

World's Best R&D COMPANIES

R&D's readers select their favorite companies based on the R&D performance, reputation, growth, and service of these technology leaders to the community.

Corporate research and development has become a global operation, with most large, and even small, companies maintaining and building R&D operations in far-flung offices. U.S.-based IBM, for example, is now said to have more scientists and engineers in India than it has in the U.S. Similarly, a number of large European and Asian pharmaceutical companies have more research resources in the U.S. than they do in their home countries to support the world's largest healthcare market and researcher base.

As a result, categorizing the "best" of these organizations is a difficult task, at best. How do you rate a company whose R&D organization is a large network of global facilities, products, technologies, and researchers? The most commonly used metrics for measuring R&D per the Goldense Group Inc., Dedham, Mass., include overall R&D spending (as a function of percent of revenues), the number of patents received, the number of new products as a percent of sales, changes in R&D headcount, the num-

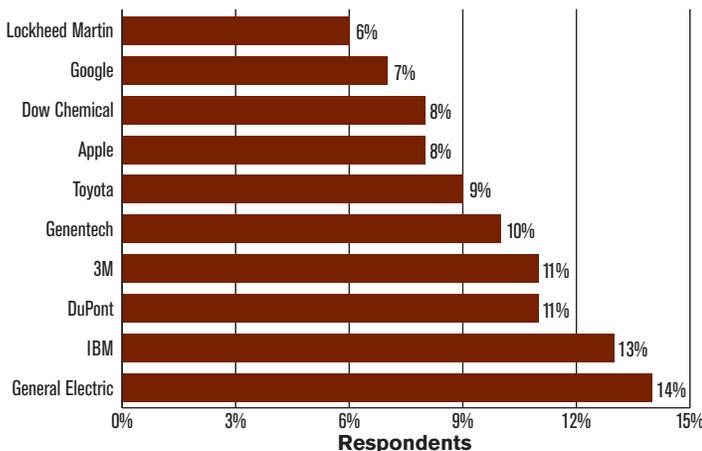
ber of new products in the pipeline, and the organization's overall investment in new product development. R&D Magazine's editors used these data and additionally surveyed our readers. The R&D performance of more than 130 R&D-intensive companies was evaluated and combined with data on intellectual property, community service, and financial growth trends of these companies.

Three tiers of R&D

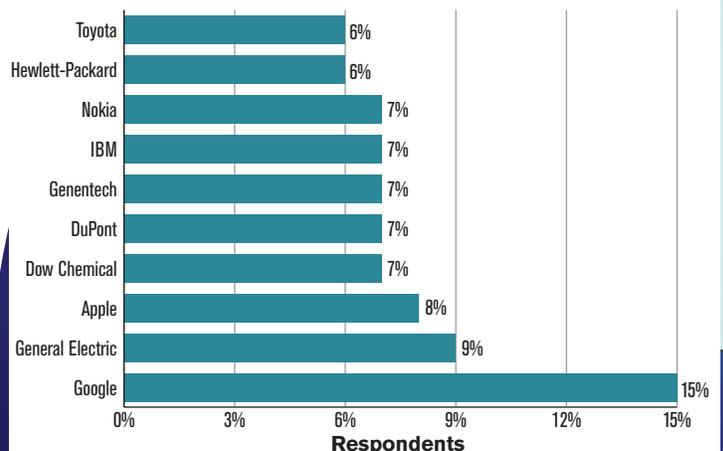
The results of these tabulations and evaluations are shown in the attached table.

In R&D's evalua-

Where Would You Like to Work Based on Their R&D?



What Companies Have the Most Improved R&D in the Past 5 Years?



