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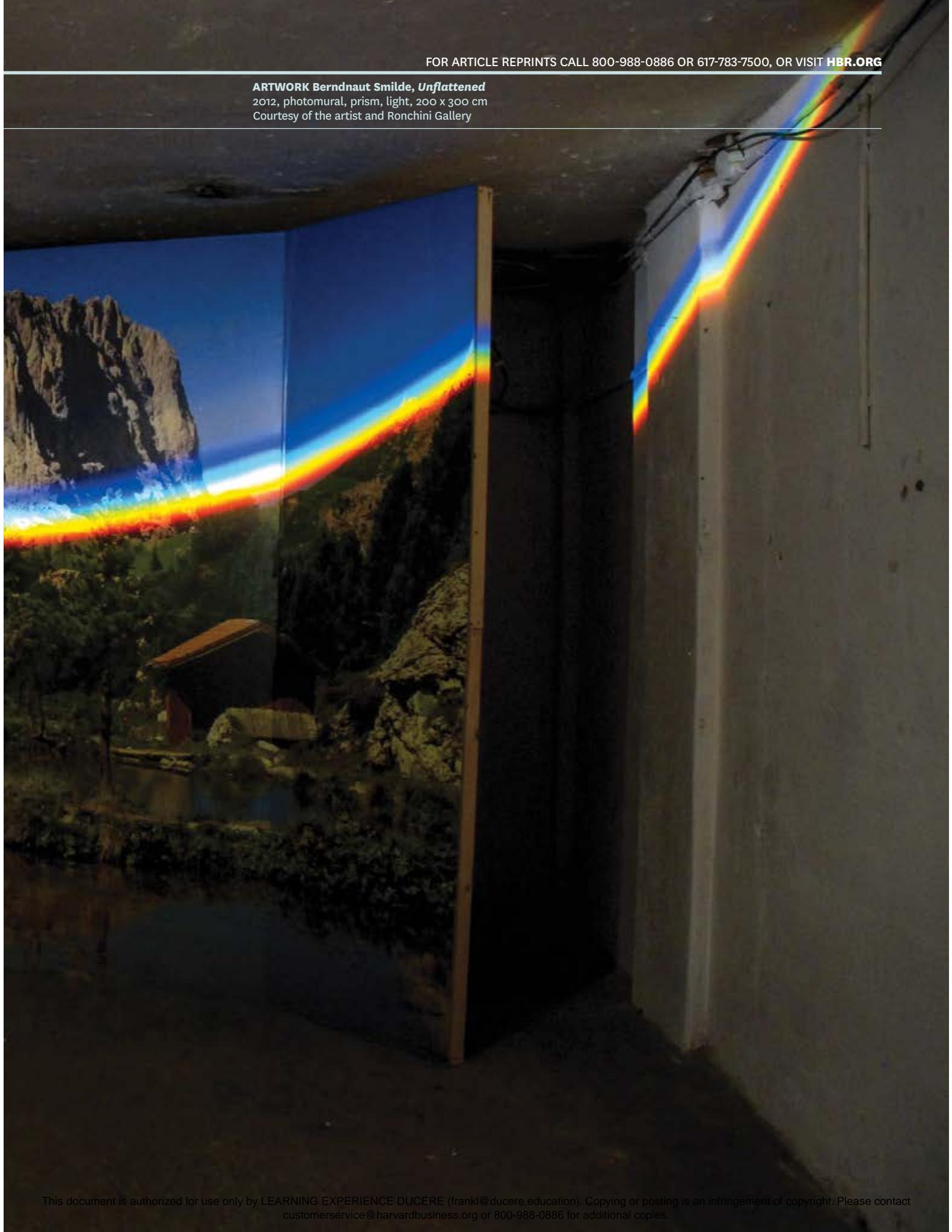
SPOTLIGHT

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ARTWORK Berndnaut Smilde, *Unflattened*
2012, photomural, prism, light, 200 x 300 cm
Courtesy of the artist and Ronchini Gallery

ASK NOTABLE INNOVATION leaders what they think about traditional management practices—say, those taught in a typical MBA program—and you get some pretty strong reactions. Take Elon Musk, a cofounder of PayPal, Tesla, and SpaceX. "At my companies," he says, "our position is that we hire someone in spite of an MBA, not because of one." Or Intuit cofounder Scott Cook: "When MBAs come to us, we have to fundamentally retrain them—nothing they learned will help them succeed at innovation."

