

Global industry stories for the

# Industrious.

Issue 3

# Industrious.

## Issue 3 | 2018

**CMO and publisher:**  
Sharon T. Driscoll

**Head of content  
and publisher:**  
George Hammer

**Guest editor:**  
Mark Foster

**Editor-in-chief:**  
Michael Todd Cohen

**Editorial team:**  
Justine Jablonska  
Rich McKay  
Jordan Teicher

**Design:**  
Reda Charafeddine  
Karen Kolbe  
Trent Schulze

**Digital:**  
Julie Bertolini  
Seth Carnes  
Taylor Stockwell  
Bogdan Niculi  
Catalina Bradatan

**Social media:**  
Claudia Maseo  
Arzi Rachman

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## Letters from the editors

### Sharon T. Driscoll, CMO Industry Marketing & VP Sales Enablement, IBM

We're all familiar with the jarring effects of constant change in industry: the push and pull of new models and unexpected competitors, and the impossibility of "business as usual." We've entered the age of the new normal, an imperative for any and all businesses to transform.

To address that need, in this issue of *Industrious* we've assembled stories from across government, travel and transportation, manufacturing, retail, and more to spur unconventional thinking—and to remind our readers of the human outcomes in all this technological turmoil.

While we can't stop the world of industry from furiously turning, we can provide context in the midst of chaos; a foothold and footpath as the new normal sets in and the horizon of the next great iteration of your business comes into view.

### Mark Foster, Senior Vice President, IBM Global Business Services

What makes the difference in the never-ending cycle of adaption when the only constant is change? A partner.

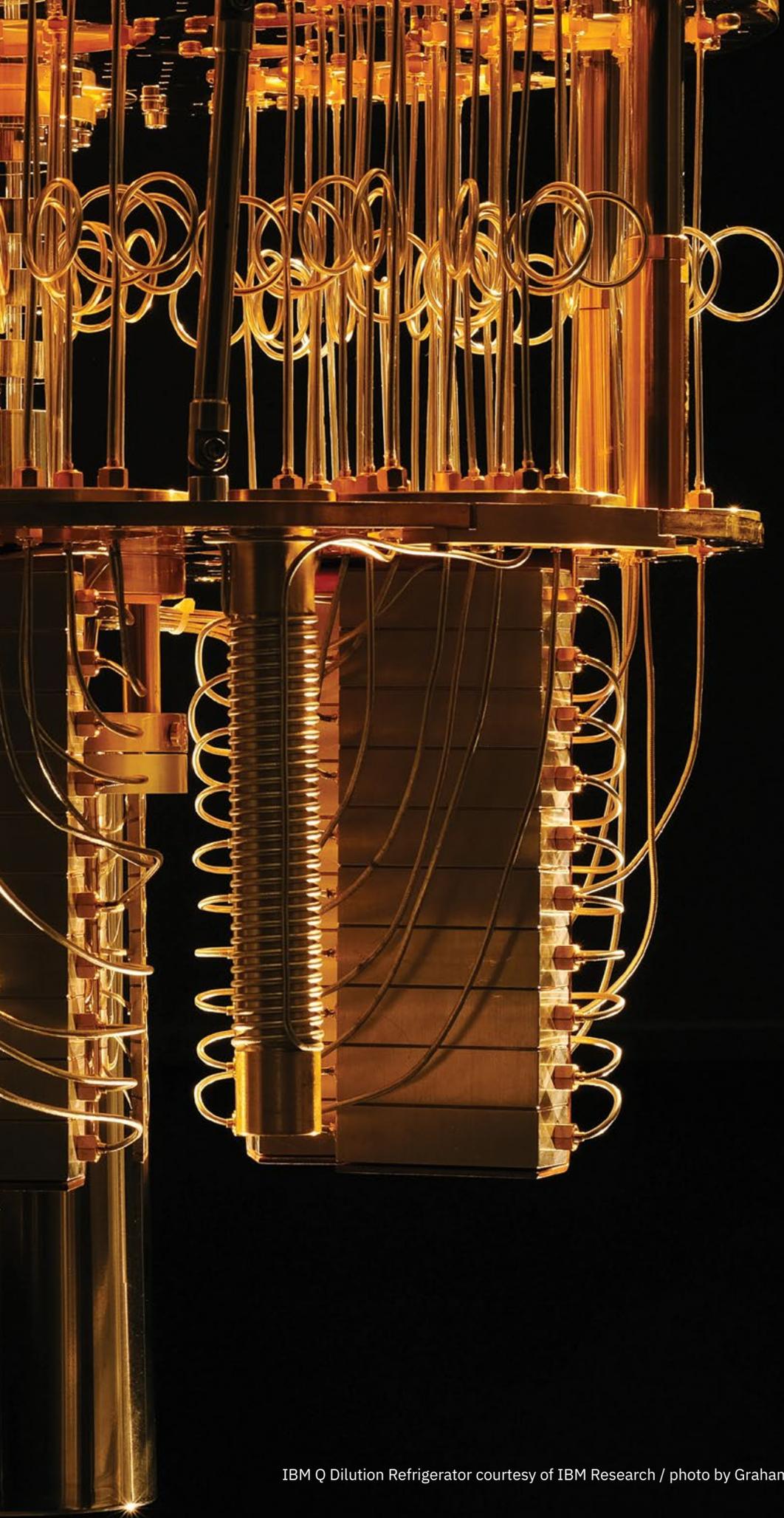
Technology—while a powerful and exponentially advancing tool—cannot stand on its own, especially in an environment where globalization, regulatory shifts, and changing customer expectations are adding to the forces of disruption. It requires a partner operating at the intersection of business and technology with a keen understanding of where the opportunities are for businesses to apply these incredible capabilities.

