

DANIEL BURRUS'

# TECHNO TRENDS

THE BIG IDEAS THAT ARE  
CHANGING EVERYTHING

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## Anticipating Digital Disruption

By Daniel Burrus, CEO of Burrus Research

Why didn't a cab driver think of Uber? Why didn't Barnes & Noble think of Amazon? Why didn't Blockbuster think of Netflix? Why didn't Marriott think of AirBnB?

The answer to all four, and the myriad other companies displaced by digital disruption, is that at some point, you established a cash cow—a product or service that generates the majority of your income and profits—and you spent years and even decades building a successful business around it designed to not only grow, but also to protect and defend it. The fact that most of us are all so busy and so focused, coupled with the ongoing need to meet or exceed your quarterly numbers will keep you from looking far enough outside of your business and industry to see the disruption ahead.

In order to thrive in this time of exponential change and rapid digital disruption, it is imperative to actively scan far outside of your industry looking for new ways to disrupt yourself, before others do it for you. When you do discover a new technology or technology-driven trend that could be used to disrupt you, it is important to separate what I call the Hard Trends that will happen from the Soft Trends that might happen.

When you can anticipate a disruption before it happens, you now have a powerful choice. You can either be the disrupter or the disrupted. You can use predictable Hard Trends to create the new cash cows that will disrupt your competitors and grow your future. It's important to understand that disruption can either bring opportunity (if you get there early)—or disaster (if someone

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## TECHNOLOGY NEWS HIGHLIGHTS

### Better Batteries From Wood

Researchers recently announced that they've developed a method for producing high-capacity batteries from wood pulp. Known as aerogel, the new wood-based material allows for greater flexibility in battery design.



Typical batteries are basically two-dimensional in terms of the way they store energy – trapping electrons on the surface of a non-flexible substrate. In order to reduce weight, manufacturers have focused on making them as thin as possible. But that also makes them less resistant to shock and stress. Aerogel, on the other hand, is a foam-like material that is not only stronger and lighter; it also allows batteries to be built in three dimensions to store significantly more power in less space.

The process begins with breaking down tree fibers to approximately one-millionth their normal thickness to create nanocellulose. These molecules are frozen, freeze-dried, and then processed to stabilize them and prevent the material from collapsing. The resulting foam (which resembles a foam mattress) can be touched and even compressed without breaking.

The final step is to treat the material – inside and out – with a conductive ink to give it the desired electronic properties. Because it's three-dimensional, the total conductive surface area is substantially increased. For example, when spread out, one cubic decimeter (about 4"x4"x4") of aerogel would cover an area the size of a football field.

Best of all, since they're made from cellulose, the new batteries are environmentally friendly.

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## Smart Clothing



Google's Advanced Technology and Projects (ATAP) group recently partnered with Levi Strauss & Co. to launch Project Jacquard, an initiative aimed at taking smart clothing to a whole new level.

Using a combination of metallic alloys and natural and synthetic fibers, they have created a conductive yarn that is sensitive to touch and/or gestures. It can be woven directly into the fabric or used to create sensor arrays throughout a garment to capture signals, which are then transmitted wirelessly to a smartphone or other mobile device.

The applications are as limitless as the apps that will run them – GPS, directions, notifications, text messages, and much more. Eventually conductive fabrics could even be incorporated into wearable devices that monitor physiological parameters such as heart rate, temperature and oxygenation.

*For information: Levi Strauss & Co., 1155 Battery Street, San Francisco, CA 94111; Web site: <http://levistrauss.com/>  
Google, Inc., 1600 Amphitheatre Parkway, Mountain View, CA 94043; Web site: <https://www.google.com/about/>*

## Self-Destructing Electronics

The downside of electronic devices that are constantly being improved and replaced is that most of the “old”



devices end up in landfills, where they may take centuries – or even millennia – to break down. But researchers have now developed a way to reduce electronic waste and improve sustainability in manufacturing by creating devices that can either dissolve away or easily be broken down into their molecular components to be recycled.

