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GLOBAL INNOVATION 1000

Proven Paths to Innovation Success

Ten years of research reveal the best R&D strategies for the decade ahead.

BY BARRY JARUZELSKI, VOLKER STAACK,
AND BRAD GOEHLE



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The success of corporate R&D is on every C-suite agenda. Yet wide disparities persist in how well innovation investments actually pay off. As a consequence, R&D is often seen as a black box, where large sums of money go in and innovative products and services only sometimes come out. One of the aims of the Global Innovation 1000 study, our annual analysis of R&D spending, has been to demystify the process—and to find universal principles that can be applied by any company, in any industry.

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This year, the 10th anniversary of the study, we looked back at a decade's worth of research on R&D spending patterns and surveys of innovation executives, plus anecdotal insights about how companies have been improving their innovation performance. We also surveyed more than 500 innovation leaders in companies large and small, across every major region and industry sector, to ask what they have learned in the last 10 years about why some investments work and others do not. We found that it's really not that mysterious: Over the years, we've identified the core strategies that can improve a company's return on its R&D investment, and we've witnessed some consensus around the key success factors that drive results. For example, one of the main messages we heard is that innovation leaders feel they have made real progress in better leveraging their R&D investments, particularly by more tightly aligning their innovation and business strategies, and by gaining better insights into customers' stated and unstated needs. And in fact, 44 percent of our 2014 survey respondents say that their companies are better innovators today than they were a decade ago, while another 32 percent say they are much better. Only 6 percent say they are doing worse.

For our 2014 study, we also looked ahead to the next decade, asking our survey respondents how they expect their innovation practices to evolve. We found tremendous opportunities for improvement: Only 27 percent feel they have mastered the elements they will need for innovation success over the next 10 years. Gaining that expertise will be important as companies' innovation goals change in the future. Many of our respondents said their companies plan to shift their R&D spending mix over the next decade—from incremental

innovation to new and breakthrough innovation, and from product R&D to service R&D.

Our study also provides some insight into trends in R&D spending during the last decade. The rate of growth in innovation expenditures for the Global Innovation 1000 slowed sharply in 2014, to just 1.4 percent—the slowest rate of growth in the past 10 years for the 1,000 global companies that spent the most on R&D. (R&D spending declined only once during this time period: in 2010, in the wake of the financial crisis and recession, and then only modestly.)

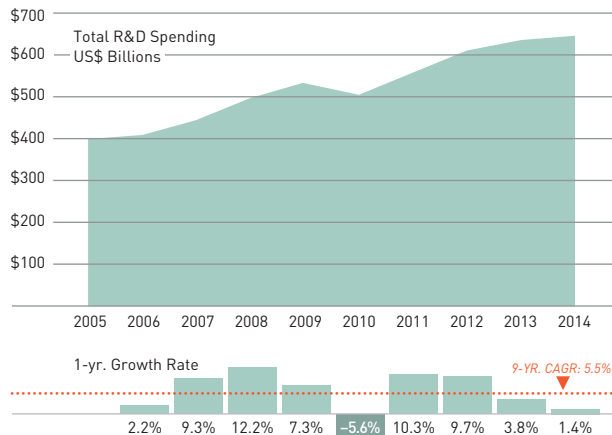
The last two years of decelerating growth—3.8 percent growth in 2013 and 1.4 percent in 2014—could be attributed to the general mood of uncertainty overhanging today's global economy or the unusual amount of geopolitical turmoil in the world. Looking at 10 years of data, however, suggests another, simpler explanation: reversion to the mean. The slowdown followed two years of above-average growth in 2011 (10.3 percent) and 2012 (9.7 percent), and R&D spending growth will likely move closer over time to the average 5.5 percent compound annual growth rate from 2005 to 2014. It also may be that innovation spending slows about five years after a market disruption. After all, the next-lowest year of R&D spending growth was in 2006, five years after the 2001 dot-com bubble burst (*see Exhibit 1*).

Another possible explanation for the slowdown in R&D spending growth is that companies, over time, have been learning to do more with less. The long-term rate of R&D intensity (innovation spending as a percentage of revenues), for example, has declined over the last decade at a compound average rate of 2 percent per year. This also reflects one of the major findings of

Only 27 percent of respondents feel they have mastered the elements they will need for innovation success over the next 10 years.

Exhibit 1: R&D Spending Growth, 2005–14

With one exception, each year of the Global Innovation 1000 study has witnessed an increase in R&D investment.



Source: Bloomberg data, Capital IQ data, Strategy& analysis

our Global Innovation 1000 research, which has been reaffirmed in each of the last 10 years: There is no statistically significant relationship between sustained financial performance and R&D spending, in terms of either total R&D dollars or R&D as a percentage of revenues. Our inaugural study, in 2005, “Money Isn’t Everything,” found that R&D spending levels have no apparent impact on sales growth, gross profit, enterprise profit, market capitalization, or shareholder return. Since then, we have conducted more than 10,000 statistical analyses of the relationship of research and development spending to corporate success, which have all led to the same conclusion. The only exception is when companies’ R&D spending falls into the bottom decile compared with their peers’ spending, which does compromise performance.

Mr. Innovation himself, the late Steve Jobs, put it more pointedly in *Fortune* magazine in 1998: “Innovation has nothing to do with how many R&D dollars you have. When Apple came up with the Mac, IBM was spending at least 100 times more on R&D. It’s not about money. It’s about the people you have, how you’re led, and how much you get it.”

