R&D networks (such as NineSigma and our supplier network), the technology entrepreneur and hub network, our connect-and-develop legal resources, and our training resources report directly.

The VP oversees the development of networks and new programs, manages a corporate budget, and monitors the productivity of networks and activities. This includes tracking the performance of talent markets like NineSigma and InnoCentive as well as measuring connect-and-develop productivity by region – evaluating, for example, the costs and output (as measured by products in market) of foreign hubs. Productivity measurements for the entire program are reported annually.

NineSigma. P&G helped create NineSigma, one of several firms connecting companies that have science and technology problems with companies, universities, government and private labs, and consultants that can develop solutions. Say you have a technical problem you want to crack–for P&G, as you'll recall, one such problem is cold-temperature washing. NineSigma creates a technology brief that describes the problem, and sends this to its network of thousands of possible solution providers worldwide. Any solver can submit a nonconfidential proposal back to NineSigma, which is transmitted to the contracting company. If the company likes the proposal, NineSigma connects the company and solver, and the project proceeds from there. We've distributed technology briefs to more than 700,000 people through NineSigma and have as a result completed over 100 projects, with 45% of them leading to agreements for further collaboration.

InnoCentive. Founded by Eli Lilly, InnoCentive is similar to NineSigma – but rather than connect companies with contract partners to solve broad problems across many disciplines, InnoCentive brokers solutions to more narrowly defined scientific problems. For example, we might have an industrial chemical reaction that takes five steps to accomplish and want to know if it can be done in three. We'll put the question to InnoCentive's 75,000 contract scientists and see what we get back. We've had problems solved by a graduate student in Spain, a chemist in India, a freelance chemistry consultant in the United States, and an agricultural chemist in Italy. About a third of the problems we've posted through InnoCentive have been solved.

YourEncore. In 2003, we laid the groundwork for a business called YourEncore. Now operated independently, it connects about 800 high-performing retired scientists and engineers from 150 companies with client businesses. By using YourEncore, companies can bring people with deep experience and new ways of thinking from other organizations and industries into their own.

Through YourEncore, you can contract with a retiree who has relevant experience for a specific, short-term assignment (compensation is based on the person's preretirement salary, adjusted for inflation). For example, we might tap a former Boeing engineer with expertise in virtual aircraft design to apply his or her skills in virtual product prototyping and manufacturing design at P&G, even though our projects have nothing to do with aviation. What makes this model so powerful is that client companies can experiment at low cost and with little risk on cross-disciplinary approaches to problem solving. At any point, we might have 20 retirees from YourEncore working on P&G problems.

Yet2.com. Six years ago, P&G joined a group of *Fortune* 100 companies as an initial investor in Yet2.com, an online marketplace for intellectual property exchange. Unlike NineSigma and InnoCentive, which focus on helping companies find solutions to technology problems, Yet2.com brokers technology transfer both into and out of companies, universities, and government labs. Yet2.com works with clients to write briefs describing the technology that they're seeking or making available for license or purchase, and distributes these briefs throughout a global network of businesses, labs, and institutions. Network members interested in posted briefs contact Yet2.com and request an introduction to the relevant client. Once introduced, the parties negotiate directly with each other. Through Yet2.com, P&G was able to license its low-cost microneedle technology to a company specializing in drug delivery. As a result of this relationship, we have ourselves licensed technology that has applications in some of our core businesses.

When to Engage

Once products and ideas are identified by our networks around the world, we need to screen them internally. All the screening methods are driven by a core understanding, pushed down through the entire organization, of what we're looking for. It's beyond the scope of this article to describe all of the processes we use to evaluate ideas from outside. But a look at how we might screen a new product found by a technology entrepreneur illustrates one common approach.

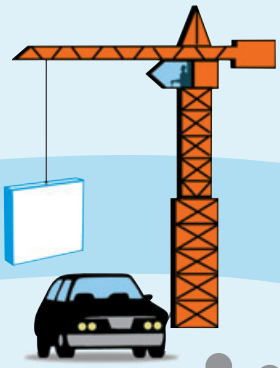
When our technology entrepreneurs are meeting with lab heads, scanning patents, or selecting products off store shelves, they're conducting an initial screening in real time: Which products, technologies, or ideas meet P&G's where-to-play criteria? Let's assume a technology entrepreneur finds a promising product on a store shelf that passes this initial screening. His or her next step will be to log the product into our online "eureka catalog," using a template that helps organize certain facts about the product: What is it? How does it meet our business needs? Are its patents available? What are its current sales? The catalog's descriptions and pictures (which have a kind of Sharper Image feel) are distributed to general managers, brand managers, R&D teams, and others throughout the company worldwide, according to their interests, for evaluation.

Meanwhile, the technology entrepreneur may actively promote the product to specific managers in relevant lines of business. If an item captures the attention of, say, the director of the baby care business, she will assess its alignment with the goals of the business and subject it to a battery of practical questions–such as whether P&G has the technical infrastructure needed to develop the product – meant to identify any showstopping impediments to development. The director will also gauge the product's business potential. If the item continues to look promising, it may be tested in consumer panels and, if the

The Osaka Connection

In the connect-and-develop world, chance favors the prepared mind. When one of P&G's technology entrepreneurs discovered a stain-removing sponge in a market in Osaka, Japan, he sent it to the company for evaluation. The resulting product, the Mr. Clean Magic Eraser, is now in third-generation development and has achieved double its projected revenues.

