

# Staying



**Ben-Gurion University's Hugo Guterman:**  
"It's not a technology that is disruptive—it's  
the way people end up using it."

Photos: Ben-Gurion University of the Negev



**A**utomakers and other traditional original equipment manufacturers are well aware that their companies are ripe for disruption, Simon Euringer, head of the Silicon Valley-based BMW Group Technology Office USA, said.

"There is a certain sense of urgency—because we have seen so many strong players who have been made redundant in so many industries," he explained. "We are paying attention. Because we understand that so many technologies that have turned out to be disruptive to a legacy player were started by someone who wasn't even in the realm of the business they were about to disrupt."

That's a critical point. Google did not need a press to upend the newspaper and magazine publishing industry. Netflix didn't change one physical aspect of the DVD. And many still argue that a basic Nokia phone, knocked out of the mobile phone market by Apple's iPhone, was a better example of physical engineering than the smartphones that replaced it. But data—in wily and unanticipated ways—found ways to determine who would reign supreme even among the most sophisticated physical objects.

Everyone seems to have a favorite disruption story. Inside business school classrooms, outside C-suite conference rooms, or on the stages of the latest viral TED talks, you'll hear riffs on David and Goliath. These tales inevitably highlight how strong, successful manufacturing giants were taken down by young disrupters like Uber, Google, SpaceX, and Netflix. These companies, and others like them, changed the direction of entire industries. The stories serve as an inspiration for budding entrepreneurs—and, increasingly, a warning for even the most competitive manufacturers.

"Simply stated, disruption is the convergence of technology and business model innovation that makes it possible for entrepreneurs and companies to create new products and services," said Tony Seba, an entrepreneur and author of *Clean Disruption of Energy and Transportation*. "Disruption can help transform or even create entirely new markets—and, in doing so, have the power to destroy the investing industry that's been transformed."

# Viable

IN TODAY'S DIGITAL AGE, CAN TRADITIONAL MANUFACTURING COMPANIES HARNESS DISRUPTION BEFORE IT ENGULFS THEM?  
**BY KAYT SUKEL**

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ften, that transformation is digital in nature. Take Kodak, a company that was long considered the very model of American innovation.

Fun fact—Kodak created the very technology that changed the way the world takes and shares photographs and that ultimately brought about its ruin: the digital camera. Where mechanics and physical assets once ruled the day, bits, bytes, and pixels became the new foundation upon which the image market was built.

“‘Kodak moments’ was a marketing phrase that everyone used to know and use,” said Tom Mayor, an industrial manufacturing strategy practice leader with KPMG. Kodak’s photographic film was the medium on which families captured their vacations and memories, he explained. Kodak dominated the film market, which it primed by churning out easy-to-use cameras. Today, a much diminished Kodak makes business printers.

“This was a fantastic manufacturing company,” Mayor continued. “But digital capabilities are offering new ways to improve all manner of productivity and inefficiency improvements across manufacturing in quite extreme ways, offering new capabilities with the power to transform the market. You have to find a way to keep up, or risk getting left behind.”

Keep up or risk getting left behind. That man-

Kodak's Steven Sasson invented digital cameras in the 1970s, but the company never profited from the technology. Today, SpaceX's reusable rockets are disrupting the space launch industry.

Photos: Kodak and SpaceX



date raises a critical question for today’s manufacturers: how can large corporations, especially those that specialize in mechanical products like aircraft, rockets, cars, and other machinery, stay viable in the digital age? Can they harness disruption before it engulfs them?

## Disruption in the Data

Today, Seba said, manufacturing companies need to understand that they need core competencies in both the physical and digital realms to endure. This is true even in industries that traditionally see themselves solely as creators of physical assets.