Nothing? Why is that?

We've been investigating that question for more than five years now, in the course of our work identifying companies that have earned a significant share-price premium by consistently launching innovative products and entering new markets. These companies have been successful time and again, we've found, not because they've won big bets but because they've made the process of bringing new offerings to market more reliable and less risky.

They've done so by drawing on a wealth of ideas developed over the past 50 years. Among them are Ted Levitt's insights into understanding the true scope of a business and the purpose of its offerings from the customer's point of view; Clayton Christensen's work on identifying the jobs people need to do, for which they buy particular products and services; Jeff Dyer, Hal Gregersen, and Clayton Christensen's research on the skills innovators use to discover new ideas; IDEO's approach to developing empathy with customers and synthesizing new ideas from disparate sources, known as design thinking; Steve Blank and Eric Ries's method, called lean start-up, for testing possible offerings through a series of quick, focused experiments; and Ian MacMillan and Rita McGrath's test-and-learn approach to validating the viability of promising offerings and business models in the market. We have brought these strands together to map out the end-to-end process successful innovators use to conceive, develop, test, and launch innovations more reliably (see the sidebar "A Comprehensive Approach to Innovation").

Like any effective corporate operation, this process, which we call the innovator's method, requires discipline, perseverance, and dedicated, effective leadership. But as innovators like Musk and Cook point out, it is a different kind of leadership, calling for skills and tactics that many of us have yet to master. In this article we lay out those skills and offer our insights into the unique challenges they pose.

Don't Dictate a Vision— Set a Grand Challenge

If we ask you to think of a leader setting a grand innovation challenge, what might come to mind is some story about Steve Jobs—maybe the one in which he challenges his team to put 1,000 songs in your pocket.

That's not what we're talking about here. Nor are we talking about setting a vision the way traditional leaders do, by laying out the company's strategic priorities. Both approaches imply that the leader's role is to decide what to do and then direct the organization to do it.

Innovation is at heart a process of discovery, and so the role of the person leading it is to set other people down a path, not to short-circuit it by jumping to a conclusion right at the start. To lead innovation, you don't have to be the next Steve Jobs, nor do you need to guess the future. Rather, you must carve out the mental space within which the innovation process can be carried out.

How? First, by setting the expectation that innovation will push boundaries. Fashion designers often include very bold designs in their lines to inspire customers to try more-flamboyant styles. In a similar way, Amazon pursues its flying drones, and Google's X lab its driverless cars and high-altitude Wi-Fi, in part to make their entire organizations bolder and more innovative.

You need not go so far. You can push boundaries just as dramatically by demonstrating a willingness to reimagine some of your organization's most fundamental assumptions about products, customers, and business models.

Consider Kraft's experience in China. Kraft entered the Chinese market in 1984, intending to build a $1 billion business based on the company's existing roster of successful products. By 2006 revenue had reached only a tenth of that goal, and the business was losing money. To turn the situation around, Kraft sent in three senior leaders to head up a "blank check" initiative, which gave them the freedom within a set time frame (12 months) to make any changes they saw fit.

The three spent time talking to consumers in order to understand their problems and to begin considering solutions and workable business models. On the basis of the initial insights they gained, they floated a question: "What would happen if we abandoned our low-cost, high-volume approach to selling Oreos?" It was a shocking suggestion. It would

Idea in Brief

THE PROBLEM

At its heart, innovation is a process of discovery that requires a different approach to leadership than the core business.

THE SOLUTION

The accomplished innovation leader works more by example than by dictate: asking questions rather than making decisions; clearing a path to the unknown for the innovation team rather than identifying the end goal; and giving people the right kind of time, the right constraints, and the right tools.