Businesses have a proliferation of new technology options to consider, such as AI, automation, IoT, blockchain, and the cloud—all holding the potential to transform organizations and create new sources of competitive advantage. These technologies have given rise to the Cognitive Enterprise, a new business model characterized by platforms and composable processes, anchored in the expertise of people informed by data that has not previously been accessible.

In this issue of *Industrious*, we give real-world examples of how these advances are being applied. We've also paired expert insights from many of our best minds and linked them to digital interviews. The videos and companion articles explore crucial topics like digital transformation in government, blockchain's effect on the complex supply chain, and the impact of AI on travel and transportation.

As a partner, we believe change can be a catalyst for breathtaking innovation. Our hope is that the stories we've captured here will spark your imagination and stimulate ideas for how you can harness the power of emerging technologies to create the future in your industry.





IBM Q Dilution Refrigerator courtesy of IBM Research / photo by Graham Carlow

# IBM Research's Kathryn Guarini connects the dots across industries

Jordan Teicher, September 18, 2018

"It's not sufficient to deliver technology alone," said Kathryn Guarini. "You have to apply that technology and innovation to solve real world problems."

As the head of IBM Industry Research, Guarini spends her days doing just that. A celebrated technical researcher with more than 65 US patents to her name, Guarini leads an organization exploring how the combination of technologies like AI, IoT, and blockchain can address some of the most pressing challenges across industries.

One recent IBM Industry Research invention, IBM Crypto Anchor Verifier, is a perfect representation of that mission. By fusing optical analytics and AI, the technology can scan objects and capture their optical properties, then upload that verified data to the blockchain. Its applications cut across industries, from spotting counterfeit olive oil and steel to analyzing water quality.

In this interview with *Industrious*, Guarini discussed Industry Research's mission and her thinking on the intersection of industry and technology.

## ***Industrious*: What does Industry Research learn by operating across industries?**

**Guarini:** In our research programs, we have a set of what I call horizontal technologies. Our research allows us to validate the applicability of those technologies across industries, and that informs our technology agendas. Today, we're continuing to enhance the capabilities of a scalable, secure blockchain platform, for instance. How do we enhance the Hyperledger Fabric, open-source technology on which blockchain is based? How do we integrate it with AI? When we apply blockchain to financial services, for example, we need to think about secure tokens, digital currencies, data sharing, and privacy concerns. Those aspects of the use case then drive us back into our research.

