

DANIEL BURRUS'

TECHNO TRENDS

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THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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25 Game-Changing Hard Trends for 2014 - Part 2

By Daniel Burrus, CEO of Burrus Research

Last month I shared 12 of my Top 25 Game-Changing Hard Trends that will cause both disruption and opportunity on a global level. This month, I bring you 13 additional trends to complete the list. Remember, to stay competitive, your organization needs to anticipate the technology trends that are shaping your business and then develop innovative ways to use them to your advantage in your organization. Use this list as a roadmap to be pre-active and determine how your company can profit from these trends now and in the future.

13. 3D Displays for Smart Phones and Tablets will be the breakthrough that will drive wide-scale consumer acceptance of 3D computing. This trend is just starting with hand-held gaming systems and, thanks to the need to visualize ever increasing amounts of rich data, we will see 3D data simulations for the enterprise grow rapidly starting with the military and then to medicine, fashion, architecture, and entertainment to name a few.

14. Augmented Reality (AR) Apps will become more common, adding just-in-time information to our physical world. Simply aim your smart phone camera at a crowded street to find the stores who have the exact products you are looking for. Or, when you are in a store, use your phone's camera and AR app to quickly locate the products you need. Put on a pair of Google Glasses and see the information you need about how to service your lawn mower or install a water filter. Every business and school could find a great use for this powerful tool.



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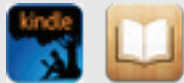
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TECHNOLOGY NEWS HIGHLIGHTS

Zapping Alzheimer's

A new tool for treating brain disorders is providing clinicians with yet another way to fight Alzheimer's and other devastating conditions. Known as transcranial magnetic stimulation (TMS) the system activates underused portions of the brain using electromagnetic wave pulses. Unlike the controversial electroshock or electroconvulsive therapy (ECT), which has been used in the past to counteract severe depression, TMS carries nearly no risk of seizure because it is aimed at specific regions of the brain and operates at greatly reduced intensities. Treatments generally last about 20 minutes and may continue for up to six weeks, depending on the disease.



Two independent companies are currently marketing devices that operate on this principle – one that is targeted for Alzheimer's and another that is designed to combat a range of disorders including depression, Parkinson's, autism, and tobacco addiction. Further research is aimed at using TMS to treat other addictions as well as obesity.

For information: Ronen Segal, Brainsway, 19 Hartum Street, Bynet Building, Har Hotzvim, P.O. Box 45169, Jerusalem, Israel 91451; phone: 855-200-DTMS; fax: +972-2-581-2517; email: info@brainsway.com; Web site: www.brainsway.com/usa/

Tracking In-Store Shoppers

Indoor tracking is already being widely used by big-box retailers to log information about how much time shoppers spend in certain departments, but for all intents and purposes, until they check out, little is known about their actual purchase decisions.

That's why the next big thing in indoor location technology will likely be to bring Internet-style behavioral advertising to brick-and-mortar stores, offering product suggestions based on customer profiles and activities.



For example, if you put a jar of peanut butter into your grocery cart, your smartphone may send you a message for a dollar off on a loaf of bread. Or, when you begin browsing the cold medication aisle, a coupon for Kleenex may pop up on your screen. A store-specific app may even include a graphical presentation of where the product is located and the most efficient route to get there.

Many experts believe that indoor mapping will revolutionize retailing and couponing. Others are somewhat cautious, citing privacy concerns. Either way, it's safe to say that shopping experiences will continue to evolve well into the future as retailers begin to engage more proactively with their customers via smartphones.

For information: Point Inside, Inc., 800 Bellevue Way, Bellevue, WA 98004; www.pointinside.com

Ultrasonic Windshield Wipers



Did you ever wonder how fighter jets keep their windshields free of rain, insects and other visual obstacles? No, it's not the squeegee-type blade that was patented before the Model T hit the assembly line, and has been used on just about every automobile for more than a century. It's more like an ultrasonic force field that envelops the windshield to repel anything in its way. And recently, the leading designer of Formula One and Nascar racecars announced that it's considering adapting the same technology for its legendary supercars.

