

# THE MOST INNOVATIVE COMPANIES 2016

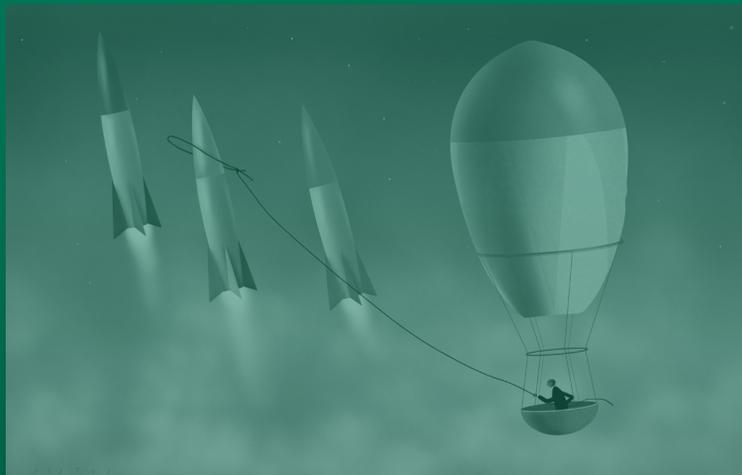
GETTING PAST “NOT INVENTED HERE”



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# THE MOST INNOVATIVE COMPANIES 2016

GETTING PAST “NOT INVENTED HERE”

MICHAEL RINGEL

ANDREW TAYLOR

HADI ZABLIT

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# INNOVATION IN 2016

**E**VEN A QUICK SCAN of our 2016 list of the 50 most innovative companies highlights the impact of the digital revolution. (See Exhibit 1.) Long-standing tech giants hold down the top places once again, new digital disruptors such as Uber and Airbnb have joined the list, and the expanding role of digital innovation is readily apparent in the presence of some traditional manufacturers and process-driven companies, such as General Electric and Daimler. BCG's 11th annual global survey on the state of innovation shows that using technology to secure an innovation advantage is no longer the purview of tech companies.

## The Challenges of External Innovation

The pace of technology-driven change is faster than ever before—we are seeing both more-rapid technology development and the quicker impact of new technologies in virtually all aspects of business (as well as daily life). To keep up, tech natives and nontech companies alike must continually be on the lookout for promising new technologies and then incorporate them into their operations in order to realize the market potential of these innovations. These are two substantial and distinct challenges: finding and developing.

First, consider the challenges in finding new innovations. There are gems and veins of ore

out there, but there is also plenty of fool's gold. Often the most exciting discovery is a diamond in the rough: an unexpected use for a new technology. The ability to prospect and to separate the valuable stone from the quartz is something that most executives responding to our survey believe that their firms could improve.

One solution is to apply data analytics tools that can boost innovation productivity by, for example, identifying trends and possible new directions from disparate external sources. Harnessing data from multiple sources—global patent filings and venture funding databases, for example—has helped scores of companies better understand the range of opportunities open to them and identify possibilities for product and business model innovation and moves into adjacent areas.

## Overcoming Internal Resistance

Bringing the fruits of a new technology to market is its own challenge. Many companies run into internal resistance to innovations that were “not invented here.” Feeling threatened, the organization's organs of innovation seek to kill off external ideas before they can gain any traction.

But there are ways to marry the best of internal and external innovation. Different companies use different approaches. Some make

## EXHIBIT 1 | 2016 Most Innovative Companies

1	Apple	26	Pfizer
2	Google	27	General Motors
3	Tesla Motors	28	JPMorgan Chase
4	Microsoft	29	Johnson & Johnson
5	Amazon	30	AXA
6	Netflix	31	Nike
7	Samsung Group	32	Expedia
8	Toyota	33	Allianz
9	Facebook	34	SpaceX
10	IBM	35	Xiaomi
11	Bayer	36	The Walt Disney Company
12	Southwest Airlines	37	Hilton
13	Hewlett-Packard	38	Renault
14	BMW	39	NTT Docomo
15	General Electric	40	Intel
16	Daimler	41	Marriott International
17	Uber	42	3M
18	Dupont	43	Dell
19	Dow Chemical Company	44	Orange
20	BASF	45	Siemens
21	Airbnb	46	Huawei
22	Under Armour	47	Bristol-Myers Squibb
23	Gilead Sciences	48	Honda
24	Regeneron Pharmaceuticals	49	BT Group
25	Cisco Systems	50	Procter & Gamble

Source: BCG Global Innovation Survey, 2016.

acquisitions—Cisco Systems is a leading example—while others use commercial arrangements such as licensing to gain access to ideas and intellectual property, a practice that is common in health care. Manufacturers, retailers, financial institutions, and others have set up shop in tech centers such as Silicon Valley and Boston with the express goal of tapping into technology-based innovation. In recent years, big companies have sought to emulate startups by pursuing corporate venture capital and sponsoring incubators and accelerators.

