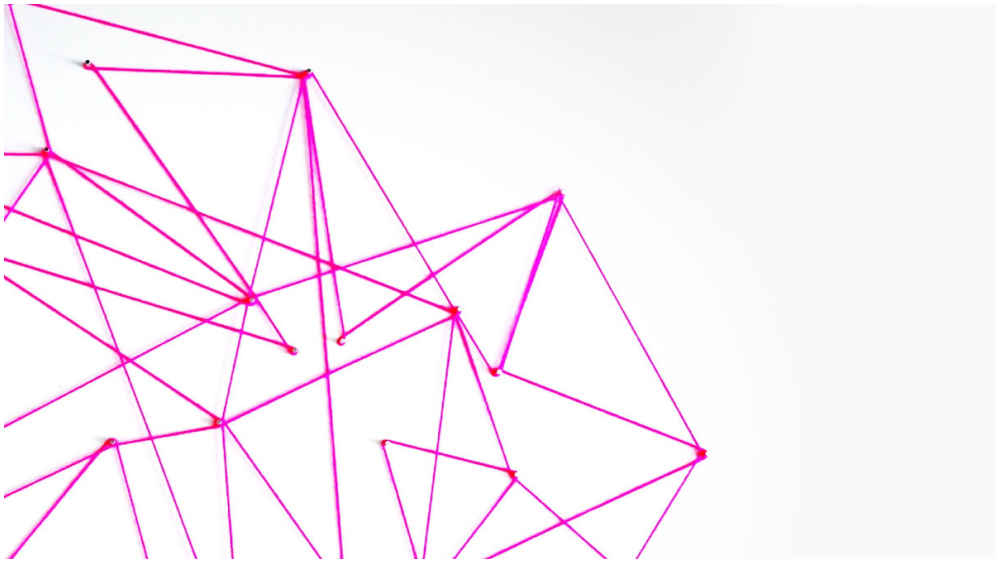
Harvard Business Review | Digital Article

Disruptive Innovation



The 4 Types of Innovation and the Problems They Solve

by Greg Satell

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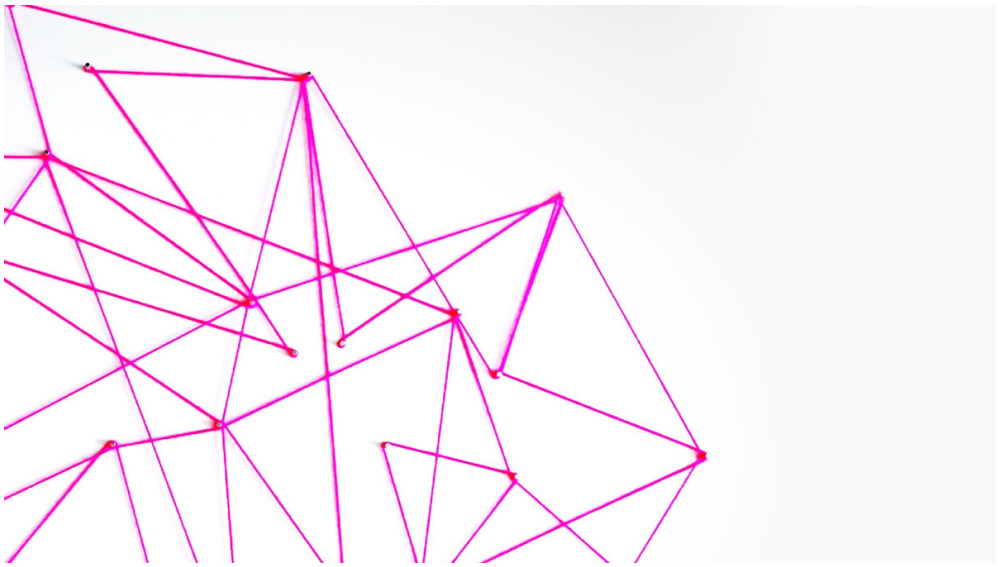
Published on HBR.org / June 21, 2017 / Reprint H03PU8



One of the best innovation stories I've ever heard came to me from a senior executive at a leading tech firm. Apparently, his company had won a million-dollar contract to design a sensor that could detect pollutants at very small concentrations underwater. It was an unusually complex problem, so the firm set up a team of crack microchip designers, and they started putting their heads together.

About 45 minutes into their first working session, the marine biologist assigned to their team walked in with a bag of clams and set them on the table. Seeing the confused looks of the chip designers, he explained that

clams can detect pollutants at just a few parts per million, and when that happens, they open their shells.

As it turned out, they didn't really need a fancy chip to detect pollutants — just a simple one that could alert the system to clams opening their shells. "They saved $999,000 and ate the clams for dinner," the executive told me.

That, in essence, is the value of open innovation. When you have a really tough problem, it often helps to expand skill domains beyond specialists in a single field. Many believe it is just these kinds of unlikely combinations that are key to coming up with breakthroughs. In fact, a study analyzing 17.9 million scientific papers found that the most highly cited work tended to be mostly rooted within a traditional field, with just a smidgen of insight taken from some unconventional place.

But what if the task had been simply to make a chip that was 30% more efficient? In that case, a marine biologist dropping clams on the table would have been nothing more than a distraction. Or, what if the company needed to identify a new business model? Or what if — as is the case today — current chip technology is nearing its theoretical limits, and a completely new architecture needs to be dreamed up?

In researching my book, *Mapping Innovation*, I found that every innovation strategy fails eventually, because innovation is, at its core, about solving problems — and there are as many ways to innovate as there are types of problems to solve. There is no one "true" path to innovation.