Software—and China—Rising

The industry shares of total R&D spending among the Global Innovation 1000 during the previous 10 years have been consistent: The computing and electronics, healthcare, and auto sectors have together accounted for two-thirds of total spending. The largest percentage increase in R&D spending, however, has been in the software and Internet category, which over the last three years accelerated from single-digit to double-digit growth. Growth in the computing and electronics and healthcare sectors decelerated over the last two years, while spending in the auto and industrials sectors continued to rise steadily (see “Profiling the Global Innovation 1000,” next page). Interestingly, growth in R&D spending in the latter two sectors, along with aerospace and defense, may primarily reflect new outlays on software within those companies, resulting from the increasing prevalence of software and computer-controlled systems in both the products they make and the factory automation they deploy.

“Ten years ago, a car radio was a radio with a two-line display and a bunch of buttons,” says Tim Yerdon, vice president of design, marketing, and connected services at Visteon, which supplies cockpit electronics and heating and cooling thermal management systems to automakers. “Today, the radio is basically a computer

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Profiling the Global Innovation 1000

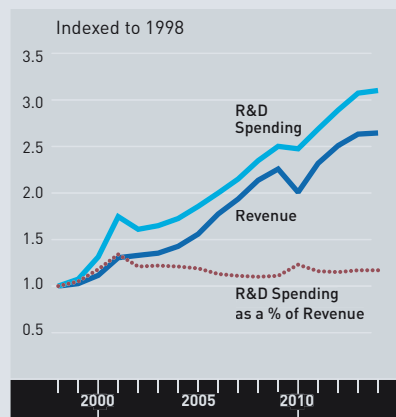
Amid an unsettled world outlook, R&D spending among the Global Innovation 1000 totaled US\$647 billion in 2014, just 1.4 percent more than in the previous year. This is the second year in a row of below-average growth, following unusually strong (about 10 percent)

gains in 2011 and 2012 as innovation spending bounced back after the financial crisis. Revenues for the Global Innovation 1000, meanwhile, increased by a solid 3.7 percent (to \$18.4 trillion) in 2014. As a result, R&D intensity—innovation spending as a percentage of revenue—fell slightly to 3.5 percent, close to its long-term average (see Exhibit A).

The slow growth in total innovation spending for 2014 is a big-company phenomenon: The top 100 innovation spenders accounted for

Exhibit A: R&D and Revenue

R&D spending totaled US\$647 billion in 2014, an increase of just 1.4 percent over 2013.



Source: Bloomberg data, Capital IQ data, Strategy& analysis

Exhibit B: The Top 20 R&D Spenders

The two biggest spenders from 2013, Volkswagen and Samsung, held their positions. Although their industries, along with healthcare, continue to dominate this list, the software and Internet sector increased its presence in the top 20 this year, with Amazon making its first appearance.

Companies that have been among the Top 20 R&D Spenders every year since 2005

Rank		Company	R&D Spending			Headquarters Location	Industry
			2014 US\$ Billions	Change from 2013	As a % of Sales		
1	1	Volkswagen	\$13.5	18.9%	5.2%	Europe	Auto
2	2	Samsung	\$13.4	28.0%	6.4%	South Korea	Computing and Electronics
3	4	Intel	\$10.6	4.6%	20.1%	North America	Computing and Electronics
4	5	Microsoft	\$10.4	6.1%	13.4%	North America	Software and Internet
5	3	Roche	\$10.0	-1.8%	19.8%	Europe	Healthcare
6	7	Novartis	\$9.9	5.6%	17.0%	Europe	Healthcare
7	6	Toyota	\$9.1	-7.0%	3.5%	Japan	Auto
8	10	Johnson & Johnson	\$8.2	6.8%	11.5%	North America	Healthcare
9	12	Google	\$8.0	17.1%	13.3%	North America	Software and Internet
10	8	Merck & Co.	\$7.5	-8.1%	17.0%	North America	Healthcare
11	11	General Motors	\$7.2	-2.3%	4.6%	North America	Auto
12	14	Daimler	\$7.0	4.8%	4.4%	Europe	Auto
13	9	Pfizer	\$6.7	-15.1%	12.9%	North America	Healthcare
14	30	Amazon	\$6.6	43.8%	8.8%	North America	Software and Internet
15	23	Ford	\$6.4	16.4%	4.4%	North America	Auto
16	15	Sanofi	\$6.3	0.1%	14.5%	Europe	Healthcare
17	13	Honda	\$6.3	-6.6%	5.4%	Japan	Auto
18	16	IBM	\$6.2	-1.2%	6.2%	North America	Computing and Electronics
19	17	GlaxoSmithKline	\$6.1	-2.4%	14.8%	Europe	Healthcare
20	24	Cisco Systems	\$5.9	8.3%	12.2%	North America	Computing and Electronics
TOP 20 TOTAL			\$165.3	5.4%	8.0%		

Source: Bloomberg data, Capital IQ data, Strategy& analysis

less than 1 percent of the 2014 increase in R&D spending, compared with 45

percent the previous year. Yet despite the slowdown among the 100 largest, overall, nearly 60 percent of the companies that were also on the list in 2013 increased their R&D spending. (Calculations are based on companies' reported R&D spending in the last fiscal year, as of June 30, 2014. For more details, see "Methodology," page 15.)

Although big companies scaled back their rate of R&D spending growth, they still accounted for the lion's share of total R&D spending. The top 20 companies, in fact, accounted for more than 25 percent of the total in 2014. Several newcomers joined the ranks of the top 20, including Amazon (at number 14), Ford (number 15), and Cisco (number 20) (see *Exhibit B*). Overall, however, the top 20 list has remained fairly consistent over the 10 years that we've analyzed the Global Innovation 1000. Thirteen companies have been listed every year: GlaxoSmith-Kline, Honda, IBM, Intel, Johnson & Johnson, Microsoft, Novartis, Pfizer, Roche, Samsung, Sanofi, Toyota, and Volkswagen.