## **What are the benefits for businesses of being early explorers of new technologies?**

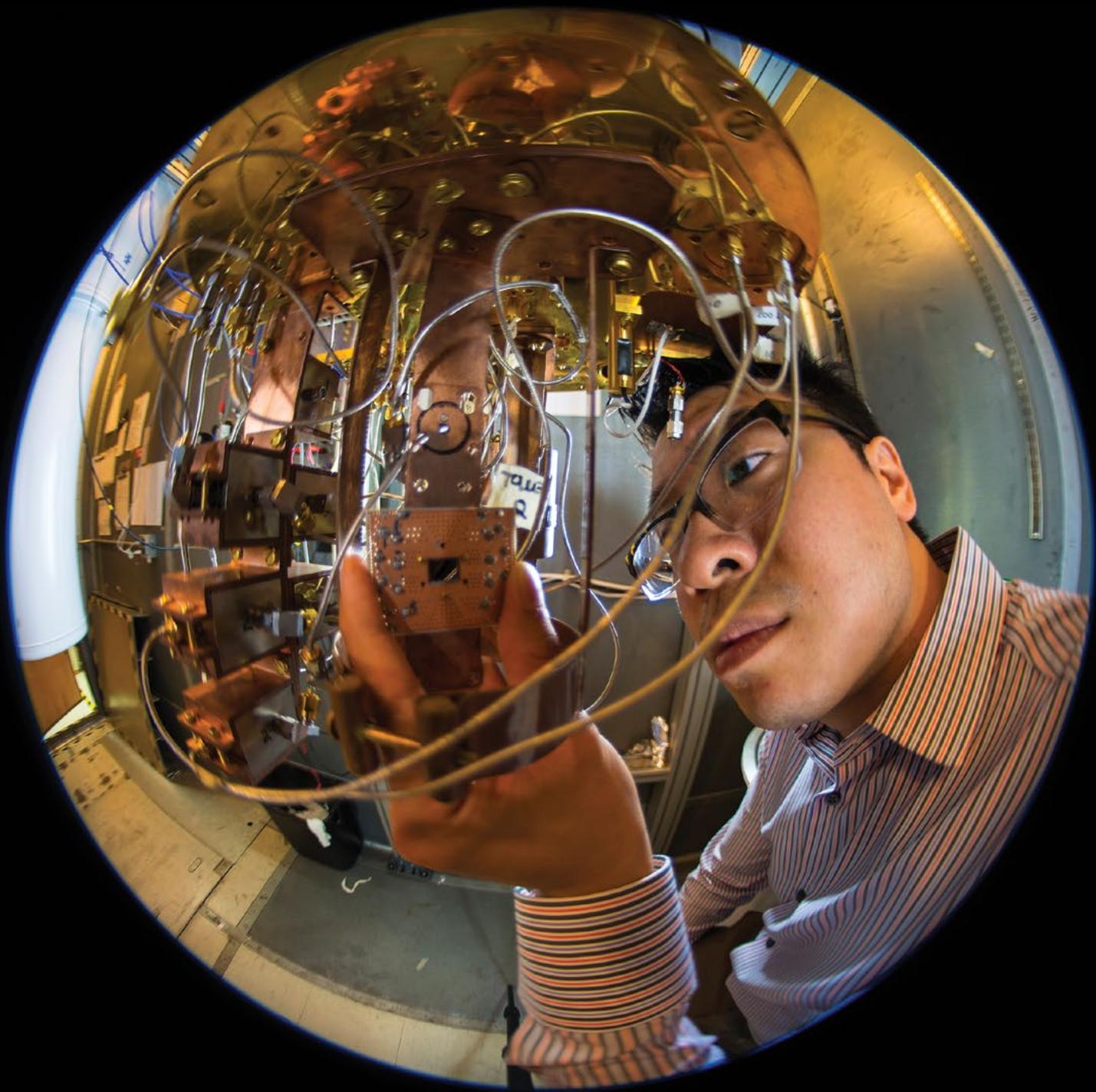
Let's take quantum computing as an example. At IBM Research, we're pioneering much of the quantum computing technology available for business applications. It's still early days and clearly an exploratory space. So why would a bank or pharmaceutical or electronics company want to think about quantum? Simply put, they want to look for the opportunity to be leaders in applying new technology to their business. They don't want to be surprised when a competitor is the first to use quantum in a way that gives them a unique advantage.

## **Quantum may still be in an experimental phase but AI is already changing businesses and industries. What's next for AI?**

It's our expectation that in the coming years we'll see broader applicability, meaning we'll train and build AI systems for one task and one domain, and be able to apply it more broadly to other areas of the business, and even related domains. But we still need to work on explainability— that is, ensuring that AI decisions are transparent and explained to end users so they can be an active area of collaboration. We also need to keep working to ensure that AI is unbiased and trained with the appropriate data, and that the algorithm and deployments meet the regulations and principles of the business.

