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Daniel Burrus'

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TECHNOTRENDS® NEWSLETTER

The biggest ideas that are changing everything

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Anticipatory Leaders Leverage Future Facts™

By Daniel Burrus, CEO of Burrus Research

The coronavirus pandemic has proven to be one of the most disruptive occurrences to happen in modern history. Starting in mid-March of 2020, something happened that would have been considered unheard of on January 1: Everyone was forced to change in some way — and with so many business closing their doors, and large numbers of employees globally sheltering in place and working from home, we turned to digital solutions like never before.

From a business perspective, you were either shut down, like bars and restaurants, or you were booming, like grocery stories and pharmacies. And with no clear end to the pandemic in sight, there were, and still are, extremely high levels of uncertainty to deal with, on both a personal and a business level. Unlike the Great Recession of over a decade ago, the coronavirus pandemic was not the result of a rapid industry decline like housing prices dropping to foreclosure levels, or a dramatic stock market crash due to bad loans. This was quite a different disaster, creating unique problems we had no experience in solving, as well as new types of opportunities. The solutions — from a vaccine level, a business level, and a government level — would need to be quite different as well.

> *Failing to plan is planning to fail.*

We cannot turn back the clocks and undo the damage the pandemic has done, but we can move forward with an anticipatory mindset and a firm plan of action. For many decades now, and in all industries, digital disruption has been on an exponential curve upward. Because the pandemic forced us to turn to technology for help on both a personal and business level, the pace of technology-driven change increased dramatically, far beyond merely exponential levels. Now that this change has been set in motion, the question remains: What do we do now?

Having a plan is always a key to success. There is an old saying: "Failing to plan is planning to fail." I would add that it is equally important to build the likelihood of change into the plan by making the plan a dynamic plan (as opposed to a static plan that is unchangeable). But both during and after the pandemic, successful planning requires more than a simple business forecast (of events that may or may not happen) or scenario planning (in which a planning team creates a number of possibilities and develops a reactive strategy for each).

Hundreds of organizations worldwide have embraced my Anticipatory Planning Method because it allows them to find certainty in an uncertain world and the confidence to make bold moves forward. A foundational portion of the methodology teaches you that all trends are either Hard Trends based on future facts (relating to events that will happen) or Soft Trends based on future assumptions (about events that might happen). By separating future facts from future assumptions, you have a powerful way to uncover game-changing opportunities — even in a pandemic!

In scenario planning, all scenarios represent Soft Trends, or assumptions about the future that might happen. None of these scenarios represents a future fact, which is why you need so many scenarios. Soft Trends, and the scenarios you can derive from them, are very useful because they identify opportunities to influence

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TECHNOLOGY NEWS HIGHLIGHTS

Solar Refineries

Manufacturers are continuously looking for new ways to convert waste carbon dioxide into useful chemicals. These processes require electricity to break the strong double bonds between carbon and oxygen, but using power derived from fossil fuels for this purpose is somewhat self-defeating. So researchers are looking to sunlight-activated catalysts (or photocatalysts) to drive these reactions.

In the past, photocatalysts made from semiconductors have been used; however, these typically need to operate in the ultraviolet (UV) range — which makes up only about 5% of the spectrum — to generate sufficient power. More recently, an emphasis has been placed on developing materials that can harvest energy from the more abundant visible spectrum by carefully engineering the composition and structure of existing catalysts. For example, doping titanium dioxide with nitrogen lowers the amount of energy required to convert carbon dioxide so that the reaction can be driven with natural sunlight rather than more harmful UV light.

Advances like this have the potential to move the chemical industry closer to creating a negative-emissions economy while generating platform molecules for a variety of useful products, including adhesives, foams, floorings and disinfectants.

For more information, contact the California Institute of Technology, Joint Center for Artificial Photosynthesis, at 1200 East California Blvd., Pasadena, CA 91125, or via its websites: www.caltech.edu or http://resnick.caltech.edu/

Hydrogen-Powered Trucks

The United State Department of Energy (DOE) is hoping to fuel a new commitment to the development of hydrogen power by investing $100 million in the research and development of hydrogen-powered, heavy-duty trucks. Although the concept has been around since the 1960s, efforts to commercialize emission-free vehicles in the U.S. have lagged behind those of Japan, China and Europe. But the proposed new partnership among national laboratories, universities and private companies — known as H2@Scale — is designed to jump-start the development of technologies that could finally form the infrastructure of a hydrogen economy.