The slowdown in total innovation spending growth for 2014 reflects declines in five of the nine industries we track. Although R&D spending fell less than 2 percent in the aerospace and defense, healthcare, computing and electronics, and consumer sectors, these cutbacks are particularly notable because the four sectors' spending represents 53 percent of total Global Innovation 1000 R&D spending. The telecom sector posted the steepest decline, dropping 7.5

percent. This was a continuation from 2013, when telecom R&D spending was down 2.2 percent. Pricing pressures, combined with the need for increased capital expenditures to update networks to the latest technologies, likely led telecom companies to shift investment away from R&D. Innovation spending was up modestly in the chemicals and energy, industrials, and auto sectors, with the biggest increase—a solid 16.5 percent gain—in the software and Internet sector (see *Exhibit C*).

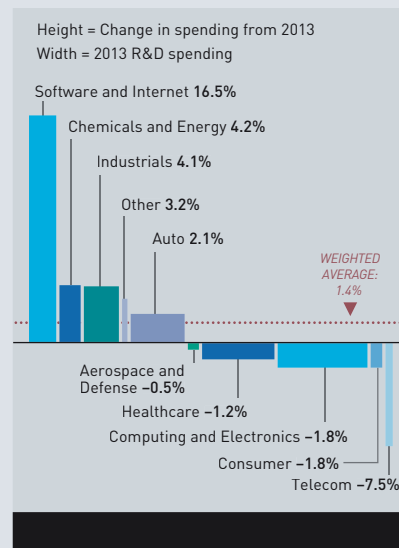
At nearly 12 percent, that sector has had the highest compound average growth in R&D spending over the 10-year history of the Global Innovation 1000 study—boosted significantly by double-digit increases in each of the last three years. This is not surprising, given the dynamism of the industry. What may be surprising, however, is that the chemicals and energy sector and the industrials sector had the second- and third-highest rates of growth, respectively, both in 2014 and over the last 10 years.

Despite the impressive growth of innovation spending in the software and Internet category, four other industries spent more absolute dollars on R&D in 2014: computing and electronics, healthcare, auto, and industrials (see *Exhibit D*). In fact, three of them—computing and electronics, healthcare, and auto—have spent more on R&D than the software and Internet industry in each of the last 10 years. This shows that there has been and continues to be a huge amount of innovation spending going on outside Silicon Valley and other tech clusters.

Looking at the regional data, R&D spending growth in 2014 has slowed in both North America (a 3.4 percent increase) and Europe (2.5 percent)

Exhibit C: Change in R&D Spending by Industry, 2013–14

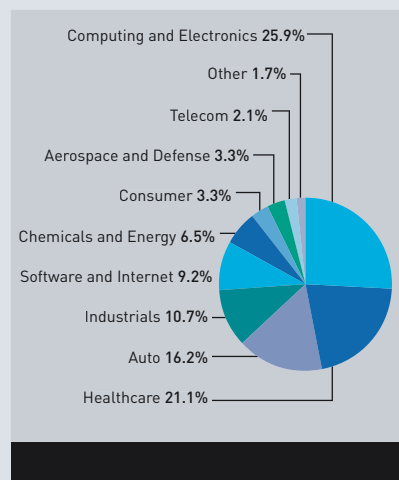
Five industries decreased their R&D spending this year, but the software and Internet sector forged ahead—increasing spending by 16.5 percent.



Source: Bloomberg data, Capital IQ data, Strategy& analysis

Exhibit D: Spending by Industry, 2014

The computing and electronics segment remains the top R&D spender, with healthcare close behind.



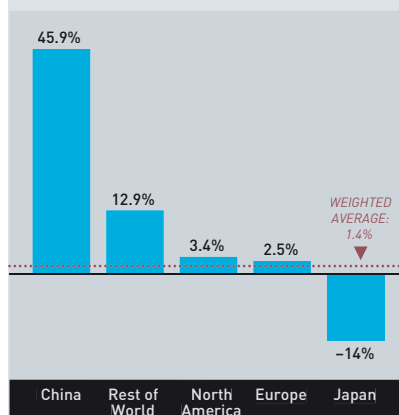
Source: Bloomberg data, Capital IQ data, Strategy& analysis

(see *Exhibit E*, page 7). Japan, meanwhile, continues to retrench. R&D spending was down 14 percent for Japanese companies in 2014,

(continued on page 7)

Exhibit E: Change in R&D Spending by Region, 2013–14

Companies headquartered in China continued to invest heavily in R&D, even as growth in other regions slowed or decreased.



Source: Bloomberg data, Capital IQ data, Strategy& analysis

(continued from page 6)

following a 3.4 percent decline in 2013. Innovation spending in the rest of the world, a category that includes Brazil and India, rose by a solid 12.9 percent, but that also represents a slowdown from the 13.7 percent increase in 2013. The clear exception to 2014's generally downbeat trend was China, where R&D spending was up an impressive 45.9 percent—a further acceleration from the 34.4 percent rate of increase in 2013. (For a closer look at China's continuing rise as an innovation power, see "China's Innovation Engine," by John Jullens and Steven Veldhoen, page 9.)

The story in 2014 may be one of slower growth, despite a few standouts, but the story of the last 10 years is one of sustained investment. Even at the depth of the Great Recession, spending contracted only modestly, far less than the decreases in capital expenditures or revenues. In fact, the level of spending needed for a company to be included in the Global Innovation 1000 has more than doubled, from \$37 million in 2005 to \$83 million in 2014. And the amount of spending needed to break into the top 20 list has grown by 46 percent—from \$4.1 billion in 2005 to \$5.9 billion in 2014.

(continued from page 4)

that's attached to the car and comes with a large display, anywhere from six inches to as much as 17 inches in a Tesla, for example. The software enables a reduction in the complexity of the hardware because as you add software for that display, it can be applied across different vehicle lines."

