

[Rubric] **Innovation**

[Headline] **A Smarter Way to Green-Light Innovation**

[Deck] Most companies could do better at assessing which R&D projects should go forward, but by managing bias and involving more people, organizations can increase their odds of success.

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The Research

- The authors conducted a multi-year research project inside a global professional services firm, collecting both quantitative and qualitative data about the firm's innovation selection process.
- In an initial study, they examined how eight selection panels composed of senior managers and leading engineers allocate money to new research ideas. In a second study, they analyzed 763 decisions made in random order by one of the eight panels.
- They also conducted interviews with several dozen executives.

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[Main text]

In early 1962, an unknown band from Liverpool auditioned for Decca Records. The label rejected the band, saying, “We don’t like their sound, and guitar music is on the way out.” About 18 months later, the Beatles would release their first album.ⁱ The rest is history.

The business world is full of anecdotes about how firms pass on an idea that later became a huge success. The reverse is also true; in some cases, firms invest in promising ideas that prove disastrous. A famous example is Iridium Communications, a former division of Motorola that sought to market satellite phones broadly. After the company sent satellites into orbit in 1998, a host of issues prevented the business from gaining traction with customers; the company filed for bankruptcy the next year. (After a restructuring, Iridium is still around, and its technology is used by the US military.)ⁱⁱ

Selecting innovative new projects for further investment and development is critical—and hard. The best R&D projects can renew an organization’s product lines, processes, and services, improving performance and competitiveness. But deciding which new ideas are winners and which are duds is tough, because new initiatives are characterized by fundamental technological and market uncertainty. And our research shows that at many companies, bias and process issues can imperil good decisions.

To improve their track record of choosing the right innovations to bring forward, leaders must first understand where R&D selection panels go wrong. Based on our research, we have identified five main categories of such issues. We suggest specific steps that leaders can take before, during, and after the selection process in order to make more objective, fact-based decisions about which new ideas to green-light. While nothing can eliminate all risk from an inherently speculative endeavor, improving the process can tip the odds in companies’ favor.

Common Problems In How Companies Select Projects

Many firms have created expert panels that invest significant time and effort in reviewing project pitches and deliberating on their merits. Because these panels are usually composed of senior members of the organization, they are an expensive resource. But research shows that these expert panels can be highly problematic, for five principal reasons.

First, panels tend to show a strong bias against highly novel ideas,ⁱⁱⁱ even though generating them is the explicit goal of innovation efforts. Decision-makers often reject highly novel ideas, even if they claim to want breakthrough innovations, because they are uncomfortable with the risk involved in pursuing them. We conducted a study in a leading professional services firm and found

that project review panels were more likely to fund projects with intermediate levels of novelty. Some degree of novelty increased the chance of funding, but too much reduced those odds.^{iv}

Second, a broad range of studies has found that expert panels favor projects from some people over others, in contrast to the meritocratic ideal of the best ideas being funded.^v These biases may manifest as a preference for men over women, for people with familiar names as opposed to those with “foreign-sounding” names, for people with greater experience within the organization, for people from a particular location, or for people with high-status affiliations (such as a famous university). There are two potential explanations for this. Selection teams often look for cues to cope with uncertainty, falling back on their prior thinking about the people behind a given idea, rather than the merits of the idea itself. But even more important: expert panels often lack diversity. Organizations commonly staff panels with “the usual suspects”: highly senior white men. Because decision-makers prefer people who are similar to themselves senior white men are more likely to select ideas from other white men instead of women or people of color.

A recent study examining the selection of start-ups applying to the MassChallenge accelerator program found that when judges evaluate start-ups alone—without consulting with other judges and on the basis of a purely textual description of the venture—they are less likely to be influenced by the founder’s gender and where they earned their university degree. In contrast, when they perform their assessment after watching a short pitch and Q&A session, gender and educational background become more important in their evaluations.^{vi} When individual characteristics are more apparent, they affect the outcome of the decision-making process. This effect is compounded when an evaluation must be performed quickly, suggesting that fatigue and high workloads could lead to more biased choices.

The lack of diversity in expert panels is not only problematic as it may give rise to the aforementioned preference for people who are similar to the selectors and a bias against women and people of color. It is also problematic as people with different demographic backgrounds have different lived experience and consequently different interests which ideas to pursue. Thus, only including white men and leaving out women or people of color may lead to missed opportunities or failed investments.

Third, technology companies usually staff expert panels with the scientists and engineers, who tend to focus on the technical aspects of an idea, without sufficiently considering the business opportunities and challenges. Although some expertise is required, having only experts on a panel can be problematic.^{vii} Panel members may have a bias for ideas originating from their own field of expertise, and experts are prone to systematic errors in assessing truly novel ideas.

Fourth, the panel decision-making process itself may also lead to inferior outcomes. As in many other areas of collective decision-making, applications are often introduced by a panel member, akin to an informal sponsor. This person frames the discussion around the issues they believe the group should consider creating groupthink around their own stance. Even if they strive to be objective, their own views on the project may be reflected in their tone and presentation, telegraphing biases and shaping the views of others on the panel.

