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# TECHNOTRENDS<sup>®</sup> NEWSLETTER

*The biggest ideas that are  
changing everything*

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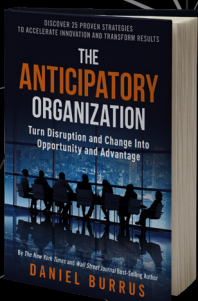
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## Change. From the Inside Out.

By Daniel Burrus, CEO of Burrus Research

Here's a question I like to ask my consulting clients. When you make business changes, are they coming at you from the outside in or inside out? At first, it seems like a trick question, but there is some good logic behind it. Your answer can reveal a lot about your preparedness for the future. In other words, whether you're anticipatory or reactionary.

In my experience working with top leaders from business, healthcare, government and education on five continents over the past 30 years, I have found that the majority of change comes from the outside in. The list of examples is long:

- When a new law is passed, you have to make changes in order to comply with it.
- When a new competitor comes into town offering lower prices, you probably have to change some aspect of how you do business to compete.
- If you're in charge and you change the corporate strategy, you may notice your employees scramble to react.
- When a new technology comes out that changes customer behavior, you'll most likely request that your IT department get the new products in order to keep up with the accelerating changes.

Change from the outside in can affect our personal lives as well. For example, when gas prices go up, you may be inclined to change

your spending and/or driving habits in order to even things out. If you or your spouse are laid off, your daily focus shifts to finding work.

The truth is, most of us are being conditioned to make changes based on outside factors. For example, when the stock market goes down, people often sell, and when it goes up, they buy.



*Rather than being proactive, we find ourselves constantly putting out fires and managing the latest crisis.*

That's what concerns me about outside-in changes. Whenever change comes from the outside, we are forced to react to it. Rather than being proactive, we find ourselves constantly putting out fires and managing the latest crisis.

### Crises Come from the Outside In

This is such a common problem that probably a hundred business books have been written about it – and that's a modest estimate. Most of those books will tell you that the key to a successful future is the ability to be agile. In other words, they say, you need to react fast!

Reacting fast to external change is good, but using agility as your main strategy tends to keep you locked in a crisis management mode. When you spend most of your time putting out fires, day after day, month after month, year after year, the future tends to unfold in an uncontrollable

*continued on page 8*

TECHNOLOGY NEWS HIGHLIGHTS

# Treatment for Severe Depression

Deep brain stimulation (DBS) is used to treat certain neurological conditions in patients who are unable to control their symptoms with medications.

It involves implanting electrodes into specific areas of the brain to regulate abnormal impulses or stimulate cells that produce certain chemicals, and has been used to treat a variety of movement disorders such as tremors, Parkinson's disease and epilepsy.

Studies are now being conducted to evaluate the efficacy of DBS as a treatment for major depression with promising results. In one German study, four patients suffered sudden relapses after years of successful treatment.

However, it was discovered that, in all four cases, the device had either stopped working due to loss of battery power, or the patient had turned it off. Once the systems were reactivated, all of them recovered within about 12 hours.

The research team is planning to conduct a follow-up study of 60 participants.

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# Fully Autonomous Farming

The world's first fully robotic production farm recently began operations in a former commercial warehouse. Designed from the ground up to utilize robots for every step of the process – from transplanting seedlings to watering, trimming and harvesting crops – the developers hope to address the need for affordable, locally grown produce in urban “food deserts” as well as rural areas where fresh produce may not be available year-round.

The new farm utilizes a hydroponic growing system which takes 90 percent less water than traditional methods. Plants are arranged in a single layer to take advantage of natural light, which saves on energy and LED bulbs. Even the design of pots and trays is optimized to work with the robots. As a result, the robotic farm can generate up to 30 times more produce than a similar-sized outdoor farm.

The system also uses artificial intelligence (AI) to improve its operations. The developers hope to eventually build algorithms that will enable the robots to identify plant diseases and what nutrients are needed for optimal growth.