The pervasiveness of software, Yerdon continues, means that auto suppliers are innovating more—and more quickly—than ever before. "If you think of the auto sector as three spinning gears, automotive is a fairly large gear and spins on a four-year cycle, because that's how long it generally takes to develop a vehicle. The consumer electronics wheel is spinning six to eight times faster, because every six months there's a new phone or other device or app. As a global supplier, we're the meshing gear between the two."

Across regions, we have seen both incremental and radical change in R&D spending patterns over the last 10 years. On the one hand, companies headquartered in North America, Europe, and Japan continue to dominate the total amount of global R&D spending. Yet despite their dominance, Europe's share has been flat over the last decade at around 30 percent, North America's share has declined from 42 percent to 40 percent, and Japan's share has fallen from 24 percent to 18 percent. The rise of China as an innovation powerhouse, on the other hand, has been startling. China's R&D spending is rock-

eting upward at sustained double-digit rates, and recent studies suggest that more innovation and fiercer technological competition with established Western players are on the way from Chinese firms (see "China's Innovation Engine," by John Jullens and Steven Veldhoen, page 9).

Alignment and Insight

Our 10-year analysis shows that companies have been raising their innovation game by focusing on two areas: business capabilities, and organization and processes. The five specific capabilities and processes that respondents most often report having improved over the last decade were, in order of selection frequency: (1) aligning the innovation portfolio with customer needs and wants, (2) developing and retaining people with the right technical knowledge, (3) ensuring that innovation leaders and business leaders are aligned, (4) understanding new product- and service-related technologies and trends, and (5) pursuing lean product development. Our analyses have also shown that such focus pays off: The top 25 percent of companies measured by sustained financial performance concentrate on a shorter, more coherent list of innovation capabilities rather than trying to be good at everything.

These observations correspond to key findings from our earlier studies. For example, almost two-thirds of our respondents report that their company's innova-

“There has been a strong push over the last 10 years to align what you do in R&D with what you do in the business,” says Nestlé’s Oliver Nussli.

tion strategy has become better aligned with its business strategy. This has been a theme throughout our Global Innovation 1000 work, developed most fully in our 2011 study, “Why Culture Is Key.” We have found that companies with more tightly aligned business and innovation strategies had 40 percent higher operating income growth over a three-year period, and 100 percent higher total shareholder returns, than industry peers with lower strategy alignment.

“There has been a strong push over the last 10 years to align what you do in R&D with what you do in the business, and it has gotten better,” says Oliver Nussli, head of project and portfolio management at food and beverage manufacturer Nestlé. “Many companies have streamlined their R&D portfolios because there were too many things going on that were leading nowhere or had little chance of success.” Recently, Nussli says, Nestlé completed a study to design foods that would better meet the needs of elderly people (whose nutritional requirements differ from those of younger people because of bone, joint, and muscle conditions). Both the business and the R&D organizations were intensely involved, and as a result, he says, “the business side knows what it’s going to get, and the R&D side knows what it has to work on.”

Nestlé’s recent study also ties into another key finding from previous years: the importance of gaining deeper insights into customers’ wants and needs. This year, more than three-quarters of the participants said their understanding of customers had become notably more detailed over the last decade. “One of the big changes is the way companies bring in consumer insights,” says Frank Dethier, innovation manager at chemical manufacturer Huntsman Corporation. “Ten years ago, com-

panies or industries defined what the markets needed. Nowadays, consumers are not just asked for their advice and input—they are defining what the products and services should look like, and can even drive and create products themselves on [crowdfunding] platforms like Kickstarter.”

As we noted in our 2007 study, “The Customer Connection,” companies can spend more money, hire the best engineers, develop the best technology, and conduct the best business market research, but unless their R&D efforts are driven by a thorough understanding of what their customers need and want, their performance may fall short. We tested this hypothesis and found that over a three-year period, companies that directly captured customer insights had three times the growth in operating income and twice the return on assets of industry peers that captured customer insights indirectly, as well as 65 percent higher total shareholder returns.

The Need Seeker Advantage

Ten years’ worth of research and insights also illuminate the strengths and challenges of the three different ways that companies approach innovation. In 2007, the Global Innovation 1000 study identified three fundamental kinds of companies, each with its own distinct way of managing the R&D process and its relationship to customers and markets. Every company tends to follow one of these three innovation models; we thus categorize companies as being Need Seekers, Market Readers, or Technology Drivers.

Of course, all three models share the same broad innovation goals. Every company wants to have superior product performance and quality, to make a strong connection with customers, and to feel passion and pride

China's Innovation Engine

by John Jullens and Steven Veldhoen

In 2005, only eight China-based companies ranked among the Global Innovation 1000. By 2014, the number had risen to 114—a 1,325 percent increase. Chinese companies are also increasing their R&D spending much faster than companies in other regions: The rate of increase in 2014 was 46 percent, compared with rates in the low single digits in Europe and North America. Moreover, these numbers understate the full extent of

innovation activity in China, because they don't reflect the significant R&D spending in the country by multinationals headquartered in other regions. For example, in 2008, when the Global Innovation 1000 study factored in the R&D activities of multinationals in China, the country was already the fourth-largest for corporate innovation spending—and undoubtedly would be ranked even higher today.

China's emergence as an engine of innovation has been driven by a characteristically Chinese approach—one that is top-down, fast, and decisive. In the country's dynamic market, fierce rivalries have developed between domestic and multinational firms, as they compete to fulfill the needs and wants of China's

tens of millions of midmarket consumers. Innovation is often a C-suite responsibility, in Chinese companies, which are trying to catch up with more experienced competitors from developed countries. And because Chinese companies must migrate into higher-value-added activities quickly if China is to move beyond the so-called middle-income trap, innovation is also a top priority of the central government.