The work is the result of a collaborative effort between two multidisciplinary research groups. The initial project was to develop transient electronics for biomedical implants that dissolve in water. This latest work expands on the triggers to include ultraviolet light, mechanical stress and heat.

The heat-triggered, self-destruct devices consist of magnesium circuits printed on thin, flexible substrates. Tiny drops of a weak acid encapsulated in wax are used to coat the device. When heat is applied, the wax melts, releasing the acid, which dissolves the device within a couple of minutes. By tuning the thickness of the wax, concentration of the acid, and the temperature, the speed of the reaction can be controlled. Different parts of a device can be coated with waxes of different melting points to selectively eliminate some portions while preserving others. They have even developed a means to control the reaction remotely by embedding a radio-frequency receiver and an inductive heating coil into the device, allowing a user to activate the self-destruct sequence on demand.

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## Bladeless Wind Generator



The latest development in wind turbine design isn't a turbine. In fact, it has no moving parts at all! The simple design – which resembles a giant straw – means that it's less expensive to manufacture, cheaper to maintain, and should last considerably longer than typical wind turbines.

Called Vortex Bladeless, the new generator utilizes a force known as vorticity. This aerodynamic effect occurs when wind breaks against any solid structure. In fact, architects and engineers try to avoid these forces when designing buildings, bridges and other structures because of the potentially damaging effects (see, for example, the Tacoma Narrows Bridge). But the Vortex Bladeless exploits this phenomenon, using the wind to produce mechanical oscillations that can be converted to electricity by an alternator in the generator base. An integrated system of magnets adjusts on the fly to optimize the movement based on the wind speed.

Although the bladeless generator captures about 30 percent less energy than a typical turbine, the design allows more of them to be installed in a given area. Combined with lower manufacturing and maintenance costs, it is estimated that the new system will cut energy costs by about 40 percent over traditional turbines. In addition, they oscillate

at frequencies below 20 Hz, so they produce no audible noise; and they're much safer for birds.

The company hopes to introduce a 42-foot, 4-kilowatt home version called Vortex Mini sometime next year at a tentative price of \$5000, and a 1-megawatt Vortex Grand (large enough to power 400 homes) by 2018.

For information: Vortex, Barcelona, Spain; Web site: <https://www.indiegogo.com/projects/vortex-bladeless-a-wind-generator-without-blades--3#/story>

## App-Enabled Soccer Ball

Adidas recently released a new addition to their miCoach product line that helps soccer players fine-tune their



kicking technique by providing instant feedback on a variety of performance metrics. Called SMART BALL, the size 5 regulation weight soccer ball has the feel and reaction of a normal ball, but is designed to communicate with the miCoach app to analyze kick data and provide tips for mastering new techniques and improving ball control.

A sensor array suspended in the center of the SMART BALL collects data, and proprietary algorithms determine the speed, power, spin, strike point and trajectory of the kick. The information is transmitted via Bluetooth to a mobile device where the miCoach app predicts and displays the complete path of the ball, even if it's kicked against a wall. Tutorials offer advice based on the data, and a library of ball-mastery videos provide guidance for improving ball touch

and handling. Users can also capture video of their kicks to share with friends, prove their ability with power and speed challenges, and track their progress in their personal record book.

Battery life is about 2000 kicks or one week and recharge time is approximately one hour. The package retails for about \$200.

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Celsius; an antibacterial paint that destroys up to 99 of surface bacteria; and a rust-proofing paint that protects objects immersed in seawater for up to 10 years.

A side benefit of finding new uses for agricultural by-products as ubiquitous as rice husks is the additional revenue it will generate for famers.