Also referred to as "fuel-cell vehicles," hydrogen-powered vehicles are totally emissions-free, with the only by-product being water. Compared to batteries, hydrogen weighs far less, making it an attractive fuel alternative for cargo-carrying vehicles. It also enables trucks to refuel more quickly and travel longer distances.

The government-funded research will focus on replacing current hydrogen-producing methods — which involve reacting natural gas and steam — with electrolyzers. These systems use solar and wind power to split hydrogen molecules out of water. Known as "green hydrogen," fuel created in this way can be stored in underground reservoirs currently used for natural gas, and then converted back to electricity for use in a variety of applications, powering everything from fuel-cell vehicles to homes. The researchers contend that producing electricity in this way would be far more efficient than relying directly on lithium battery storage or large solar farms.

The aim is to drive down the cost of commercialization so that hydrogen becomes more economically viable for consumer vehicles as well. In Japan, hydrogen power will play a large part in next year's summer Olympic Games, where athletes will be housed in a hydrogen-powered village and transported via hydrogen-powered buses.

For more information, contact the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, at 1000 Independence Avenue SW, Washington, DC 20585 or via its website: https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technologies-office

A New Approach to Vaccine Development

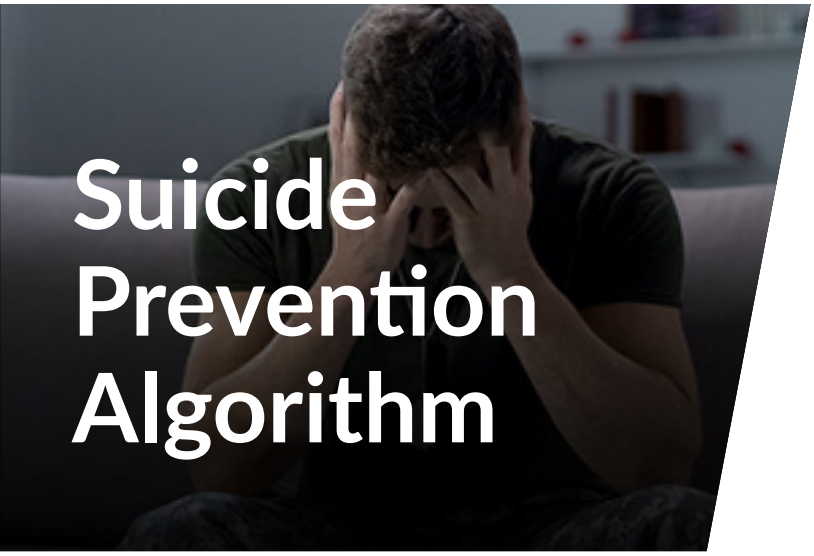
The technology being used to develop coronavirus vaccines at an unprecedented speed could change the way we treat diseases forever. Previous vaccines used weakened versions or specific pieces of a virus to stimulate antibodies. But at least two of the vaccines currently in development use synthetic messenger RNA (mRNA) to "trick" the immune system.

The virus that causes Covid-19 (known as SARS-CoV-2) was a good target for this type of vaccine because of its characteristic "spike"

proteins (that make it look somewhat like a tiny medieval weapon), which the virus uses to penetrate cells. Very simplistically, the mRNA vaccines instruct human cells to produce these spike proteins, triggering an immune response. If the body is subsequently infected with the actual virus, it already knows how to fight it off by attacking the spikes.

An important aspect of mRNA vaccines is that they are designed to be platforms that can be modified for other proteins as well. In the future, they could be used to treat not only viruses, but inherited diseases, allergies and even cancer. However, they are fragile, requiring ultra-low-temperature storage — a drawback that poses challenges for production and transport.

For more information, contact Pfizer, Inc., or Moderna, Inc., via their websites: pfizer.com or modernatx.com



Suicide Prevention Algorithm

The Veterans Administration (VA) has developed an artificial intelligence (AI) decision-making algorithm to identify those veterans who are at a high risk for suicide. Called ReachVet, the system has prompted doctors to reassess their methods for isolating the factors that lead to suicidal events.

The algorithm was developed from a database of thousands of previous suicides. It integrates 61 factors — including diagnoses, prescriptions, age and marital status — and uses predictive modeling to derive a score for each person. Those in the top 0.1% have been shown to be 4o times more likely to die of suicide. Consequently, these veterans are flagged and contacted to arrange for an appointment to review prevention strategies with a clinician. The algorithm generates a new list each month.

