

DANIEL BURRUS'

TECHNO TRENDS

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THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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What's Your Innovation Readiness?

By Daniel Burrus, CEO of Burrus Research

To succeed at business, you just need to have huge resources and personnel to leverage, right? Wrong. You can never rely on what you've already built; your business is only as strong as its next innovation. Some companies are organizing themselves to have breakthroughs in innovation while others are failing to do so because of fear, inertia, and an overabundance of caution. There's a fine line between sloth and prudence: understanding that can make the difference between success and failure.

Though rethinking and reorganizing the fundamentals of your business can be daunting actions to take, the cost of doing nothing is far higher. Is your day-to-day management plagued with tunnel vision? How are you positioning yourself to take the leading edge tomorrow? You won't do it resting on your laurels. Truly disruptive innovation does not just mean improving something that already exists. It means taking a deep dive into the new.

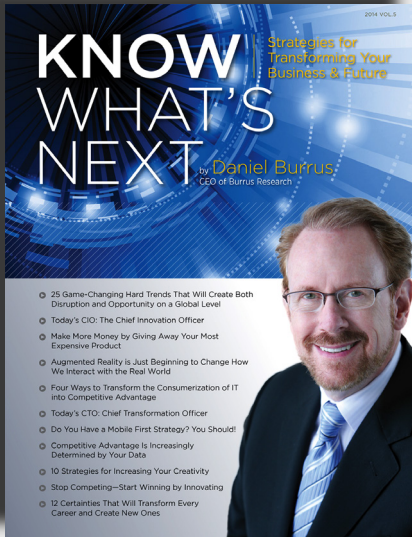
For instance, you can create a new market by focusing on a different set of values than those that are currently dominating. Think about the early world of digital cameras. Every model had high price tags and dozens of settings to toggle, suitable for professional photographers or dedicated hobbyists. The smartphone totally disrupted the digital camera industry because it opened the doors of photography to a huge new market more interested in speed and convenience than perfect image resolution. Now those young people have a serviceable



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TECHNOLOGY NEWS HIGHLIGHTS

Voice Biometrics

The latest addition to your digital profile may very well be the sound of your own voice. Often referred to as the invisible biometric, the "voiceprint" is becoming an increasingly popular means of identification, and a step up from knowledge-based security methods.



The technology takes advantage of the fact that a person's speech is as unique as a fingerprint, with hundreds of distinctive characteristics relating to the sounds of air flowing out of the lungs, across the vocal chords, over the tongue and out through the lips, nose and teeth. Once all of these features are analyzed, they can be compared to the voiceprint on file to verify or identify the speaker. One obvious advantage is the elimination of layers and layers of PINs, passwords and security questions that have become the hallmark of knowledge-based systems. But better than that, would-be hackers are discouraged from attempting to break into voiceprint secured accounts because doing so requires that they leave behind their own voiceprint.

No longer the exclusive purview of governments and intelligence services, voice biometrics are already gaining momentum in the business sector with revenues expected to double over the next year. It's been estimated that over 65 million voiceprints have already been harvested and stored in databases for commercial as well as security/surveillance applications.

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Nuance Communications, Inc., 1 Wayside Road, Burlington, MA 01803; phone: 781-565-5000; fax: 781-565-5001; Web site: www.nuance.com

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3D Selfies



Digital cameras and smartphones may have brought about the demise of photo booths and mall portrait studios, but a new trend is beginning to emerge that could redefine the family snapshot. Enter...3D scanning and printing.

There are currently at least four locations in New York City alone where you can walk in, step into a full-body scanning booth for a few minutes, and a few days later receive a miniaturized statuette of yourself. The figures are typically printed in full color using gypsum powder glued together with colored ink, but the technology lends itself to a variety of materials. For example, one supplier offers to reproduce your likeness in chocolate, at 99£ (about \$150) for a box of six.

Retail chains are also getting a piece of the action. At select Walmart and Sam's Club stores you can have your face (or your child's face) scanned and placed on the body of one of three Marvel action heroes. And Staples is looking at getting into the business of providing personalized bride and groom wedding cake toppers to future-thinking bakeries.

For information: iMakr; Web site: www.imakr.com
3DPlusMe; Web site: www.superawesomeme.com
3ders.org; Web site: www.3ders.org

More Eyes on the Road

Driving assistance systems have become commonplace on many newer models of cars. However, most



of these systems are limited to alerting the driver of an impending collision or unintended lane change. Now a new microcamera is in development that can also detect traffic signs and signals, providing an added level of safety.

