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Using Open Innovation to Identify the Best Ideas

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To reap the benefits of open innovation, managers must understand what to open, how to open it and how to manage the resulting problems.

As innovation becomes more democratic, many of the best ideas for new products and services no longer originate in well-financed corporate and government laboratories. Instead, they come from almost anywhere and anyone. [1] How can companies tap into this distributed knowledge and these diverse skills? Increasingly, organizations are considering using an open-innovation process, but many are finding that making open innovation work can be more complicated than it looks. PepsiCo, the food and beverage giant, for example, created controversy in 2011 when an open-sourced entry into its Super Bowl ad contest that was posted online featured Doritos tortilla chips being used in place of sacramental wafers during Holy Communion. Similarly, Kraft Foods Australia ran into challenges when it launched a new Vegemite-based cheese snack in conjunction with a public naming contest. The name Kraft initially chose from the submissions, iSnack 2.0, encountered widespread ridicule, and Kraft abandoned it. (The company instead asked consumers to choose among six other names. The company ultimately picked the most popular choice among those six, Vegemite Cheesybite.)

Reports of such problems have fed uncertainty among managers about how and when to open their innovation processes. Managers tell us that they need a means of categorizing different types of open innovation and a list of key success factors and common problems for each type. Over the last decade, we have worked to create such a guide by studying and researching the emergence of open-innovation systems in numerous sectors of the economy, by working closely with many organizations that have launched open-innovation programs and by running our own experiments. [2] This research has allowed us to gain a unique perspective on the opportunities and problems of implementing open-innovation programs. (See "About the Research.") In every organization and industry, executives were faced with the same decisions. Specifically, they had to determine (1) whether to open the idea-generation process; (2) whether to open the idea-selection process; or (3) whether to open both. These choices led to a number of managerial challenges, and the practices the companies implemented were a major factor in whether the innovation efforts succeeded or failed.

Kraft Foods Australia ran into challenges when it launched a new Vegemite-based cheese snack in conjunction with a public naming contest.

Image courtesy of Flickr user mattbraga

ABOUT THE RESEARCH

Over the last 15 years, we have been studying the emergence of various distributed-innovation efforts such as communities and contests. These efforts typically engage thousands of individuals to participate in innovation-related problem-solving activities and represent an important opportunity for companies to leverage their own internal innovation efforts. We have studied leading open-innovation platforms, conducted large-scale surveys with thousands of individual participants on their motives and actions, worked closely with several leading companies that have implemented both internal and external open-innovation programs and run our own field experiments to understand the dynamics of participation. Our analytical methods have included econometric evaluation of platform performance, analysis of survey results from participants and field experiments to understand causal mechanisms underlying participation dynamics.

The Challenge and Opportunity of Open Innovation

We found that many managers misperceived the risks and opportunities presented by open innovation. Some managers were fearful about venturing into an entirely new type of innovation process. Others didn't fully appreciate the risks (or opportunities) of letting the world innovate with them. In practice, however, open innovation is rooted in classic innovation principles such as idea generation and selection. [3] Success still relies on finding the right way to organize and manage this process.

Most managers who have heard of the potential to open the idea-generation process know one of the advantages: the sheer number of ideas that become available. If ideas for solutions can come from anywhere, then a fundamental statistical principle is that the more ideas generated, the better the quality of the best one is likely to be. A second, lesser-known advantage of open innovation is that the value of the best idea generally increases with the variability of the ideas received. Given managers' experience in cultivating internal ideas, they often seek to use open innovation to access a pool of reliable high-quality ideas. Yet there can be an advantage to casting the net widely enough to access ideas of widely varying quality: The quality of the average idea may fall, but the best one is more likely to be spectacular. [4]