Our studies have found that contrary to common perceptions outside the country that associate Chinese companies with rigidity and a copycat mind-set, these companies embrace a combination of openness to outside ideas, a pragmatic approach to experimentation, and ruth-

regarding its portfolio. And all three models pursue capabilities for understanding emerging technologies, engagement with customers, and product platform management. Each model, however, also has distinct characteristics and priority capabilities that influence how the company develops and launches new products and services.

Need Seekers, such as Apple, Procter & Gamble, and Tesla, make a point of using superior insights about customers to generate new ideas. They gain this insight through direct engagement with customers (for instance, Apple routinely learns from interactions at its retail stores) and through other means, including analysis of big data. Most important, they develop new products and services based on this superior end-user understanding. Their goal: to find the unstated customer needs of the future, and to be the first to address them. Their cultures encourage openness to new ideas from customers, suppliers, competitors, and other industries, and they prioritize directly generated consumer/customer insights and enterprise-wide launch capabilities. We estimate that 25 percent of the Global Innovation 1000 companies are Need Seekers.

Market Readers, such as Samsung, Caterpillar, and Visteon, make up some 40 percent of the Global Inno-

vation 1000 companies. They focus largely on creating value through incremental innovations to products already proven in the market. They use a variety of means to generate ideas; most involve closely monitoring their markets, customers, and competitors. This implies a more cautious approach, one that depends on being a second mover or “fast follower” in the marketplace. One of their specific innovation goals is customizing products and services for local markets, and they seek a culture of collaboration across functions and geographies. They prioritize capabilities for managing resource requirements and engaging suppliers and partners.

Technology Drivers, such as Google, Bosch, and Siemens, depend heavily on their internal technological capabilities to develop new products and services. They leverage their R&D investments to drive both breakthrough innovation and incremental change. They hope and expect that by following the imperatives implied by their discoveries, they will naturally meet the known and unknown needs of their customers. Their distinct innovation goal is to develop products of superior technological value, and their cultures reflect reverence and respect for technical knowledge and talent. Approximately 35 percent of the Global Innovation 1000 companies are Technology Drivers.

less abandonment of failing projects. They are willing and able to rapidly adapt

their business models and pursue strategic acquisitions of developed-market firms to gain the technology they need, as Lenovo has done. It's perhaps not surprising, then, that over the last three years, our China Innovation Survey results have indicated that the advantaged Need Seeker strategy is more prevalent among Chinese companies (37 percent of companies in the 2014 study) than in the Global Innovation 1000 (25 percent of companies in the 2014 study) (see Steven Veldhoen et al., "2014 China Innovation Survey: China's Innovation Is Going Global,"

Strategy& white paper, Sept. 2014).

These efforts are paying off: Two-thirds of the multinational executives in China who responded to our 2014 survey said some of their Chinese competitors are as good as or better than their own company at innovation. In fact, leading Chinese companies such as Haier and Xiaomi are already developing advanced innovation capabilities, enabling them to compete for share in global markets with in-demand, high-tech products (see "The Thought Leader Interview: Zhang Ruimin," by Art Kleiner, *s+b*, Winter 2014).

As China's companies globalize, they will begin to push the innovation bar higher. Eighty-seven percent of Chinese "globalizers" named innova-

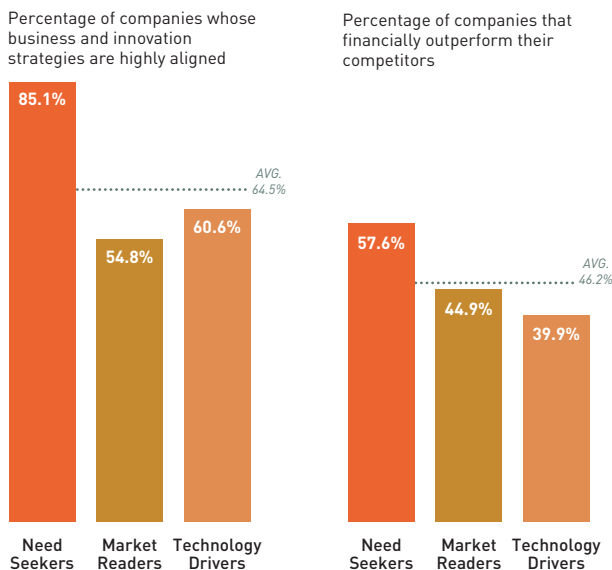
tion as one of their top three strategic priorities (31 percent reported that it is their number-one priority). They are ready to move out of China and up the value chain, especially in B2B sectors where professional buyers tend to be less brand sensitive. And again, they will do it in a way that is both characteristically Chinese and increasingly common among global companies everywhere—by acquiring and integrating capabilities in the locales to which they are expanding, rather than bringing this knowledge back home to their headquarters.

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Based on our long-term view of these strategies, we have determined that each can be successful and can enable companies to outperform their competitors

Exhibit 2: The Success of Need Seekers

More often than Market Readers and Technology Drivers, Need Seekers say their business and innovation strategies are highly aligned, and that they financially outperform their peers.



Source: Strategy& 2014 Global Innovation 1000 survey data and analysis

if executed well: Apple, Samsung, and Google are all highly innovative, and are recognized as such by the innovation leaders who vote on our study's top 10 list (see "The 10 Most Innovative Companies," next page). In general, the most important success factor is how well companies execute on their chosen strategy—whether they align their innovation strategy with their business strategy, whether they have prioritized the right capabilities, whether they have the right culture to enable their strategy, and whether they are using the tools that will help them develop new ideas and processes that are consistent with their innovation model. The quality of the alignment of all these elements is the key, and it trumps the amount of R&D spending.