These are all viable approaches to overcoming the not-invented-here mindset, but the right method needs to be applied in the right circumstances.

### Putting It All Together: Value Creation Through Innovation

Innovation is ultimately about creating value. Customers flock to novel products and busi-

ness models. Investors bid up new revenue streams. Consider the case of Under Armour, which joined the most innovative companies list in 2016 at number 22. It is the top fashion and luxury company in our 2016 value creators study, with a 42.5% total shareholder return over the five years from 2011 through 2015.<sup>1</sup>

Calling Under Armour an apparel company is somewhat akin to saying that Apple is a hardware company. Just as Apple innovates on the basis of empowering users, Under Armour innovates on the idea of making athletes better. It uses technology in all aspects of its business. This approach has led it from the high-performance fabrics that were the company's genesis to connected fitness devices and wearables and, most recently, to a new venture, Under Armour Connected Fitness. This endeavor, a combination of internal and acquired resources, seeks to transform fitness and performance through an ecosystem of digital devices, tools, and data that help users

plan, monitor, adjust, and enhance their fitness and athletic activities. Under Armour has 175 million users in its fitness community and reports that it is adding 125,000 new users every day.

Under Armour has been agnostic when it comes to the source of its innovations. Its founder and CEO, Kevin Plank, invented a material that would repel perspiration and stay dry during workouts. In 2013, he acquired the company MapMyFitness, which became the foundation of Under Armour Connected Fitness. (He had used MapMyFitness's app when running.) As the company grew, Plank established an innovation lab. He also acquired two companies that brought not only products and technologies but also engineering capabilities and large communities of users, from which Under Armour seeks to learn.

Plank understands that data is at the center of everything he is trying to do: he has focused intently on capturing and employing data both for the users of Under Armour products and for the company's innovation and growth programs. The company has even launched an adjacent business that offers other brands access to its fitness community as a way to increase their visibility and create affinity among consumers concerned about fitness.

Under Armour is a young company that has ridden its innovations to some \$17 billion in market value in less than a decade. As in many firms that are using digital technologies to disrupt their industries, innovation is central to what Under Armour is and what it does. But many bigger, older companies—more than half the top-50 list—have been just as innovative for decades, and some for more than a century.

Take BASF. A regular on our most innovative companies list, the chemical company makes a point of looking for opportunities outside its operations. According to the company's website, a dedicated subsidiary, BASF New Business, "tracks down long-term trends and innovative subjects in industry and society, analyzes their growth potential, and checks whether potential new business areas fit in well with BASF." A global scouting and incubation team identifies new business areas and assesses how BASF's chemical and technology expertise can further their development. The company's External Innovation Verbund facilitates connections with all manner of outside sources of potential innovation.

**D**ESPITE growing into large, multiproduct, multidivision, multinational organizations, companies such as BASF have managed to keep the innovative lifeblood flowing. They have found ways to apply the benefits of the digital and data revolutions to the transformation of their own industries. There are opportunities for plenty of other companies to follow their example and do the same to transform their innovation performance.

NOTE

1. See *Value Creation Through Active Portfolio Management*, the 2016 BCG Value Creators report, October 2016.

# CASTING A WIDE INNOVATION NET

**A** FEW YEARS AGO, BROOKS Automation, a leading supplier of equipment and components to the semiconductor industry, was seeking new revenue streams. Cyclicalities and slowing growth prompted the company to look outside its core business. Conventional analyses, based on such metrics as market size and the ability to command a price premium, could rank the attractiveness of new markets, but they couldn't answer a fundamental question: If competitive advantage is driven by some combination of position and capabilities, in which adjacent markets would Brooks be poised to win?

New techniques could help answer that question. Using advanced analytics to sift through massive amounts of data from multiple sources, the company rapidly homed in on an idea. There was a clear theme in Brooks's most-cited patents: the company had exceptional capabilities for creating and controlling very cold environments under a vacuum—and for handling materials within them. This insight made it much easier to evaluate various adjacent markets. The storage of frozen tissue samples quickly emerged as highly promising. The existing storage solutions for precious and perishable tissue samples were far from sophisticated. Brooks's expertise could make a huge difference. But the life science industry differed markedly from semiconductors. This raised the next question: What was the best way to enter that market?

Brooks sought to speed its entry into the new sector with a series of small acquisitions of life science companies that had complementary expertise, technology, and customer access. This exploratory approach enabled Brooks to expand carefully and learn along the way. The initial results of this strategy have been positive. The new life science business continues to grow and now approaches 20% of the company's revenue. And the many new product and service opportunities in the segment offer significant room for growth.