With ReachVet in use since 2018, providers have observed that the algorithm identifies not only patients who were previously considered at risk, but also many who were not. In addition, it appears to encourage high-risk vets to increase their use of VA services.

For more information, contact the U.S. Department of Veterans Affairs at 810 Vermont Avenue NW, Washington, DC 20420, or visit https://www.research.va.gov/currents/0918-Study-evaluates-VA-program-that-identifies-Vets-at-highest-risk-for-suicide.cfm

Plant-Based Plastics

Researchers recently found a new use for bagasse — the portion of the sugar cane plant that is left after the sugar-bearing juice has been extracted from the cane. Bagasse represents about 90% of the sugar cane mass. Currently, it is mainly burned to fuel generators. But with a little tweaking, it can also be used to manufacture biodegradable food containers.

Previous attempts to use bagasse for this purpose fell short because the product could not withstand contact with liquids. Bagasse is composed of short fibers, giving it little resilience when wet. But when combined

with a longer fiber, like bamboo, the long and short fibers interweave and overlap to provide a stronger bond. In addition, when heat is applied (as it is in the hot-press manufacturing process), the lignin in the fibers binds the materials together and produces a water-repelling effect.

The new material is completely biodegradable; when buried in the ground, approximately half of a cup made from the bagasse material had rotted away in a matter of two months. It's also twice as strong as the plastic typically used to make beverage cups and costs about half to produce, making it ideal for products like coffee cups, straws, and disposable plates.

For more information, contact Hongli Zhu in care of Northeastern University, College of Engineering, 360 Huntington Avenue, Boston, MA 02115or via email at h.zhu@northeastern.edu; or visit https://coe.northeastern.edu/

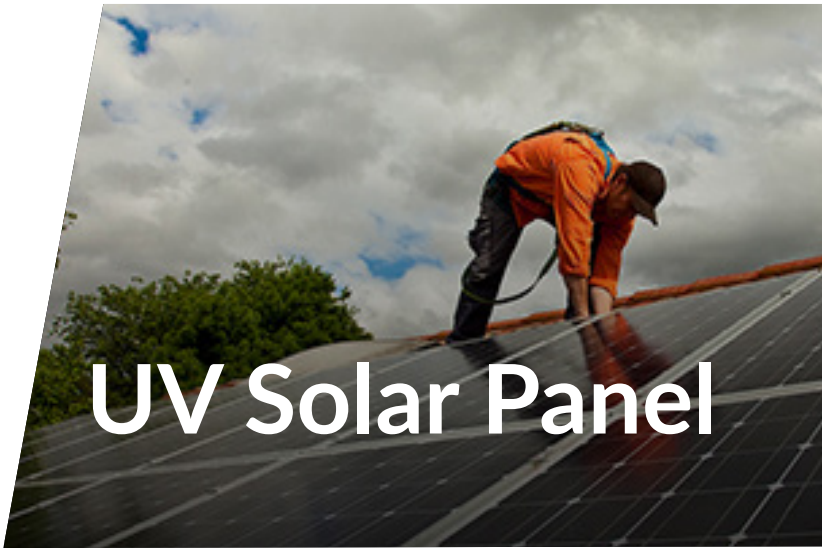
First-Responder Drones

Drones have been widely used by police agencies for years. Typically, such drones are dispatched on location and manually controlled by an officer to assess a situation before sending in personnel. But a new type of drone has come on the scene that employs many of the same technologies used in self-driving cars to navigate to and from a location on its own.

When an emergency call comes in, such a drone can be dispatched automatically from a central launch pad. Typically, federal and local laws require that such flying be done by a certified pilot, and that a police officer be present on location to carry out any investigation. The Federal Aviation Administration (FAA) also has laws in place to prevent interference with other aircraft by requiring that pilots only operate drones within line of sight. But some municipalities have obtained waivers enabling them to operate these self-navigating drones from as much as three miles away.

Policing at a distance has become an integral component of law enforcement during the pandemic to limit risk of exposure, but many agencies are considering drones as a more efficient and less costly way to police urban areas in the long term as well. Of course, such remote policing techniques raise questions about privacy and human rights, as they permit law enforcement to gather and store information on anyone, anywhere — with or without cause. Currently, departments using these drones are treating all information obtained just as they do body-cam data — that is, as evidence to be released only with approval. But the potential exists for parts of a community to be unfairly targeted. As always, it's not the technology ... it's how you use it.