THE IMPLICATIONS

Innovation leaders can create a sustainable competitive advantage not through the superiority of a particular invention but by creating an organization that can learn from mistakes faster, more efficiently, and more consistently than competitors do.

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mean closing down the large, modern factories and the centralized Beijing and Shanghai distribution operations and sending home experienced, expensive expats. But raising the question put the possibility on the table that the operation could be made profitable if the company aimed for lower margins. That would give Kraft's innovators the flexibility, resources, and time to experiment with radical business model alternatives.

That sounds bold enough, but the three went even further—they questioned the nature of the Oreo itself. "Would an Oreo still be an Oreo if it weren't round? Or if it were made up of different flavors?" they asked, after field research indicated that consumers in China found the cookies too bitter and the filling too sweet.

By suggesting how far the boundaries could be pushed, the leaders carved out the mental space their innovation team needed to develop more than 20 prototypes of the Oreo for the Chinese market. Among the successful variations were not only familiar tweaks, like smaller package sizes and a less sweet version, but also entirely different flavors (including peanut butter and green tea ice cream), a version with many layers, and one in the shape of a drinking straw. Eventually the willingness to rethink boundaries paid off as revenue swelled sixfold and Oreo became the number one cookie brand in China.

Clearly not everything the Oreo team tried was going to work (a bubble gum–filled version tasted pretty good but couldn't be swallowed), which brings us to the leader's second task in carving out the mental space for innovation: demonstrating your intention to both embrace and manage uncertainty.

Most people are terrified of what uncertainty might do to their careers, so it's crucial to communicate that some uncertainty is a good thing. Demonstrating vulnerability can be effective. Acknowledge that even the innovators in the trenches—not just the efficiency-oriented organization—find high-uncertainty problems to be hard, messy, and nonlinear. Send the message that this is normal and that it's OK to feel apprehensive.

It's equally important to demonstrate your intention to limit risk by putting some boundaries around uncertainty. That means releasing some constraints as you are establishing others. For instance, although it's not your job to tell your team what specific opportunities to pursue, you can as a starting point identify a market to address, designate one that's off-limits, or select a customer segment to explore. A leader with a deep understanding of customer behavior and technology trends can also suggest some initial avenues of inquiry.

A couple of basic tactics can be especially useful here. The first is setting a "time box"—that is, giving your team a fixed amount of time, usually two or three months, to resolve the most basic uncertainties surrounding an innovation project. That's straightforward enough. But the second tactic, managing decision points, is tricky. When results of experiments are not what you'd hoped, and time is running out, it's your responsibility to help the team evaluate the results honestly, change direction if need be, and sometimes pull the plug, freeing up mental and physical resources to try another approach. That's easy to say, but anyone who's killed a project knows it takes resolve and not a small amount of courage.

It's important for a company to have leaders who articulate the core strategy, act as guardians of the flagship offerings, and remain vigilant in serving valued customers. But if you are acting as an innovation leader, that is not your job. You must be an advocate for the new and the different, setting the grand challenge more by deed than by word—by keeping an eye out for the unusual (the outliers, the frustrated

VIDEO For an interview with Nathan Furr on why innovation requires a new set of management practices, visit this article on **hbr.org**.

customers, the anomalies), fearlessly questioning the assumptions on which the core business runs, and demonstrating the willingness to try things that may be far outside the norm. Even (or especially) if they don't work, that will send the message that you are serious about innovation.

Don't Make Decisions— Design Experiments

In the late 1980s an engineering team at NEC devising a way to program business telephones developed an unusually small computer terminal. When vice president Tom Martin saw how lightweight it was, he asked if it could be made to run MS-DOS. When the engineers said that would be easy, he realized he had the makings of something big—a new kind of portable PC—and he quickly assembled a cross-functional team to develop it.