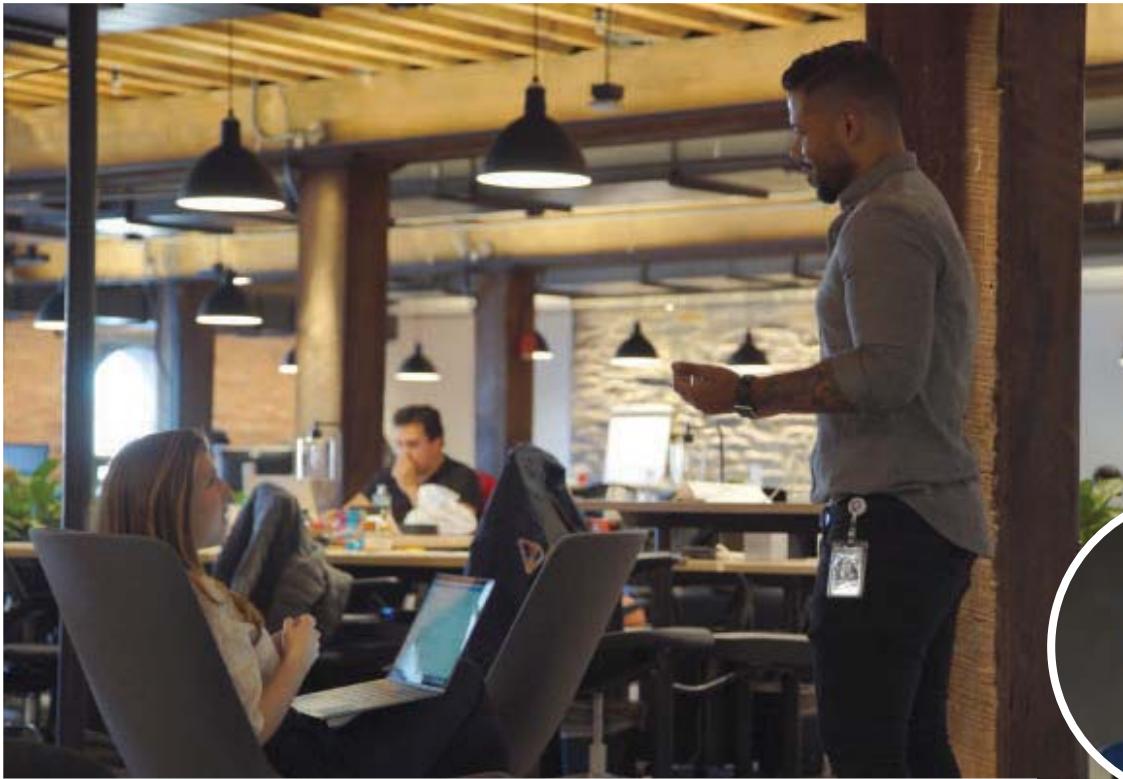
“Everything is digitized nowadays,” he said. “And that data can give you critical information to make your physical assets even better. So you can’t think of the physical and digital separately anymore. You just can’t.”

It is the data, even more than the digital connectivity, which makes marketplace disruption possible. For many startups, the only way to challenge established companies is to use data the way David used his sling, to even the odds.

Many of these startups are tiny. To succeed, they must become experts in sensing the right information, knowing what to retain and what they can safely throw away, and mining the amassed data to boil it down into actionable intelligence to drive software and engineering initiatives.

A company that offers plug-and-play manufacturing analytics to small factories or harnesses additive manufacturing to print a





United Technologies' Vince Campisi: UTC understands electronics, but it built a small research center in Brooklyn to tap the current of the latest digital technologies.

*Image: United Technologies*



car or turbine engine is not going to threaten industry leaders today. Yet software and data scale quickly.

Spotify took just 12 years to reach 2017 revenues of \$5.5 billion while replacing CDs with streamed music. In less than 10 years, Airbnb grew to \$2.6 billion while unsettling the hospitality industry. Uber, also less than 10 years old, brought in \$7.4 billion as it replaced taxis.

Digital technology has enabled small startups to upend industry after industry. These David and Goliath stories are nothing less than startling. They also encourage small startups to set their sights on industries whose barriers to entry once ran into billions of dollars.

To keep up, legacy OEMs need people on board who can keep up with these startups. And, given the speed of digital change, they need to get up to speed quickly. This is the reason why BMW's Euringer stresses urgency.

Vince Campisi, chief information officer of United Technologies Corp., agrees.

"Our industries will be written in code, going forward," he said. "The next chapters will be written in data. And that's what we really need to harness when we think about disruption and using it as a vehicle to grow our business results."

### Lightning in a Bottle

As manufacturing giants across the globe seek to improve their fusion of digital and physical engineering, they are seeking investments—in technologies and digital startups—to guarantee smooth sailing in disruptive markets, KPMG's Mayor said.

Essentially, they are trying to capture "lightning in a bottle." If this sounds easy, it is because we can look back and see which technology or business model gained prominence. History teaches us that no one can say, definitively, which technologies—and the ways we apply them—will be game changers and which ones will be only flashes in the proverbial pan.

"Many players in both automotive and aerospace are making active efforts to get out in front of this," Mayor said. "They know it's not something that can be ignored. But the way these new technologies change markets are often unexpected. How can you know which way to go?"

Trying to innovate from within is a tough proposition. Most large-scale manufacturing companies are simply too large and structured to foster true innovation, Seba argued. The very bureaucracies and procedures that help them do what they do best—make products—often get in the way of creative adaptation.