## **Since its earliest days, IBM Research has supported diversity and inclusion. How do those values shape the organization today?**

We recruit talent from all over the world and from disciplines as varied as computer science, health care, pharmaceuticals, manufacturing, data science, semiconductor physics, cybersecurity and more. That diversity of technical skills, along with gender diversity and more is what gives our research team its strength.



# Can better data analytics slow the fastest-growing illegal trade in the world?

Justine Jablonska, September 18, 2018

One day, teenager Ann\* was at sports practice when someone handed her an energy drink. She—and some of her teammates—woke up in a truck that drove for hours to a large tented brothel. For the next three years, she and hundreds of other girls were forced into sex work, servicing dozens of “clients” daily.

The global breadth of human trafficking is staggering: it is the third-largest and fastest-growing criminal activity in the world.

Globally, the number of estimated victims range from 20 to 40 million. The US State Department reports that an estimated one million people are trafficked across America’s borders annually; 80 percent are female and 50 percent are children.

“In the late 18th century, people around the world campaigned to outlaw this ancient trade in human beings,” said Caroline Taylor, IBM Global Markets VP. Legislation was passed, bilateral treaties were signed, and the human slave trade was outlawed. “Abolitionists thought this was the beginning of the end, that this global trade in human beings would stop. Sadly, it wasn’t and it didn’t.”

Today, human trafficking is notably problematic for law enforcement to identify—let alone prosecute. According to the State Department, 2016 saw just 14,894 prosecutions and 9,071 convictions.

“ People shouldn’t be bought and sold. It’s time to stop. ”

When children like Ann and her teammates first disappear, their families and police often search for them with no success. The issue is that there’s a missing link between the kidnapping and the human trafficking.

Every supply chain needs a product. Every business needs a broker. Without data and the power of analytics, finding the link back down the supply chain, through the broker, to the potential source is nearly impossible. You can’t stop what you can’t see. But analyzing the data enables us to see; to make those connections.

That’s where IBM comes in. Taylor chairs the board of trustees at non-profit STOP THE TRAFFIK (STT), which began 15 years ago as an awareness campaign with the intent of expanding into prevention. That prevention has significantly expanded thanks to its relationship with IBM.

In 2016, STT launched an app that enables anyone in the world to submit information on suspicious activity. IBM has provided a grant to redevelop the app for a better user experience and expanded functionality, including a multilingual chatbot. IBM has also provided STT with software, cloud tools, and the expertise of data analysts and architects to help advance its work.

\*Not her real name.

“It’s been a learning journey from small beginnings,” said Neil Giles, Director of STT’s Centre for Intelligence-Led Prevention. “The world is still waking up to how technology can fight crime.”

IBM has worked with STT and like-minded data-oriented nonprofits and NGOs over the last three years, contributing nearly \$2 million in resources.

“IBM’s contributions of data analytics expertise and technology made an immediate impact on the effectiveness of STOP THE TRAFFIK’s essential work,” said IBM VP for Corporate Citizenship and IBM Foundation President Jennifer Ryan Crozier.

In 2016, STT identified eight hotspots on a Nigeria-Libya-Italy trafficking route, and launched a geo-targeted social media campaign to draw attention to the risk of trafficking in each area. That same year, the group teamed up with Western Union, Europol, and law enforcement in three European countries to bring down a ring of 32 traffickers, according to STT’s Giles.

And in May 2017, IBM worked with US-based nonprofit DeliverFund to deliver definitive evidence to local police that resulted in convictions and 40-year prison sentences for four human trafficking suspects that had been under suspicion for almost three years.

Applying technology to the problem might just be the thing that disrupts traffickers enough to make it no longer profitable for them, according to Taylor.

“It’s like with smallpox: you disrupt the contagion,” she said.

Now, the question is whether the disruption can be large enough.

## What’s next: big data in action

Ann is one of tens of millions of victims around the globe. Their stories are often as complex and tragic as the issue itself.

A trafficker can exploit an individual in more than one way. A child can be moved to the back of a kitchen in a restaurant. That child can be moved into a sweatshop and exploited as cheap labor. The child can be moved behind closed doors to serve as a domestic slave. The child can be forced to commit crime. And—horrifically—the child’s organs can be harvested and sold to the highest bidder.