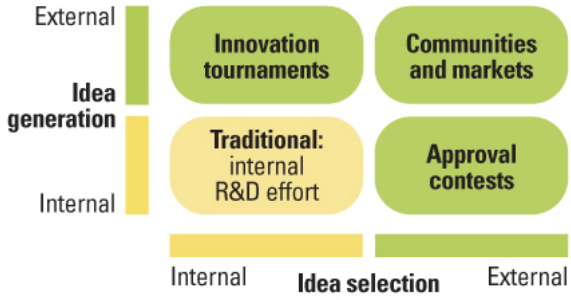
As apprehensive as many managers frequently are about generating ideas through open innovation, they are usually completely unfamiliar with the possibilities created by opening the second part of the innovation process — idea *selection* — to outsiders. Most managers assume that only company employees can make good choices about which ideas are best. Yet opening the idea-selection process can also generate significant value. Outsiders have distinctive expertise and perspectives, which enable them to pick winning ideas. This is particularly true when it involves products that can be used in many ways, or when fashions or requirements change quickly.

For example, in the multibillion-dollar windsurfing and kiteboarding industries, enthusiasts use products in ways that far outstrip the original intent. As such, skilled and active users are well-positioned to evaluate new ideas — after all, they understand better than anyone what's needed to perform specialized maneuvers or tricks. [5] In other industries, such as apparel, changes occur so rapidly that selecting new ideas often requires tapping into inchoate customer opinions. Outsiders can also be helpful in suggesting applications for new ideas, thereby making the selection of the best ideas easier.

When picking an open-innovation strategy, managers must choose whether to open the idea-generation process, the idea-selection process or both. (See "Selecting the Right Innovation Approach.") They can be reassured that their prior experience managing innovation is valuable; important elements of these processes remain the same. However, each element presents new challenges to managers.

SELECTING THE RIGHT INNOVATION APPROACH

Essential to innovation is the ability and knowledge to generate ideas and to select among them. In deciding what mode of innovation to pursue, companies need to consider whether the requisite knowledge is internal or external to the organization.



Opening the Idea-Creation Process

To increase idea generation, many organizations are turning to innovation contests. These competitions are a kind of reverse auction: Prizes are offered, and designers bid with possible solutions. The value sponsors receive varies based on the number of participants and the quality of the ideas. Recently, for example, Harvard Medical School used a worldwide contest to generate new hypotheses for curing and treating Type 1 diabetes. Within six weeks, it received more than 190 submissions. The 12 winners included an undergraduate student in chemistry, a retired dentist, a geophysicist and a high-profile genetics researcher with no prior background in diabetes. A subsequent analysis of the proposals revealed that much of the knowledge content went beyond what would have occurred in the traditional academic discipline of diabetes. [6] A similar initiative by the National Eye Institute in Bethesda, Maryland, resulted in the submission of 548 research proposals for arresting and curing various eye-related diseases.

Managers tend to discount the advantages of open innovation for two main reasons. First, many managers worry that innovation contests will get in the way of collaborative innovation. Second, they tend to think that open innovation doesn't work on anything but very narrow technical problems. In both cases, they are mistaken. In terms of undermining collaboration, we found that contests can be designed to allow (if not encourage) "coopetition" among tournament rivals. This was the case with Netflix's $1 million contest to find the best algorithm for recommending movies to its customers. The winning entry represented the efforts of two competing groups that merged late in the contest — a maneuver that prompted other participants to pool their resources as well. Indeed, throughout the contest, rivals were freely sharing knowledge and often merging into new teams of competitors. Similarly, The MathWorks has run a semiannual software development contest for 10 years in which hundreds of problem solvers compete and collaborate to find algorithmic solutions to challenging problems. In fact, many online contest platforms are configured to enable participants to form teams and merge their efforts. Some design-contest platforms (for example, Chicago-based crowdSPRING and Australian company 99designs) enable the sponsors to run completely open contests in which all entries are visible to all competitors, allowing for rapid learning.