As the team attempted to balance portability and usability, it faced some tough decisions. Adding an internal 3.5-inch hard drive would dramatically increase the laptop's memory but also add to its weight. It was a tough call, but the project leader decided to leave the drive out, reasoning that customers would find the small internal memory adequate, since they could always connect to an external floppy drive. As buzz around the new product began to grow and the launch date drew near, NEC made the investment necessary to produce thousands of units.

By the time the UltraLite launched, on a crisp October evening in New York City, praise was already pouring in. At just over four pounds, the laptop was half the weight of its nearest competitor, and its backlit screen was a technical marvel. It appeared on the cover of *PC Magazine.* The *New York Times* honored it for technical merit. "The NEC UltraLite is a Porsche," enthused *Consumer Reports.* Years later computer historians would recognize it as the product that ushered in a new era in portability.

Only one thing dampened the enthusiasm. Despite expensive advertising campaigns, the UltraLite wasn't selling. In hindsight, the problem was clear: Consumers simply would not accept a computer without that built-in hard drive. The company had ramped up production on the basis of the untested assumption that the hard drive could be left out, and that turned out to be fatally incorrect.

We argue that NEC made two mistakes. The first was omitting the hard drive. The second and perhaps more significant mistake was believing that it was the project leader's role to make that decision.

The innovator's method reduces the risk involved in bringing innovations to market by offering a better tool for making tough choices—a process for systematically testing critical assumptions with customers. The tool has powerful implications for leadership: It requires the leader to change from being the chief decision maker to being the chief experimenter.

What does that mean? Essentially, the leader's role shifts from providing answers to posing questions. When a manager or anyone else on the team says, "I think we should do X," it's the leader's job to ensure that the next question is, "What's the fastest way to run an experiment to help us know whether we *should* do X?"

Making that switch sounds straightforward, but it's hard, for several reasons.

First, it calls for a new understanding of what constitutes a decision. When leaders stop being the chief decision makers, they still make decisions—but of a different kind. Most managers are used to go/no-go choices: They either commit significant resources to a project and go full steam ahead, or they kill it. Innovation leaders need to learn instead how to say, "Maybe. Let's conduct an experiment to find out."

Second, becoming the chief experimenter often requires developing new skills. You need to be fluent enough in the process to help your team identify critical assumptions, fashion experiments to test them, and interpret the results. And as you move from one experiment to the next, you must remain steadfast in pursuing the approach, even if your team members revert to traditional roles.

How steadfast? One of us, Nathan Furr, is frequently approached by students, managers, and entrepreneurs who ask, "Is my idea any good?" He reminds them that he can't possibly answer that question—only customers can. As a customer base, he is a sample size of one.

A well-focused, fast, and frugal experiment with customers feels very much like a failed product launch.

A Comprehensive Approach to Innovation

Conceiving of, developing, and launching new offerings is an inherently risky undertaking. By combining the risk-reduction ideas that innovation thinkers and practitioners have developed over the years, we can map out an end-to-end process that can greatly increase the odds of successfully launching innovative offerings in uncertain markets. This process has four steps:

1 GENERATE INSIGHTS
Use questioning, observational, and networking skills to search far and wide for broad insights into problems that may be worth solving.

2 IDENTIFY AN IMPORTANT PROBLEM
Through direct observation look for an unsolved problem or an unfilled emotional or social need that enough people have for the opportunity to be worth pursuing.

3 DEVELOP THE SOLUTION
Instead of building a complete product, quickly construct a set of simple prototypes of many different solutions. For each, start with a theoretical prototype (that is, a verbal description). If that looks promising internally, move to a virtual prototype you can test with customers. This must be a visual representation but could be just a drawing. Move next to testing a minimum viable prototype with customers (the simplest, quickest physical version of the offering you can devise). Finally, pilot test the full-blown solution—the minimum "awesome" product (a refined version that seeks to be awesome on the few features that inspire customers).

4 DEVISE THE BUSINESS MODEL
Once you have worked out the offering, apply the same experimental approach to developing and testing the components of the business model, including approaches to pricing and customer acquisition.