*For information: Dr. Nguyen Thi Hoe, Kova Paint Group, Lot 32, Lien Co My Dinh, Tu Liem, Hanoi, Vietnam, 10000; phone: +84-4-3764-7750; fax: +84-4-3764-8035; email: [Hanoi@kovapaint.com](mailto:Hanoi@kovapaint.com); Web site: [www.kovapaint.com/en/](http://www.kovapaint.com/en/)*

## Bullet-Proof Paint



A Vietnamese research chemist recently introduced a new type of paint that can stop a bullet from two meters away. The key ingredient is a nano-silica substance found in rice husks. While conventional protective vests require 20 to 40 layers to obstruct a bullet, the number of layers could be reduced to 6 when coated with the new paint. That translates into less bulk and weight for the wearer.

But it turns out that rice husks have some additional properties that have been incorporated into other paint products. For example: a fire-resistant paint that can protect wood, steel and concrete surfaces for up to 6 hours at temperatures of 1000 degrees

## Smart Diaper



Last year, Intel introduced Edison, a lightweight, low-power development platform designed to fuel the move toward wearable technology. The tiny computer includes a 22nm chip, onboard WiFi and Bluetooth in a package about the size of an SD card, and developers all over the world have been using it to power the Internet of Things (IoT).

One such application that recently debuted at Computex is called DiaperPie. The small module sits inside a regular diaper and monitors the presence of moisture (pee) and methane (poo), as well as baby's temperature and sleeping position. Information is sent via Bluetooth LE to a smartphone app to alert

parents when baby needs a change. The data is also logged on the app and in the cloud.

Although it's not yet a commercial product, DiaperPie is expected to be about the size of a coin, if and when it's released.

*For information: Acer Inc., 8F., 88, Sec. 1, Xintai 5th Road, Xizhi, New Taipei City 221, Taiwan; phone: +886-2-2696-1234; fax: +886-2-2696-3535; Web site: [www.acer.com](http://www.acer.com)*

## Mirror, Mirror on the Wall...



In an effort to compete with online retailers' ability to gather information and recommend products to their buyers, upscale brick-and-mortar retailers are upgrading their fitting rooms with high tech mirrors that offer similar capabilities. Shoppers who try on clothes are nearly twice as likely to make a purchase as those who just browse. But only about 28 percent of shoppers at a typical clothing store ever walk into a dressing room, often because customers have a perception that fitting rooms are dingy, dimly lit spaces with poor (if any) service. But that could change thanks to some innovative new technologies.

The Memory Mirror features an advancement called virtual dressing that uses simple body gestures to change outfits, display 360 degree views and make side-by-side comparisons. Users must register and

provide an email address to use the mirror's features, however all data collected remains anonymous.

The Magic Mirror recommends selections based on gender, which is automatically recognized when they enter the dressing room. It also incorporates a feature that allows customers to purchase items directly from the mirror and have them shipped to their home.

Yet another approach utilizes radio frequency identification (RFID) embedded in the clothing tags. Customers indicate which items they would like to try on, and the sales clerk sends them a text message when the fitting room is ready. And it seems to be working. The two pilot test sites are selling clothing at a rate two-and-a-half times faster than they projected.

*For information: MemoMi Labs Inc., Palo Alto, CA; phone: 650-646-3888; email: [info@memorymirror.com](mailto:info@memorymirror.com); Web site: <http://wp.memomi.co> or <http://memorymirror.com>  
Big Space, 350 7th Avenue, New York, NY 10001; phone: 212-564-5924; Web site: [www.thebigspace.com](http://www.thebigspace.com)  
eBay Enterprise; Web site: [www.ebayenterprise.com](http://www.ebayenterprise.com)*

## Digital Disruption

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else does). I won't spend time now covering how to separate these two types of trends in this blog because I have written extensively about this over the years as well as covering the methodology in my New York Times bestseller Flash Foresight.

A second reason so many companies fail to see the disruption that lies ahead is that when someone from the outside uses digital disruption to disrupt you, the strategy most often invoked is to protect and defend the status quo. It is amazing how much time and money organizations spent protecting and defending their current cash cows. In the past this was a valid strategy that did produce good results. But digital disruption is different. Because it tends to be game-

changing with a very low cost of entry, it is not hard for a small startup to quickly disrupt not only a big business, but even an entire industry.