As for the argument that open innovation works only on narrow technical problems, there are many counterexamples. Since mid-2010, General Electric, for example, has partnered with a number of venture-capital firms to host the "Ecomagination Challenge," which boasts a $200 million fund for identifying and investing in cutting-edge ideas and business models in the areas of renewable energy, grid efficiency and energy consumption. GE created an online system through which academics, entrepreneurs and others could submit their ideas. Within six months, the company attracted more than 60,000 participants and received more than 5,000 ideas and business plans from 85 countries. So far, the company and its partners have invested more than $134 million into the ideas received. [7] Another organization that uses an open approach to address broad problems is Paris-based eYeka, which works with global brands such as HSBC, Kraft Foods and Coca-Cola to develop new product concepts and product positioning. Stéphanie Hajjar, then an innovation manager at SFR, the French telecommunications company, said that an eYeka contest to develop new education offerings for children was able to provide ideas in a fraction of the time that a traditional company typically takes — and at less than half the cost. Brands including AXE, SmartWool, Harley-Davidson and LEGO have developed marketing campaigns with the help of innovation-oriented platforms including Victors & Spoils and Tongal.

This is not to say that managing an open-innovation process is without challenges. One potential problem stems from how companies contract with idea generators. Companies have long hired outside experts to develop new products or create the next great advertising campaign. With open innovation, however, they don't contract with the expert — they buy the idea after it has been developed. The difference might seem subtle, but it can create enormous challenges. When you contract with an idea generator, you can specify up front who will own the future ideas. When you acquire the *idea*, it can be problematic — a difficulty that's captured by the so-called "Arrow's information paradox." [8]

ModCloth, an online clothing retailer, uses customer feedback to gauge fashion trends and to determine which ideas to implement.

Image courtesy of ModCloth.

Nobel Prize laureate Kenneth Arrow argued that the value of an idea cannot be assessed unless it is revealed. But once it's revealed, the potential buyer has it and can decline to pay for it. Intellectual property rights such as patents mitigate this problem by restricting unauthorized use of inventions. But ideas on their own can't be patented or copyrighted. For such cases, Arrow's paradox is a major barrier. Fear of having their ideas copied unfairly might discourage the most talented innovators from participating in

contests, leaving sponsors with a weaker pool of entries.

A few companies have been able to overcome Arrow's paradox by developing reputations for fair dealings. S.C. Johnson & Son, for example, the company known for such household products as Glade air fresheners, Kiwi shoe polish and OFF! insect repellent, has worked diligently to establish itself as an honest buyer of external ideas and thus has succeeded in attracting good ideas from outsiders. For organizations without such a track record, an intermediary can be useful. Waltham, Massachusetts-based InnoCentive, one of the most successful innovation contest platforms, for example, connects companies to the broader community of idea generators. Because of its track record (it has run more than 1,000 innovation challenges, with awards ranging from $5,000 to $1 million), companies can essentially "rent" InnoCentive's reputation when engaging in an idea tournament and have ready-made access to tens of thousands of idea generators. Inventors know that InnoCentive has every incentive to ensure that ideas aren't misappropriated; its business model *depends* on having a reputation for handling contests effectively and honestly. As a safeguard, InnoCentive requires clients to submit to intellectual property audits as a means of verifying that ideas are being properly used and that inventors are being properly compensated.

A second challenge in managing open innovation is caused by a shift in who bears the cost (and risk) of idea generation. In traditional product development, idea generators get paid for their efforts, and the purchasing company bears the risk that the development process will yield good ideas. With open innovation, the company pays for a design only after it has been completed. This means that the idea generator bears both the cost and the *risk* of developing a design. The result: Increased investment required to generate ideas and solutions, and fewer contest entrants. Because innovation contests generally work best with a healthy number of contributors, companies should consider implementing mechanisms for lowering the investment cost of participation.

One way to reduce the cost of participating is to provide contestants with design tools. Semiconductor companies such as LSI, in San Jose, California, have long provided customers with electronic "tool kits" that help them develop innovative chips. [9] In a similar vein, Threadless, an online artist community and design company based in Chicago, supplies designers with guidelines, tips and templates for popular items such as T-shirts, messenger bags, backpacks and laptop cases. In a dramatically different setting, Goldcorp, the Vancouver-based mining company, encouraged teams to develop new approaches to finding gold in its northwest Ontario mines by sharing its geological data and software.