Traffickers take an individual for one purpose, and then move and repurpose them. And then do that again. And again. That’s one of the reasons human trafficking is the fastest-growing illegal trades in the world.

It’s imperative that every trafficked individual find their way to freedom and a new life. But STT focuses on prevention using this unique methodology—in partnership with IBM—because, Taylor said, “we will never rescue our way out of this crime.”

It’s precisely because of individuals like Ann that STOP THE TRAFFIK and IBM are working to build an intelligence hub that will collect and analyze data from multiple, varied sources, and serve as a global communications hub and data clearinghouse for non-profit, public, private, and law enforcement partners.

“This is big data in action,” Taylor said. “This is what data-driven really means.”

Since human trafficking is such a colossal illegal economy—it generates \$150 billion annually—one of the project’s key factors is collaboration with financial institutions. By making it easier for the financial world to connect human trafficking with money-laundering activities, the technology will have the chance to make a dent on trafficking on a global scale, according to Crozier.

Taylor agrees that the potential for impact is enormous.

“We can change the way the world works,” she said. “People shouldn’t be bought and sold. It’s time to stop.”

# For this Maryland city, a smarter city is a safer one

Justine Jablonska, August 9, 2018

Seat Pleasant, Maryland is located on less than one square mile a few miles east of Washington, DC. It has two major highways running through it, a population of 4,721, and a mayor who likes to ride a bike wearing a shirt with his title in large letters across the back. Upcoming city events include summer movie nights and mini-camps for kiddies.

Seat Pleasant is also one of the first small smart cities in the United States.

Mohamed Abdelhameid oversees the management of the city's various tech solutions, including the MySeatPleasant mobile app and the connected government solution powered by IBM's Intelligent Operations Center. As Seat Pleasant's Director of Connected Government Solutions, he defines a smart city as one that applies technology across the government to connect its departments with one other, and connects the government with citizens and businesses.

"I'm really excited about the vision," Abdelhameid said in a phone interview.

Small cities, he explained, are typically underserved when it comes to technology because of limited budgets. To begin the process, Seat Pleasant generated revenue from offender-based funding.

Seat Pleasant began its smart journey in May 2016. Today, a year and a half after its smart kickoff, city officials and citizens are both seeing results and planning for what's next. Service response times have drastically improved, as has public safety. A new housing program includes once-abandoned and now freshly renovated smart homes. And—perhaps most importantly—the community is palpably engaged and energized.

## Potholes begone with 98 percent increased response times

The city's new Public Engagement Department focuses solely on citizen engagement. Part of its mission: "consistent and continuous interactions with citizens." Previously, citizens could only contact government services on weekdays, between the hours of 9 a.m. and 5 p.m. Now, they use an app to ask questions and submit requests anytime, and report issues like potholes.

Recently, a tree fell into the middle of a street and a Seat Pleasant citizen used the app's chat feature to reach out for help. A public works employee was dispatched and dealt with the tree removal. Service request response—and closing—times have increased by 98 percent, said Abdelhameid. And city employees can log in wherever they are to retrieve and respond to requests in real time.

A pothole, a fallen tree—these are small matters within the larger scope of what governments deal with every day (though anyone who's ever had car damage from a pothole may argue otherwise). But getting those fixed quickly and efficiently matters, and what's more, points to one of Mayor Eugene W. Grant's main goals: that citizens know their government is responsive.

## From 140 abandoned houses to new smart homes

Housing is another critical issue for the city. Eighteen months ago the city had 140 vacant houses. These devalued their neighborhoods and cost the city tax revenue. What's worse, vacant homes were responsible for 30 percent of the crime in those areas, according to Chief of Police Devan A. Martin.

Having access to that kind of data was key to driving public policy changes. The city purchased the vacant houses, turned them into smart homes, and is now putting them back on the market.



Seat Pleasant Mayor Eugene W. Grant



Director of Public Engagement Sharron Lipford



Chief of Police Devan A. Martin



Director of Connected Government Solutions Mohamed Abdelhameid

Martin is also using data to understand where to deploy resources based off where crimes occur. One block, for example, had 16 break-ins in 2016. This year, it's had none. Thirteen percent of the city's criminal arrests came from one property. Previously, his department had no insights into that type of information.