## Tapping—or Missing—External Sources

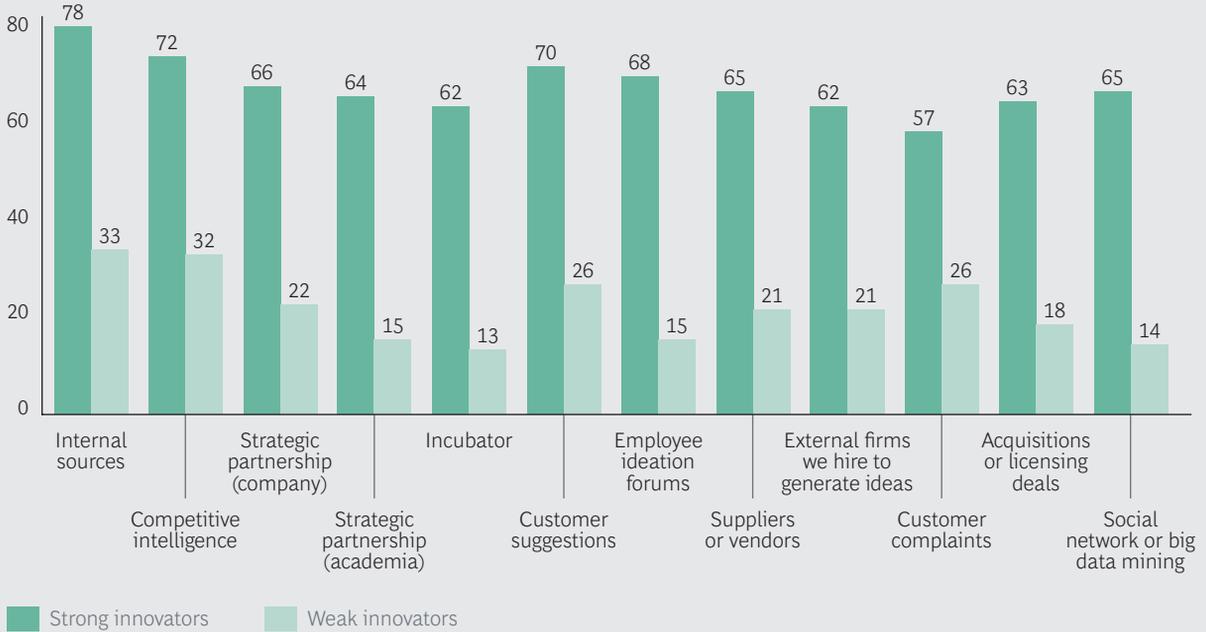
The self-described strong innovators in our study are far more likely than the self-described weak innovators to cast a wide net as they look for potential innovations. (See Exhibit 2.) They are also substantially better at using multiple data sources—not just their own but also external sources such as global patents, scientific literature, semantic networks, and venture funding databases. (See Exhibit 3.) Moreover, strong innovators use external data in multiple phases of the innovation process, from identifying promising new ideas to making investment decisions. (See Exhibit 4.)

The best of the strong innovators are adept at leveraging external innovation for many purposes:

## EXHIBIT 2 | Strong Innovators Cast a Wide Net

HOW OFTEN DO NEW PROJECTS AND IDEAS FOR GROWTH GENERALLY COME FROM EACH OF THE FOLLOWING SOURCES?

% of respondents selecting "Often" and "Very often"



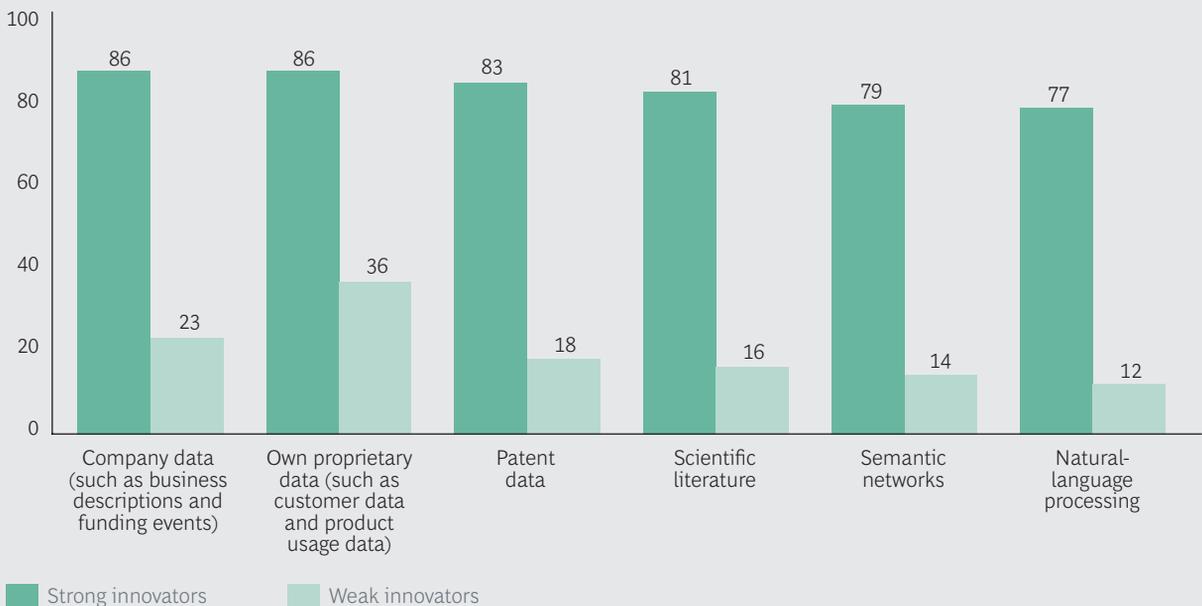
Source: BCG Global Innovation Survey, 2016.