For example, the camera can automatically detect and process a change in speed limit that could easily be overlooked by the driver. Similarly, it can advise the operator of stop signs, one-way streets and no passing zones. The image processing algorithm can be customized for a variety of scenarios and adapted to the traffic signs that are typical for a given country. It can detect objects, people animals and their position and be coupled to the braking system to avoid an accident; or it may be mounted on the dashboard and trigger an alarm if the driver appears drowsy.

The optics and processing circuitry – consisting of 72 passive and 13 active components – are all integrated directly into the circuit board using glass fibers and epoxy resin. By embedding the electronics in this manner, the system is impervious to vibrations, even on uneven roadways. Its small size (16 x 16 x 12 millimeters, including optics) will make it easy to integrate into a variety of vehicles.

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Smart Bandage



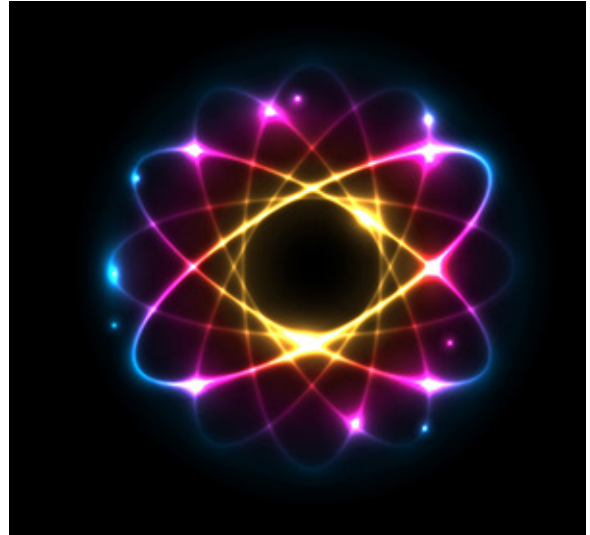
An international research team has created a paint-on, see-through bandage that glows to indicate the oxygen concentration level around a wound. The ability to accurately map tissue oxygen levels in severe acute and/or chronic burns and wounds may significantly improve the success in treating them and restoring physical function.

The bandage consists of a viscous liquid that contains phosphors which emit a glow, depending on how much oxygen is present. The lower the concentration, the more brightly the phosphors glow. The liquid is “painted” onto the skin and dries to a solid film in a matter of minutes. A transparent barrier layer is then applied to make the bandage more sensitive to changes in tissue oxygen by preventing the exchange of gases between the bandage and room air.

A camera-based readout device is used to generate a burst of light that triggers the phosphors in the bandage. The resulting glow can be measured by its brightness or by the color of the light emitted to create a map of tissue oxygenation levels. The variations in color and intensity can also be captured on a camera or smartphone, paving the way for a field-ready device.

For information: Conor L. Evans, Massachusetts General Hospital, Wellman Center for Photomedicine, 50 Blossom Street, Boston, MA 02114; phone: 617-726-1089; Web site: www.massgeneral.org/Wellman/

Compact Fusion



Harnessing the power of nuclear fusion has been the holy grail of energy technology for the last 60 years. And for good reason. It's clean. It produces no harmful radiation. And it has unlimited potential to power ships, aircraft and even cities using very little fuel. But it also has its drawbacks.

Unlike fission, which splits atoms apart, creating large amounts of heat that can be used to generate power, fusion uses heat to fuse ions together, causing them to release large amounts of energy. The process generates three to four times more power than a fission reaction and about a million times more power than a chemical reaction. In fact, it's the same process by which the sun generates unbelievable amounts of energy. The tricky part is keeping those ions (which form blazing hot plasma) away from the sides of a reactor container, a feat which is traditionally thought to require massive magnets and a reactor the size of a large building.

Although still in the theoretical stage, a new approach is being investigated that scales down the reactor to about one-tenth the size of previous concepts. By reducing the size of the device, it will be easier to build and faster to develop and refine. And in the end, instead of a building-sized reactor, a fully functional reactor capable of powering a city of 100,000 people could fit on that back of a truck.

For information: Lockheed Martin, 6801 Rockledge Drive, Bethesda, MD 20817; phone: 301-897-6000; Web site: www.lockheedmartin.com/us/products/compact-fusion.html

Big Data...Big Medicine



“Big data” has enormous potential to transform medicine by revealing patterns among diseases, genes, lifestyles, geographical areas, and countless other parameters. In addition, benefits and side effects of specific medications or treatments could be more easily identified, even in small subsets of individuals. But the barriers to harnessing the power of big data for this purpose are many, not the least of which is the importance of maintaining patient confidentiality.