"We have data now. We're processing it. We're making fact-based decisions," Martin said. Martin grew up in the Seat Pleasant community.

"I was part of the community. I saw the police department. But there was nothing connecting us," he said. A smart city, he said, can bridge that gap and draw communities together. "We're more responsive now. Citizens have trust in the process," he said.

### **What's next for Seat Pleasant?**

Eighty percent of US cities have populations of 10,000 or less, and cities already collectively bargain for services like a police dispatch. Seat Pleasant hopes to become the first small city to extend its benefits to neighboring communities and share the cost of technology, according to Abdelhameid.

"It's definitely something new and never been done on this scale," he said. "We want to be a technology hub." And while that's an enormous opportunity for the city, it will bring another layer of challenges. "We don't want anyone getting left behind in this new economy," Abdelhameid said.

His upcoming plans include using technology for workforce development and education. Another key challenge is to prevent displacement.

"We're creating policies that freeze tax rates, incentivize people not to sell their homes and be able to afford them long term," he said.

It's all part of the bigger picture of ensuring that the city is having a positive impact on its community, reducing crime, and enhancing employment opportunities.

"Our goal is to improve the quality of life for citizens," Abdelhameid said. "Technology can do that. And we see that as a means to promote social justice, equality, and inclusion."



## Expert Insight

# How can governments deliver personalized services?

Julia Glidden, General Manager  
Global Government Industry

Hear from our expert:  
[ibm.biz/Industrious3Gov](https://ibm.biz/Industrious3Gov)



# The surprising new government service: delight

Rich McKay, June 1, 2018

“The more people are involved in their government, the better served we all will be,” said IBM’s Director of Global Development Brenda Decker.

Decker has extensive experience helping states become more efficient and open to their citizens. As one of StateScoop’s Top Women in Technology for 2018, Decker has helped governments use technology from blockchain to AI to transform core services and revenue systems.

We talked with Decker about how governments can grow with their citizens’ expectations—and yes, even delight them.

## ***Industrious:* How can governments leverage modular technology?**

Decker: Governments originally built systems to more efficiently manage their records. A health and human services system, for example, was designed to be a huge record-keeping system.

Although citizens’ needs progressed and they became accustomed to on-demand services and interactive technology, many systems were never rewritten. Governments modified them, putting technologies on top of technologies and adding front-end systems.

Now there is nobody left who built the original systems and agencies are afraid of triggering a domino effect.

Budgets have become constrained in government so there is little appetite for throwing away the whole system and starting over, because that is overwhelming and expensive. People want a roadmap of where to start and where to go.

They also want to know how to escape the quagmire of outdated systems and move forward.

In modular systems, people can take a piece, remove it, and modernize it. The pieces can interact with each other. You don’t need to rip and replace old systems.

## **How can governments use blockchain?**

Each government agency sees itself as an individual business and often exists in a silo.

The Department of Corrections, for example, deals with inmate records of all kinds that are held by different government agencies, including health, court, physical attributes, family history, and driving records.

To obtain a total view of that inmate, they need to interact with four or five different agencies, all with different formats and requirements for what they can and cannot use.

With blockchain, those records can remain the property of those agencies. The Department of Corrections can access them when needed without having to store them in their own environment. They can be confident the records are authentic and immutable.

We can expand that to citizens. Let’s say Jane Citizen wants to interact with government and has vehicle, health, and court records. Those disparate records across agencies may need to interact for a specific purpose. Again, with blockchain, agencies can access these without affecting the records’ integrity, security, or authenticity.

Citizens need government services. Why can’t governments use information about citizens to proactively serve their needs and do more or all of the tedious paperwork? All the citizen would have to do is verify and provide the appropriate permissions to access the information.

## How can governments build trust?

News related to security breaches continues to dominate our lives. Governments must prove to citizens that the records citizens entrust them with are safe, secure, and being used for intended purposes—nothing more and nothing less.

As government works more and more as one cohesive entity, rather than many different silos, citizens will start to recognize that providing information has benefits for their daily lives. Sharing information about a commute could help the government provide ways to avoid flood-damaged roads or reduce pollution.

Is it possible for governments to make services and interactions enjoyable for citizens? It should not be a pain to register a car, get a driver's license, or request birth records.