The advantages of indoor farming are many. In addition to being sustainable and scalable, growing food indoors reduces the need for pesticides and herbicides, and isn't affected by

climate or weather. Bringing food production closer to the consumer also reduces the time, cost and environmental impact of transporting goods (sometimes as far as 2,000 miles for a head of lettuce).

For information: Iron Ox; Web site: <http://ironox.com/>



# Healthier Tomatoes

Many of the plant-based foods that we eat today were domesticated from wild plants by breeding selected mutants that possessed desirable characteristics. For example, South American wild tomatoes, which produce fruit about the size of the pea, have been bred over 3,000 years into the larger varieties we now find in supermarkets by picking only the largest fruits for propagation. But the increased size comes at a price with regard to flavor and nutritional value.

Now researchers are looking at ways of redomesticating several types of wild tomatoes to restore some of the desirable traits that have been lost over time. Using the CRISPR gene-editing technique, they have boosted lycopene levels while tripling the size as well as the number of fruits produced. Other experiments are aimed at improving disease resistance, increasing salt tolerance and enhancing levels of vitamin C.

CRISPR also has the potential to turn other wild plants into viable food crops, including foxtail, oat grass and amaranth. Wild plant varieties have the advantage of being more resilient to climate changes and disease. And there are plenty to choose from – out of an estimated 50,000 edible plants in the world, 90 percent of our food currently comes from only 15 basic crops. Best of all, with the help of today's technology, the transition from wild plant to food staple could be accomplished in a few years, rather than a few millennia.

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leaves people limping for several months as the muscles around the joint heal. Six-month follow-up examinations showed that those patients who received the stem cells had stronger hip muscles (as measured by an exercise machine) than those in the placebo group. In all cases, the surgery was their first hip replacement, and further testing will need to be conducted to determine whether similar results can be expected in patients undergoing their second or third procedure, where the muscles have already undergone significant trauma.

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## Stem Cells to Increase Muscle Strength

Recent research suggests that stem cells from placentas may help patients develop stronger hip muscles following hip replacement surgery. Known as PLacental eXpanded (PLX) cells, the mesenchymal stem cells can be administered without the need for tissue matching, and release hormones and growth factors that facilitate the healing of damaged tissue by stimulating the body's own regenerative systems.

The PLX cells were tested on 20 patients following hip replacement, a procedure which



## Artificial Wood

Scientists have created a new material that's as strong as wood but more impervious to water and fire. Moreover, it doesn't require years to grow!

The synthetic wood was created by freeze drying a solution of polymer resin containing a pinch of chitosan – a sugar derived from the hard, outer skeleton of shellfish. This yielded a structure of tiny pores and channels which was then cured at high temperatures (200 degrees Celsius or about 400 degrees Fahrenheit) to forge strong chemical bonds. The resulting

material is as crush resistant as wood, but could be made even stronger through faster freeze drying and/or higher curing temperatures.

The samples maintained their strength even after being soaked in water and a strong acid bath for 30 days. Under similar conditions, samples of balsa wood lost two-thirds of their strength and 40 percent of their crush resistance. When exposed to fire, it was difficult to ignite, and it stopped burning when the flame was removed.

In addition to the obvious application as a building material, its ability to trap air might also make the mock wood effective as an insulator, while its high impact resistance would make it useful for containers and packaging.

*For information: Shu-Hong Yu, University of Science and Technology of China, 1129 Huizhou Ave., Baohe Qu, Hefei Shi, Anhui Sheng, China, 230022; Web site: <http://en.ustc.edu.cn/main.htm>*

The Source Hydropanel is a self-contained, solar-powered system that can produce enough drinking water for two or three people per day. A super-absorbent material collects water at concentrations up to 20,000 times that of the ambient air, making the system effective even in desert conditions. The solar panel powers an internal fan and heats the absorbent material to create condensation. The water is collected in a 30-liter reservoir where it is mineralized with calcium and magnesium (for taste) as well as ozone (for purity). The water can then be pumped directly to an indoor tap.