Increasingly, we have come to believe that the Need Seeker strategy is inherently advantaged. This is not the only successful model, but it is the most consistently successful. Our 10-year analysis supports this conclusion. Need Seekers, for example, report being better at innovation today than they were 10 years ago at a significantly higher rate than companies following the other two strategies, and they also more often indicate that they are financially outperforming their competitors—a claim supported by our analysis (see *Exhibit 2*).

Our analysis of Need Seekers in the past has sug-
(continued on page 12)

The 10 Most Innovative Companies

Which companies do innovation executives around the globe consider to be the very best at discovering and developing new products and services, and bringing them to market? We have posed this question in the Global Innovation 1000 survey in each of the past five years, and the majority of participants have consistently placed Apple and Google at the top of the list. This year, Amazon continued its rise up the rankings. It first appeared on this list at number 10 in 2012, jumped to the fourth position in 2013, and then rose to number three in 2014, moving Samsung down a spot. Tesla, which first appeared in 2013 in ninth position, rose to number five in 2014—likely reflecting not only its highly rated cars, but also its move to unilaterally make its patents freely available to competitors. Procter & Gamble rejoined the list in 10th place after dropping off last year, while Facebook—number 10 last year—fell from the list (see Exhibit F).

Consistent with one of the core insights of the Global Innovation 1000 studies over the past decade—that spending more on R&D does not drive more innovation (or better financial performance)—the top 10 innovators

once again outperformed the top 10 R&D spenders in market capitalization growth, revenue growth, and EBITDA as a percentage of revenues (see Exhibit G).

Several of the industries represented by the 10 most innovative companies are also featured on the top 10 spenders list: software and Internet, computing and electronics, and auto. But interestingly, no healthcare companies have been selected by the R&D executives we've surveyed over the last five years as among the 10 most innovative, despite the fact that at least four of the top 10 R&D spenders each year have been healthcare companies. One possible explanation is that healthcare companies' innovations tend not to be so closely identified with their brands, except, perhaps, by healthcare professionals.

In contrast, the four most innovative companies—Apple, Google, Amazon, and Samsung—all deliver branded products and services that are a part of most people's daily lives, and they make new product announcements often. But making a media splash is by no means requisite to a company's selection: Slow and steady can also win. For example, 3M keeps a comparatively low media profile but has products in wide use, and has been voted among the 10 most innovative firms in each of the five years we've asked the question.

Exhibit F: The 10 Most Innovative Companies

Amazon and Tesla continued to move up, both placing in the top five. P&G returned to the list, replacing Facebook in the 10th position.

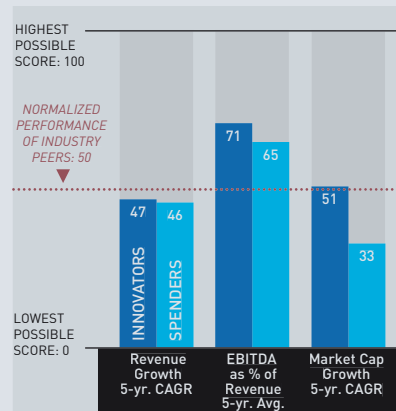
Companies that have been among the 10 most innovative every year since 2010

RANK	2014	2013	Company	R&D Spending	
				2014 US\$ bil.	Rank as % of sales (intensity)
1	1	1	Apple	\$4.5	32 2.6%
2	2	2	Google	\$8.0	9 13.3%
3	4	3	Amazon	\$6.6	14 8.8%
4	3	4	Samsung	\$13.4	2 6.4%
5	9	5	Tesla Motors	\$0.2	440 11.5%
6	5	6	3M	\$1.7	79 5.6%
7	6	7	GE	\$4.8	30 3.3%
8	7	8	Microsoft	\$10.4	4 13.4%
9	8	9	IBM	\$6.2	18 6.2%
10	-	10	P&G	\$2.0	70 2.4%

Source: Bloomberg data, Capital IQ data, Strategy& 2014 Global Innovation 1000 survey data and analysis

Exhibit G: The Top 10 Innovators vs. Top 10 R&D Spenders

On an indexed basis, the top innovators led on all three financial metrics for the fifth straight year.



Source: Bloomberg data, Capital IQ data, Strategy& 2014 Global Innovation 1000 survey data and analysis

(continued from page 10)

gested that they tend to focus on more tightly aligning their innovation and business models. In our 2011 study, we found that what sets Need Seekers apart is their ability to execute on their strategy—to combine all the elements of innovation into a coherent whole, with a culture that supports innovation. In a study we conducted in 2012 in conjunction with the Bay Area Council Economic Institute, we found that significantly more of the technical leads at companies classified as Need Seekers report directly to the CEO, and that their innovation agendas are much more likely to be developed and clearly communicated from the top down to the rank and file of the organization. They were also much more likely to point to product development as the function with the most influence on their company's power structure. (That same study also revealed that Silicon Valley firms are almost twice as likely to follow a Need Seekers model than the general population of companies—46 percent versus 28 percent, a consequence of the startup/venture capital mind-set of tightly aligned business and technology strategies.)

Our 2014 survey produced similar findings: A much higher percentage of Need Seekers reported that their innovation strategy was highly aligned with their business strategy, compared with either Market Readers or Technology Drivers (*see Exhibit 2, page 10*). Such alignment comes naturally for Need Seekers, because their whole ethos is rooted in understanding and being close to the customer through direct exposure to the end-user, rather than relying on market analysis or the views of intermediaries. Interestingly, recent research has found that the Need Seeker strategy is more prevalent among Chinese companies than among the Global Innovation 1000.