We're all used to purchasing things online and getting instantaneous responses across our devices about when our product will be delivered. Government has to be as easy as ordering groceries online or ordering a book on a device and reading it instantly. Government has to get to that point to delight its citizens.

## How can governments empower, retain, and hire more people in tech?

Government is a tough place to work. It cannot compete financially with the private sector. Governments have very open processes. If a government worker makes a big mistake, it could potentially be in the news.

But there are benefits to working in government. It's one of the rare industries in the world where IT professionals work in environments that do absolutely everything versus just working in one industry such as financial services or retail.

Government is an industry of industries—including law enforcement, banking, emergency services, health, or transportation.

We get to work with some of the best technology, tools, and people. It is an excellent place to start a career because you will get the training you need and find the environment in which you want to be.

There wasn't a day in government that I didn't walk out the door without feeling I did something that helped make my city, state, or country better. Working for government is an opportunity of a lifetime. Yes, we do give up something for it, but we gain so much more. In government, people can change the world.

## How has the government CIO's role evolved?

It's becoming more of a strategic role, and less of a nuts-and-bolts, keep-the-computers-running role.

Technology touches everything in government in some way. CIOs should set a strategy that improves the lives of the people that depend on government and provide individualized services to people with complex needs.

CIOs have to take a strategic view across disparate government silos and ask, "Where is the right way to go? How do I advance things?"

CIOs will be more prominent stewards of data and arbiters of how and where that data is used. They'll ensure that citizens understand that their personal information is being used appropriately.

## Which fictional government would you like to join?

I don't want to be in the government that "The Flintstones" were running—I'm absolutely positive of that. In the movie "American President," President Andrew Shepherd said, "I was so busy trying to keep my job that I forgot to do my job." I want to work with a government that is busy doing its job.

# Kroger's food safety chief wants to untangle the food supply chain

Jordan Teicher, September 6, 2018

Howard Popoola was nine years old when he planted corn for the first time in the backyard of his family's home in northern Nigeria.

"A few days after, you could see something coming out of the ground," he told *Industrious*.

Popoola was hooked. Throughout his childhood, he continued to grow fruit, vegetables, beans and whatever else he could coax out of the soil. His yield often ended up on his family's dinner table.

"My passion was really in growing food," he said.

Popoola's early love of food made him particularly sympathetic to the lack of it in "less blessed" areas of the world. That sensitivity informed his subsequent career moves. After studying food and industrial microbiology at the University of Lagos, he joined the United Nations Food Program (now the World Food Programme). For years, Popoola traveled to dozens of countries to help manufacturers comply with the UN's food safety standards.

"That's where I cut my food safety teeth," Popoola said. From there, Popoola honed his skills in high-level positions at Darigold, Kraft, Nestle, US Foods, and Topco. Today, Popoola is well beyond cutting his teeth. Now, he's working at the cutting edge of food safety.

As VP of corporate food technology and regulatory compliance at the American retailer Kroger, Popoola is one of a small number of industry leaders engaged in an ambitious new effort to provide an unprecedented level of trust and transparency to the food supply chain through blockchain technology. The initiative, called IBM Food Trust, includes 10 companies across the global food supply, including producers like Dole and other major food retailers like Walmart.

"Unlike any technology before it, blockchain is transforming the way like-minded organizations come together and enabling a new level of trust based on a single view of the truth," said Marie Wieck, general manager for IBM Blockchain, in a release.

## Changing the industry

The food supply chain has never been more complex. These days, an ingredient from one producer can end up in thousands of products distributed to retailers around the world. And yet, there is currently no widely adopted industry standard for how each segment of the food system—farmers, processors, distributors, retailers—tracks and records data on those products. Many are still recording their data on paper. While some use digital methods, they don't enable communication with other parties in the system.

Piecing together traceability data, therefore, requires sifting through hundreds or even thousands of documents—a slow, complicated and often ineffective process. During a foodborne disease outbreak, it often takes manufacturers weeks to figure out the precise point of contamination, so they simply ask the retailers to toss out any product that has the slightest chance of being contaminated.

"The only way we can eliminate waste is to make sure that we avoid a situation where we have to throw out a whole bunch of perfectly OK food just because we can't isolate the contaminated product," Popoola said.