For this reason, the National Institutes of Health (NIH) recently announced a program called Big Data to Knowledge (BD2K), which is aimed at developing a comprehensive strategy to catalog and index health-related datasets for building a searchable, online, digital library. Known as the Biomedical and healthCARE Data Discovery and Indexing Ecosystem (BioCADDIE), the three-year project will draw on the expertise of biomedical librarians as well as researchers to increase the usefulness of data that's already being collected in a variety of formats, while maintaining a clear distinction between published and private information. It is hoped that encouraging the sharing and re-use of biomedical data will accelerate the pace of medical discoveries while lowering cost.

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Magnetic Computers

Worldwide, it's estimated that 2.7 zettabytes (that's 2.7 followed by 21 zeroes) of data are currently being stored on magnetic media. Magnetic materials are tremendously useful for the task because they can retain information for long periods of time without consuming power. This has led researchers to investigate whether they could also be used to build computers and make them more power efficient.

Computer simulations have shown that magnetic wires 1/200th the diameter of a human hair can form “tornadoes” of magnetization (technically known as magnetic vortex domain walls). By encoding the clockwise and counter-clockwise rotations as zeroes and ones, they can encode binary data and create logic gates, which form the basis for performing calculations. In other words, magnetic materials could be used not only for storage, but also to process data more efficiently.

The next step will be to create experimental prototypes to determine if they can be made small enough and fast enough to become a viable technology.

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the healing process to administer medications only as long as they are needed.

For information: John Rogers, University of Illinois at Urbana-Champaign, Frederick Seitz Materials Research Lab, 104 S. Goodwin Avenue, M/C 230, Urbana, IL 61801; phone: 217-244-4979; email: jrogers@illinois.edu; Web site: <http://rogers.matse.illinois.edu/index.php>

Dissolving Circuits



Integrated circuits that dissolve completely in water may be the next step in developing a variety of new devices from “green” consumer electronics to implantable medical devices that disappear when they’ve performed their intended function.

These circuits combine advances in materials chemistry, studies of dissolution, engineering development of components and sensors, and new fabrication techniques to address the challenges of biocompatibility and high volume manufacturing. Biomedical implants represent one major area of application for physically “transient” devices. For example, brain monitors that aid in rehabilitation or stimulators that accelerate bone growth could be made to disappear through resorption into the body, eliminating the trauma of removing them surgically. Or devices that are designed for programmed drug delivery could be triggered by

What’s Your Innovation Readiness?

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digital camera in their pockets at all times, and one that takes them about one minute to master.

But this isn’t about coming up with a new product; it isn’t even necessarily about tapping into new markets. To be a successful innovator, you have to be aware of the hard trends that will disrupt your current models. You need to think critically and proactively not about what might happen, but about what is absolutely inevitable.



The Mindset That Increases Innovation Readiness

The biggest hurdle for innovation readiness is

your organization's mindset. Human beings are programmed to love feeling comfortable and secure. The problem is that our need for comfort and tendency to blindly adhere to "the way we've always done things" make us very ill-suited to succeed in a world that is constantly and rapidly shifting underneath our feet.

For example, I've written about how the best way to "fix" a tough problem is often to skip it entirely. Those problems that seem most important right now—the ones eating into your daily schedule and keeping you up at night—those are trapping you. It's familiar, almost easy, to plug away at the same challenges, because it's safe, and you know the terrain.



You mire yourself in the tasks of keeping your current model chugging along, and so you end up robbing yourself of all the time and attention you should be devoting to understanding the next disruption and seizing the opportunities that it will bring. Trust me: whatever challenges are dogging you on the day-to-day level are insignificant compared to the shift that's coming your way.

Innovation doesn't happen in the comfort zone. It happens when you understand how much you're going to have to grow and transform in order to not keep up with disruptive change, but to anticipate it. The key thing is for your company to understand that innovation is uncomfortable because it's new, not because it's bad.



Ask yourself: what can you do to create an environment among your leadership and employees that embraces the discomfort zone where real creativity happens? Let this question penetrate your plans and practices, and you'll find that you have the power to be the disruptor, not the disrupted.

"Safe and secure" is just another way of saying "on borrowed time."



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