Another way to reduce the cost of designing and encourage participation is to break complex problems into smaller pieces — each with a prize. NASA learned this lesson when it began to post challenges on InnoCentive. One challenge NASA asked people to solve was how to build a laundry system for the International Space Station. However, the project proved to be exceedingly complex. "From this experience we learned that a number of small building block challenges should have been used in creating a robust overall solution," admitted Jeffrey R. Davis, director of NASA's Space Life Sciences. In addition to deconstructing problems into smaller chunks, NASA has discovered that problems need to be clearly articulated and framed in a way that can be understood by researchers from different disciplines.

TopCoder, an online contest platform for software development with more than 500,000 members, has created a rigorous process for problem deconstruction. The company systematically breaks down large client software projects into modules that can be designed, developed, integrated and tested separately by different individuals. Recently, for example, in building a new health care provider portal and fraud detection system for the U.S. Department of Health and Human Services and the state of Minnesota, TopCoder divided the project into 123 smaller problems and received submissions from 73 individuals from 16 countries.

Opening the Idea-Selection Process

As we have noted, managers are less familiar with the option of opening the idea-selection process to outsiders. Such approaches commonly take the form of "approval contests" — think of the TV shows *American Idol* and *The Voice*, in which outsiders vote to determine which entries should be pursued. Approval contests have taken the fashion industry by storm. Traditionally, companies have relied on teams of designers and fashion experts to determine new lines of clothing, and they often contracted with celebrities or big names in the fashion industry to launch multimillion-dollar advertising campaigns. But Zara, the Spanish retailer, eschews those approaches. Instead, it manufactures small batches of numerous designs — about 10,000 new items every year — and then lets customers determine the latest trends. Not only does this allow Zara to identify popular items, it also enables the company to cut its losses quickly when a product flops.

Threadless, a design company, allows external selectors to vote on the more than 800 designs submitted each week.

Images courtesy of Threadless.

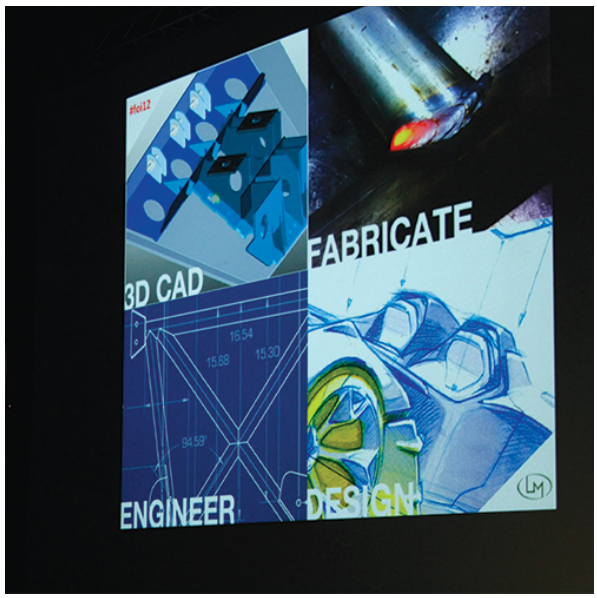
ModCloth, an online retailer based in San Francisco that specializes in vintage and vintage-inspired clothing, takes this approach a step further, using customer feedback to gauge fashion trends and to determine which ideas to implement. Through the company's website, consumers vote and express opinions on designs. Another online fashion boutique, Shopbop, which was acquired by Amazon.com in 2006, asks customers to "heart" products and then aggregates the data to

create personalized boutiques. It uses the data to determine the size of its production runs.

The trend of polling consumers is not limited to clothing or fashion, however. LEGO Group, the Danish toy company, asks consumers to vote on which landmark buildings it should feature in future architectural model kits. More recently, Wal-Mart has asked its customers to vote on new products it should carry online or on its retail shelves.

Despite these real advantages, opening up the selection process also has its perils. On the plus side, it allows companies to shift costs and risks to outsiders. However, while outsiders may have unique insights into the value of an idea, their concept of value is not always aligned with the company's strategy, brand or profit goals. By encouraging external groups to make choices about the best ideas and designs, managers cede control to people who might have different incentives.