BMW's Simon Euringer: BMW may have opened an autonomous driving campus near Munich, but it also operates a Silicon Valley research center.

Photos: BMW



**D**isruptions usually come from the outside," he explained. "It doesn't mean that it can't be done from the inside, but it's hard. You need a very agile organization that can not only anticipate the disruption but also identify the right way to act on it. That's why we see many companies looking at Silicon Valley, and the companies there, to help them figure out a way forward."

That often involves acquisitions. According to Accenture, nearly one-third of companies who acquired or merged with another company over the past two years describe themselves as traditional companies acquiring digital companies.

Of those who completed five or more deals, half were done to gain digital capabilities.

Companies are also forging unique partnerships with academic laboratories and small companies in hot tech communities. OEMs look to Pittsburgh

for robotics, to Israel for machine learning and to New York for intelligent building technology. Companies are going to where the technologies are being nurtured and developed.

Despite Seba's warning, others hope to innovate from within. United Technologies Corp. just opened its own digital accelerator in Brooklyn, N.Y. Its mission is to translate new technologies into ways to serve UTC's aerospace and smart building businesses. Campisi said this approach allows them to cultivate technologies that can integrate "within the fabric of the company."

"We are trying to balance our approach with a 70-20-10 model," he said. "We spend 70 percent optimizing the core of our business, the things we've historically done really well. Then we have 20 percent allocated to the new things where software and analytics can improve what we're doing today or potentially broaden a particular customer segment. That last 10 percent? That's

## AIRBUS DIALS INTO SILICON VALLEY

When Elon Musk first shared his idea for a low-cost, reusable booster rocket with commercial satellite launch companies, they essentially blew him off. Now, his SpaceX Falcon 9 dominates the orbital launch business.

Airbus did not want to be caught unawares again, so it launched an outpost in Silicon Valley to explore unusual concepts. These include (from left to right) Vahana, an autonomous electric vertical take-off and landing passenger craft for cities; Transpose, a modular aircraft interior system; and Voom, an affordable helicopter service.



about the moon shots, the things that could be disruptive in the future."

Such moon shots, however, Euringer said, can't be mandated by the traditional business hierarchy. He says the BMW Group Technology Office's mission is to simply "surprise" the folks back in Bavaria.

"This doesn't work if headquarters is giving us requirements," he explained. "Surprising them means doing the work to offer something they wouldn't have done if the Technology Office did not exist. We are here to remind them that just because something has always been done a certain way, that doesn't mean it necessarily has to stay that way because times, technologies, and behaviors change."

While there is no blueprint for successfully harnessing disruption, Mayor said, large companies looking for ways to embrace the digital world do have an advantage over small start-ups.

"The cool thing is when a Fortune 500 does manage to capture something, they know how to scale things," he said. "They have presence in markets around the world, they have armies of manufacturing engineers that can actually take a product and figure out how to deliver it in a warrantable form. There's a huge amount of power in OEMs when they do catch these new technologies, because they can make them real and scalable in a hurry."

### Revolution or Evolution?

Of course, it does not always work out that way. Too often, said John Dolan, a professor at Carnegie Mellon University's Robotics Institute who is working on autonomous automobiles—which many believe will be the next great industrial disruption—when companies try to "catch" disruption, they fail. This is because they cannot see the forest for the trees as they race to be first in a particular market.

"Right now, at least in autonomous automobiles, what I see is that many of the large automobile

companies are developing a lot of the same things," he said. "Maybe their way has a little special twist, but we seem to be trying to solve the same problem over and over again. That makes it hard to be truly disruptive."

But Hugo Guterman, head of the Laboratory for Autonomous Robotics at Israel's Ben-Gurion University of the Negev, who is currently working on an autonomous robotic chauffeur instead of an autonomous vehicle, says, ultimately, it's not a technology that is disruptive—it's the way that people end up using it. And that's important to remember.

"With all this data, we are entering the second industrial revolution," he said. "There are already so many technologies being developed in universities and industry that have the power to disrupt companies, markets, and even society. But I don't know if we understand how they will do that yet."

His graduate student, Oded Yechiel, agrees. And he suggests that digital disruption is more of an evolution than a revolution when it comes to changing physical industry.

"These markets are evolving as these new technologies become available," he explained. "But, to a certain extent, disruption is part of that evolution. There have always been companies that have been strong and then fell when a new technology came about. It's the nature of things."

"But if bigger companies can get past their bureaucracies and regulations, to work with small companies and also laboratories that can really think outside the box, there is always the possibility to move forward."

And in doing so, perhaps, those companies can become the next big disruption story. **ME**

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