Two 4-foot by 8-foot panels produce, on average, between 4 and 20 liters of water per day, depending on the ambient air conditions. A small back-up battery powers the unit on cloudy days. Systems have already been installed in more than 15 countries on five continents where they meet or exceed international water standards and guidelines for contaminants. Installations in the U.S. include schools and private homes as well as commercial buildings. The cost for an each panel is around \$2,000.

*For information: Zero Mass Water; phone: 855-796-9283; email: [contact@zeromasswater.com](mailto:contact@zeromasswater.com); Web site: <https://www.zeromasswater.com/>*



## Water from Sunlight and Air

Many experts agree that clean drinking water could be the greatest challenge we face, now and in the future. It has been estimated that half a million people die each year from drinking contaminated water. But the technology to achieve true water independence for every person, and provide the perfect balance of minerals and electrolytes in a truly sustainable system may already be here.



## Toward a Zero-Carbon Society

The Australian Renewable Energy Agency has partnered with energy company Jemena

to begin a five-year trial aimed at bringing hydrogen power to the domestic grid. The first step in the trial is a \$15 million electrolysis plant to produce hydrogen with electricity that is sourced from renewables, including solar and wind power. Australia has reliable supplies of both, but using it to generate hydrogen also enables it to be stored in pipelines to be drawn upon when needed (like batteries only cheaper).

The next step will be to mix small amounts of hydrogen with natural gas for domestic use in western Sydney. Since hydrogen can replace most fossil fuels for heating and cooking, a 10 percent hydrogen mix will be unnoticeable to customers but have a big potential impact on carbon emissions.

As hydrogen output continues to grow, scientists have also been looking at cost-effective ways to store and transport it to other countries. The recent development of a membrane that is capable of extracting high-purity hydrogen from ammonia was the key. By storing hydrogen as ammonia, it can be shipped and stored easily, then extracted later to fuel vehicles.

In the longer term, the technology being developed could unlock a \$1.7 billion opportunity to export hydrogen to countries like Japan and South Korea where policies have been put into place to encourage low-carbon energies. In Japan alone, the goal is to have 40,000 hydrogen cars on the road by 2020.

*For information: Australian Renewable Energy Agency (ARENA); Web site: <https://arena.gov.au/> or <https://arena.gov.au/projects/atco-hydrogen-microgrid/>  
Jemena; Web site: <https://jemena.com.au/> or <https://jemena.com.au/about/innovation/project-h2go>*



## Epidermal Robot

Someday your health may be monitored by tiny robots that live on your skin. Researchers are already testing a prototype of such a device, dubbed SkinBot, to systematically study a range of human body parameters.

Measuring 2 x 4 x 2 centimeters in size, SkinBot travels over the surface of the skin with suction cup feet. It's equipped with three types of sensors, including electrodes to monitor biopotentials (such as heart signals), a camera to image skin anomalies (such as wounds or lesions) and an accelerometer/gyroscope to measure body position and/or cardiorespiratory vibrations.

Devices like these could be programmed to conduct examinations in places that would otherwise be inaccessible to medical personnel such as a collapsed building or a battlefield. In the future, they may be further equipped to administer injections or even perform minor surgery.

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# Change. From the Inside Out.

*continued from page 1*

and often less desirable way.

In other articles, I have sometimes referred to agility as a pivot. Using my examples at the top of this article:

- When the competition launches a new product, you react quickly and decisively to combat it;
- When a new IT technology becomes available, you buy it in order to change business conditions; and
- When a law takes effect, you factor it into your day to day – but it's almost always after the fact.

Think of it this way: In basketball, a pivot requires you to keep one foot planted and is a maneuver that stops forward motion.

## **Opportunity Comes from the Inside Out**

Instead, let's look at some of the most powerful new products. Did the crowdsourcing disruptor Kickstarter become a dominant force because it was agile? Was agility the driving force in Facebook's dominance in social media? Of course not.

