



IT Trends and Predictions for 2011

by Jill Gilbert

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This column discusses five information technology (IT) trends that continue to unfold, plus three technologies that could make a world of difference in the future.

Trends

Social Networking

A group of Harvard students invented Facebook so that students could get to know each other. Today, Facebook has more than 500 million subscribers, and many big businesses have a Facebook presence. Social networking is here to stay. With advances in technology, in a few years social networking may bear little resemblance to its current format.

Mobile Everything

Cell phones and personal digital assistants (PDAs) morphed into SmartPhones (see "Get Smart (phones)," *EM* March 2010, p. 32). The iPad entered a market where Netbooks, tablet computers, and ultraportable notebook computers abound. With an astounding 500 million cell phones in operation, fully 90% can access the Internet. SmartPhones have all but made obsolete consumer video cameras, MP3 players, eReaders, satellite navigation, and remote controls.¹

Collaboration

Environment, health, and safety professionals, like other knowledge workers, are stuck in the 1990s with tools that do not promote knowledge sharing. Much "knowledge capital"—which can lead to competitive advantage—lies locked in the heads of individuals, as well as in spreadsheets, word processing documents, e-mails, and slide presentations. This limits productivity.

Existing technologies such as wikis, blogs, and video conferencing can help promote knowledge sharing for better business decision-making. Technology by itself does not foster collaboration. A leap forward in knowledge worker productivity requires process innovations, training, and technology.

Anything as a Service

We purchase utilities on a subscription basis, paying as we go. We do not own the power generation facilities or transmission lines. In urban areas like New York, people often opt out of car ownership, instead subscribing to a service that allows car rental by the hour.

Hard-copy periodicals, movies, and books soon will become artifacts. Newspapers have published their daily papers on the Internet for some time, to the detriment of hard-copy subscriptions. Netflix and others have captured the video subscription market. Amazon, iTunes, and Wal-Mart lead the e-Music market, while Barnes & Noble (Nook), Amazon (Kindle), and Sony have created a book and periodical market—buy one copy of a book, and read it on your e-book reader, SmartPhone, or PC.

The Cloud—computing infrastructure, platform, applications, and content delivered as a service—is growing as well. Many organizations recognize that software is not their core business, and that other companies can deliver computing power faster, better, and cheaper than software installed on the premises. Software as a service is growing at 17% a year,² from front-office and sales applications to enterprise-wide software.

Sustainability

IT plays a dual role with respect to sustainability. IT is a significant contributor of greenhouse gas emissions. However, IT can eliminate many times its environmental footprint in areas such as smart power grids, efficient buildings, power planning, and better logistics planning. Companies are beginning to address the environmental impacts of IT, and the IT hardware industry is building



electronics with a greener footprint (See “High-Tech Industry Heats Up Efforts to Lessen Climate Change,” *EM* August 2008, p. 36).

Technologies to Watch

These three technologies could unlock a universe of possibilities.

Efficient Energy Storage and Ultra-Low Energy Consumption

Battery life and energy consumption limit our technical capabilities. Today's SmartPhones and other ultraportable Internet-connected devices have better battery life than their predecessors, though battery life remains limited, requiring a tether to an electrical charger. Despite several generations of improvements in battery technology, rechargeable batteries have a shelf life whose expiration is not predictable.

The Massachusetts Institute of Technology, University of Maryland, and others conduct nanotechnology research on a new generation of batteries. The key is to achieve the needed combination of high energy density, high power, and fast recharge that are essential for our energy future,⁴ whether for electric cars, small communications devices, or entire manufacturing plants.

Silicon Chip Alternatives

Silicon-based technology has its limitations for computing power, information storage, and access, especially in high-power and high-temperature devices. As silicon chips decrease in size and their transistors get smaller, they become less efficient, leaking electrical current, and producing heat. Researchers look to nanotechnology for alternatives to silicon chip circuitry. Gallium nitride (GaN) transistors could reduce energy consumption and improve the efficiency of power electronics systems

in everything from motor drives and hybrid vehicles to household appliances and defense industry equipment, while combining several electronic functions onto a single chip.⁵ Chinese and Danish researchers are collaborating on alternatives that use organic materials. Some of the latest SmartPhones use organic LED screens.

Low-Cost or Free Communications Networks

For those whose livelihood depends on communications, poor data, voice, and video communications infrastructure makes doing business difficult at times. Only 21% of the population of Asia has access to the Internet, while more than 77% of the North American population has access.⁶ Internet bandwidth and reliability varies by service provider, type of service selected, the number of concurrent users, and other factors. Cell phone and SmartPhone users can experience intermittent service and poor data quality.

New 4G networks could make major improvements. Sprint, Verizon, T-Mobile, and AT&T all have 4G networks under construction, replacing older, copper wiring with fiber optics. All the advertising of faster, better networks leads us to believe that 4G is a revolutionary technology. So far, it's mostly advertising, as the networks have yet to be built, available in limited markets at best. On December 1, 2010, Verizon turned on its 4G network, but not for SmartPhones—where subscribers could see the greatest benefits.

IT provides capabilities that we could not have predicted just a few years ago. Cutting-edge technologies could be even more exciting... stay tuned. **em**

'The realization of long-lasting and rapidly rechargeable electrical energy storage is perhaps the most important barrier to the replacement of carbon-based fuels by electrical energy systems.'

>> **Joel Schindall,**
MIT³

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