

TECHNOLOGY

Collaborative R&D: the University-Industry Approach

by Kelsey Chong



Most companies recognize that external collaboration can be very beneficial to the research and development process. Companies should strongly consider a collaborative relationship with university research labs.

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When it comes to R&D, external collaboration comes with undeniable merits. While a single firm's R&D resources are generally limited to a specific field or product, **external partner collaboration promotes innovation** by giving access to a vast pool of global talent, knowledge, and expertise. Furthermore, collaborative R&D can also **drive down research expenses** by sharing costs amongst partners.

With more and more startups like Airbnb, Coursera, and Uber threatening to disrupt traditional industries, startup-corporate R&D collaboration has become highly coveted by large firms. Corporate giants are experts in maintaining consistent large-scale production. But when the need for innovation comes around, these highly bureaucratic organizations require the skills and creativity of quick-moving, multifunctional startups.

Aside from increasingly popular startup-corporate collaboration, however, **there's another form of collaborative R&D** that has brought innovative success to both American and European firms alike since the early 1980's. That form is none other than university-industry collaboration.

An Unlikely Pair

Because universities and corporations are complete opposites in their R&D approaches and circumstances, the two initially resemble water and oil.

Universities are centers for skill development and academic learning. With the main objectives of educating students and stimulating analytical, revolutionary thinking, these **higher education institutions** are equipped with the greatest minds in their respective fields. Beyond your average universities, however, also exist schools that boast the prestigious title of research university. **The United States is currently home to over 250 research universities**—the most notable including schools like Berkeley, Harvard, Stanford, and Michigan State. On top of general undergraduate education, these campuses allocate a significant portion of resources and funding towards graduate education and research. Facilities like extension centers, multiple campuses, research institutes, and private research parks are naturally scattered across these large, R&D dedicated campuses—each one fully furnished with state of the art equipment and cutting-edge technology. Research universities utilize these assets together with federal funding to conduct research with the end goals of expanding public knowledge and advancing studies in pure scientific fields.

Meanwhile, **corporations are being driven in the opposite direction**: being forced to sacrifice long-term, discovery-based R&D resources and efforts to compensate for growing competition in the market. Rather than investing in independent, experimental research, **companies are instead concentrating their budgets on profit-driven applied research**—where priority is given to product-specific projects and analysis with more immediate results, such as pinpointing target consumer needs and trends. To make matters worse, the economic recession of 2008 also induced severe federal budget cuts on research, with an estimate of a gross deficit of about **\$95 billion in government R&D spending** by 2021. With the government financing about **60% of all basic research** in the United States, corporations are now even more discouraged from devoting funds towards innovation and new products.

Back to School

Surprisingly enough, the greatly differing natures of R&D in these two types of organizations are precisely what make them the perfect partners for collaboration. Due to the negative correlation between increasing market competition and the ever-shrinking size of corporate research laboratories, **large companies now lack the resources to house diverse research communities**. While corporations used to facilitate high interaction between a variety of interdisciplinary, pure, and applied sciences, **severe budget cuts and a shift towards product-focused studies** have now led to the filtering out of low priority fields and the destruction of these intellectually stimulating environments.

On the other hand, universities are major hubs for critical thinking and the intersection of different disciplines. Instead of being limited to a specific product, university researchers can freely explore topics of interest and reach out to expert faculty from a range of STEM and social science backgrounds to **promote new combinations of interdisciplinary studies**. As a result, research universities can help companies fill the gaps between basic and applied research, and **regain access to environments with heavy interdisciplinary interaction and innovation**. In return, universities receive large amounts of research funding, insights on real market data, and unique opportunities to apply scientific discoveries towards directly improving people's lives and implementing societal change.

Other mutual benefits of university-industry collaboration include **technology transfer and student involvement**. Through **technology transfer**, universities can license intellectual property and technology patents to companies for commercial applications. This agreement to share university-exclusive knowledge and technology not only helps spark corporate innovation, but also introduces a refreshing entrepreneurial culture into the university that will attract new recruits and boost faculty retention. As industry research fills university laboratories, undergraduate and graduate students will also gain exposure to real-life applications of their studies, or even hands-on experience with company projects by working in school labs. While university education is enriched by these experiences, corporations also gain the opportunity to reach out to, influence, and train potential future employees.

Building Common Ground for Success

At the same time, however, corporate and university differences can also lead to conflicts in interest or operations.

Universities emphasize academia and **aim to publish research results as soon as possible** to make headway in scientific discovery. Conversely, businesses are **focused on obtaining new patents and products**, and are thus often reluctant to publish or share any information with competitors. Any disclosure of corporate research results must be carefully timed in accordance with the market to ensure profit. Furthermore, **university laboratories tend to engage in long-term projects and operate at a slower pace**. On the other hand, corporate researchers must deal with the pressure of the marketplace—juggling time-sensitive product development projects, and constantly readjusting to face new challenges on a day-to-day basis. As a result, universities **can often fall behind** the fast-paced expectations of corporations.

Because of the contrasting fundamental objectives of both types of organizations, both sides must actively work to bridge the gap for a successful partnership. Some of the key steps to ensuring effective collaboration include identifying shared goals and maintaining constant communication. Recognizing a shared vision beforehand will allow both parties to agree on a set of expectations and establish a clear framework to follow moving forward.

Within this framework, determining how resultant intellectual property will be used is especially vital to prevent potential disputes from arising later on. Additionally, facilitating regular communication and the open exchange of ideas and information will allow both entities to build mutual trust and overcome differences.

By taking the initiative to maintain transparency in all steps of collaboration, **universities and corporations can build successful long-term partnerships** where both parties can share risk and accountability, and maximize mutual R&D benefits.

► References



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