One reason for Facebook's unprecedented success is that it picked up where the limitations of other platforms like MySpace left off. In the case of Kickstarter, the developers took a popular altruistic concept – used by Caring Bridge and others – and applied it to entrepreneurship. I sometimes call this approach to innovating a new business going in the opposite direction.

## **Gaining Control of Your Future**

Inside-out thinking is part of what it means to be anticipatory, which is a mindset I describe in my latest book, *The Anticipatory Organization* now available on [Amazon.com](https://www.amazon.com). One of the salient principles of *The Anticipatory Organization System* is the Hard Trend Methodology.

Think about the Hard Trends that are important to you and your organization. Think about the problems and opportunities that derive from those Hard Trends. What can you do now to not only presolve those problems before they become genuinely disruptive but also leverage those Hard Trends into game-changing opportunities that you can identify and manage?

For instance, one clearly defined Hard Trend is that there will be greater government regulation in the future, not less. For many, that's merely a headache that has to be endured. By contrast, given that greater regulation is a certainty, what opportunities derive from that? They're certainly going to be there, whether you like it or not.

By using strategies such as Hard Trends (those things we know for certain are going to occur) and Soft Trends (those that may occur but are open to influence), you can anticipate the future. And from there, you can plan accordingly. That's a dynamic force that moves from the inside out, rather than just outside in.

I would argue that the only way to positively influence your future is to drive some of the change from the inside out. This is true for both organizations and individuals.

## **5 Tips for Thinking Inside Out**

It is essential to spend at least a small portion of time thinking about your future in an opportunity mode. To do this, you have to realize that there will always be fires to put out, but putting out fires will not move you forward in a



well thought out way.

**1. Build thinking time into your schedule.** Try spending a minimum of one hour a week unplugging from the present crisis and plugging into future opportunity.

**2. Find certainty in chaos.** Instead of feeling blocked by all the things you are uncertain about in your work and life, ask yourself: What am I certain about? Those are the Hard Trends.

**3. Be anticipatory.** Based on Hard Trends, think through these key questions: What is sure to happen in the next two to three years? What problems will your company be facing? What problems will your customers be facing (and how can you address those pain points)?

**4. Dream a little.** Another good question to ask is: What is my ideal future? What are the steps to get there - whether it's a business goal or a retirement dream? Or it could be a bit of both.

**5. Put ideas into motion.** Once you are clear on your vision and have identified the Hard Trends that will impact you, spend some of your opportunity time solving problems before they happen.

That's the crux of inside-out thinking; you get to ask yourself what steps you can take to shape the future now - not later.

The reality is, there will still be more fires to put out tomorrow and the day after. Build the opportunity hour into your calendar now. If you don't, the future you end up with might not be the one you would have wanted.

### An Example of Inside-Out Anticipation

Let's say your organization is highly regulated by the government. When you're anticipatory, you're constantly on the lookout for new laws

that will impact your business. You routinely monitor new legislation and learn about a bill that will affect your company's tax structure. It seems likely to pass, so you get to work with your attorneys to restructure your employee benefits plan accordingly.

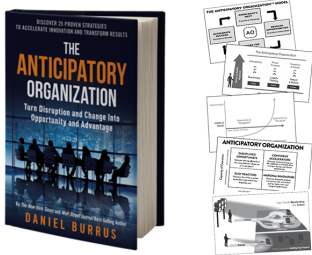

The bill becomes law and your organization is already set to leverage the new rules. Because you are ahead of the game, you find ways to not just adhere to the new guidelines but turn them into an opportunity. By contrast, other organizations also affected by the legislation are forced to scramble after the fact.

This example illustrates how being anticipatory can presolve a problem before it really becomes a major headache.

The level of pervasive disruption that you need comes from the inside out (making the first move) rather than the outside in (moving in response to something). What events and developments can you anticipate by using your inside-out thinking?

If you need help getting started, try my Hard Trend Methodology, which is the mindset I describe in my latest book, *The Anticipatory Organization: Turn Disruption and Change into Opportunity and Advantage*.

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