One solution is for companies to retain explicit residual control. For example, even though Threadless, the clothing design company, allows external selectors to vote on the more than 800 designs submitted each week, the voting statistics are used only to narrow the pool (to 100). From there, the company's executives and employees choose seven to nine designs per week to manufacture. In making the choices, Threadless executives weigh three factors: scores from outside selectors, score distribution (which indicates fan intensity) and their own sense of fashion aesthetics and style trends. This residual control allows Threadless executives and managers to reject designs they consider inappropriate, offensive or redundant. Recently, for example, Walt Disney partnered with Threadless and its community to create new T-shirt designs based on familiar characters (like the Muppets) and more recent characters (like Phineas and Ferb, who are featured in an animated TV series of the same name on the Disney Channel). Although the Threadless community has artistic freedom to create new interpretations of Disney's characters and the community can vote as they wish, Disney gets to tap into the experience of the selectors at Threadless.



Companies can also decide how much control to exercise over the chosen designs — and the community that's invited to participate in the selection process. The goal is to balance freedom of expression and the desire for honest feedback with the civility and respect that is necessary to encourage participation. This balance at one point became an issue at ModCloth, the online clothing retailer. Kerry Whorton Cooper, a former chief operating officer of the company, recalled an early experiment with sourcing customer fashion feedback through Facebook: "One of our employees is a plus size. Someone called her 'fat,' and the wall just exploded in conversation. Our girl [at ModCloth] is lots of shapes and creating a cohesive community is part of what we do."

Opening Both Idea Generation and

Selection

Some organizations, particularly those focused on products where needs change quickly, have opened both the idea-generation and -selection parts of the innovation process. Threadless has established an online community to source and select T-shirt designs. New York City-based Quirky, which specializes in "socially developed" products, has expanded on this approach to include a wide range of consumer products. Consumers submit ideas for products — everything from flexible power strips to collapsible hangars — and the most popular items are then developed, produced and sold online and through U.S. retailers such as Best Buy and Target. Muji, an eclectic home goods retailer based in Japan, has deployed a variation of this approach. It allows consumers to modify and recombine its core products. If a modified item receives orders from a sufficient number of people, Muji will manufacture the product for those customers and also carry it in its retail stores.

The benefits of opening both idea generation and selection are not just for companies selling relatively inexpensive consumer items. Local Motors, an automotive design, manufacturing and technology company based in Chandler, Arizona, relies on an online community that includes customers, designers (both amateurs and professionals) and car enthusiasts. Management evaluates the submissions that generate the greatest amount of interest; the final selections are built in regional "microfactories" capable of producing around 2,000 vehicles per year. In addition to commercial projects, the company recently worked with the U.S. Department of Defense's Defense Advanced Research Projects Agency (DARPA) to create a next-generation combat support vehicle. Traditional auto manufacturers are also pursuing their own experiments with design communities. BMW has run several community challenges related to redesigning the interior of vehicles, and Fiat has

developed an urban concept car, the Mio, through interactions with 17,000 consumers and their more than 11,000 ideas.

In software, open-source coding projects let outsiders both generate and select the designs that will be enabled in the software code. The rapid rise of open-source software in the core part of the Internet's infrastructure (for example, operating systems, databases, Web technologies and big data analytics) and also within many aspects of high-tech hardware devices (for instance, Android phones, TiVo DVRs and Sony PlayStations) has been predicated on vibrant communities of software developers that continually generate, modify and select code submissions. Indeed, high-tech leaders such as Apple, Google, Facebook and IBM have all learned to harness the energies of open-source software communities by both contributing actively to the creation of public software goods and creating complementary assets that can leverage the community-created solutions. [10]

The high-technology sector has also pioneered the creation of two-sided platforms that enable thousands of developers to create niche software applications on core platforms. The applications are marketed to consumers, with the platform operator taking a cut of the sales price. Although Apple's App Store may be the most successful example of a two-sided platform, other companies, including SAP and Microsoft, have had their own successes in this area.