Finally, the timing of the process can also yield inferior decisions. For example, we know that the

timing of meals affects judges' sentencing decisions, such that the percentage of favorable rulings gradually drops before, and then increases after, session breaks.^{viii} In addition, the order in which projects are reviewed shapes outcomes. Looking at unique data from a professional services firm, we found that the decision to fund one project makes it unlikely that the next project will be funded. This occurs even when the sequence is random.^{ix}

Making Smarter Decisions Before, During, And After The Selection Process

There are a number of ways to reduce these biases and improve outcomes before, during, and after selecting innovation projects for further investment. Although these practices may require some resources and effort to deploy, they likely cost less than the traditional model of selection, which heavily taxes senior managers and technologists' time and effort.

Before Selection

Before projects are evaluated, companies can take steps to ensure they get a fair assessment based on their merits, primarily by revising the process by which ideas are submitted for consideration.

Remove names and demographic information. To combat latent biases, organizations should mask or remove the names and key demographic characteristics of creators behind any ideas under consideration. Some research has found masked submissions in science increases the likelihood of women receiving grants.^x One simple, low-cost experiment that an organization can run is to mask the identity of the idea creator and selector, to test whether there is a bias for certain types of individuals in your organization.

Notably, although masking submissions is a start, companies will likely need to take additional steps to identify biases. A study concerning grant proposal acceptance by the Gates Foundation found that blind reviews do not always comprehensively eliminate gender biases.^{xi} Gender-based differences can arise in the writing styles of the project proposers, which implies that organizations need to continuously, and proactively, gauge whether they are falling prey to biases.

Standardize submissions. It's critical that ideas competing against each other are comparable. This can be achieved by providing a detailed, standardized template for submissions. At DARPA, program managers must frame their proposals following the Heilmeier Catechism,^{xii} a set of questions first formulated by George Heilmeier, the director of the agency in the mid-1970s. It establishes the criteria used by selectors to decide whether to fund a project, and also acts as a screening device for project managers to judge whether their ideas have a chance of being approved.

The Heilmeier Catechism

As part of the evaluation process for new ideas, DARPA requires that all project creators address a standard set of questions.

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?

- What are the risks and the payoffs?
- How much will it cost?
- What are the midterm and final “exams” to check for success?

Another advantage of standardizing submissions is that companies can more easily build up searchable repositories of accepted and rejected ideas that can be easily compared, making the process more transparent and objective. A company we studied posts all project pitches and decisions on an internal webpage so that people can learn about what has worked in the past. Like pre-publication review in science, this open model also allows anyone in the firm to comment on pending applications, ensuring the panel has access to the views of others in the organization before making its decisions.

Amazon also requires employees to present their ideas using a standardized approach. The basic criteria for evaluation are also similar to those of the Heilmeier Catechism: estimating the market potential of the idea, whether Amazon can build it, and whether customers will love it.^{xiii}

During Selection

The selection process itself is the most ripe for rethinking. There are several measures that organizations can take to improve outcomes.

Seek diverse voices from inside the company. Research has highlighted the importance of diversity across multiple dimensions—demographic characteristics but also professional expertise and backgrounds. Having a more diverse selection panel cannot only help to overcome the bias against women and people of color but also leads to more products that are appealing to people with different needs and interests. Second, greater knowledge diversity increases the odds of more novel projects being funded. One relatively easy method to make selection teams more diverse is to include people with both technical and non-technical backgrounds. This ensures that projects are evaluated not solely on technical aspects, but also on market potential, business planning, strategic fit, and financing. For instance, many pharmaceutical companies involve experts in different therapeutic areas, as well as marketing representatives, in assessing drugs in development.

In addition, companies can empanel selection juries or create citizen assemblies among employees. If companies pursue this approach, they should also ensure that panel members feel that they can freely express their views, especially among senior managers and technologists. The benefits of diversity are only realized when people speak up and give voice to their different perspectives.

Use crowd-sourcing principles, both internally and externally. The basic principle of crowd-sourcing is that the collective wisdom of a large group can sometimes lead to a better outcome than a decision by a small number of experts. Companies can use this approach both internally and externally. In internal crowd-sourcing, companies provide a fictional currency to all employees or a large group of individuals and let them “invest” that currency in the idea that they think has the most potential. BMW, for example, has experimented with giving shop floor workers a limited budget of blue buttons to prioritize among project proposals collected from the workforce.^{xiv} Siemens has used a prediction market to evaluate new ideas suggested by its employees.^{xv} An interesting facet of these methods is that they sometimes point to conclusions that run counter to those of company executives.