It works by surrounding the windshield with high frequency sound waves (so high that they're not even audible to bats). These ultrasonic waves generate vibrations which cause tiny bubbles to form and collapse at a high rate, lifting up and peeling away anything that attaches to the surface. Side benefits include improved aerodynamics and a simpler design with fewer moving parts.

For information: McLaren Applied Technologies, Ltd., McLaren Technology Centre, Chertsey Road, Woking, Surrey GU21 4YH, United Kingdom; phone: +44-(0)1483-261400; fax: +44-(0)1483-261402; Web site: www.mclaren.com or <http://cars.mclaren.com/home/html>

e-Fabric Battery

Up to now, development of truly “wearable electronics” has been limited by the battery technology required to power them. Still tethered to wall outlets



by chargers and cords, many apparel-integrated electronics need to be disassembled and plugged in, making them cumbersome to use. But a recent breakthrough in e-textiles could overcome these hurdles and take smart clothing to the next level.

A group of Korean researchers has developed a robust battery that can be woven directly into fabric by coating polyester yarn with nickel, followed by carbon, and covering it with a layer of polyurethane. Adding lightweight solar cells to the fabric allows the wearer to recharge the battery without plugging it in. And the material is flexible enough to keep working even after being folded and unfolded many times.

For information: Korea Advanced Institute of Science and Technology, 291 Daehak-ro, Yousung-gu, Daejeon, Republic of Korea 305-701; Web site: www.kaist.ac.kr

Air Bag Bicycle Helmet

Bicycle helmets are only useful if people wear them, and an alarmingly high percentage of people simply don't. Excuses abound...they're hot, they're uncomfortable, they look silly, and (perhaps most of all) they ruin your hairdo.



Enter...the Hovding device (also billed as the “invisible” bicycle helmet). Designed to be an airbag for your head, it looks like a bulky scarf that's worn around your neck, but actually contains sophisticated sensors and gyroscopes. A built-in computer monitors a cyclist's movements, velocity and angle, and any abnormal patterns which would be indicative of a collision will trigger a small gas canister in the back of the collar to inflate a protective nylon hood that covers the head and neck. Like an airbag, once deployed it cannot be used again.

In an independent study of the thirteen most popular helmets on the market by a Swedish insurance company, the Hovding device demonstrated three times better shock absorption than any competitive helmet. It currently retails for about \$500.

For information: Hovding, Grimsbygatan 24, 211 20 Malmö, Sweden; phone: +46-40-236868; Web site: www.hovding.com/en/

Desert Fish Farm

When you first think about it, cold-water fish farming in the middle of the desert doesn't seem to make financial sense. Building a land-based recirculation aquaculture system covering an area of 500,000 square meters at a cost of more than



\$27 million, plus the ongoing costs of keeping the tanks cooled to a temperature of 13 degrees Celsius (about 50 degrees Fahrenheit) sounds too expensive to be competitive. But one Middle Eastern firm is betting that it will pay off in a big way.

First of all, the cost of shipping salmon (for example) from northern Europe can run up to \$5 per kilogram, so producing it locally results in big savings. While the company can, and has, built tanks offshore, in the long run they see onshore farming to be much more environmentally sound and sustainable, since it avoids issues such as acid rain, high tides and elevated water temperatures that already threaten oceans and marine life. In addition, there is less likelihood of spreading diseases or otherwise causing harm to wild fish.

The new facility will be capable of producing approximately 4,000 tons of fish per year including salmon, Hamour, and sea-bream.

For information: International Fish Farming Holding Co. PJSC, Silver Wave Tower, 4th Floor, Unit 404, P.O. Box No. 32619, Meena Street, Abu Dhabi, United Arab Emirates; phone: +971-2-644-8090; fax: +971-2-644-7060; Web site: www.asmak.biz

