

DANIEL BURRUS'

TECHNO TRENDS

THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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3 Keys Leaders Can Use To See The Future

By Daniel Burrus, CEO of Burrus Research

We're all aware that there are timeless leadership principles that have been true since the dawn of time and that will continue to be valid in tomorrow's business environment. Things like integrity, honesty, and personal responsibility immediately come to mind. While those are all vital traits, they're not the leadership traits I'm addressing right now.

In today's world of technology-driven transformation, leaders need to embrace a new leadership principle if they want their organization to be relevant today and in the future.

In the recent past, leaders have focused on *agility*—being able to change quickly based on external circumstances because change from the outside-in has been coming at an ever-increasing speed, and it's only getting faster. Many of these types of changes are driven by technology, but they're also from our customers, because technology is influencing our customers and changing the way they interact with us.

We also have increasing transparency, meaning your customers and prospects have access to complaints, as well as accolades, through social media and other new forms of communication. All of these changes, which are coming from the outside-in and force agility, cause leaders to react, crisis manage, and put out fires on a daily basis.

Knowing this, it's evident that simply being agile no longer works. Instead, today's leaders need to be *anticipatory*.

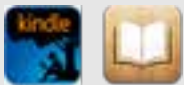
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TECHNOLOGY NEWS HIGHLIGHTS

“Sense”ational Technology

Over the next few years, we can expect to interact with our electronic devices using all of our five senses. For example, mobile devices are already learning to “see”



better with apps like Google Goggles, which can identify landmarks, translate text, or save contact information from a business card simply by taking a photo. Their ability to “hear” has also improved in recent months, with voice recognition applications like Siri getting better every day. According to a recent report by IBM, the next big thing will likely be technology that allows users to “feel” objects being displayed on their touch screens.

Today's touch panels typically don't provide any positive tactile feedback, but a new technique, known as haptic technology, creates the sensation of varying texture when a user touches the screen. Disney's TeslaTouch transfers oscillating electrical fields to the finger, while Swiss researchers use changes in vibration to simulate the feel of different materials. The result is an experience that brings the virtual world and real world closer than ever. For example, when shopping online, you would be able to feel the texture of a shirt before you purchase it.

For information: Jessica Hodgins, Director, Disney Research, 4720 forbes Avenue, Lower Level, Suite 110, Pittsburgh, PA 15213; phone: 412-297-4020; email: drp-info@disneyresearch.com; Web site: www.disneyresearch.com/project/teslatouch

Augmented Reality in Your Living Room

A new proof-of-concept system is designed to enhance interactive entertainment experiences by projecting visualizations beyond the television screen and onto the walls of the room to create an immersive gaming environment without the need for customized graphics. Dubbed IllumiRoom, it utilizes a Kinect camera to automatically capture the geometry of the room so that the projected



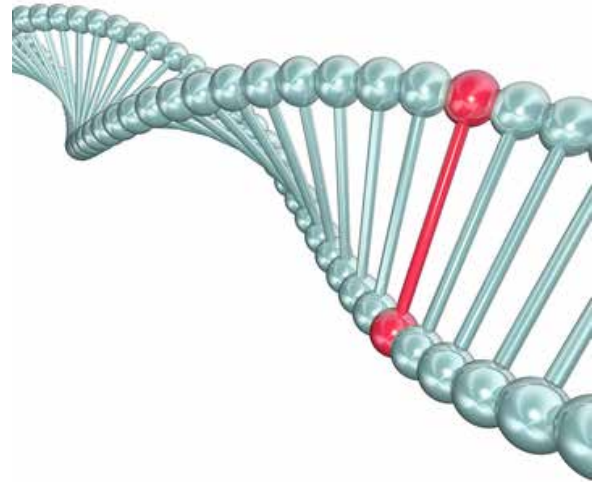
visuals can be adapted in real time.

The new system would enable a whole different level of gaming. Imagine driving through the mountains in a virtual car race while snowflakes swarm around the room or travelling through virtual space while stars and planets zoom past. Unfortunately, there are still a number of obstacles to widespread commercialization of such a system, including cost, complexity, and the availability of compatible content, but given the rapid pace of technological innovation it may not take that long before you might be able to buy one for your own living room.