Some companies can also involve external crowds in innovation selection. LEGO Ideas, a well-known crowdsourcing platform, lets people around the world share their ideas for new LEGO sets, vote on proposed ideas, and indicate how much they would pay for them. From LEGO's perspective, this reduces demand uncertainty and indicates which ideas may be successful. Since its inception in 2014, LEGO has received more than 100,000 ideas. By letting the crowd pre-filter the best ideas, LEGO has only had to carefully evaluate a small subset, which has reduced the selection burden and allowed the company to focus its attention on the most promising ideas and their fit with LEGO's business model. Some products now on store shelves were originally developed through the platform.^{xvi}

Use a workshop approach. Another way to assess innovation projects is to use workshops, which brings together experts from different fields to work together. The approach arose in the UK, where government-funded research councils wanted to break away from the limitations of anonymous peer review, which tends to be conservative and intolerant of interdisciplinary projects.^{xvii} (In the UK, these events are called "sandpits.") Workshops bring together scientists working in an area for a week-long intensive retreat, where participants discuss their research ideas, get feedback from other experts, and collectively select which projects will be funded.

Leave it up to chance. It may sound heretical, but some organizations are incorporating randomness in R&D decisions, particularly when choosing among projects of mid-level quality. (It is typically easier to find agreement about outlier projects—those that are either extremely promising or extremely weak.) For example, New Zealand's Health Research Council created a system for randomly allocating scientific funding using a lottery. Scientists prepare a full proposal and every proposal that meets a set of basic requirements enters the lottery. Hence, chance decides which initiatives get funding.^{xviii}

Given the difficulty predicting outcomes for mid-level projects, random selection is likely to be as effective as educated guesswork. Recently, the Swiss National Science Foundation took up this idea. When reviewers cannot agree on a ranking of two or more research projects, rank is determined via a random drawing.^{xix} Early research shows that these approaches can generate science of equal or better quality than the formal selection process.^{xx} Of course, such efforts are unlikely to fully replace other means of selection, but they can provide useful antidotes to conventional thinking.

Stage head-to-head comparisons. When companies need to rank a set of ideas, they can borrow an approach from chess, known as an Elo comparison. (Arpad Elo was a physics professor who developed the concept.) In chess, if you beat a good player, you move up much higher in the rankings than if you beat a bad player. The strength of competition matters. Organizations can apply that same logic to select novel ideas. By comparing just two ideas against each other, and repeating those comparisons across other combinations, companies can develop a ranking of ideas from best to worst. This approach simplifies the process of assessing a potentially overwhelming set of choices.^{xxi}

Shell uses a head-to-head approach in its idea competitions. After ideas are pitched, the company asks the company to score two ideas against one another. The German auto manufacturer Smart used an online design contest to solicit new designs and establish relationships with external partners. In just six weeks, the company attracted several thousand designs from people in 110

countries, and it used an Elo algorithm to sort them.^{xxii}

After Selection

Finally, once organizations have determined which projects to green-light, they can take actions that help innovators develop more successful proposals, and help decision-makers make better choices next time.

Provide feedback on proposals. Selection panels should provide specific feedback on all proposals and make it accessible across the organization. This kind of feedback should help idea creators to better structure future submissions, alleviate the potential demotivating effect of having an idea rejected, and increase trust that the decision process is fair. And, critically, requiring this feedback creates an accountability mechanism that will encourage selectors to consider what motivated them to reject or accept a given project.

Ericsson has set up an online system called “Idea Boxes” for collecting and managing employees’ ideas. Critically, the system includes moderators who are responsible for providing feedback within one month of submission, explaining why an idea has been selected or rejected. Because these comments are visible to the entire organization, employees can learn from their own and others’ experiences.^{xxiii}

Similarly, Bristol-Myers Squibb has made significant changes to its selection process, to increase fairness and the accountability of decision makers. Committees in charge of managing the portfolio of drugs and deciding which compounds to progress through the pipeline are now required to communicate their decisions and provide feedback to R&D project leaders within hours. Most importantly, R&D project leaders are asked to fill in a survey evaluating not only the selection process but also each of the individual members of the committee.^{xxiv}

Track and learn from failures. Too few organizations conduct a systematic, quantitative review of their R&D selection process. In particular, organizations fail to capture sufficient information on their failures. A big component of cultivating a tolerance for failure is to show failures and learn from them. Without such information it is difficult to know whether selected projects met expectations, or whether the organization missed an opportunity that another entity ultimately pursued.

By monitoring outcomes of the selection process—both successes and failures—it is possible to assess how well the current selection process works. Such analysis will reveal not only whether the process can identify high-value ideas but also whether the pool of projects and/or creators fully reflects the wide range of talents and skills of the organization, and whether selection panels are overly risk-averse.

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No one wants to be the decision-maker who passed on a good investment—like the senior partner of venture capital firm Bessemer Venture Partners who counseled a Facebook founder, “Kid, haven’t you heard of Friendster? Move on. It’s over!”^{xxv} And the Bic executives who green-lighted a pen for women that unsurprisingly failed in the marketplace no doubt had regrets.^{xxvi} But there will always be some hits and some misses in the process of assessing innovation projects for

funding. Our research shows that by understanding the potential pitfalls and improving the process, companies can make smarter decisions and generate better outcomes. Innovation will always be tough to assess, but by creating a process that is more open, fluid, and collaborative, organizations can spot the true golden nuggets among the rocks.

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