As technology evolves, will PCs be left behind?

September 12 2011, By Jon Swartz

Steve Jobs' bombshell resignation as CEO. Hewlett-Packard's abdication of its multibillion-dollar PC group. Google's $12.5 billion purchase of Motorola Mobility. Dell's wobbly sales forecast.

The whipsaw sequence of recent events in the technology industry highlighted what many are calling the rise of mobility and the marginalization of the PC. Meteoric spikes in the sale of smartphones and tablets are merely hastening the diminished status of the traditional desktop PC, whose sales have flattened the past few years with little relief in sight.

The shift from PCs to mobile devices and so-called cloud-based computing has sent ripples throughout the high-tech industry, uprooting HP's business strategy and propelling a Google wireless partnership that seemed unthinkable weeks ago.

Google Chairman Eric Schmidt put it bluntly last week at a cloud conference here: He said tech had exhausted the limits of the PC as a platform, and the future would center on mobile devices.

"The PC market has become commoditized," says Forrester Research analyst Sarah Rotman Epps. "It's a highly competitive business, though PC sales continue to grow."

Absent Jobs' daily wizardry and exacting standards, many now openly question whether even Apple can maintain its innovative ways and

marketing guile several years from now, further jeopardizing its own PC sales and inflicting more damage on an-already reeling PC industry.

"Jobs' charisma and marketing skills - not just his tech vision - helped Apple sell products to consumers," says Yan Anthea Zhang, professor of strategic management at Rice University's Jones Graduate School of Business. "With him off-stage, competitors have a chance to catch up to Apple's dominance in the smartphone and tablet markets, in particular."

Certainly the PC isn't necessarily going the way of the dinosaur, pay phones and space shuttle missions. But "[personal computer](#)" isn't necessarily the first thing most people think of when they talk computers. For many, it's iPhone, Android phone, iPad, Kindle - even BlackBerry.

"When I helped design the PC, I didn't think I'd live long enough to witness its decline," Mark Dean, an IBM veteran who helped build the first PC 30 years ago, recently wrote on his blog. "But, while PCs will continue to be much-used devices, they're no longer at the leading edge of computing."

"The social revolution is driving a paradigm shift in hardware and software, says Salesforce.com CEO Marc Benioff, who has predicted the end of the PC for years. "HP was the first to go, and others will if they don't keep up" with changes.

The rise of software and cloud computing have paralleled the waning dominance of the PC and contributed mightily to its current state, say venture capitalists and tech executives. Kids, in particular, are eschewing desktop PCs and laptops for smartphones and iPads to play games, use email and perform other tasks that do not require large screens.

"The PC device has evolved in terms of size, shape, use and ubiquity,"

says Pat Richards, a former IBM executive who is now chief technology officer of SCIenergy, an energy-management software company. "There is no doubt software and apps are a huge part of that" by letting consumers perform computing tasks everywhere at any time.

"We're moving from the general-purpose PC to task-specific devices," Richards says. "The iPad can do a lot of what a PC does. And, increasingly, TV screens are replacing computer screens."

"Cloud-based services eliminate the need for heavy local software," says Kevin Spain, general partner at Emergence Capital Partners, which has invested in Salesforce.com and Yammer, a social-networking service for companies.

And, despite its formidable stronghold at businesses, there are signs that the Microsoft Windows monopoly is "cracking," says Ben Horowitz, co-founder and general partner at venture-capital firm Andreessen Horowitz.

"People at the bottom of the food chain used to introduce new technology at a corporation," Horowitz says. "Now executives are buying tablets instead of traditional computers."

The massive move to mobile devices and tablets is reflected in worldwide sales. Market researcher Gartner says sales of smartphones will soar 56 percent, to 467.6 million, this year. Tablet sales will grow nearly four times, to 69.8 million this year, Gartner says.

Worldwide PC shipments, meanwhile, are expected to edge up 9 percent, to 383.6 million this year, Gartner says.

As PC shipments slacken, so have sales of the peripherals that work with them. U.S. consumer sales of printers and keyboards/mice are flat to

slightly up, while those for monitors are flat or slightly declining, says researcher The NPD Group. Intel, meanwhile, increasingly is going mobile. Though it builds chips that power 80 percent of the world's PCs, it cannot escape the inevitability of the smartphone age.

The jump to mobile devices, especially outside the United States., happened so fast that it caught many flat-footed. The immolation of HP, the world's No.1 PC maker, is Exhibit A.

The original garage startup's abdication of the PC business is the latest blow to an industry reeling from paper-thin margins and a massive migration to mobile computing.