The Best R&D Companies in the World

Company	Corporate HQ	R&D HQ ^	2006 Rev Billions US\$	2005-6 Rev Change	Fortune 500 Rank, 2007	2006 R&D Billions, US\$	2005-6 R&D Change	R&D as % of Rev.	Schonfeld R&D Rank**	2006 U.S. Patents	SIC Code
IBM	Armonk, NY	Yorktown Heights, NY	91.4	0.3%	15	6.107	45%	6.7%	13	3,651	7370
General Electric	Fairfield, CT	Niskayuna, NY	168.3	21%	6	2.969	83%	1.8%	37	1,051	9997
DuPont	Wilmington, DE	Wilmington, DE	27.4	1.7%	74	1.302	-2.5%	4.8%	68	531	2820
3M	St. Paul, MN	St. Paul, MN	22.9	8.3%	97	1.522	22.5%	6.6%	62	489	2670
Toyota	Toyota City, Japan	Toyota City, Japan	203.8	13.8%	-	2574	56%	3.7%	2	384	3711
Google	Mountain View, CA	Mountain View, CA	10.6	72.8%	241	1.229	104.8%	11.6%	71	n.a.	7370
Apple	Cupertino, CA	Cupertino, CA	19.3	36.6%	121	0.712	33.1%	3.7%	105	106	3571
Microsoft	Redmond, WA	Redmond, WA	44.3	11.3%	49	6.584	80%	14.9%	6	1,463	7372
Genentech	South San Francisco, CA	South San Francisco, CA	7.6	36.9%	-	1.773	40.5%	23.3%	58	146	2834
Dow Chemical	Midland, MI	Midland, MI	49.1	6.1%	40	1.164	8.5%	2.4%	74	89	2821

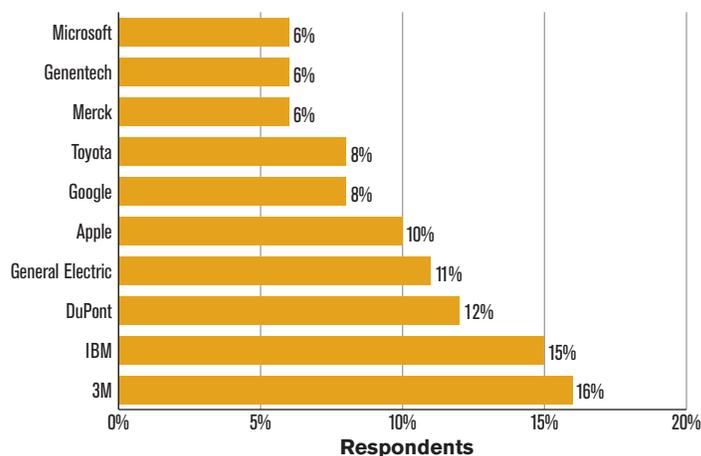
^ - The main R&D HQ is listed, however most of these large corporations have a large global network of R&D Centers.

** - R&D Ratios & Budgets, Schonfeld & Associates, Inc., Libertyville, IL

The overall ranking of these companies was created by the editors of R&D Magazine based upon a weighted combination of financial data, growth indicators, intellectual property and R&D Magazine survey data.

tions, these Top 10 rankings broke down into primarily three tiers with IBM, General Electric, and DuPont sharing the top tier; 3M, Toyota, Google, and Apple the middle tier; and Microsoft, Genentech, and Dow Chemical populating the third tier. Those in the top tier were placed there primarily because of the outright volume of research performed, their consistent performance in this area, and their long-standing, continued, and growing global R&D presence. The middle tier was populated with three companies—Toyota, Google, and Apple—who have seen dramatic growth over the past several years based primarily on the value contributed by their R&D opera-

What Companies Are the Leaders in R&D?



tions. 3M, which in past years might have been placed in the top tier, maintains its presence within the top ten based mostly upon its past glories, reputation, and aggressive technology development programs.

The lower tier—Microsoft, Genentech, and Dow Chemical—consists of large, well-respected R&D players, with entrenched global development programs that will continue to grow their companies' product lines for years to come. These companies are not the high growth players of the middle tier and don't have the outright R&D dominance of IBM, GE, or DuPont, but they stand alone in their support of R&D, the continued flow of innovative products, and the dominance that they hold over their specific markets.

While the choices for the Top 10 are very large R&D players, with R&D budgets from \$700 million to more than \$7,000 million, their choices were not made just because they have big budgets. Their R&D rankings based on budgets only go from # 2 to # 105, with an average ranking of # 50. There's only one company, Toyota, in the Top 10 of R&D spenders. They have consistent and mostly growing R&D budgets, because they are successful in how they run their R&D operations.