For most innovations you need to successfully complete all four steps before devoting resources to scaling. The exceptions are businesses that have network effects, such as PayPal, where the value of the innovation increases with each additional member. Even in those cases, you need to work through these steps judiciously as you scale, or you will most likely end up with a flameout worthy of the dot-com era.

Maintaining that perspective takes a high level of resolve, because it means relinquishing power to the team and acknowledging that your ideas, like everyone else's, are just guesses. As Intuit's Cook told us, "[CEO] Brad Smith and I have to live by the same rules. So we end up asking ourselves questions like, 'I have a fundamental belief about what we should do. Now, what are the assumptions on which it is based? And how are we going to test them?' We need to do this just like we would for anyone else. Experiments will be nothing but window dressing until you change how decisions are made and who makes them."

Third, being the chief experimenter is hard because even your innovators won't always want to do experiments. The entire purpose of conducting experiments is to resolve some uncertainty and thus reduce risk quickly and cheaply. To do that you need to test prototypes, not full-blown products. This is easy to understand intellectually but often hard to accept emotionally. To understand why, we invite you to engage in a short thought experiment:

Imagine yourself conducting a perfect product launch. You roll out a brilliantly clever, well-made product to a broad group of customers. You ramp up press coverage and recruit an army of social media influencers to maximize adoption. Your product makes the cover of *Time*. Revenue pours in. You've just invented the next iPod. Great work!

Now imagine yourself conducting a bad product launch. You introduce the offering to a very small group. There's no media attention. No influencers. No advertising blitz. And a good thing, since the product hardly works. In fact it's so bad, you feel embarrassed. Target customers reject it. Not one dollar changes hands.

That's what it feels like to conduct a well-focused, fast, and frugal experiment—like a failed product launch. So it's not surprising that innovators often overdevelop their prototypes, launch them more broadly than they should, and focus on the wrong metrics of success.

We have found a formulation by former Qualcomm innovation leader Ricardo dos Santos to be particularly helpful in overcoming those tendencies. He points out that all business experiments, successful or not, generate three kinds of value. The first is *insight value*—that is, the insight into the unknown that comes from reducing uncertainty. That's the value NEC might have realized had it tested with consumers an early prototype of a superlight laptop

without a hard drive. Clearly, knowing that people wouldn't go for it would have been just as valuable as knowing that they would. The second is *option value*—the option, upon resolving an unknown, to pursue, alter, or abandon a course of action. Even if no one had had any use for the UltraLite, NEC might have applied elements of its prototype—some code? some component? that nifty screen?—to a more viable product. Third is *strategic value.* That's the value of the relationships NEC innovators would have built with potential customers while testing the original prototype, which would have enabled them to test different combinations of features quickly. It's also the strategic value of the knowledge gained: Was there an optimal trade-off among features? Or did customers value memory so much that NEC could never have built a device light enough to distinguish it from competitors' offerings? Viewed through measures other than volume, margins, market share, and revenue, the value of investing in experiments becomes clearer.

Don't Just Ignite Ideas— Prepare the Organization to Accept Them

When dos Santos joined Qualcomm, in 2006, he confidently set out to transform its failing idea-management program. With the support of a visionary CEO and a mandate to create disruptive new products, he devised a sweeping program, dubbed Venture Fest, to tap into ideas from all over the organization.

Venture Fest got off to a rousing start. Employees submitted ideas. Through peer review, 20 of the best were selected, and trainees developed them into prototypes and tested them with customers during a three-month, part-time boot camp. Several of the ideas, considered to be potential breakthroughs, subsequently received approval and funding from top executives. But when asked to release some of their best employees to work on those projects, business unit managers resisted. Worse, R&D managers argued that the whole effort was redundant. After five turbulent years, the program was quietly folded into the R&D function.

Educating the wider organization. What went wrong? Dos Santos had done a good job igniting new ideas on the "sell side"—that is, developing innovators through concentrated learn-by-doing efforts—and had even increased the start-up spirit of the company overall. But if he were to do it again, he told us, he would have focused just as much on the "buy side"—on educating the rest of the organization "so that we could all be using the same language and align our discovery efforts."