For information: Microsoft Research Labs, One Microsoft Way, Redmond, WA 98052; phone: 800-642-7676; Web site: www.research.microsoft.com/en-us/projects/illumiroom/

DNA Data Storage

In today's information society, there is an ever-growing need for more efficient and reliable ways to store data. From magnetic tapes, to floppy disks, to optical disks, to flash memory, the evolution of storage media has been nothing short of monumental over the last couple of decades. Now researchers are looking to the very



fabric of life – DNA – to catapult us to the next level.

To demonstrate the concept, they digitized a photograph, a scientific paper, a 26-second audio file (from King's "I Have a Dream" speech) and all 154 of Shakespeare's sonnets, then encoded that digital information as four-letter DNA sequences. The code was used to synthesize strands of DNA, which, when all was said and done, were barely visible in a test tube. The information was then recovered by reading it back through a machine.

Because the retrieval process is time-consuming, DNA storage may not be practical for general use or for information that is retrieved often. However, the technology could be very useful for storing large archives (such as historical documents or library holdings), and could conceivably keep them safe for centuries.

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Hydrogen from Sunlight



In the quest for an efficient and inexpensive way to produce hydrogen, scientists have developed a method that mimics photosynthesis to create the clean-burning gas.

All photocatalytic systems operate essentially the same way: light absorbing materials (known as chromophores) produce electrons when exposed to light, and a catalyst combines the electrons with protons from a solution to form hydrogen gas. The new method, however, differs from traditional processes in several key ways.

In a conventional system, the chromophores consist of organic molecules, which deteriorate after a few hours. The new setup uses cadmium selenide nanocrystals, which were still going strong after two weeks. Traditional systems also use platinum-based catalysts, whereas the new method uses nickel, which is more affordable and less toxic. The new process can also be tuned to capture energy from a broader light spectrum, making it more efficient.

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Accurate GPS In Buildings



There's no argument that GPS has made life easier, but today's satellite navigation systems sometimes lack precision in complex urban areas where large buildings can block signals and cause reflections that confuse receivers. Now a new technology called Locata has been developed that not only provides precise positioning on city streets, but even works indoors.

Instead of satellites, Locata uses localized, ground-based radio transmitters that project signals a million times more powerful than GPS. The nodes are totally configurable and may be placed to suit the application. And Locata operates on the 2.4GHz global open access ISM band, so it can be deployed anywhere.

Applications for the new positioning technology are virtually endless. It could be used by emergency services to navigate urban areas and large buildings; it could guide travelers through busy airports or railway stations; it could even help shoppers locate the exact product they're looking for on store shelves. Ideally, the new technology would be used alongside traditional GPS to provide seamless positioning indoors and out.

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Brain Cells from Urine

Chinese researchers recently developed a method for converting skin-like cells from the linings of kidney tubes (which are present in urine) into neural progenitor cells. The discovery could lead to new treatments for a variety of neurodegenerative disorders including Alzheimer's and Parkinson's.

Although often equated to stem cells, progenitor cells are actually oligopotent, meaning that they can only differentiate into a few types of cells – in this case, neurons and glia cells. But the key innovation is in the method used to convert them. Rather than reprogramming their genetic code using genetically



engineered viruses, the researchers used bacterial DNA which replicates in the cell cytoplasm. In addition to being faster, it is thought that, by eliminating the need to tamper with the chromosomes directly, the chances of mutation are reduced.

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Mind Control

The latest advances in thought-controlled robotics was recently demonstrated as a patient – paralyzed from the neck down by a rare disease that erodes the brain and spinal structures – used a robotic arm to pour water from one glass to another with unprecedented dexterity.



The brain-computer interface consists of two electronic chips, each with 96 electrodes, implanted into the motor cortex and wired through the skull to a computer that translates her thoughts into electronic signals. Over the course of about 13 weeks, the patient “trained” the system by watching the arm move and imagining that she was controlling it, while the computer recorded her neural activity. Eventually, the computer was able to decode her thoughts into movements, and generate a feedback loop to fine-tune control. Within two days the patient was moving the arm in three dimensional space, and with additional practice, has been able to feed herself.

The next step will be to give the arm the sensation of touch by adding sensors to detect vibration, pressure and temperature. A wireless version is also being developed to eliminate the need for wires through the skull.

