

SEVEN TECHNOLOGIES THAT CHANGE EVERYTHING

INNOVATION ALWAYS HAS THE POWER TO DISRUPT BUSINESS. HERE'S WHAT TO WATCH IN THE YEARS AHEAD.



1. AJAX

■ **WHAT IT IS:** Software tools that make browser-based applications behave more like software running on a PC.

■ **WHY IT'S HOT:** Most Web apps require that a new webpage be sent to a user to accomplish each individual step in a task, which explains why they're often sluggish. But Ajax (the name stands for asynchronous JavaScript and XML) lets new data trickle in, updating the content of the page on the fly. You've probably already used an Ajax application: It's the secret sauce in Amazon's A9 search, Google's Gmail service, Netflix's movie

ratings, and Yahoo's Flickr photo website. Yet Jesse James Garrett of San Francisco-based Web consultancy Adaptive Path, who came up with the name Ajax, believes its real impact will be in enterprise applications—speeding the work of remote employees. Business process and integration software company Tibco has already started incorporating Ajax into its General Interface platform. And Microsoft is working on an Ajax developer kit—a sure sign that it's ready for the big time.

■ **KEY PLAYERS:** Amazon, Google, Microsoft, 37signals, Tibco Software, and Yahoo.



2. BIOGENERIC

■ **WHAT IT IS:** Generic forms of the patented drug proteins sold by big biotech firms.

■ **WHY IT'S HOT:** Companies like Amgen and Genentech rely heavily on expensive but effective protein-based therapies for diseases ranging from chronic renal failure to diabetes. These patented therapies, also known as biodrugs, accounted for \$18 billion in sales last year. Now many of the best-selling biodrugs are going off patent—which means that if others can copy them, they can sell them. But cloning a protein, with its complex molecular structure, is far more difficult than copying an aspirin. And unless it's a perfect clone, under today's

rules, regulators will not approve it. Biogenics are a major focus for pharmaceutical companies in China and India, and they are also likely to be sold in the European Union soon. The FDA is considering rules for the United States, however, and the industry is split on how to handle the new drugs. Biogenics have the potential to capture roughly 11 percent of the total biodrug market, which could send prices plummeting. That would be bad news for the likes of Genentech, but potentially great news for millions of patients.

■ **KEY PLAYERS:** BioPartners, Cangene, GeneMedix, LG Chemicals, Momenta Pharma, Rhein Biotech, and Wockhardt.




3. DEEP WEB SEARCH

■ **WHAT IT IS:** Technology that boldly goes where no search engine has gone before.

■ **WHY IT'S HOT:** Google may have already indexed 8 billion webpages, but that's just the tip of the iceberg. Many more pages are hidden behind corporate firewalls or in databases waiting to be indexed. By some estimates, this so-called dark Web is 500 times bigger than the World Wide Web as we know it. Unlike the public Internet, however, it can't be retrieved by the usual Web crawlers. Instead, the information must be fed into search engines' mammoth databases using special retrieval techniques.

Before the advent of desktop search, our PCs were part of that invisible Web—connected to the Internet but not indexed. File-sharing networks already search your PC for MP3s, but there are tricky privacy and security issues to resolve before your hard drive can join the visible Web. There are also millions of digitally transcribed books waiting to be connected. Ultimately, deep Web search could answer a direct question better than hundreds of links, because many of the most authoritative sources have yet to make it online.

■ **KEY PLAYERS:** Endeca, Glenbrook Networks, Google, IBM, Kozoru, and Yahoo. 



4. HIGH-DEFINITION RADIO

■ **WHAT IT IS:** Forget satellite. Regular radio is getting an upgrade, with CD-quality audio and many more channels.

■ **WHY IT'S HOT:** Under pressure from satellite services like XM and Sirius, online music services, and iPod-type devices, the \$20 billion-a-year radio industry has been steadily losing listeners' attention. HD radio is seen as the solution. The technology splices existing spectrum owned by station operators into thin bands. Each band supports a new radio station, so one FM or AM station can be divided into as many as eight channels to broad-

cast eight times the music, the talk, and (most important) the ads. And since they're digital, HD radio streams can easily be stored, giving listeners the option to pause and rewind live broadcasts, just as TiVo did for TV.

