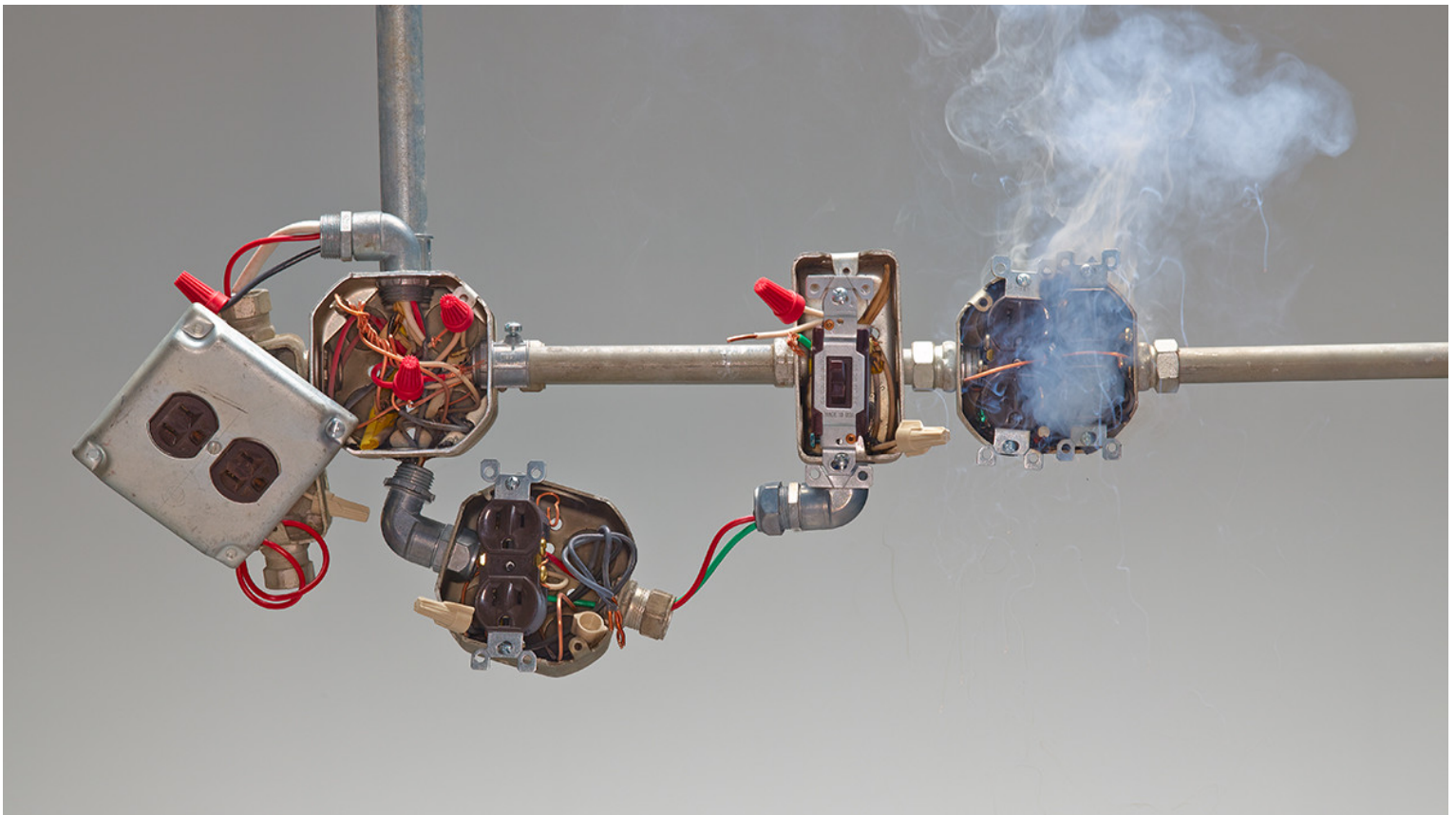


RESEARCH & DEVELOPMENT

A Study of NASA Scientists Shows How to Overcome Barriers to Open Innovation

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MAY 29, 2018



Open innovation processes promise to enhance creative output, yet we have heard little about successful launches of new technologies, products, or services arising from these approaches. Certainly, crowdsourcing platforms (among other open innovation methods) have yielded striking

solutions to hard scientific and technological problems—prominent examples being the Netflix predictive recommendation algorithm and the approach to reducing the weight of GE jet engine brackets. But most R&D organizations are still struggling to reap the very real rewards of open innovation. We believe we’ve hit on an important hidden factor for this failure and that it holds the key to a successful integration and execution of open innovation methods.

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We conducted an in-depth, three-year study at NASA’s Space Life Sciences Directorate to closely track the opportunities and challenges involved with open innovation in an incumbent R&D organization over time. Over the course of one year, we observed as NASA took a two-track approach to solving 14 strategic problems: The

organization used both the traditional collaborative R&D model led by its own experts, and also open online innovation platforms led by crowds of non-domain experts.

The second approach led to relatively speedy solutions to three of the challenges and was particularly successful in the challenge of predicting dangerous solar storms, where it produced a breakthrough within a mere three months. But bringing the open-source solutions to life proved more challenging. Some of the directorate’s scientists and engineers resisted the new approaches, citing process, budget, and procedural issues. The managers were able to solve those challenges, yet the tensions remained.

It took us months to realize what was going on here: The most resistant scientists and engineers saw open source methods as a fundamental challenge to their professional identities. They defined themselves as “problem solvers,” but open innovation crowdsourcing platforms didn’t let them play that role; instead, they had to frame problems for someone else to solve. “I’ve always been attracted to places that allow you to be able to think and solve greater problems,” one scientist told us, “If I can’t do it at NASA, what is keeping me from going somewhere else?”

By contrast, there were other scientists and engineers who perceived the open methods as an opportunity to enhance their role and capabilities. As some engineers described it, this transition was a shift from thinking “the lab is my world” to “the world is my lab.” They argued for the need to

let go of the “how” of their work and refocus on the bigger “why.” They called on their colleagues to shift their professional identities from “problem solvers” to “solution seekers.”

These identity dynamics are often hidden from managers and difficult for them to shape. We therefore remained at NASA for two more years in order to understand how managers can influence the way innovation professionals perceive their role and integrate open innovation methods. We saw that it is vital to refocus engineers and scientists on the higher purpose of their work—at NASA, this meant focusing on the bigger mission of getting to Mars—and reframing the open innovation method as a tool that enables R&D professionals to achieve their mission faster. As one scientist put it, “At the end of the day, it’s about the *big* agenda versus the personal one. Science is about finding the truth!”

More practically, our research showed us that managers should encourage and reward solution seeking. In every successful R&D organization there are hero stories about problem solvers; these need to evolve to celebrate the innovators who find solutions in creative ways. These are the innovators who should get the spotlight and the resources. And rather than incentivizing only patents or publication, offer financial recognition to those who embrace the solution-seeking mindset.

It is important to communicate that innovation is not only about having an innovative technology or science; it is also about innovating the actual process of innovating. As Einstein famously said, “We cannot solve our problems with the same thinking we used when we created them.” There is no one process that fits all scientific and technological problems. The more experimentally R&D professionals think and behave, the easier it will be for them to adopt fundamental changes in the way they do their work.

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