For more information, visit https://www.police1.com/ or https://www.police1.com/police-products/police-drones/articles/deploying-a-drone-as-a-first-responder-vpqwfc9T2AFvmfLV/



UV Solar Panel

A new solar panel has been invented that can produce energy even when the clouds roll in.

Known as AuREUS (Aurora Renewable Energy and UV Sequestration), the new technology could represent a huge breakthrough for the widespread adoption of an abundant and renewable source of energy.

Anyone who has gotten sunburned on a cloudy day knows that ultraviolet (UV) light is present even when the sun isn't shining. The inventor exploited this fact and designed an organic luminescent resin that absorbs UV light and converts it to visible light. The resin — made from fruit and vegetable crop waste — is then combined with a solar cell that converts the visible light to electricity. The resulting transparent lime green panels can line windows or roofs to create power-generating buildings. A single 2-foot by 3-foot section generates enough power to charge two cell phones.

The concept may also be adapted to make textiles that generate their own power for sensors and personal electronic devices. Taking solar energy from large-scale solar farms and putting it directly in the hands of the consumer will be a big step toward energy independence. The technology received the James Dyson Award 2020 for Sustainability.

For more information, contact Carvey Ehren Maigue at Mapua University, 658 Muralla St., Intramuros, Manila 1002, Philippines, +63(2) 8247-5000, or visit https://www.mapua.edu.ph/ or https://www.mapua.edu.ph/news/article.aspx?newsID=2134

Living Robots

Researchers have created the first programmable living organisms using the cells of an African clawed frog — Xenopus laevis. Dubbed "xenobots," they represent the world's first living robots.

Less than one millimeter wide, the bots are composed of only two types of cells: skin and heart muscle. Computer algorithms are used to determine the cell configuration that will enable them to perform specific tasks, with the skin cells providing structure and the heart cells acting like motors. For example, when placed in a petri dish, a xenobot with a fork-like appendage swept up loose particles overnight. Other xenobots might be developed to work cooperatively to perform other tasks, such as transporting payloads. And because they are composed entirely of living cells, xenobots are totally biodegradable.

Applications for these living robots range from cleaning up microplastics in the ocean to creating rejection-free, targeted drug delivery systems that use robots made from a patient's own cells. But there are many questions yet to be addressed, such as whether or not living robots will develop the capability to reproduce or change function. Going forward, a multidisciplinary approach — one that includes the involvement of applied ethicists — is warranted to ensure safety.

For more information, contact David Blackiston at Tufts University, Department of Biology, Robinson Hall, 200 College Avenue, Medford, MA 02155, 617-627-2264, or visit https://www.tufts.edu/ or https://ase.tufts.edu/biology/labs/levin/publications/documents/2020-publicity-meet-the-xenobots-nytimes.pdf

Anticipatory Leaders Leverage Future Facts™

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an assumption. But assumptive scenarios neglect the most important part of strategic planning, future facts — or, in other words, certainty.

Presently, the vast majority of organizations in a multitude of industries are reactionary — or, at best, agile fast reactors. While agility is very important, the pandemic has showed us that when disruptive change occurs, it doesn't matter how agile you are — you can't react quickly enough to get ahead of the change curve and truly take advantage of disruptive change. Therefore, as you create your plans for the years ahead, you will find it very beneficial to move beyond basing your plans only on assumptions about what the future will bring and to learn instead to anticipate and use future facts to take better advantage of what is to come.

2020 Accelerated Digital Trends

Digital disruption was already increasing at an exponential rate even before the big elephant known as COVID-19 entered the room in 2020. When the pandemic hit, many focused on the obstacle and put innovation and growth out of mind, replacing them with a reactive strategy only.

Of course, we did have to react to massive changes quickly, which is why I always say that it is important to be agile. Many things come out of the blue to which we need to be able to react quickly. However, as an Anticipatory Leader, you are not limited to mere reaction. You learn how to create a list of things you are certain about, and a list of things that you can do, thereby arming yourself with a way to grow no matter what the situation is.

For example, here is a Hard Trend future fact: The pandemic will end. Post-pandemic success will be determined by what you do now, not what you do then! Therefore, becoming anticipatory — that is, spending less time putting out fires set by the pandemic and more time discovering the amazing opportunities that are right there for you to see — will serve you well into the future.

