

TECHNOTRENDS®

Newsletter

Published by Burrus Research Associates / www.burrus.com

January, 2006

Vol. XXII, No. 1



The Both/And Principle

By

Daniel Burrus

The ability to accurately anticipate the future provides organizations and individuals with a major competitive advantage. In an effort to help you become much more accurate with your forecasts, it is important to understand the Both/And Principle. In the mid-1980s, I began to notice that top executives, managers, business publications, and the popular press were all making the same false assumptions about the future of technological change. Every time a new product category was introduced, they assumed that the older category would quickly vanish. Notice I said *product category*. The reason I use that term is because individual products do come and go, based on decisions made by management in each company. For example, in the late-'80s, many futurists made the mistake of predicting that by the late-1990s, our offices would be paperless. As of 2006, we are still waiting!

There are countless examples, but here are others I'm sure you will remember. In the mid 1990s, around the time that Netscape, Yahoo!, e-Bay and many other Web-based businesses started rapidly growing, many futurists, and the press, were predicting that bookstores, auto dealerships, shopping malls and retail stores in general would soon be obsolete. The list of mistakes about the future goes on and on. One of the reasons I did not fall into this trap of bad predictions with most of the others is that I had developed a series of guiding principles based on my research that would help me to avoid such mistakes. One of the most powerful I call the *Both/And* Principle.

Both/And thinking is a powerful corrective to either/or thinking, meaning that the future will be either one way or the other. *Both/And* recognizes the folly of assuming that the new will totally supplant the old. *Both/And* recognizes that they can be integrated. The hottest breakthrough technologies tend to coexist and integrate to create new value with their predecessors rather than completely co-opting them. Why? The old tech has its own unique profile of functional strengths. In the case of paper, it's inexpensive, portable, erasable, foldable, readable and, best of all, it doesn't disappear if the computer goes down! Digital has its powerful strengths as well; it's here to stay, but so is paper. So are:

- Brick and mortar retailers and Internet retailers;
- Paper mail and e-mail;
- Full service and self service;
- Traditional media and the Internet;
- Phones on your desk and cell phones;
- Nautical charts and GPS-based e-charts;
- Copper and fiberoptics; and,
- Gasoline engines and hybrid engines.

The list goes on and on. A key success strategy is to integrate the old and the new based on the strengths of each I'm not saying that volume and market share will remain unchanged for the old technology. Obviously, there will be additional slices taken out of the pie – some smaller, some larger. Yet, the *Both/And* new tech and old tech combinations have an amazing way of enlarging the pie itself.

The important point here is that in a *Both/And* world there isn't the horrendous pressure to place all or nothing bets on emerging technology. By all means, keep looking into the visible future and acting on what you see. To see the future – and to profit from it – think *Both/And*.

TECHNOLOGY NEWS HIGHLIGHTS

STICK-ON SOLAR PANELS

Much of the recent work in the area of solar energy has focused on making panels that are more efficient and cost-effective. But part of a new trend in the industry, called building-integrated photo-voltaics, or BIPV, has the goal of producing new solar products that automatically increase the amount of usable energy that can be generated. The idea is to build solar technology directly into the new products to integrate even more energy into the environment in different ways. One start-up company is directing its development efforts toward increasing solar energy generation by creating solar cells that are more versatile. Its solar cell, called Power Glass™, is an innovative, see-through film that can be applied to windows and convert them into energy-producing surfaces. The semi-transparent, thin-film cells could also be built into a variety of materials – including glass and plastic – turning entire buildings into solar power generators.