Note: The "Strong innovator" and "Weak innovator" categories are based on survey responses.

## EXHIBIT 3 | Strong Innovators Are Good at Using Multiple Data Sources for Innovation

HOW WOULD YOU RATE YOUR COMPANY'S SKILL AT LEVERAGING EACH OF THE FOLLOWING DATA AND ANALYSIS TYPES AS PART OF YOUR INNOVATION EFFORTS?

% of respondents selecting "Strong" and "Very strong"

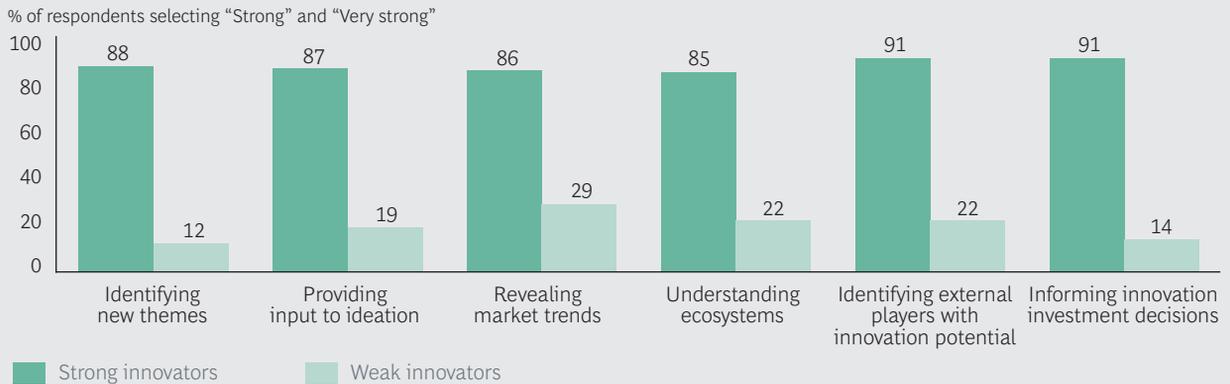


Source: BCG Global Innovation Survey, 2016.

Note: The "Strong innovator" and "Weak innovator" categories are based on survey responses.

## EXHIBIT 4 | Strong Innovators Use External Data Throughout the Innovation Process

HOW WOULD YOU RATE YOUR COMPANY'S SKILL AT LEVERAGING BIG DATA AND ADVANCED ANALYTICS TO HELP WITH EACH OF THE FOLLOWING ASPECTS OF INNOVATION?



Source: BCG Global Innovation Survey, 2016.

Note: The "Strong innovator" and "Weak innovator" categories are based on survey responses.

- Finding the next big thing
- Avoiding disruption by unearthing emerging technologies and innovation trends
- Linking with startups and leading inventors to accelerate innovation
- Building networks of collaborators to stay on top of leading-edge technology
- Assessing the impact of new technologies on the business
- Identifying adjacent growth opportunities
- Attaining a position of technology leadership

As Brooks discovered, a huge amount of data is available to help innovators shape and pursue their innovation strategies. But this in itself causes problems. The first is identifying what data exists and figuring out where to find it. The second, and usually much bigger, challenge is sorting, organizing, and gleaning usable insights from millions of files (or pages) from disparate depositories, databases, websites, and other sources. Plenty of companies mine patent data, for example, to keep track of the IP their competitors are developing. It's a far different order of complexity to pinpoint commonalities and directions when the data comes from multiple sources such as global patent filing trends, venture funding

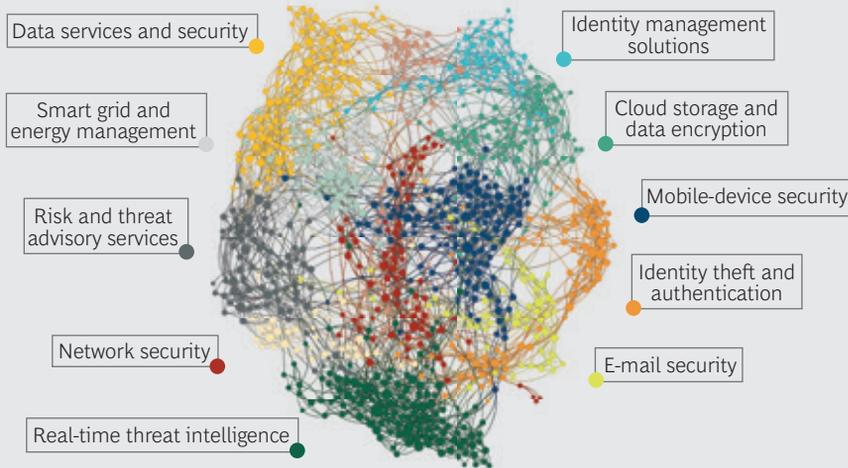
databases, scientific literature, and expert industry opinions.