A key to success for an established company that's facing the early stages of being disrupted is to adopt a strategy of embrace and extend. Kodak spent over a decade and millions of dollars protecting and defending their film based photography business. Unfortunately, Kodak, along with Polaroid and many others, saw digital photography as a Soft Trend that could be protected and defended against, but as I identified in the 1980s, and as we all know today, it was a Hard Trend that could not be stopped or defended against.



Two years before Amazon was founded, I was launching one of my books Technotrends at the American Booksellers Association National Book Expo where there were 10,000 bookstore owners including Borders and Barnes & Noble. In a speech I delivered at the convention, I said "In two years there will be a virtual bookstore." I also said "Any of you could start a virtual bookstore today because the tools are there to do it, but I think it will be

someone from the outside because you are all too busy selling books." The rest is history. My point is that disruption is there to see when you identify the Hard Trends shaping the future—and not taking action on a future fact will impact your business regardless of your size.

Another key reason for missing digital disruption is assuming that it won't happen to you and your business. Today, there are many industries that are ripe for digital disruption and when you take the time to look outside of your industry at the Hard Trends that are shaping the future, you will be amazed at what you can see.

A key to success at this point in time is to understand that digital disruption will happen to you if it has not already happened. And it will happen again and again as technology-driven exponential change provides new game-changing capabilities.

As you look at your business, are you looking outside of it as well? What are your blind spots? What fundamental assumptions about the "way things will always be" do you operate on? What are you doing to become your own disruptor, so you aren't left in the dust?

What is a hotel? What is a taxi? What is a bookstore? Companies like Marriott and Barnes & Noble, not to mention government agencies like New York's Taxi and Limousine Commission, thought they knew the answer to those questions.

It begs the question: What do you think you know about your industry?

Think about the enormous architecture of administrators and personnel that exist to put you in a hotel room. Marriott has to buy, build, and

maintain its vast quantity of properties; it has to hire, train, and manage untold thousands of bellhops, maids, chefs, valets, and concierges; it needs to run security, clean pools, renovate, repair, and be on call 24 hours a day.



Now, thanks to having a multimedia computer in our pocket or purse, think about how much simpler it is, and more profitable for all parties, for consumers and providers to deal with each other directly. AirBnB and Uber used smartphones and mobile apps to provide the mediums for customers to conduct transactions in a very easy and convenient way.

Consider how fast the mobile web has changed how we all live, work, and play. The sudden instant, massive connectivity of the mobile web enabled the “sharing economy,” and the democratization of all commodities. You don’t have to be a hotel to be in the accommodations business; you just need a bed and a smartphone. The massive hotel chains had so much more than that, but they blew it because they were jealously guarding their cash cow, instead of using Hard Trends to create the next disruption.

When you let your ideas about consumers calcify and stop adapting much less anticipating, that’s when you start inadvertently digging your own grave. “Well nobody will ever want to buy a book without human contact, so let’s keep building stores,” said Borders, may it rest in peace. Borders could have survived and even thrived if they would have embraced the Hard Trends shaping the future and focused on reinventing the retail experience. Unfortunately, they focused on protecting and defending themselves out of business.

One of the biggest common threads between the businesses that have been disrupted is thinking that your business is immune to changing circumstances. The fundamental assumptions of so many businesses—people will always stay in hotels, people wouldn’t trust strangers to drive them around or lend them a place to stay—have turned out to be wrong.

Begin thinking about other emerging digital disruptions: the wearable web (smart watches and much more), the drivable web (smart semi-autonomous cars), the domestic web (smart homes), and so on. What does that do to your industry? If you think the answer is “nothing,” I encourage you to think twice.

You need to become your own disruptor, your own best competition. Don’t get comfortable. Disrupt yourself, or someone else will.