For information: XsunX, Inc., 65 Enterprise, Alisa Viejo, CA 92656; phone: 949-330-8060; fax: 949-330-8061; email: info@xsunx.com; Web site: www.xsunx.com

FLU CHIP

In an effort to find a faster means of diagnosing highly contagious strains of flu, researchers at the University of Colorado have come up with a chip that identifies multiple types of viruses in less than half a day. Traditional laboratory tests require up to four days, which makes it difficult to contain the spread of organisms once they are detected. Traditional laboratory tests require up to four days, which makes it difficult to contain the spread of organisms once they are detected. In using the new test, RNA is extracted from nasal secretions and placed on a glass wafer containing DNA fragments that mimic various flu viruses. If the RNA matches a specific flu strain, it will bind with the DNA. When placed under a laser scanner, the bound fragments glow in patterns of dots that are unique to each strain. The new chips may be ready in time for next year's flu season.

For information: Kathy Rowlen, University of Colorado, Chemistry & Biochemistry Dept., 215 UCB, Boulder, CO 80309-0215; phone: 303-492-5033; email: rowlen@colorado.edu; Web site: www.colorado.edu

MICROBOT

As robots continue to get smaller and smaller, their potential applications keep growing. The latest development in the field of micro-robotics is a machine about the thickness of a human hair that moves along like an inchworm and turns by planting one foot and pivoting. Although the tiny robot currently draws its power and control signals from the electrostatic surface on which it moves, later versions could be networked to perform a variety of tasks, including manipulating cells, repairing circuitry, or exploring hazardous environments.

For information: Bruce Donald, Dartmouth College, Computer Science Department, HB6211, Hanover, NH 03755; phone: 603-646-2206; email: bruce.r.donald@dartmouth.edu; Web site: www.dartmouth.edu

NANOSPRINGS

Scientists at Rensselaer Polytechnic have found yet another useful property of carbon nanotubes. In addition to being super-strong, superconductors impervious to radiation, when they are placed inside one another, they can also act as super springs. The researchers found that the tiny tubes can be compressed to less than 15% of their

original length and still bounce back to their full size without any damage. And, when combined to form a foam-like substance, they were able to withstand 10,000 cycles of compression without fracturing or losing elasticity. Applications for the new material could include cushioning highly sensitive electronic components.

For information: Pulickel Ajayan, Rensselaer Polytechnic Institute, Materials Science & Engineering, MRC 1st Floor, 110 8th Street, Troy, NY 12180; phone: 518-276-2322; fax: 518-276-8554; email: ajayan@rpi.edu; Web site: www.rpi.edu

BLOOD SUGAR READINGS IN THE BLINK OF AN EYE

A new device will make it easier and painless for diabetes patients to monitor their blood sugar without the need for finger pricks. The system works by shining an invisible beam of infrared light at the tiny blood vessels in the white of the eye (the conjunctiva) without actually touching it. The amount of light that is reflected back is proportional to the concentration of glucose in the blood. Clinical studies will soon be under way to obtain necessary FDA approval for its use. The final device will likely be about the size of a cell phone, and could become commercially available as early as 2009.

For information: John Burd, Oculir, Inc., 4930 Bradshaw, San Diego, CA 92130; phone: 619-992-2873; email: jburd@oculir.com; Web site: www.oculir.com

THE NEXT PHASE IN VOICE RECOGNITION

Today's voice recognition systems are very accurate for a limited vocabulary, but a new software technology will soon make it possible for users to access information over any IP network using normal conversational speech. By using multiple speech-recognition engines and filtering content to more accurately determine context, the technology is capable of understanding natural sentences. It was recently shown to accurately understand more than 90 % of sentences in a test demonstration. The new software can be integrated into a variety of hardware devices – such as radios, GPS systems, or control devices – to provide hands-free operation for a broad range of applications.

For information: Mike Kennewick, Voice-Box, 105 N.E. 38th Place, Building 9, Kirkland, WA 98033; phone: 425-968-7900; fax: 425-576-9155; email: mikek@voicebox.com; Web site: www.voicebox.com

COMPUTER-ENHANCED VIRTUAL COLONOSCOPY

A new computer-aided detection (CAD) software program could make virtual colonoscopy a less invasive procedure that is as accurate as traditional optical methods. Virtual colonoscopy creates a three-dimensional image of the colon using a CT scan. By evaluating the shape and density of questionable areas in the colon, the new software makes it possible to more accurately discriminate between precancerous polyps and healthy tissue. The system was tested on 792 patients and detected the same number of polyps appropriate for removal as traditional visual colonoscopy. In addition, it discovered two tumors that were missed by the traditional method.