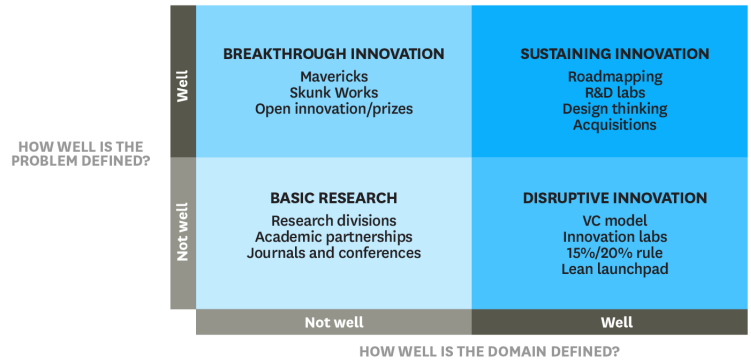
Yet all too often, organizations act as if there is. They lock themselves into one type of strategy and say, "This is how we innovate." It works for a while, but eventually it catches up with them. They find themselves

locked into a set of solutions that don't fit the problems they need to solve. Essentially, they become square-peg companies in a round-hole world and lose relevance.

We need to start treating innovation like other business disciplines — as a set of tools that are designed to accomplish specific objectives. Just as we wouldn't rely on a single marketing tactic or a single source of financing for the entire life of an organization, we need to build up a portfolio of innovation strategies designed for specific tasks.

It was with this in mind that I created the Innovation Matrix to help leaders identify the right type of strategy to solve a problem, by asking two questions: *How well can we define the problem?* and *How well can we define the skill domain(s) needed to solve it?*

4 Types of Innovation



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Sustaining innovation. Most innovation happens here, because most of the time we are seeking to get better at what we're already doing. We want to improve existing capabilities in existing markets, and we have a pretty clear idea of what problems need to be solved and what skill domains are required to solve them.

For these types of problems, conventional strategies like strategic roadmapping, traditional R&D labs, and using acquisitions to bring new resources and skill sets into the organization are usually effective. Design thinking methods, such as those championed by David Kelley, founder of the design firm IDEO and Stanford's d.school, can also be enormously helpful if both the problem and the skills needed to solve it are well understood.

Breakthrough innovation. Sometimes, as was the case with the example of detecting pollutants underwater, we run into a well-defined problem that's just devilishly hard to solve. In cases like these, we need to explore unconventional skill domains, such as adding a marine biologist to a team of chip designers. Open innovation strategies can be highly effective in this regard, because they help to expose the problem to diverse skill domains.

As Thomas Kuhn explained in the *The Structure of Scientific Revolutions*, we advance in specific fields by creating paradigms, which sometimes can make it very difficult to solve a problem within the domain in which it arose — but the problem may be resolved fairly easily within the paradigm of an adjacent domain.

Video The Explainer: Disruptive Innovation
To view, please visit this article at HBR.org.

Disruptive innovation. When HBS professor Clayton Christensen introduced the concept of disruptive innovation in his book *The Innovator's Dilemma*, it was a revelation. In his study of why good firms fail, he found that what is normally considered best practice — listening

to customers, investing in continuous improvement, and focusing on the bottom line — can be lethal in some situations.

In a nutshell, what he discovered is that when the basis of competition changes, because of technological shifts or other changes in the marketplace, companies can find themselves getting better and better at things people want less and less. When that happens, innovating your products won't help — you have to innovate your business model.

More recently, Steve Blank has developed lean startup methods and Alex Osterwalder has created tools like the business model canvas and value proposition canvas. These are all essential assets for anyone who finds themselves in the situation Christensen described, and they are proving to be effective in a wide variety of contexts.

Basic research. Pathbreaking innovations never arrive fully formed. They always begin with the discovery of some new phenomenon. No one could guess how Einstein's discoveries would shape the world, or that Alan Turing's universal computer would someday become a real thing. As Neil deGrasse Tyson said when asked about the impact of a major discovery, "I don't know, but we'll probably tax it." To his point, Einstein's discoveries now play essential roles in technologies ranging from nuclear energy to computer technologies and GPS satellites.

Some large enterprises, like IBM and Procter & Gamble, have the resources to invest in labs to pursue basic research. Others, like Experian's DataLabs, encourage researchers and engineers to go to conferences and hold internal seminars on what they learn. Google invites about 30 top researchers to spend a sabbatical year at the company and funds 250 academic projects annually.

Yet one of the best-kept secrets is how even small and medium-size enterprises can access world-class research. The federal government funds a variety of programs, such as the Hollings Manufacturing Extension Partnership, a series of manufacturing hubs to help develop advanced technologies, and Argonne Design Works. Local universities, which have a wealth of scientific talent, can also be a valuable resource.

Taking steps to participate in these types of programs can help small business compete in competitive markets. For example, Mike Wixom of Navitas, a four-year-old battery company that joined the Joint Center for Energy Storage Research (JCESR) as an affiliate, told me, "As a small company, we're fighting for our survival on a daily basis. Becoming a JCESR affiliate gives us an early peek at technology, and you get to give feedback about what kinds manufacturing issues are likely to come up with any particular chemistry."

So, clearly, being able to reach out to scientists on the cutting edge can help a business plan for the future, just as the other approaches, such as design thinking, open innovation, business model innovation, and others, can help propel a business forward if applied in the right context. But no one solution fits all problems.

If your innovation strategy is struggling or failing, consider whether it's because you've locked yourself into a single approach. There are always new problems to solve; learn to apply the solution that best fits your current problem.

Greg Satell is an international keynote speaker, adviser and bestselling author of Cascades: How to Create a Movement that Drives Transformational Change. His previous effort, Mapping Innovation, was selected as one of the best business books of 2017. You can learn more about Greg on his website, GregSatell.com and follow him on Twitter @DigitalTonto.