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Innovating with external partners doesn't always give companies a competitive advantage. It needs to be balanced with internal efforts.

BY NEIL C. THOMPSON, DIDIER BONNET, AND YUN YE

New digital technologies have upended conventional business models, organizational structures, and operating processes in most industries. Almost every aspect of business — customer relations, supply chain management, after-sales service — has been radically altered.

Nowhere is that more evident than in brick-and-mortar companies' innovation processes. Facing tough competition from digital upstarts that are creating and capturing value in new ways, incumbents are trying to figure out how to keep up.

While the need for innovation in the digital age may be an open-and-shut case, CEOs of these companies aren't sure whether their innovation processes should be open, shut, or both. Many businesses that used to depend only on internal innovation have begun to tap external innovation to quickly acquire the digital capabilities they need to navigate the constant stream of new technologies. However, forging partnerships and investing in startups doesn't always confer a competitive advantage; often, we find, it only helps incumbents catch up with rivals. The need to acquire capabilities quickly is important, but companies must also continue to invest in developing key capabilities internally, even if that takes more time.

Most companies, our research suggests, should rethink their innovation systems and develop portfolios with a balance of innovation sources. They must treat external innovation as a way of broadening their portfolios, not as a substitute for internal innovation. Only then will they be able to execute the transformations that will allow them to win the digital future.



THE

RESEARCH

The research behind this article, conducted in 2018-2019, included companies in seven industries from Australia, China, France, Germany, Japan, South Korea, the U.K., and the U.S.

The authors held in-depth interviews with executives in 30 large corporations across industries and countries to obtain a granular understanding of innovation practices and systems.

They then structured and, through Phronesis Partners, administered a survey to quantify innovation practices and systems, polling innovation leaders at 320 large corporations with revenues of more than \$500 million a year and gathering data on 640 innovation projects.

Reaching Out to New Partners

It's beginning to dawn on many businesses, be they consumer-facing or industrial, that digital transformation isn't just about investing more in IT, digitizing operations, and creating websites, mobile apps, and online channels to connect with customers and suppliers. All that improves efficiency, but it doesn't alter the business model. A digital transformation is a deeper change. It entails using second-wave technologies such as the industrial internet of things, artificial intelligence, and machine learning to create new sources of value through product and process innovation. For instance, manufacturers are figuring out how to use robotics and machine learning in production and supply chain management, and services companies are learning to deploy augmented and virtual reality to improve training.

But transforming a business is hard, expensive, and time-consuming, so companies are dedicating more and more resources to it. In 2012, experts recommended creating an innovation portfolio that allocated 10% of the budget to transformational projects, 20% to moderately transformational projects (sometimes called adjacent or substantial projects), and the remaining 70% to incremental innovation. By 2018, our studies show, most companies were focusing squarely on transformation, investing as much as 30% of their outlays in major projects and 35% in moderately transformational projects. Only 35% of budgets were being spent on incremental innovation — half the percentage in 2012.

What's more, 95% of the companies we surveyed said their most successful innovation project in the recent past had been mainly digital. That number was remarkable not only because it was so high but also because it was so similar across industries.

Yet, many of our respondents also admitted that they didn't possess the capability to develop digital applications. Across all types of innovation projects, companies reported that their internal capabilities weren't as good as those of the market leaders 51% of the time. But when it came to digital innovation, they fell short of the leaders an overwhelming 81% of the time. That's why so many companies are looking to source innovation from outside the organization; they are desperate to access digital capabilities and applications — quickly.

Although companies have been experimenting with open innovation for more than 15 years, our data reveals a notable shift in recent years. Companies have begun to seek innovation from a wide variety of potential partners, not just the ones with which they've already built relationships. Just seven years ago, 70% of businesses worked only with the existing partners in their value chains, either customers or vendors. But in the past five years, more than 75% of the companies we surveyed started drawing on a multiplicity of innovation sources. Nowadays, only 17% limit themselves to supply chain partners; most work with several kinds of partners, such as universities, think tanks, consultants, crowdsourcing platforms, startups, and innovation labs (which are internal structures that serve as bridges to external innovation).