### Harnessing Innovation Analytics

As the amount of data has burgeoned, so has the sophistication of the tools to analyze and visualize it. BCG's Center for Innovation Analytics uses a suite of tools and approaches to tap into multiple public and proprietary sources in order to help companies answer tough questions about innovation and growth. These can pertain to identifying adjacent opportunities (including novel uses of a company's existing capabilities), finding white-space opportunities, monetizing a company's own intellectual property, identifying and screening acquisition targets and venture partners, and gaining an understanding of new technologies that may represent a competitive threat.

Consider a hypothetical company that has an interest in moving into cybersecurity. It might want to begin by understanding the shape of investment in the sector: the key applications, the underlying technologies, the most important players in technology and funding, and changes in investing trends. This requires a lot of data: from 2011 to 2015, venture firms invested more than \$17 billion in nearly 1,000 cybersecurity-related firms. Exhibit 5 offers an example of how this data might be visualized and analyzed. This semantic analysis (which looks for commonalities—of words and concepts, for example—in unrelated sources of

## EXHIBIT 5 | Visualizing Key Areas for Investment in Cybersecurity



Source: BCG analysis.

unstructured data) reveals ten technology subsectors in cybersecurity, such as identity management and real-time threat intelligence.

This high-level view is just the start; it's also possible for executives to drill down to information on individual companies in order to spot whether and where rivals are making investments, or to identify attractive partnership or acquisition candidates. Companies can combine insights from funding data with patents, social media, scientific publications, and a variety of other sources to make informed strategic decisions.

For companies in industries undergoing technology-driven evolution or disruption, innovation analytics can provide a critical means of staying abreast of changes and determining which new technologies to apply to innovation efforts. A major chemical company has used innovation analytics to better understand opportunities in bio-renewables, for example. And a leading telco used it to inform new-product development by mapping the technology innovation in user interfaces among new entrants, incumbents, other rivals, and academics.

Innovation analytics can be applied in a wide range of circumstances to gain insights that help set direction and strategy. In 2016, leaders from Microsoft, the Washington Roundtable, and the Business Council of British Columbia met to explore the possibility of greater eco-

nommic collaboration between the greater Seattle and Vancouver regions. The project was inspired by the rise of innovation hubs around the world, and business and government leaders in both Seattle and Vancouver saw great promise in building on the region's strong foundation of innovators and innovation assets.

Innovation analytics surfaced some surprising reality checks. Data from LinkedIn, for example, showed low connectivity between individuals in Seattle and Vancouver; talent did not flow freely between the cities. For LinkedIn members in Vancouver, connections to members in Seattle accounted for less than 1% of total connections; for members in Seattle, connections to people in Vancouver accounted for only 0.4% of connections. Data from Thomson Reuters showed that educational institutions in both cities trailed other areas in academic citations. And data from investment databases showed that the availability of local capital was an issue. These and other analytics-driven insights helped shape the challenge facing the two cities and give direction to the efforts to build a more vibrant innovation corridor.

**T**HE most innovative companies are data-driven innovators. By using the right tools, just about any company in any industry can harness data, including from sources that have not been readily accessible in the past, and use the insights that emerge as the basis for novel products and approaches.

# BRINGING OUTSIDE INNOVATION INSIDE

“**N**O MATTER WHO YOU are, most of the smartest people work for someone else,” Sun Microsystems cofounder Bill Joy observed more than a quarter century ago. Since so much of innovation today is rooted in technology, especially digital technology, Joy’s Law presents companies with a double-barreled conundrum. How (and where) do they look for the best ideas, and how (and where) do they turn those ideas into business realities with significant revenue streams? Here we examine the second question, specifically the rise of new models and vehicles for developing external innovation and the need to manage both internal and external sources.

## The External Innovation Imperative

Companies have long incorporated external innovations through a variety of mechanisms, including acquisitions, partnerships, joint ventures, and licensing. But the technical basis of so many innovations today has increased both the need to access new technologies and capabilities from outside the company and the variety of models for doing so, such as corporate venture capital, accelerators and incubators, and innovation labs. And regardless of the source of the innovation, many companies must still overcome the not-invented-here mentality when they attempt to bring a new idea, capability, or model into their organizations.