LED Carpet



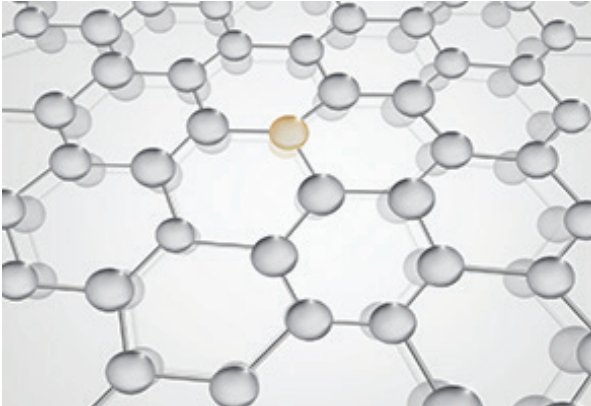
Two global leaders in lighting and carpets recently announced a partnership to develop “light transmissive carpets” capable of turning floors into displays. The key was to replace the traditional rubber carpet backing with something that could transmit light and still stand up to the wear and tear of heavy foot traffic. The result was a translucent plastic laid on top of a thin steel screen containing an array of LEDs.

One of the first applications for the new floor covering will be for animated signage on the floors of airports, theaters, hotels and other public areas, not only to guide people to their destination but also to facilitate efficient evacuation in the event of an emergency. From a purely aesthetic standpoint, the lighted carpet could not only enhance ambiance but also serve to visually declutter busy areas by making information visible only when it's needed. And it's only a matter of time (probably not long) before we'll see it being incorporated into interactive gaming technologies.

For information: Desso, Taxandriaweg 15, 5142 PA Waalwijk, The Netherlands; phone: +31-(0)416-684-100; Web site: www.desso.com

Philips Licht Nederland, Boschdijk 525, Postbus 90050, 5600 PB Eindhoven, The Netherlands; phone: +31-40-278-7500; Web site: www.lighting.philips.nl/

Self-Healing Polymers



The ultimate in sustainability is finding materials that can repair themselves, and while several researchers have come up with ways to mend small cracks or surface scratches, they have yet to develop something that can regenerate large sections of damaged material, such as the broken leg of a chair. Recently, engineers proposed a model for a composite polymer gel that could do just that by taking inspiration from nature – specifically from amphibians that can regenerate severed limbs.

The model divides the process into three distinct instruction sets. The first is initiation, in which the material senses the removal of material and initiates regrowth. The second is propagation, where the growth continues until it reaches the desired size. The third and final stage is knowing when to terminate the process.

The proposed material is a hybrid of nanorods embedded in a polymer surrounded by a solution of monomers and cross-linking molecules. When a break in the gel occurs, the nanorods adjacent to the cut act as sensors and initiate a polymerization reaction between the monomers and cross-linking molecules, creating a new gel. Complex computational models are used to establish

guidelines for terminating the reaction once the break has been sealed.

The model is a first step toward developing even more complex materials and processes with vast practical applications.

For information: Anna Balazs, Ph.D., University of Pittsburgh, Swanson School of Engineering, 151 Benedum Hall, Pittsburgh PA 15261; phone: 412-648-9250; fax: 412-624-9639; email: balazs@pitt.edu; Web site: www.pitt.edu or www.engineering.pitt.edu/chemical/

25 Game-Changing Hard Trends for 2014

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15. Intelligent Electronic Agents using natural language voice commands was launched with Apple's Siri, which was rapidly followed by Android, Microsoft, and others all offering what will become a mobile electronic concierge on your smart devices, including your phone, tablet, and television. Soon retailers will have a Siri-like sales assistant, and maintenance workers will have a Siri-like assistant. The possibilities are endless.

16. Digital Identity Management will become increasingly important to both organizations and individuals as new software allows users to better manage their multiple identities across business and personal networks. **Next Generation Biometrics** integrated into your smart phone, as Apple has recently done, as well as tablets and other devices, will play a key role in both identity management and security. As this hard trend continues, expect to see multiple biometrics, including facial recognition and voice recognition, used based on the level of security you need.

17. Mobile Banking and Payments using smart phones as an eWallet is already being used in an increasing number of countries and will finally take off on a larger scale thanks to an increasing number of phones with either secure **Mobile Banking Apps**, and/or **Near Field Communications (NFC)** chips. More important, banks and credit card companies are already starting to see non-bank competitors jump in to the mobile payment race, including Google Wallet and Apple's Passbook to name a few.