Businesses in a wide variety of traditional brick-and-mortar industries, such as manufacturing, retail, and even fast food, are tapping diverse sources of digital innovation. McDonald's, the world's second largest fast-food chain, is an illustration of this shift. In the past two years, it has invested in developing a mobile app and a mobile-based order system as well as self-order kiosks inside its restaurants using innovations sourced from outside the company.

After investing in a mobile-app vendor, Plexure, in early 2019, the company started experimenting with digital personalization at drive-through locations. In April 2019, McDonald's acquired Israeli startup Dynamic Yield, whose personalization systems and decision-logic technologies allow the company to personalize its outdoor drive-through menu displays based on the time of day, the weather, current restaurant traffic, and trending menu items. The technology can also display suggestions from the menu based on a customer's selections. Dynamic Yield's technologies were integrated into nearly all McDonald's drive-through windows in the U.S. and Australia by the end of 2019.

McDonald's has also focused on digital voice recognition. In September 2019, it acquired Apprente, a startup developing voice-based technology that can handle multilingual, multiaccent, and multi-item ordering. That will allow for faster, simpler, and more accurate order taking at drive-throughs, and, over time, the technology will be incorporated into mobile ordering and the kiosks inside McDonald's

outlets. In fact, the Apprente team will be the first members of a new group, McD Tech Labs, in McDonald's Global Technology team, whose goal is to grow the company's footprint in Silicon Valley.

The Benefits of External Innovation

Becoming more open to external innovation is a marked departure from the “not invented here” syndrome from which companies suffered for decades.

That old, centralized approach to innovation has its limits; as Sun Microsystems cofounder Bill Joy famously said, “No matter who you are, most of the smartest people work for someone else.” Companies now recognize that when they lack internal capabilities that will allow them to remain competitive in the digital age, it's essential to look outside the organization for new technologies and applications.

Many companies also look outside to scan for the “unknown unknowns” that could disrupt their businesses in ways they haven't foreseen. Most are trying to make up for lost time, and investing in partnerships is a faster way to tap new technologies than starting from scratch.

Acquiring and developing capabilities externally helps companies mix and match from several sources to meet their needs. For example, iFlytek, a global leader in computer speech technology, has set up joint laboratories with several Chinese universities. The director of each laboratory is a university professor, while iFlytek experts are sent to work with them to develop new technologies and applications. This innovation ecosystem allows the company to tap cutting-edge knowledge from diverse sources even as it works on the innovations it needs.

Indeed, using external partners often makes it easier for companies to adopt a cautious approach to innovation. They can experiment with the use of high-potential technologies outside the organization

until they are de-risked enough to be incorporated into the company's products and services.

Finally, and importantly, open innovation helps guard against one of internal innovation's biggest risks: **incrementalism**. Innovators inside an organization, particularly in the business units, tend to develop products and processes that are easiest for the organization to adopt. That effect can be so strong that it stymies the creation of radical innovations that will reinvent the existing business. Incrementalism will prevail, pushing change forward in small steps that will leave the company vulnerable to disruptive threats from outside.

The Power of Doing It Yourself

Given those factors, the future of innovation may appear, inevitably, to be open. But our research suggests that open innovation need not, and should not, be the only way forward.

Indeed, internal innovation may be even more critical because it offers the possibility of differentiation. Leading digital companies — whether they're technology vendors, application developers, or data giants — like to work with many brick-and-mortar companies on key applications in order to spread development costs, attract venture capital, and become industrywide platforms. For instance, Google's Waymo, which is developing autonomous driving technology, has struck partnerships with Fiat Chrysler Automobiles and Jaguar Land Rover as well as Renault-Nissan. That will give all three global automakers the benefit of offering consumers self-driving cars, but none of them will enjoy a major edge over the others.