The Next 10 Years

As part of our 2014 study, we asked participants to look to the future—to tell us about their expectations for their innovation agendas for the next 10 years. We found that the Global Innovation 1000 companies have some common expectations and goals, and that there is some convergence around areas where they hope to improve their innovation performance. They believe that aligning business and innovation strategies will be the most important driver for innovation success. Interestingly, this and other key areas are the same ones that Need Seekers are already focused on today (*see Exhibit 3, next page*).

All respondents report that they plan to shift their current R&D spending mix from incremental innovations to more new and breakthrough innovations. Today, 58 percent of R&D spending is directed at incremental or renewal innovations, just 28 percent at new or substantial innovations, and only 14 percent at breakthrough or radical innovations. In 10 years, respondents expect the picture will look quite different (*see Exhibit 4, next page*).

At Reliance Industries, the energy and chemicals group that is India's largest private-sector company, Ajit Sapre, group president of research and technology, anticipates that R&D spending on new, substantial, or breakthrough innovations will rise. Reliance is focusing on potential breakthroughs in energy and materials that could help India meet its growing demand for energy and infrastructure—particularly by leapfrogging existing technologies used in developed markets. “The outcomes are fuzzier, and they are much more risky,” says Sapre, “but if we are successful, they could lead to paradigm shifts. If you focus too much on near-term goals, you can miss the long-term opportunities.” The aspira-

Exhibit 3: The Key Areas of Innovation Focus

Survey respondents across all three innovation models report similar areas of focus for their R&D programs over the next 10 years—and most are areas on which Need Seekers have already been focused.

■ Past 10 years □ Next 10 years



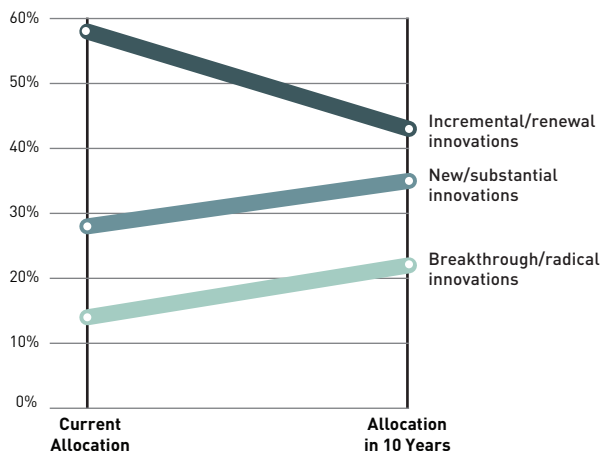
Source: Strategy& 2014 Global Innovation 1000 survey data and analysis

tion to seek out new and substantial innovations is understandable, and will certainly pay off for some innovators. To capitalize on such a significant reallocation of spending, however, many companies will need to make major changes in their approaches to innovation and in

Exhibit 4: Future R&D Investment

Survey respondents expect to shift their R&D investment mix from incremental to new and breakthrough innovations.

Average allocation of R&D spending on types of innovation



Source: Strategy& 2014 Global Innovation 1000 survey data and analysis

their capabilities. Breakthroughs, for example, involve higher risk than incremental innovations, so it is important to make sure both that these innovation goals make sense given the company's market position and strategy, and that the right risk management capabilities are established to handle a higher-beta portfolio. As Fassi Kafyeke, director of advanced design and strategic technology at Canadian plane and train manufacturer Bombardier, told us, "New research projects will continue to involve more collaborators, including universities, suppliers, and other industrial partners. Ultimately, this will make product development more robust and enable greater technology leaps, while reducing risks and cost."

Companies also expect to allocate more R&D spending to enabling services and less to creating products. The current allocation slightly favors product R&D, 52 percent to 48 percent. By 2024, respondents expect that relationship to flip—with R&D for services rising to 62 percent, versus 38 percent for R&D for products. At Visteon, for example, Tim Yerdon is leading a group exploring services related to connected cars and intelligent transportation systems. The group has already delivered developments such as wireless charging

“New research will involve more collaborators,” says Bombardier’s Fassi Kafyeke. “Ultimately, this will enable greater technology leaps, while reducing risks.”

in the car, and is actively developing wireless communication technology enabling cars to communicate with one another. “It’s not a traditional business model for an automotive parts company based in the Midwest—even for a global supplier like Visteon,” says Yerdon. “It’s much more like a tech company in Silicon Valley.” As more companies consider a significant shift to services, it will be important to ensure that the company’s innovation goals are aligned with the needs of the enterprise strategy, and that the business model includes a plan for capitalizing on the envisioned service innovations.

Exhibit 5: The Capabilities of Top Performers

A closer look at the capabilities on which the top 25 percent of companies by financial performance in each strategy model are focused.

	NEED SEEKERS	MARKET READERS	TECHNOLOGY DRIVERS
Translation of consumer and customer needs to product development	●	●	●
Market potential assessment	●	●	
Open innovation	●		●
Technical risk assessment	●		●
Rigorous decision making		●	●
Directly generated, deep customer insights and analytics	●		
Enterprise-wide product launch	●		
Resource requirement management		●	
Supplier/partner engagement in the development process		●	
Detailed understanding of emerging technologies and trends			●
Product life-cycle management			●

Source: Strategy& 2014 Global Innovation 1000 survey data and analysis

Prescriptions for Innovators

Despite the inherent advantages of the Need Seeker model, it’s not the right approach for every company. Indeed, many Market Readers will be more successful if they concentrate on the capabilities, goals, and attributes that are distinct to Market Readers than if they try to move too far toward the Need Seeker model and get only partway there. The same is true for those following a Technology Driver model (*see Exhibit 5*).