As I said earlier, the pandemic has dramatically accelerated many of the digital trends that were already growing exponentially long before the pandemic. For example, Digital Hard Trends like eCommerce accelerated ten years' worth in five months! During the lockdown, many had to stay home, prompting them to shop online for just about everything, including ordering food for curbside pickup. Even grocery stores that were packed with customers saw an increase in demand for online ordering. And as you might guess, contactless payment systems also grew rapidly.

When technology advances accelerate, the number of new opportunities accelerate as well. Are you and your organization taking the time to identify the new opportunities for accelerating growth that this massive acceleration in ecommerce enables?

Digital Trends in Accounting and Finance

The same challenges and opportunities applied to the accounting and finance industry. When the pandemic hit, midsize and small banks, as well as accounting firms that were not already using VPNs for security and the cloud, quickly turned to cloud solutions to maximize the productivity of both their remote staff and remote customers. The distancing forced by safety concerns represented a major opportunity for those Anticipatory Accounting™ firms and banks that had anticipated these Hard Trends and were already using cloud computing services and secure VPNs for remote work before the pandemic hit. These well-prepared organizations very quickly adjusted and benefited from having their employees and customers work remotely. And as you might guess, the distancing forced by the pandemic accelerated remote working by 10 years in just five months — and cloud computing, which was already being used by many organizations, by four years in just five months.

Are you and your organization taking the time to identify the new opportunities for accelerating growth that this massive acceleration of

distributed cloud computing services enables? Do you have a plan to leverage what you've learned from remote working after the pandemic ends?

Banks and the financial industry have had to contend with another major challenge: With so many employees going remote and customers going digital, there has been a sharp acceleration in digital cash management, remote banking, and applications for loans, not to mention PPP loan management. As a consequence, digital fraud has become an even bigger problem — *one that drove the accelerated use of adaptive and predictive cybersecurity applications by five years in five months.*

Are you and your organization taking the time to identify ways you can take cybersecurity to the next level? Instead of simply reacting as quickly as you can threats, are youactually developing a predict-and-prevent strategy?

Going Forward, Not Back

It is important to understand that things will not fully go back to the way they were pre-pandemic, but that should not worry you. In your personal life, you'll still want — and be able — to do most of the things you did pre-pandemic, like taking a walk on a beach and going to a restaurant with friends. But the way you do those everyday things will involve a much higher level of digital integration, even if you don't actually see it. And when it comes to business, both digital transformation and digital disruption have been accelerated, and will continue to accelerate post-pandemic.

That's why it is so important to become an Anticipatory Leader who identifies problems before they occur (so that you can pre-solve them) and disruptions before they disrupt (so that you can turn change and disruption into a business and personal advantage).

Playing Offense Versus Defense

Consider almost any team sport, which requires players to focus on both offense and defense. Offense is focused on moving the ball forward and gaining points. Defense tries to prevent the opponent from scoring points.

Defense is reactive: The faster you react (the more agile you are), the better you're able to protect and defend your team's interests. Offense, on the other hand, is anticipatory: It requires players to scan the entire playing field continuously for opportunities to move the ball forward and score points.

To succeed on the field, a team must be effective both at reacting and anticipating. But most businesses, and the people who lead and manage them, spend the vast majority of their days only reacting — to a problem, a customer complaint, an email, or a situation. In other words, these businesses and their managers are only playing defense.

But how many championships have been won with defense alone? The last 20 years of Superbowl winners didn't triumph simply because they had the best offense — they were the best at being anticipatory!

The pandemic has illustrated for us that when things change fast and that change accelerates, you can't react quickly enough to get ahead, no matter how agile you are. Becoming an Anticipatory Leader allows you to take control of change and disruption, and to disrupt rather than simply being disrupted. By becoming what I call a positive disruptor, you can create the transformations that need to happen to elevate your organization's relevancy and accelerate innovation and growth. In business, offense wins!

Actively Shape Your Future!

Technology trends have been dramatically accelerated by between four and ten years in just a few months. It's important to understand that this dramatic acceleration, which has pushed beyond merely exponential levels, has created many new and game-changing opportunities for you and your organization. Have you noticed? Are you building accelerated technology Hard Trends and future facts into your plans now? Are you positioning your organization to be a positive disruptor in the years ahead?

It's time to play offense, to be anticipatory! It's time to actively shape your future — because if you don't, someone else will!

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