German chemical company BASF manufactures a melamine resin foam called Basotect for soundproofing and insulation in the construction and automotive industries.



LEC, a Tokyo-based consumer-products company, markets Basotect foam in Japan as a household sponge called Cleenpro.

2001
DISCOVER

A Japan-based technology entrepreneur with P&G discovers the product in an Osaka grocery store, evaluates its market performance in Japan, and establishes its fit with the P&G home-care product development and marketing criteria.

2002
EVALUATE

The technology entrepreneur sends samples to R&D product researchers in Cincinnati for performance evaluation and posts a product description and evaluation of market potential on P&G's internal "eureka catalog" network.

Market research confirms enthusiasm for the product. The product is moved into portfolio for development; P&G negotiates purchase of Basotect from BASF and terms for further collaboration.

2003
LAUNCH

Basotect is packaged as-is and launched nationally as Mr. Clean Magic Eraser.

Mr. Clean Magic Eraser is launched in Europe.

BASF and P&G researchers collaborate in shared labs to improve Basotect's cleaning properties, durability, and versatility.

2004
COCREATE

The first cocreated Basotect product, the Magic Eraser Duo, is launched nationally in the United States.

The cocreated Magic Eraser Wheel & Tire is launched nationally in the United States.

BASF and P&G continue to collaborate on next-generation Magic Eraser products.

response is positive, moved into our product development portfolio. Then we'll engage our external business development (EBD) group to contact the product's manufacturer and begin negotiating licensing, collaboration, or other deal structures. (The EBD group is also responsible for licensing P&G's intellectual property to third parties. Often, we find that the most profitable arrangements are ones where we both license to and license from the same company.) At this point, the product found on the outside has entered a development pipeline similar in many ways to that for any product developed in-house.

The process, of course, is more complex and rigorous than this thumbnail sketch suggests. In the end, for every 100 ideas found on the outside, only one ends up in the market.

Push the Culture

No amount of idea hunting on the outside will pay off if, internally, the organization isn't behind the program. Once an idea gets into the development pipeline, it needs R&D, manufacturing, market research, marketing, and other functions pulling for it. But, as you know, until very recently, P&G was deeply centralized and internally focused. For connect and develop to work, we've had to nurture an internal culture change while developing systems for making connections. And that has involved not only opening the company's floodgates to ideas from the outside but actively promoting internal idea exchanges as well.

For any product development program, we tell R&D staff that they should start by finding out whether related work is being done elsewhere in the company; then they should see if an external source – a partner or supplier, for instance – has a solution. Only if those two avenues yield nothing should we consider inventing a solution from scratch. Wherever the solution comes from (inside or out), if the end product succeeds in the marketplace, the rewards for employees involved in its development are the same. In fact, to the extent that employees get recognition for the speed of product development, our reward systems actually favor innovations developed from outside ideas since, like Pringles Prints, these often move more quickly from concept to market.

We have two broad goals for this reward structure. One is to make sure that the best ideas, wherever they come from, rise to the surface. The other is to exert steady pressure on the culture, to continue to shift mind-sets away from resistance to "not invented here." Early on, employees were anxious that connect and develop might eliminate jobs or that P&G would lose capabilities. That stands to reason, since as you increase the ideas coming in from the outside you might expect an equivalent decrease in the need for internal ideas. But with our growth objectives, there is no limit to our need for solid business-building ideas. Connect and develop has not eliminated R&D jobs, and it has actually required the company to develop new skills. There are still pockets within P&G that have not embraced connect and develop, but the trend has been toward accepting the approach, even championing it, as its benefits have accrued and people have seen that it reinforces their own work.

Words of Warning

Procter & Gamble's development and implementation of connect and develop has unfolded over many years. There have been some hiccups along the way, but largely it has been a methodical process of learning by doing, abandoning what doesn't work and expanding what does. Over five years in, we've identified three core requirements for a successful connect-and-develop strategy.

- Never assume that "ready to go" ideas found outside are truly ready to go. There will always be development work to do, including risky scale-up.
- Don't underestimate the internal resources required. You'll need a full-time, senior executive to run any connect-and-develop initiative.
- Never launch without a mandate from the CEO. Connect and develop cannot succeed if it's cordoned off in R&D. It must be a top-down, companywide strategy.

Adapt or Die

We believe that connect and develop will become the dominant innovation model in the twenty-first century. For most companies, as we've argued, the alternative invent-it-ourselves model is a sure path to diminishing returns.

To succeed, connect and develop must be driven by the top leaders in the organization. It is destined to fail if it is seen as solely an R&D strategy or isolated as an experiment in some other corner of the company. As Lafley did at P&G, the CEO of any organization must make it an explicit company strategy and priority to capture a certain amount of innovation externally. In our case, the target is a demanding – even radical – 50%, but we're well on our way to achieving it.

Don't postpone crafting a connect-and-develop strategy, and don't approach the process incrementally. Companies that fail to adapt to this model won't survive the competition.

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