That's the key challenge of depending too heavily on external innovation: Because such technology partnerships don't deliver differentiation — they tend to simply raise the baseline and establish parity



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between rivals — they confer less competitive advantage than internal innovation. Our studies bear this out. Of the innovation projects that our sample of companies conducted internally, 87% yielded persistent or sustained competitive advantage, whereas only 60% of the innovation projects sourced externally did so. Put another way, only 13% of in-house innovation yielded no advantage or an advantage that rivals quickly matched, but that happened 40% of the time when companies depended on external innovation sources.

Internal innovation is critical for digital transformation for many reasons. Apart from delivering competitive advantage, it helps maintain trade secrets and protect intellectual property. Doing that becomes much more difficult when working with partners; that's true even if your partners don't work with your direct competitors, because they may still percolate what they've learned through the industry. Even if a technology or knowledge isn't shared with rivals, problems can still occur. When a company sources a key capability externally, that supplier becomes central to its value-creation process. For example, if a machine learning startup figures out what product- or feature-usage data best predicts renewals and upselling opportunities, it can wrest bargaining power — and a large share of the profit pool — from its partners.

Further, internal innovation allows experiments to be done in real-life situations. Born-digital companies, such as Facebook and Booking.com, are constantly testing different algorithms and designs. In doing so, they can gather real consumer data, rather than hypothesized responses, in ways that no external provider could offer.

Because internal innovators are familiar with their company's operations, their innovations are often easier to develop, produce, and sell than externally sourced innovations are. Project by project, internal innovations also tend to be more successful and more essential to the business.

Perhaps above all, developing innovation capabilities in-house improves them *durably*, which will stand companies in good stead in the future. In contrast, open innovation will never alter a company's capabilities or culture enough to bring about a transformation.

For all these reasons, a balance must be struck.

Developing capabilities quickly through external sources is critical, but so is tapping knowledge about your customers, your processes, and your culture in a way that only an internal innovation team can do. Smart companies, we find, treat external sources of innovation not as a replacement for internal sources but as a way of broadening the portfolio. They are not mutually exclusive, but rather complementary. In our survey, the companies that used the most external sources also used the most internal ones. Even companies with several innovation partners reported that their internal sources were the most critical.

Balancing Internal and External Innovation

Since open innovation helps companies acquire capabilities in the short run, but building capabilities internally is the best way to gain competitive advantage in the long run, how do you achieve the right balance? We suggest a three-step approach:

STEP 1: Identify critical competencies. To start, companies must determine which technological capabilities are likely to be critical in the future. Some of that happens during the regular strategy-planning process. Most businesses conduct an annual gap analysis of the capabilities they lack, and there are board- and business-level discussions about whether they should be plugged. Rarely does this exercise result in a road map showing which capabilities should be developed internally in the medium or long term and which must be acquired immediately through external sources. That's the missing link.

Of course, a key element in the calculation will be whether a given capability will help differentiate the company from rivals. The degree to which digital technologies are critical will differ; accessing data science expertise may be essential for a chemicals manufacturer, for instance, but it might not be for a real estate management company that needs to understand only sales and rental trends.

Companies must also figure out which external sources will allow them to access the critical competencies and applications they've identified. They should reach out to universities, startups, and others to see who is conducting the most exciting innovation relevant to them and then build a portfolio to fill their competency gaps. Keeping abreast of numerous would-be sources of external innovation can

be difficult, requiring focused attention and dedicated time by seasoned executives.

STEP 2: Create an architecture. Companies must also rebuild their innovation architecture so that they can manage both internal and external sources. It's important to get three building blocks right.

First, most companies will have to refine their organization design. For instance, if startups will be an external innovation source (they usually are), the business must create a way to manage those relationships — such as an incubator, an innovation sandbox, or a venture fund — and its investments in them.