Top 25 in Global Biopharmaceutical R&D Spending

	Bio./Pharmaceutical	R&D Center*	R&D 2006 Billions US\$	R&D % Rev 2006
1	Pfizer	New London, CT	7.599	15.7%
2	Johnson & Johnson	Raritan, NJ	7.125	13.4%
3	GlaxoSmithKline	Global Centers of Excellence	6.373	14.9%
4	Sanofi-Aventis	Paris, France	5.965	15.0%
5	Novartis	Cambridge, MA	5.349	14.4%
6	Hoffmann-La Roche	Basel, Switzerland	5.258	15.7%
7	Merck	Rahway, NJ	4.783	21.1%
8	Juventus	Sodertalje, Sweden	3.902	14.7%
9	Amgen	Thousand Oaks, CA	3.366	23.8%
10	Eli Lilly	Indianapolis, IN	3.129	19.9%
11	Wyeth	Mountain Junction, NJ	3.109	15.3%
12	Bristol-Myers Squibb	Princeton, NJ	3.067	12.1%
13	Abbott Laboratories	Abbott Park, IL	2.255	10.0%
14	Schering-Plough	Kenilworth, NJ	2.188	20.6%
15	Boehringer Ingelheim	Biberach, Germany	1.977	14.9%
16	Bayer	Berlin, Germany	1.791	9.8%
17	Genentech	South San Francisco, CA	1.773	23.3%
18	Takeda	Tsukuba, Japan	1.620	15.8%
19	Daiichi Sankyo	Tokyo, Japan	1.459	20.4%
20	Juventus	Tsukuba, Japan	1.435	18.3%
21	Novo Nordisk	Bagsvaerd, Denmark	1.063	16.3%
22	Allergan	Irvine, CA	1.056	34.5%
23	UCB	Slough, UK	1.024	23.1%
24	Eisai	Tsukuba, Japan	0.926	16.6%
25	Forest Labs	Jersey City, NJ	0.941	27.3%
		Total / Average	78.133	15.9%

* - Most companies have multiple global R&D sites
Source: Company data, R&D Magazine

Specific items of note that helped the editors make their decisions:

IBM continues to receive more patents on an annual basis than any other single company—for 14 consecutive years—with an increase of 22% over just two years ago. IBM also received 50% more patents in 2006 than the number two recipient (Samsung with 2,453 patents). Missing in this ranking, with the exception of Genentech, are the dominant pharmaceutical and biotech players that, on a global basis, account for nearly a third of all the R&D spent (see attached sidebar).

Revealing survey

The *R&D Magazine* reader survey was distributed electronically during September 2007, with the respondents selecting from a list of more than 130 global companies in answering a series of questions (see attached charts). When asked to select five companies to the question “What companies stand out as the leaders in research and development?” the overwhelming choice on the first round was 3M, St. Paul, Minn., outpacing all other companies by more than two to one. In the successive rounds, other large R&D companies like IBM, DuPont, GE, and Google were able to “catch up,” since most respondents had already chosen 3M as their first choice. The reasoning behind 3M’s initial choice in this question can be explained more by the company’s reputation for innovation and product development than by its current performance. 3M only finished in the top 10 (of the 130+ company choices) two more times out of the seven questions in the survey.

No one can question the strong growth and continued strength of Google and its R&D-based expansion of new products against large established competitors like Microsoft and Yahoo. As a result, our readers chose Google as their top selection to the question “What companies have improved the most in terms of their R&D support over the past five years?” The continued growth and strong global market positioning of GE, even after the departure of long-time CEO Jack Welch, resulted in its selection by our readers to the second position, followed closely by Apple. Apple’s re-invention of itself with its iPod, iTunes, and iPhone were clearly behind its selection to the No. 3 spot in this survey question (and No. 7 overall).

A surprising number of transportation-based companies—Caterpillar, Honda, Hyundai, and Toyota—finished at or just outside the Top 10 R&D-

What Happened to Biopharmatech?

Big pharmaceutical companies have struggled over the past few years to find ways to return to the high profitability days at the turn of the century. Some companies have reorganized and now see their sales increasing at double-digit rates (15% at GlaxoSmithKline, 16% at Sanofi-Aventis, and 18% at Novartis) while the industry leader, Pfizer, sees a bare 2% increase in revenues.

The traditional drug development procedures that big pharma put into place over the past ten years in hopes of increasing the number of promising potential blockbuster