It's tempting to downplay the importance of something so basic as establishing a common language. But dozens of innovators we've interviewed have cited a common language as critical for communicating the logic of what they're doing. That being said, there are elements of the language that appeal more than others to people with responsibility for core operations.

Intuit's Rules for Ethical Experimentation

A paper recently published in the *Proceedings of the National Academy of Sciences* revealed that Facebook had manipulated the news feeds of almost 700,000 users to study emotional contagion through social networks.

If users saw predominantly positive or negative messages in their feeds, Facebook's innovators wanted to know, would that prompt them to post similarly positive or negative messages? An interesting experiment, and well conceived.

But a firestorm ensued when the researchers published the results. The answer turned out to be yes—the experimenters had succeeded in making users sad by scrubbing their feeds of happy language. (It was also true that eliminating sad language made them happier, but that didn't get as much attention.)

With limited competition and an offering its users don't directly pay for, Facebook is in a strong position to withstand even dramatic hits to the brand. But it violated one of the first rules of experimentation: You should work with a small sample of willing customers in an ethical way that doesn't damage the brand. Less sturdy organizations might want to simultaneously protect their brands and free their innovators from micromanagement by establishing some ground rules, as Intuit's legal department has done.

By now, after years of economic and technological disruption, most managers understand both the urgency to innovate and the difficulty of doing so. They begin, then, from a position of anxiety. The goal in the education effort is to relieve this anxiety. We have found it effective to recognize that new, uncertain offerings require a different approach to product development than is appropriate for proven offerings, and then to describe the process of experimentation that helps reduce uncertainty, couching the value of that process in the familiar language of risk reduction. That is, it's crucial to emphasize that the process is aimed at minimizing the risks of innovation in the same way that other organizational processes minimize core operational risks. It just uses a different set of tools. As the innovation leader, you can go a long way toward decreasing resistance (if not actually getting people to volunteer resources) by mapping the language of innovation to the language of the organization in this way.

Building expertise. Many people have an innate desire to innovate, we've found. They just haven't been given the opportunity and don't know how to begin. To tap into their potential and build deep expertise, they need immersion in the innovation process.

An effective approach to immersion is the one dos Santos took—the short-term, part-time boot camp. Another is the creation of a dedicated lab or SWAT team that pairs engineering and technology experts with experts in design thinking and lean experimentation. AT&T recently created five such labs, which it calls foundries, each employing 40 to 50 people. A third option is to train individuals to work full-time assisting ad hoc start-up teams. Intuit has famously adopted this approach, so far creating some 250 such "innovation catalysts" and each year training 20 or 30 more. In this way the spirit of innovation is spread throughout the organization.

Don't Just Give People Time— Provide the Resources They Need to Act Quickly

"What prevents you from moving more new ideas to market?" we ask people who work for large companies. The most common answer: "I just don't have the time."

It takes time to research important problems in the field; conceive of, test, and revise potential offerings, and ultimately get one right; and similarly test potential business models. Reaching the kind of scale that matters to a large organization can take even more time. That's one reason so many innovation thinkers recommend that innovation operations be kept separate and preferably located far away from the core business—so that innovators can work at a different pace.

We don't necessarily agree. Dedicated space, we think, is less important than dedicated time. Google, 3M, Valve, and Intuit, among others, have had great success in getting large groups of employees to allocate 10% or 20% of their time to innovation. What's needed, in our view, is not a particular amount of time but a particular type—uninterrupted time.

Innovation requires devoted time blocks because the associational thinking that leads to new insights is more apt to happen when the mind is totally absorbed with a particular challenge, whether through observations, conversations, experiments, or meditation. You might be able to focus this way by devoting 30 or 40 minutes a day, but you're more likely to do so by setting aside a half day a week. Devoting a day or two each month to innovation "jams" can be a particularly good way to help people use time effectively.