Managers seeking to open both the idea-generation and -selection parts of the innovation process must confront the problems noted earlier. They also must address what is potentially a more fundamental problem: How to make money? Traditionally, most companies have relied on proprietary knowledge as a major barrier to entry for competitors. They appropriated value from innovations by keeping them secret, or they made money by having a superior understanding of customer needs. However, when these activities are managed outside the organization, what is the role of the company, and how can it make money?

One successful approach is for companies to reconsider what they actually do. TopCoder, for example, is not a traditional software development firm that licenses its creations. Instead, it is an online platform for software developers to work on projects for other organizations. The company charges a fee for use of its platform — a strategy also deployed by companies such as InnoCentive and Kaggle, based in San Francisco. By contrast, other companies provide the platform for free but use it to create spillover [11] value to a more traditional business.

Such additional value is also available to high-tech companies. For example, to develop the next-generation facility for integrated circuit fabrication, IBM and its competitors (including Toshiba and Samsung) joined together to create a laboratory that includes both idea generators and selectors. As a requirement for participation, each company agreed to release its intellectual property rights to the other members. This, of course, means that the companies can't compete based on their superior production processes, as those are available to all alliance members. However, they can still compete by producing better-designed products that are enabled by the shared production capabilities they jointly developed.

Determining the Right Open-Innovation Strategy

Choosing the right open-innovation strategy requires a number of steps. In working through these steps, managers should ask themselves a series of questions. First, they should consider whether outside innovators are likely to have access to unique knowledge that might be able to generate a plausible solution to an innovation problem. Is the knowledge needed to solve an innovation problem concentrated within a few individuals or teams, or is it broadly dispersed? The more dispersed the skills or the more uncertainty about what skills are needed, the more valuable opening the idea-generation part of innovation will be. In our research, many executives expressed surprise that individuals outside their company and industry could generate insights on their long-standing internal problems.

Once managers have considered whether outsiders are likely to have better ideas, they should consider whether they can attract outsiders to provide these ideas. As we discussed, if innovation requires considerable investment by the solver, the number of external people willing to participate in a company's innovation program will be limited. (This limitation can be overcome if the company actively works to decompose and disaggregate its larger problems into smaller problems, thus lowering the investment requirements for any one individual.) In addition, managers must be able to reassure innovators that their ideas will not be misappropriated. Overcoming the reluctance of innovators to disclose their ideas is critical to a successful open-innovation program. If managers conclude that outside innovators have valuable ideas and can be attracted to participate, then they know that they should consider opening the idea-generation process by either developing design tournaments or creating design communities.

After considering the idea-generation side of open innovation, managers should consider the selection side. Do outside selectors have unique knowledge about customer needs? Are these needs changing rapidly? Are specific skills required to select the right innovation? If so, outside selectors may be helpful in choosing the best innovations. Once managers have concluded that an outside perspective is useful, they should ask themselves whether they can align the incentives of the outside selectors with the company's goals. A critical question is whether managers can motivate selectors to participate if the company retains some control over what designs are chosen.

If the above analysis convinces a manager that he or she should open both idea generation and selection, one last question remains: How does the business still make money? Secret knowledge is often a critical barrier to entry for competitors and thus a critical condition for companies to be profitable. If innovation is done outside the company and selection is done by outsiders as well, a new business model is usually needed to capture value. Before selecting an open-innovation strategy, companies must have a good strategy for profiting from the innovations that emerge.

Open innovation is a simple concept: Instead of doing everything in-house, companies can tap into the ideas cloud of external expertise to develop new products and services. But, as with many simple concepts, the devil is in the details. In practice, open innovation is not just one strategy but three different strategies, each presenting enormous opportunities as well as major challenges. Moreover, open innovation is not a

panacea: It might solve some problems but create others. Open innovation might not be the right approach for every company, but many organizations can benefit from it. The key to success is careful consideration of what to open, how to open it and how to manage the new problems created by that openness.

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