The self-described strong innovators in our annual innovation survey have long used multiple channels to gain access to new ideas, capabilities, and technologies. The most direct are mergers and acquisitions, and licensing. Cisco Systems (number 25 on our top-50 list), for example, has stayed ahead of the networking technology curve in part by making more than 175 acquisitions since 1993—almost eight a year. Facebook (number 9) paid a total of \$3 billion for Instagram and Oculus VR within a couple of years of its own IPO. General Motors (number 27) has made two major investments in tech startups in 2016. The \$11 billion acquisition of Pharmasset by Gilead Sciences (number 23), the highly innovative pharmaceutical company that we profiled in our 2015 report, was pivotal for the development of Sovaldi and Harvoni, breakthrough treatments for hepatitis C.

Joint ventures, partnerships, and collaborations are another avenue. Several automakers have established partnerships with tech companies to work on autonomous vehicles: Fiat Chrysler with Google, GM with Lyft, and Volvo with Uber are three examples. Collaborations often involve a geographical element, following a variation on Willie Sutton’s explanation of why he robbed banks—companies go where the ideas are. Walmart opened a tech lab in Silicon Valley in 2011; it has since been joined there by multiple major retailers. GE has invested

more than \$1 billion in a software “center of excellence” in San Ramon, California. Most of the top ten pharmaceutical companies have a major research presence in and around Cambridge, Massachusetts, a hub for biomedical innovation.

## The Resurgence of Innovation Models and Mechanisms

In recent years, many companies have rediscovered a broad variety of models for external innovation, taking a page from the success of venture-backed startups that have disrupted multiple industries, including not just technology but also financial services, media and entertainment, travel and tourism, and marketing in general. Corporate venture capital (CVC), accelerators and incubators, and innovation labs are again becoming more common, especially among large companies. BCG’s analysis of 210 top firms—the 30 largest companies in each of seven industries (automotive, chemicals, consumer goods, financial services, media and publishing, tech-

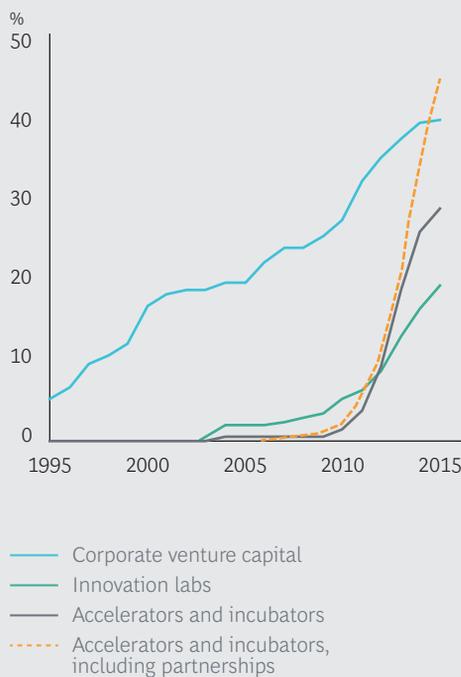
nology, and telecommunications)—found significant increases in the use of all three mechanisms between 2010 and 2015.<sup>1</sup> (See Exhibit 6.) The rapidly increasing pace of change and the proliferation of new technologies are making these new models competitive necessities, not optional activities.

CVC and incubation have come and gone over the years, but past efforts often lacked a strong link to the sponsoring company’s strategy. This wave of alternative innovation vehicles is much more tightly focused on responding to disruptive trends and enabling new business models or extending companies’ current capabilities. The new models are more closely and thoughtfully linked to the sponsoring companies’ corporate and innovation strategies and existing innovation systems.

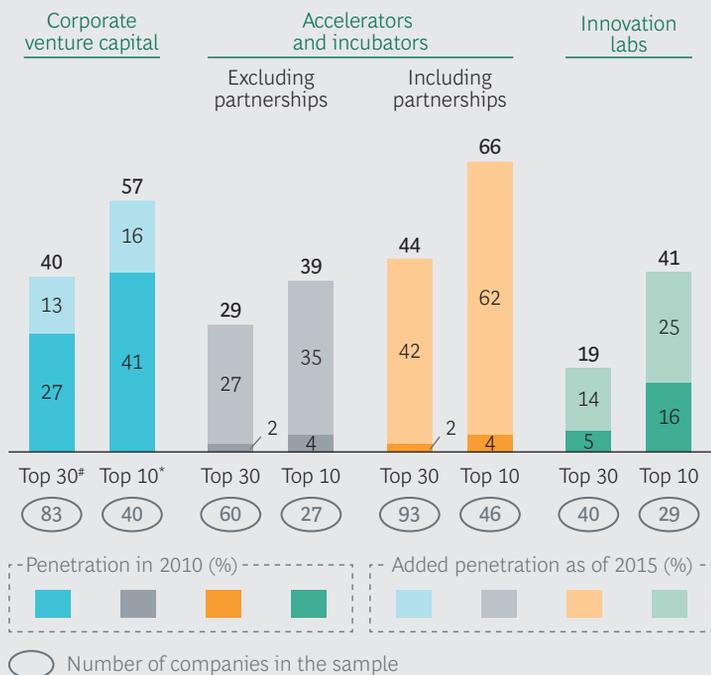
Industry context often determines which approach is best. The speed of innovation, for example, varies from one industry to the next. Where innovation momentum is high

### EXHIBIT 6 | Companies Mainly Use Three Venturing Tools

PENETRATION OF TOOLS AMONG THE TOP 30 COMPANIES IN SEVEN INDUSTRIES (CUMULATIVE)



THE LARGEST COMPANIES LEAD THE WAY



Sources: BCG Corporate Venturing database; BCG analysis.