For information: Andrew Schwartz, University of Pittsburg, Department of Neurobiology, 245 McGown, 3025 East Carson Street, Pittsburgh, PA 15203; phone: 412-383-7021; email: abs21@pitt.edu; Web site: www.pitt.edu

Orbital Solar Power System



Satellites powered by solar cells are nothing new, but aerospace engineers in Japan are developing a satellite that will be capable of sending that energy back to earth. In space, photovoltaic cells can generate about ten times more energy than on the ground. The experimental satellite will produce about 2 kilowatts of electricity and convert it into microwaves which are transmitted using an antenna about 6 feet (2 meters) across. Large ground-based antennas will receive the microwaves and convert them back, generating about twice as much power per unit area as current solar plants.

The 400 kg satellite will be launched into orbit using a new solid-fuel rocket (which is also currently under development) sometime in 2017. It will be designed to orbit in the ionosphere, where air is in a plasma state, raising the question of whether plasma will interfere with microwave transmission.

The technology is likely decades away from being commercially viable. It's estimated that the cost of one satellite capable of generating the power of a single nuclear plant would be about 1 trillion yen (more than \$10 billion).

For information: Japan Aerospace Exploration Agency (JAXA), Institute of Space and Astronautical Science (ISAS), 3-1-1 Yoshinodai, Chuo-ku, Sagami-hara-shi, Kanagawa 252-5210, Japan; Web site: www.isas.jaxa.jp/e/index.shtml

3 Keys Leaders Can Use To See The Future

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First, you have to make the future more visible. Ask yourself, "In these times of unprecedented change and uncertainty, what am I certain about?" If you look closely, you'll see there are two types of change you routinely deal with, and both are fully predictable. The first is cyclical change. There are over three hundred known cycles that allow anyone to anticipate the future. For example, home values, the stock market, imports, and exports will continually ebb and flow. Those all represent cyclical changes that are in many ways easier to deal with, provided you know historically how long the cycle will last.



Sometimes, though, changes are linear. For example, someone gets an iPod and starts listening to music on that device rather than buying CDs. That person now has all her music with her at all times. That's a linear change because she's not going back to music on CDs. Other examples of linear change include globalization, the acceleration of computer processing speed, and an increase in the world's population. Linear changes, even small ones, can have devastating effects on a business. What linear marketplace changes are on your organization's radar? Identify them so you can anticipate.

Next, identify the Hard Trends—the trends that will happen—and ask yourself, “What are the disruptions on the horizon?” How we do our supply chain, purchasing, logistics, and many more functions are being transformed by technologies like the cloud and virtualization. It’s creating disruption/opportunity. You can either sit back and wait until the disruption hits—take a “wait-and-see” approach—or you can get active, what I call being proactive, and take positive action based on future known events.



For example, if you were a cable television company, you would have to look at IPTV—Internet Protocol Television—and ask yourself, “How are young people watching TV today?” You’d see they’re using tablets like iPads or using smartphones like iPhones and Androids to watch television, such as YouTube, Hulu, and Netflix to name a few. Many of them aren’t watching cable TV anymore, even though some cable channels like Time Warner have created apps recently. Most cable companies are not embracing this revolution as a new profit center even though it is already disrupting and will continue to disrupt at an ever-increasing pace.

Finally, look outside your industry for the solutions you need. You’re probably reading a lot of information every day about the industry you’re in. You’re also likely a member of multiple industry associations, and as a leader, you probably play a leadership role in some of them. However, by being so immersed in your industry, you

may be missing what’s going on outside your industry. Therefore, look outside your industry and see where others have been innovating. Find out what changes they’ve made, technologies they’ve developed or adapted, and then modify those to your situation. Learn from their mistakes so you don’t have to make them. That’s how you proactively approach the disruptions you know are coming.

So while we all know the timeless traits of leadership, there’s no competitive advantage in being just like everyone else. That’s why being anticipatory is so important. What do you see that’s about to happen, and how can you use that



to your advantage? Instead of getting stopped by things you don’t know, it’s time to anticipate what’s coming so it doesn’t disrupt you.

No matter who you are or what you do, you can anticipate. Therefore, don’t wait for your future to unfold randomly, only to end up in a place you don’t want to be. Instead, identify the certainties that await you, pinpoint the looming disruptions, and go outside your industry to devise tomorrow’s solutions today. Look at what you can do rather than what you can’t, and you’ll emerge as a timeless leader who always succeeds.



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