18. Visual Communications takes video conferencing to a new level with programs like SKYPE, FaceTime, and others giving us video communication on phones, tablets, and home televisions. Visual Communications will be integrated with current video conferencing systems, fueling this as a main relationship-building tool for businesses of all sizes. This is the year we will see sales organizations using this to enhance communication and collaboration, gaining new competitive advantages.



19. Enhanced Location Awareness will accelerate the number of business-to-consumer apps for smart phones and tablets that will take geo-social marketing and sales to a new level of creative application, driving rapid growth. In addition, **Geo-Spatial Visualization** combines geographic information systems (GIS) with location-aware data, RFID (radio frequency identification), and

other location-aware sensors (including the current location of users from the use of their mobile devices) to create new insights and competitive advantage. Early enterprise applications include logistics and supply chain to name a few.

20. Smart TV Using Apps and Streaming

Entertainment will get a major boost in the marketplace, fueling a major shift in home viewing. Ever wonder how you could have over 500 cable or satellite channels and nothing to watch? You didn't have apps on your TV allowing you to personalize the experience. In addition, tablets are increasingly becoming a viable replacement for the second and third TV in homes. This is the beginning of a major shift that will take place in living rooms globally.

21. Personalized Manufacturing of finished goods using **3D Printing (Additive Manufacturing)** will grow exponentially. 3D printers build things by depositing material, typically plastic or metal, layer by layer until the final product is finished. Originally designed to print prototypes, they are increasingly being used to print final products such as jewelry, iPhone cases, shoes, car dashboards, parts for jet engines, prosthetic limbs, human jaw bones, and much more. It allows companies to manufacture one-of-a-kind or small runs of items quickly, locally, and with far fewer costs. We will begin to see **Manufacturing as-a-Service (MaaS)** begin as designers use CAD software to design a product, digitally send it to 3D Printing company who owns the industrial strength 3D printers, and then they will ship it to the customer.

22. Smart Machines, Smart Homes, Smart Cities, and Smart Cars Will Increasingly Become Aware of Situational Changes and Respond as they get more connected and smarter thanks to embedded and networked sensors combined with other technologies such as GPS. **Machine-to-Machine Communications** using chips, micro sensors,

and both wired and wireless networks will join networked sensors, creating a rapidly growing “Internet of Things” sharing real-time data, performing diagnostics, and making virtual repairs all without human intervention. By 2020, there will be well over a billion machines talking to each other, performing tasks, and making decisions based on predefined guidelines using artificial intelligence. For example, we may not want our cars to drive themselves anytime soon, but we do want them to keep us from having accidents, and they will. A Smart Bridge will communicate to our car that there is ice on the road ahead and slow the car down to a safer speed.

23. Advanced Automation and Robotics will take a giant leap forward after decades of promise but slow growth thanks to exponential advances in processing power, storage, and bandwidth. Also, thanks to better sensors, artificial intelligence, and Siri-like voice communications, robots will work with humans in new and productive ways.

24. Drones For Fire, Police, and Search and Rescue have already proven to be of high value and this hard trend will rapidly grow. Agricultural

applications for checking crops, fences, and cattle are also important given the more remote nature of the industry. Expect the U.S. government to limit the use of drones for businesses such as delivery services due to privacy and environmental issues.

25. Energy Storage starts to become a reality as companies such as Tesla start to sell their smart battery systems to homes and businesses who generate some of their own power using solar, wind, or other systems. In addition, as first generation hybrid vehicles get too old for the marketplace, there will be millions of batteries that will still hold enough of a charge to be repurposed into inexpensive energy storage systems. Looking a little further out, as electric and hybrid cars increase in numbers, they will increasingly be plugged into the smart grid when not in use, providing the first national energy storage system.

Spot Your Own Hard Trends

Are these the only game-changing technology-driven trends to be aware of? Of course not. As we all know from past experience, technology is always evolving, resulting in new trends emerging and new products appearing every day. That's why smart organizations stay ahead of the trends by anticipating them, adapting them to their unique environment before the competition does, and ultimately enabling the organization to profit from them. The more you're able to do that, the sooner your organization will reach the next level of success.