\*Sample includes the top 30 companies by market capitalization in each of seven industries. The total number of companies was 210.

\*Sample includes the top ten companies by market capitalization in each of seven industries. The total number of companies was 70.

and the need for innovation is great, such as in technology and apparel, companies predominantly use accelerators and incubators. In contrast, where the pace of innovation is somewhat slower, such as in chemicals, companies turn mainly to CVC.

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## Accelerators and incubators typically focus on early stages of the innovation process.

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Each vehicle serves a different function, so companies need to decide which to deploy and their specific role in the innovation development chain. So far, there is no empirical validation that one model is better than another. In an analysis of the impact of six external innovation avenues on R&D productivity in biopharma, for example, we found that all had so far yielded equivalent returns. While the evidence is still emerging on what model is best in a given situation, we can glean some lessons from what companies are currently doing.

**Corporate Venture Capital.** Among the 30 largest companies in BCG's seven sample industries, the use of CVC increased from 27% in 2010 to 40% in 2015. Among the top ten companies in each sector, it has jumped from 41% to 57%. Companies use venture investments to gain minority positions in startups and an early understanding of new markets, trends, and technologies. Some companies pursue CVC primarily for financial gain, but for many, the investments are strategically focused on furthering innovation. Companies pursuing CVC are split between those that control their investments from the center and those that empower business units to direct them.

In the past three years, both strategically and financially oriented CVC units have focused on the software industry, reflecting the increasing value of data as the trends toward digitization and virtualization gather speed, furthering the transformation of hardware to software. The value of CVC investments in software by the top 30 companies now sur-

passes the value of their investments in all other target industries combined.

**Accelerators and Incubators.** The use of accelerators and incubators has increased from 2% to 44% among the 30 largest companies in the seven industries and from 4% to 66% among the ten largest. Successful accelerators and incubators typically do not operate in a vacuum; they form partnerships with venturing operations from other companies or team up with independent accelerators or incubators. The partners often have a common interest in specific fields. Accelerators and incubators are typically focused on early stages of the innovation process.

**Innovation Labs.** The use of innovation labs has increased from 5% to 19% among the top 30 companies and from 16% to 41% among the top ten. Companies tend to employ these labs further along the development chain to accelerate time to market. They are in-house units designed to complement—not supplant—conventional R&D and often interact closely with external entrepreneurs. In effect, such labs try to operate as startups, with all the speed and agility that characterize the breed. The main focus of innovation labs tends to be on advancing products or services that are close or adjacent to the core business.

## How One Company Excels

One of the strongest longtime innovators in any industry is Johnson & Johnson, a regular member of BCG's most innovative companies list and number 29 in 2016. According to Paul Stoffels, the executive vice president and chief scientific officer, there are at least three reasons for J&J's innovation success:

- The company focuses on high-impact medical breakthroughs—"You have to bring the right technologies forward," Stoffels says.
- J&J gives equal weight to internal and external innovations and actively encourages its scientists to connect with the outside world—"You have to realize that you are not the only smart company out there," he notes.

- Management makes sure that innovation programs are strategically aligned with the company’s business objectives.

J&J employs a full range of innovation vehicles, especially early in the development chain. Each vehicle is suited to a particular stage and a specific goal: incubators for young ideas, innovation labs for companies that are looking to mature, and venture capital when the constraints are related to funding. As Stoffels puts it, “You need a system, and you need to make sure that it is strategically aligned with your objectives.”

The company’s JLABS in San Francisco, South San Francisco, San Diego, Houston, Toronto, and Boston provide flexible incubator services for 150 high-potential firms whose work has not yet entered clinical development. J&J screens approximately ten companies for each one that’s accepted. “These companies can count on us for input and support to the extent they want it,” Stoffels says. “But they don’t have to accept anything.”

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## The challenge is to keep the internal organization from killing external innovations.

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J&J’s six innovation labs provide services for companies at a slightly later position: those just entering clinical development. These labs are empowered to make deals that connect these companies directly with J&J’s business units.

The company’s venture capital arm has more than 80 investments in young companies. In Europe, where access to funding is often coupled with the challenge of access to lab space and capabilities, the company combines these services in its JLINX centers.