Second, the innovation process must change if the company's powerful business units are to buy in to and adopt external innovations. One catalytic structure is an innovation lab in which a company can colocate researchers to gain access to the capabilities of innovation ecosystems in places such as Silicon Valley or Shenzhen. Such labs can be staffed by employees seconded from the company's businesses, which helps get buy-in for external innovations. Interestingly, between 2014 and 2017, the number of corporate innovation labs being built nearly doubled, reflecting the interest in this model.

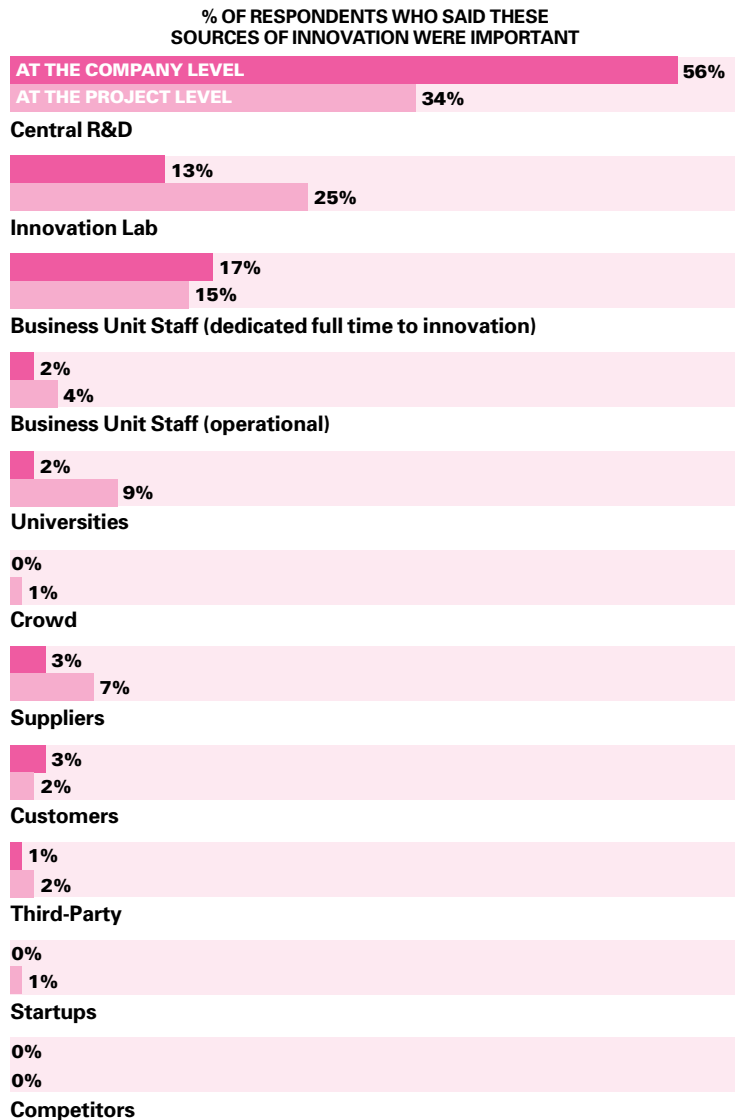
Finally, companies must develop innovation governance models with appropriate metrics to ensure consistency with their strategy. Many of the companies we studied initially struggled with governance and metrics. They assigned people to innovation projects, but the business units controlled the budgets and approvals. That resulted in slowing down the digital innovation unit, which was hamstrung by the bureaucracy.

STEP 3: Develop transfer processes. One of the most common mistakes companies make is not laying down a competence-transfer strategy from the very outset. They must map out how externally developed capabilities and skills will eventually be brought into the company. There's no silver bullet, though; the circumstances will determine each company's approach.