Just a year ago, HP was inhaling lesser rivals such as 3Par and ArcSight and posting sterling financial numbers. Today, it's contemplating whether to sell or spin off its PC division, which could mean more than one-third of its 300,000 employees might be working for someone else soon.

HP's decision to distance itself from the PC business reflects CEO Leo Apotheker's desire to expand the company into software and services that help customers deliver computing over the Internet, via the so-called cloud.

Its challenges are underscored by lackluster quarterly results and dim prospects for the near future. HP's about-face echoes a plan laid out by IBM CEO Sam Palmisano in 2005. Then, IBM sold its PC business to Lenovo to focus on services and software.

Or is the PC era - whose roots stretch back 30 years - not dead but merely changing in size and shape?

The post-PC era, if that's the right terminology, is essentially a new mix

of desktop PCs and laptops, with smartphones and tablets thrown in. Analysts believe hand-held devices, which are selling like digital hotcakes, are new must-have "addictive" markets and that the PC will continue to rule workplaces and have a place in the home.

"The PC is not dead," says Mark Anderson, publisher of Strategic News Service, one of the longest-running tech newsletters. Its paid subscribers include tech executives such as Microsoft CEO Steve Ballmer, Oracle co-President Mark Hurd and Dell CEO Michael Dell.

"Two things are happening: There has been an explosion in consumer devices for watching a movie, reading a book, playing games, looking at photos," Anderson says. "These devices that Steve Jobs incorrectly calls post-PC are mobility devices and carry-alongs. But they have nothing to do with personal computing.

"The recession impacted PC sales more than anything else," he says. "Corporations and government agencies cut back on purchases. And consumers saved their money during a down economy."

Gartner analyst Michael Gartenberg says tablets such as iPad and Samsung's Galaxy won't displace PCs but will increasingly be used as a second or third device for consumers and business users.

"A worldwide installed base of 1.2 billion Windows-based PCs is proof of the PC's relevance," says Stephen Baker, an analyst at market researcher The NPD Group.

By comparison, Gartner predicts an astounding 1 billion smartphones will be sold in 2014, about double that of PCs in the same year.

Former Microsoft executive Paul Maritz envisions consumers getting mountains of information from whatever device or cloud-based

application is best for them.

"We inexorably are shifting from a device-centric world to an information-centric world," he says.

An individual's data "will determine what devices look like, rather than the other way around, because it will outlive any particular piece of hardware where it may reside," says Maritz, who is CEO of VMware, a cloud-computing software company.

Hardware - whether a desktop PC or tiny smartphone - will always be necessary to encase data, says Sandy Kurtzig, the former Ask CEO who came out of retirement to launch cloud computing-based company Kenandy last week. "Who's going to win the (tech) race?" she asks. "Cloud is in a good place. It supplies up-to-date, secure data to all forms of hardware."

But the "most profound issue is who will be the custodian of all that information in the cloud? Apple? Google? Microsoft? Facebook?" Maritz asks.

History is littered with dead industries that were victims of new ideas or new business models, says Michael Lenox, professor at the University of Virginia's Darden School of Business. In the case of diminished industries, survivors must reinvent themselves. For example, "We still have mainframe (computers); they just have a new role," notes Maritz, a former Microsoft executive. "The same will happen with PCs. They may end up being used for PowerPoint presentations."

Lest anyone else dismiss the PC as an endangered species, consider speculation that Oracle is sniffing at HP's PC division. Even Microsoft has been mentioned as a possible suitor for HP.

"HP's situation is unrelated" to the health of PC sales, analyst Anderson says. "Look at Lenovo (Group). They just announced great numbers."

The Hong Kong-based PC maker, benefiting from low-manufacturing costs and government contracts in China, announced $5.8 billion in third-quarter sales.

And Microsoft is a multibillion-dollar testament to the power of the PC market. Some 31 percent of its nearly $70 billion in fiscal year 2011 revenue came from Windows Operating System-related products and services. The Windows OS is still used in more than 90 percent of the world's PCs, and Microsoft plans to roll out 75 retail outlets called Microsoft Stores in the near future.

"We prefer to think of this as a PC-plus era," Microsoft co-founder Bill Gates said in a 1999 opinion piece in Newsweek. "The PC-plus era will be just as revolutionary," he wrote then. "It will take the PC's power and make it available almost anywhere, on devices that haven't yet been dreamed up."

Microsoft still adheres to that credo.

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Citation: As technology evolves, will PCs be left behind? (2011, September 12) retrieved 11 May 2024 from https://phys.org/news/2011-09-technology-evolves-pcs-left.html