J&J works hard to ensure that external innovations are seamlessly meshed with internal ones. It rewards internal unit leaders equally whether innovation originates inside or outside. “Everything gets the same credit,” Stoffels notes. Internal research scientists are

evaluated on whether they stay abreast of developments in their fields and help identify the most promising external work being done—in industry, academia, or elsewhere. According to Stoffels, “We expect our people to know well what’s going on and what they need to go after.”

The bottom line is that the company’s internal scientists are still crucial to J&J’s success, despite the company’s external focus. “You can’t have good external results without strong internal scientific capabilities,” Stoffels says.

## The Importance of Incentives and Rewards

J&J’s approach to assigning credit for innovation highlights a big issue for many companies. The challenge is often not just how to source innovations externally but how to keep the internal organization from killing them off. When individuals are measured and rewarded on “their output,” and that output doesn’t include things from the outside, external sourcing becomes more difficult than it should be.

Scientists at one large pharmaceutical company that has such an incentive system recently resisted licensing a new molecule because they had been working along similar lines and saw the molecule, which performed better than the in-house version, as competition. Instead, internal researchers should get credit for successfully developing ideas from the outside. But that’s only the minimum—companies should also think about incentives for the internal organization to be active in scouting new ideas and cultivating new-idea generators.

Resistance to ideas “not invented here” is a cultural problem, and corporate cultures can be difficult to change. There are some things that companies can do quickly, however, to make their organizations more receptive to external innovations.

**Set the right incentives and metrics.** As we’ve noted, companies can do a lot to mitigate internal resistance by putting in place incentives that reward innovations when they take hold, regardless of the original source. They

can also make sure that contributions to the success of innovations, internal and external, are measured and rewarded.

**Send employees out.** Corporate infrastructure that exposes employees to outside influences and ideas through attendance at conferences, membership in professional societies, and similar activities can help break down insularity. Again, employees' involvement in such areas can be measured and rewarded, if not monetarily then through recognition and corporate support.

**Set the tone at the top.** Acknowledgment from the C-suite of successful innovations, particularly external ones, can send a powerful message that the not-invented-here syndrome will not be tolerated and that productivity and success will be recognized no matter where they originate.

**S**UCCESSFUL companies develop innovation models and systems that are suited to their circumstances and that reflect their corporate strategies. The repeated presence of companies such as J&J, General Electric, 3M, and IBM, among others, on our list of the 50 most innovative companies suggests that successful innovators also adapt their models and systems to changing times. As the pace of science and technology advancement increases, the ability to continually adapt models to successfully access and incorporate outside ideas, inventions, and tools will become even more important.

NOTE

1. See *Corporate Venturing Shifts Gears*, BCG Focus, April 2016.

# APPENDIX

BCG's annual ranking of the most innovative companies is based on a survey of senior executives who represent a wide variety of industries in every region worldwide, as well as an analysis of select financial metrics.

Before 2008, these rankings were based on a single criterion—respondents' picks. That year, we expanded the scope and added three financial measures: total shareholder return (TSR) as well as revenue and margin growth. Each measure reflected a three-year period, and TSR reflected stock price appreciation and dividends. Respondents' votes determined 80% of the ranking, TSR accounted for 10%, revenue growth determined 5%, and margin growth accounted for 5%.

In 2015, we revisited our methodology to make the results more robust and reflect the top innovators across all industries. We asked

respondents to rank the most innovative companies both inside and outside their industry. To create a better balance of subjective and objective measures, respondents' votes for companies within their industry accounted for 30% of the ranking, their votes for companies outside their industry accounted for 30%, and—to simplify the financial inputs—three-year TSR accounted for 40%.

In 2016, we assigned startups a three-year TSR for the top-50 analysis to avoid disadvantaging new companies with high valuations that promised strong returns but had not had a public offering. We defined startups as private companies founded after 2001. The TSR we used reflected the average three-year TSR for companies that had a market capitalization of more than \$1 billion, had an initial public offering from 2010 to 2012, and were founded after 2001.

# NOTE TO THE READER

## About the Authors

**Michael Ringel** is a senior partner and managing director in the Boston office of The Boston Consulting Group. **Andrew Taylor** is a senior partner and managing director in the firm's Chicago office. **Hadi Zablit** is a senior partner and managing director in BCG's Paris office.

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## For Further Contact

If you would like to discuss this report, please contact one of the authors.

### Michael Ringel

*Senior Partner and Managing Director*  
BCG Boston  
+1 617 973 1200  
ringel.michael@bcg.com

### Andrew Taylor

*Senior Partner and Managing Director*  
BCG Chicago  
+1 312 993 3300  
taylor.andrew@bcg.com

### Hadi Zablit

*Senior Partner and Managing Director*  
BCG Paris  
+33 1 40 17 10 10  
zablit.hadi@bcg.com

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For information or permission to reprint, please contact BCG at:

E-mail: [bcg-info@bcg.com](mailto:bcg-info@bcg.com)

Fax: +1 617 850 3901, attention BCG/Permissions

Mail: BCG/Permissions

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