For information: Ronald Summers, M.D., National Institutes of Health, Radiology Dept., Bldg. 10, Room 1C660, MSC 1182, Bethesda, MD 20892-1182; phone: 301-402-5486; fax: 301-451-5721; email: rsummers@mail.cc.nih.gov; Web site: www.nih.gov

ARTIFICIAL MUSCLES

Engineers at MIT are experimenting with a new technology that may someday make it possible for robots to flex their muscles as fast – or faster – than humans. The artificial muscles consist of a polymer grown in a liquid solution. The polymer is cut into muscle-like strips that can be actuated by exposing them to electrical pulses. In this experiment the electrical pulses were generated by light, instead of the more traditional method of first bathing the strips in a solution of ions. This technique speeds up the actuation time to a thousand times faster than humans can blink. Eventually, the strips will be used to give robots artificial muscles with some real flexibility in addition to strength.

For information: Xi Lin, Massachusetts Institute of Technology, Department of Nuclear Science and Engineering 24-214, 77 Massachusetts Avenue, Cambridge, MA 02139; phone: 617-253-1655; email: xilin@mit.edu; Web site: www.mit.edu

ROBOT THAT THINKS

Researchers at The Neurosciences Institute have developed a robot that is capable of learning from its own experiences. Dubbed NOMAD (Neurally Organized Mobile Adaptive Device), the two-foot tall machine contains a simulated brain that does not work by logic but by pattern recognition, more like the human brain. NOMAD can see light and hear sound, and is equipped with a gripper so it can grab objects. It has already developed a preference for striped blocks over spotted ones because it receives an electrical charge (which it interprets as “good”) whenever it picks one up. In this way it is capable of being conditioned, and is demonstrating the ability to learn through memory.

For information: Gerald Edelman, The Neurosciences Institute, 10640 John Jay Hopkins Drive, San Diego, CA 92121; phone: 958-626-2000; fax: 958-626-2099; email: info@nsi.edu; Web site: www.nsi.edu

SOLID-STATE QUANTUM LIGHT BULBS

Filament-free LEDs produce twice as much light per watt as traditional incandescent bulbs, last 50 times longer, and are much tougher. The only problem with using them as a replacement for ambient home lighting is that they cannot emit white light – the closest they can get is blue. Researchers at Vanderbilt University have found, however, that when blue LEDs are coated with a thin layer of microscopic beads, called quantum dots, the resulting LED gives off a warm, white glow similar to that of a regular light bulb. The widespread use of “quantum” lighting could greatly reduce power consumption in the future.

For information: Rosenthal Research Group, Vanderbilt University, 201 West End Avenue, Nashville, TN 37325; Web site: www.vanderbilt.edu/AnS/Chemistry/groups/Rosenthal/group_home.html

CHANGING YOUR BIOMETRIC ID

Unique biometrics, such as fingerprints, are widely used for security purposes, but the potential still exists for your stored identity to be stolen. Now, a new software technology called “cancelable biometrics” will allow your employer or bank to issue you a new set of prints in the event the security of your records is compromised. The system works by taking a set of biometric data and running it through a “transformation” program that squeezes or twists it slightly in a virtually infinite number of ways. The resulting transformed data is then stored as your new unique identification. Different transformations can be used in different locations, so that your ID at the bank is different from your ID at work, protecting your privacy even more. The software also makes it impossible to reconstruct the original image from the transformed versions.

For information: Nalini Ratha, IBM’s T.J. Watson Research Center, P. O. Box 704, Yorktown Heights, NY 10598; email: ratha@us.ibm.com; Web site: www.research.ibm.com/ecvg/biom/cancel.html