It's essential to think through different models and develop several paths for bringing needed skills into the company. In some cases, a company will be able to source technological capabilities externally; in others, it may make sense to acquire (that is, *acquire*) startups. A third option may be to develop a build-run-transfer partnership. That arrangement will allow a technology firm with the capabilities the

INTERNAL INNOVATION REMAINS CRITICAL

In a survey across 320 companies and 640 projects, respondents were asked which internal and external innovation sources were most important to their overall business and which produced their most successful (recent) innovation project. On balance, they deemed the internal sources — particularly central R&D, innovation labs, and dedicated business unit staff — more critical than external sources, such as co-innovation with customers and partnerships with startups.



company needs to build a dedicated team and manage it initially. Over time, the partner will transfer the team and all its work to the parent.

A Case in Point: Monsanto's Digital Portfolio

Some wise companies are learning to take a portfolio approach to innovation. Consider, by way of illustration, Monsanto, the American agrochemicals and

agriculture company that became part of Germany's Bayer Group in 2018. Several years ago, Monsanto decided that data science would be critical to gain sustainable competitive advantage in its businesses. By gathering and studying farm data, it could not only manage its inventory more effectively but also help farmers decide which crops to plant, which seeds to use, how much fertilizer and water were required, and so on.

Monsanto therefore started the process of transforming itself from an agricultural biotechnology company into a data-science-driven organization. Digital agriculture, as the strategy is known, entails the mass collection of farm data through sensors attached to everything from tractors to water sources. All the data is fed through a digital platform set up by a service provider, whose algorithms display conditions on the farm and make specific recommendations.

Then-CEO Hugh Grant and the company's other senior leaders felt that given its size and ambitions, Monsanto should invest in the technologies to gather and study all the data underlying decision-making on farms. Because of the complexity of the work and the scarcity of digital skills inside the company, Monsanto first turned to external sources for key capabilities. It tied up with Amazon Web Services and Google Cloud for the big data and analytics infrastructure, Atomwise for AI technologies, AT&T for collecting large amounts of data, and governments and various experts for cybersecurity support.

Monsanto also built capabilities by working with, and acquiring, startups. Each year, it meets with around 250 startups, does 30 proofs of concept, and absorbs maybe five key technologies. In 2012, for instance, Monsanto purchased Precision Planting, which produces computer hardware and software that enables farmers to increase yields through more precise planting, for \$210 million. The next year, Monsanto made an even larger acquisition, buying San Francisco-based Climate Corp., which provides weather forecasts for farmers based on modeling historic data, for \$930 million.

To successfully tap more external innovation sources, Monsanto changed its innovation architecture. It built a data science center of excellence with a centralized data platform that is API- and

microservices-driven. Monsanto adapted a software platform from Boston-based AI software company Data Robot, which allows agricultural experts to develop AI models without writing any code. Hundreds of models (a third of which are machine-learning-based) run on the platform to develop innovations for the company's supply chain, its commercial processes, and, of course, farmers.

Monsanto's new organizational constructs facilitate closer links with partners and greater absorption of key capabilities. The company delegates key employees to all the innovation projects it conducts with external partners in order to ensure active learning and knowledge transfer. From the get-go, Monsanto also internalized critical capabilities through training. Many employees reskilled by taking Coursera and Data Camp courses. Over the past three years, Monsanto's data science community has grown from fewer than 200 people to more than 500, with many biologists and process chemists turning into data scientists.

Sums up Jim Swanson, Monsanto's CIO: "You have to look at your assets and where you need a partner. ... For us, data and our scientific understanding of the data are tremendous assets. We've realized that internal capabilities are critical to our future, and we're investing in them. We're investing in the foundations of the networks and the modernization of our infrastructure. We've made tough decisions about the talent we need in digital, which is different than four years ago. We declared what was important for our future, and we've invested in the talent, the training, and we've been rigorous on how we measure, monitor, and advance. The more we do that, the more it accelerates our innovation. At the same time, we're also open about getting rid of the 'not invented here' mindset."

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