Need Seekers should hone their distinctive capabilities, which include their proficiency at directly generated deep customer insights, enterprise-wide launches, and technical risk assessment. One priority that Need Seekers cited in our survey this year as being important to their future success—open innovation—complements their approach by enabling them to seek new ideas and insights from a networked community beyond the borders of the company and its traditional partners. They should ensure that their products and services are advantaged by seeking out new ideas from customers, suppliers, competitors, and other industries, as well as by building focused technical innovation networks across the business. They should exploit front-end digital enablers such as visualization and engagement tools.

Market Readers should continue to develop their capabilities in managing resource requirements and engaging suppliers and partners. Their priority for innovation success going forward is to ensure that their innovation and business leaders are aligned. Successful Market Readers replicate and improve on competitors’ innovations quickly and adroitly. Their goals should include customizing their products for local markets, and creating a culture of collaboration across functions and geographies to facilitate rapid, seamless response. They

Methodology

As it has in each of the past nine editions of the Global Innovation 1000, this year Strategy& identified the 1,000 public companies around the world that spent the most on R&D during the last fiscal year, as of June 30. To be included, companies had to make their R&D spending numbers public. Subsidiaries that were more than 50 percent owned by a single corporate parent during the period were excluded if their financial results were included in the parent company's financials. The Global Innovation 1000 companies collectively account for about 40 percent of the world's R&D spending, whereas the next 1,000 largest corporate spenders represent 3 percent.

In 2013, Strategy& made some adjustments to the data collection process to gain a more accurate and complete picture of innovation spending. In prior years, both capitalized and amortized R&D expenditures were excluded. Starting in 2013, we included the most recent fiscal year's amortization of capitalized R&D expenditures for relevant companies

in calculating the total R&D investment, while continuing to exclude any non-amortized capitalized costs. We have now applied this methodology to all 10 years of our data; as a result, historical data referenced in the 2014 and future studies will not always align with figures published in the 2005 through 2012 studies.

For each of the top 1,000 companies, we obtained from Bloomberg and Capital IQ the key financial metrics for 2009 through 2014, including sales, gross profit, operating profit, net profit, historical R&D expenditures, and market capitalization. All sales and R&D expenditure figures in foreign currencies were translated into U.S. dollars according to an average of the exchange rate over the relevant period; for data on share prices, we used the exchange rate on the last day of the period.

All companies were coded into one of nine industry sectors (or "other") according to Bloomberg's industry designations, and into one of five regional designations, as determined by their reported headquarters locations. To enable meaningful comparisons across industries, the R&D spending levels and financial

performance metrics of each company were indexed against the average values in its own industry.

To understand how innovation has changed at companies over the past 10 years and gain insight into what to expect for the next decade, Strategy& conducted a separate online survey of 505 innovation leaders at 467 companies around the world. The companies participating represented just under US\$130 billion in R&D spending, or 20 percent of this year's total Global Innovation 1000 R&D spending. They included companies in all nine of the industry sectors and all five geographic regions.

Innovation is a function that can be managed: There are principles that are known, capabilities that can be built, and levers that can be pulled to improve the process.

need to be good at assessing feedback from sales and customer support and traditional market research. Digital enablers such as monitoring tools and idea-capture tools are critical, and are consistent with the needs of this model.

Technology Drivers should continue to enhance their product life-cycle management capabilities. Their priorities are strategic platform management and gaining a detailed understanding of emerging product- and service-related technologies and trends. They need to excel at technology road mapping and interacting with the external tech community. Digital enablers will be particularly important for them, including big data, customer profiling, and codesign tools, as well as collaborative environments that connect far-flung teams, customer relationship management systems, and ERP platforms.

Of course, some key imperatives have surfaced in the Global Innovation 1000 studies that apply to all companies seeking innovation success:

- Define your innovation strategy, communicate it throughout the organization, and identify the short list of innovation capabilities that will enable it.
- Tightly align your business and innovation strategies.
- Ensure that your innovation culture is aligned with, and supportive of, your innovation strategy.
- Focus on developing deep customer insight by directly engaging and observing end-users of your product.
- Ensure that the technical community has a seat at the table defining the corporation's agenda.
- Systematically manage the R&D portfolio, aggressively winnowing out low-potential projects and ensuring that the right risk management capabilities are in place to support big bets.

This list is more important than ever. For every shining example of a market-shaking innovation breakthrough, there are many more examples of companies that struggle to realize adequate returns from their innovation investments. But innovation, although different from operations, sales, and marketing, is nevertheless a function that can be managed: There are principles that are known, capabilities that can be built, and recognized levers that can be pulled to improve the process over time. The stakes for making these efforts are high—the disparities in innovation performance show that there are tremendous opportunities for getting more from your R&D spending, and for improving your competitive position and your financial performance. +

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Resources

Barry Jaruzelski, "Why Silicon Valley's Success Is So Hard to Replicate," *Scientific American*, Mar. 14, 2014: Further analysis of the themes reported in the 2012 Strategy& white paper "The Culture of Innovation: What Makes San Francisco Bay Area Companies Different?"

Steven Veldhoen et al., "2014 China Innovation Survey: China's Innovation Is Going Global," Strategy& white paper, Sept. 2014: How Chinese companies and multinationals are continuing to adapt their innovation strategies in China, and the important role that innovation plays in Chinese companies' globalization strategies.

For links to previous Global Innovation 1000 studies, from 2005 to 2013, as well as videos, infographics, and other articles about innovation, see strategyand.pwc.com/innovation1000.

Strategy&'s online Innovation Strategy Profiler, strategyand.pwc.com/innovation-profiler: Evaluate your company's R&D strategy and the capabilities it requires.

For more thought leadership on this topic, see the *s+b* website at: strategy-business.com/innovation.

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