There are already 450 U.S. stations broadcasting HD radio. By 2007 that number should rise to 2,500 stations, covering 90 percent of the country. The biggest hurdle to mass adoption: Listeners will need to buy new radio sets to decode HD signals.

■ **KEY PLAYERS:** Clear Channel Communications, Disney, Ford Motor, iBiquity Digital, Radiosophy, Texas Instruments, and Visteon.



5. HYBRID CELL PHONES

■ **WHAT IT IS:** Wi-Fi-enabled cell phones that bring together cellular and landline phone systems.

■ **WHY IT'S HOT:** Appearing in mid-2006 in 15 mid-priced cell-phone models, hybrid services will automatically sniff out and switch to open Wi-Fi networks inside your office and home. This could solve two big consumer frustrations: Switching to Wi-Fi will result in vastly better call quality inside residences and office towers that are hard to cover with cellular networks, while also speed-

ing up Web surfing on smartphones—an upgrade that would make them, at long last, a viable alternative to the PC.

Fixed-line/wireless convergence, along with the services it will spawn, is where carriers are looking to spend most of their money—consumers will buy 100 million hybrid handsets over the next five years, according to telecom consultancy ABI Research.

■ **KEY PLAYERS:** Bridgeport, British Telecom, Broadcom, Ericsson, Kineto Wireless, Lucent, Motorola, Nokia, Nortel, Samsung, and Texas Instruments.



6. MICRO FUEL CELLS

■ **WHAT IT IS:** Batteries for portable electronic devices that use a refillable external fuel supply, from hydrogen to natural gas, methanol, ethanol, and sodium borohydride.

■ **WHY IT'S HOT:** The more power-hungry digital devices have become, the less plain-old lithium-ion batteries have been able to keep up. Fuel cells are the leading candidate to replace them. The most popular technology is called direct methanol fuel cell (DMFC), which mixes methanol and oxygen. Hitachi has developed a methanol-based laptop

fuel cell that will go on the market in 2007. Japanese cell-phone giant NTT DoCoMo has teamed up with Fujitsu to build tiny fuel cells for mobile phones.

The transition will take time, so don't expect to buy a fuel cell at Best Buy right away. But Research & Markets, a research group, forecasts that micro fuel cell sales will grow to \$510 million by 2008 and \$11 billion by 2013.

■ **KEY PLAYERS:** Altair Nanomaterials, Ballard Power Systems, Dow Chemical, DTI Energy, Hitachi, Motorola, MTI Micro Fuel Cells, NEC, Samsung, Solvay, and Toshiba.



7. WI-MAX

■ **WHAT IT IS:** Wi-Max is like Wi-Fi on steroids, with a theoretical range of 30 miles.

■ **WHY IT'S HOT:** Wi-Fi is great, but its range is limited. Intel has taken the lead in developing Wi-Max standards, and the service is expected to roll out during the next two years—first in rural markets in the United States, Europe, and Asia, and then in new telecom markets elsewhere. (As a demonstration, Intel streamed a digital movie to a theater at the Sundance Film Festival over a 55-mile network of Wi-Max transmitters.) Skeptics argue that Wi-

Max may be supplanted by competing technologies that are on track to hit the marketplace sooner, but don't underestimate the reach of the companies that plan to support Wi-Max; the list includes AT&T, BellSouth, Qwest, and Sprint. ABI Research forecasts 8 million Wi-Max subscribers by 2008. Maravendis Telecom, a research group, says demand for Wi-Max gear will grow to \$2 billion by 2010. If the predictions come true, DSL, cable, and even T-1 connections could be supplanted.

■ **KEY PLAYERS:** Alvarion, ClearWire, Intel, Motorola, and Samsung. — OM MALIK AND ANDERS LOTSSON