Beyond carving out time, the leader needs to speed the team's progress down the innovation path by removing organizational barriers and providing resources and tools. Removing barriers is closely related to decreasing risk, since the wider organization often throws up roadblocks in response to perceived

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THE COMPANY'S INNOVATORS DO NOT NEED PERMISSION TO RUN EXPERIMENTS IF:

- People know they're participating in research.
- The experiment does not involve more than 30,000 participants in a two-month period.
- The experiment is clearly identified as such (for instance, by being labeled "Intuit Labs").
- The experiment doesn't involve a commercial transaction or collect user data (although participants may be given a small payment for their time).
- Participants learn about a test through a communication to the general public (which is not targeted to government employees or agencies).
- A complete patent search is performed before results of an experiment are publicized.

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risks. Top among those are risks to the brand. If experimenters feel uncomfortable offering prototypes of exotic Oreos to potential customers, is it any wonder if the rest of the organization feels threatened?

So even as they push their teams to go beyond the current business, innovation leaders need to think carefully about how their experiments could reflect on it. For instance, online retailers often experiment with variable pricing, but that's no comfort

Assembling team members with varied backgrounds most likely involves hiring people whose expertise you are in no position to judge.

to customers who learn they've just paid more than their neighbor for the very same product.

With a little forethought and some savvy cooperation with the gatekeepers in the organization, innovation leaders can set up guidelines to limit the liabilities of market experiments. Far from hampering innovators, commonsense guidelines can speed the process by reducing bureaucracy. Innovators who follow the rules that Intuit's legal team has devised, for instance, are free to experiment without asking for permission each time (see the sidebar "Intuit's Rules for Ethical Experimentation").

Providing the right resources starts with the makeup of the teams themselves, which may need members with exceptionally varied backgrounds. Over the years, for instance, Amazon's innovators have had to tap expertise in warehousing, fulfillment, robotics, consumer electronics manufacturing, web services, big data, cloud computing, and now drones. That's a challenge, because it most likely involves hiring people not like you, whose expertise you are in no position to judge. That's one reason Elon Musk downplays credentials like MBAs, which may or may not apply to the task at hand. Instead, he asks candidates to describe in detail how

they solved a complicated problem in order to see what approach they take to moving through complexity and uncertainty.

The teams may also need help generating broad insights and possible solutions. For this purpose Intuit has hired experts in social media, collaboration, mobile computing, and big data analysis, who are valuable for broadening solution searches and identifying what's technologically feasible.

Finally, innovators need tools for rapid prototyping: 3-D printers, machine tools, and the like for physical prototypes and flexible code structures for software. And, perhaps most critical, they need quick and easy access to customers for their experiments. AT&T regularly brings customers to its foundries. Mondelēz International (formerly Kraft Foods) similarly brings customers to a dedicated physical space, called the Fly Garage. There, as innovation team member Maria Mujica puts it, "you capture the idea, you visualize it and prototype with limited resources, and two days after, real people come in and react to the ideas that are presented by the people who created them, firsthand. That is amazing, because we then get to look into the faces of the real people and ask what they like and what they'd change." Both companies have increased their share-price premium for innovation by 50% since implementing these types of changes.

CLOCKING IN AT NUMBER FIVE on *Forbes*'s 2014 list of "The World's Most Innovative Companies" is New York–based Regeneron. The pharmaceutical firm has transformed its industry, but not by pioneering any particular drug. Rather, it has created a powerful new prototyping tool—a set of humanized mice—that enables scientists to test various gene-disease combinations and potential treatments a thousand times faster than competitors can. In this way Regeneron has cut the cost of drug development by a breathtaking 80% and dramatically increased the throughput of new products. Essentially, it has focused its innovation efforts on the innovation process itself.

Why does that make such a big difference? What the great leaders we've studied know is that when competing on innovation, sustainable advantage comes not from the superiority of any particular invention but from the superior ability of leaders to foster an organization that can learn from mistakes faster, more efficiently, and more consistently than competitors do. ▽   **HBR Reprint** R1412E