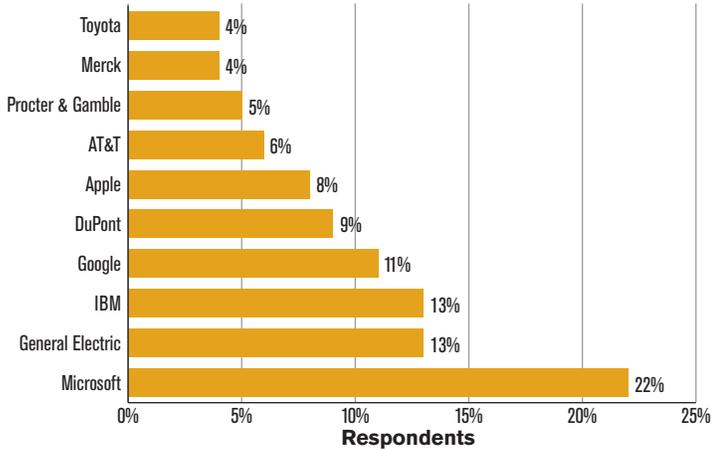
caliber drugs in the pipeline failed to be realized in the numbers that were hoped for. As a result, many continue to reorganize into multiple smaller units, while at the same time trimming their traditional large centralized operations. Johnson & Johnson, for example, recently announced 4% cuts in their global staffs, following large cuts in its once-promising Alza subsidiary in Northern California.

Biotech continues to attract large pharmaceutical companies, as some of the technologies mature and proceed through the clinical trial cycles. But even here there are changes,

as biotech giant Amgen, Thousand Oaks, Calif., found itself trimming its R&D operations earlier this year. Overall, the biopharmaceutical market finds itself holding place for the past two years as more drugs in the pipeline start to come to market in 2008 and as the legal problems seen by some companies, like Abbott Labs and Pfizer, stabilize.

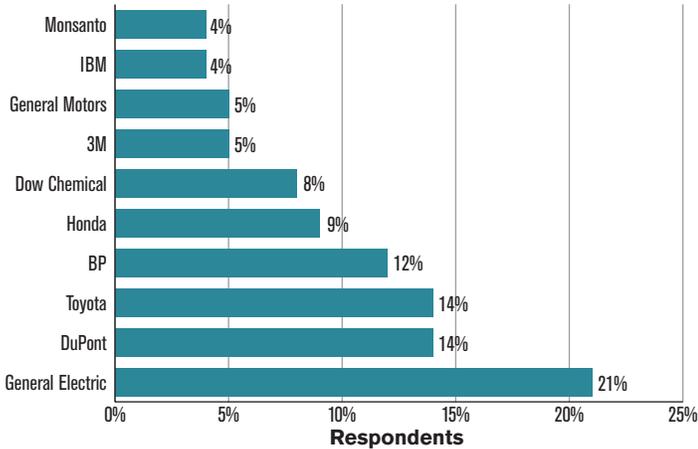
So, as the industry works to find itself and develop into more successful, innovative, and potentially entrepreneurial enterprises, there are few areas where you can point to and say that this is an R&D leader.

Which Company's R&D Has the Strongest Influence on Society?



Which Company's R&D is the Most Proactive in High-Tech Challenges?

(Global Warming, Disease, Pollution, etc.)



based companies with the most improvement over the past five years.

Our readers' recognition of the overall strong global strength and depth of General Electric's R&D capabilities and its fair treatment of its researchers likely resulted in its selection as the leading vote getter to the question "What industrial companies would you most like to work for in terms of their R&D work?" However, IBM was just a short one-percent-age point behind GE in the # 2 position.

Looking at the overall effect that R&D organizations have had on the world, few could question the effect of Microsoft and its Windows-based operating systems and products. As a result, our readers chose Microsoft as the overwhelming top response to the question "Which industrial companies have had the strongest influence on society, people's lives, and the world based upon their R&D work?" Google, which might have a shot at the leading response getter to this question in a few years, was the No. 4 choice with less than half of Microsoft's votes.

When asked "Which industrial companies have been the most proactive in addressing technological challenges like global warming, energy shortages, diseases, and pollution based upon their R&D work?" the leading vote getter was GE, outpolling its nearest rivals, DuPont and Toy-

ota, by more than six percentage points. Interestingly, each of the Top 10 choices for this question could be pointed to in some respect as also contributing to those same challenges as they were picked by R&D's readers as proactively addressing.

Super stars of R&D

The Top 10 companies highlighted here are no strangers to most researchers. Eight of them are in the 2007 Fortune 500 (missing Japan's Toyota and Genentech). Nine (missing Genentech) are in the 2007 Forbes Global 2000, ranking from No. 4 General Electric (lagging behind three banks) to no worse than No. 289 Google. Six (GE, Toyota, Apple, Microsoft, Google, Microsoft, and 3M) are in the Top 20 of Fortune's 2007 Most Admired Companies. Four (Google, Microsoft, Genentech, and Dow) are in the 2007 Fortune 100 Best Companies to Work For. The editors of *R&D Magazine* are proud to include them in our environment as well.

—Tim Studt