Kroger VP Howard Popoola

## A path forward

In the beginning of the summer of 2017, Popoola learned about a way to change the status quo. At a leadership meeting, Kroger CEO Rodney McMullen encouraged Popoola to contact his counterpart at Walmart, Vice President of Food Safety Frank Yiannas. Walmart had been working with IBM since 2016 to use blockchain to improve the way food is tracked, transported and sold to consumers. Now, the retailer, along with IBM, was inviting other businesses to explore the technology by joining the IBM Food Trust.

Traceability in the global food system is an evergreen issue, and through the decades IBM has applied the latest technologies to help address it. In the 1950s, for instance, IBM helped Denmark develop an innovative database to track every beef and dairy cow in the country. During the mad cow disease scare of the 1980s, the database helped save the nation's cattle industry.

Retailers are notoriously competitive, however, and collaboration across the industry has been challenging in the past. But Kroger's leadership didn't hesitate to join the Food Trust initiative, in large part because encouraging the reduction of food waste across the industry has long been a company priority.

Today, as part of a company program called Zero Hunger Zero Waste, store associates in nearly all Kroger supermarkets identify meat, produce, dairy and bakery items that can no longer be sold yet remain safe, fresh and nutritious. The items are then donated to Feeding America's network of food banks. According to Feeding America President Matt Knot, the nonprofit's retail donations program grew "in large part because Kroger opened its playbook to the rest of the industry and showed other retailers how it could be done." That same spirit of collaboration underlies Kroger's interest in blockchain, which requires a whole host of parties working together to be successful.

After an initial proof of technology exercise last summer, Popoola said, the company's blockchain effort remains "a work in progress." The imperative for industry players to work together to tackle problems of mutual concern, meanwhile, remains as urgent as ever.

"If there's an outbreak of E. coli associated with chopped romaine lettuce, for example, that cripples the entire industry—not just the growers, not just the Doles of this world that take on the harvested products and shred them, and not just the retailer that sells them. Everyone gets affected. That's why food safety can't be a competitive advantage, because if one of us is affected it affects us all," he said.

“ As an individual organization there's only so much we can do. But together as a team, powerful retailers and other food manufacturers can do a whole lot more. ”

## Scaling success

For Popoola, the FoodTrust initiative touches two personal passions—increasing food safety and reducing food waste.

Today, roughly one third of the food produced in the world for human consumption every year gets lost or wasted. At the same time, 815 million people around the world suffer from chronic hunger. The extreme disparity between abundance and scarcity, Popoola said, disturbs him.

"You shouldn't have to debate whether you should eat today or not. I believe it is a human right to be able to have food," he said.

That conviction has informed Popoola's work throughout his career. And it's what will keep motivating him, he said, as he works to build a stronger supply chain across the globe—one that makes shoppers as confident about the food they buy as though they grew it themselves in their own backyards.

"That's who I am today—a guy who watches over 2,800 retail stores and 38 manufacturing facilities producing safe foods, but also a guy who is passionate about making sure that we don't waste food and that we make food available to the communities we serve," Popoola said.

# In the '90s, Dan Kohn brought retail to the web. Now he has another big idea.

Jordan Teicher, September 5, 2018

On an August afternoon in 1994, 21-year-old Dan Kohn was drinking champagne and celebrating with his colleagues in a house in Nashua, New Hampshire. The happy occasion? They'd just received word that a man in Philadelphia had used his credit card to securely buy a CD—Sting's "Ten Summoner's Tales"—on the internet.

That doesn't seem like much of a reason to celebrate today, when 80 percent of Americans make online purchases. But 24 years ago, such a transaction had never happened before, and it was a huge deal.

It was an especially big deal for Kohn and the other three young men—Roger Lee, Guy Haskin and Eiji Hirai—behind NetMarket, the online marketplace that brokered the historic CD sale. Other, larger organizations were working to automate the data encryption of digital commercial transactions at the time, but, against the odds, the upstart group of recent college graduates had managed to beat them to it. With privacy for shoppers ensured, according to a *New York Times* story published the next day, the Internet was now officially open for business.

The team had spent months holed up in the house where they lived and worked to get their system up and running. Up until a day or two before the first purchase went through, though, they weren't sure it was going to work. Soon after their fears were alleviated, Kohn bragged that even NSA agents couldn't access their customer's credit card number if they tried.

The key to their success was an encryption program called PGP, or Pretty Good Privacy. Developed by the computer security expert Philip Zimmerman, it was the first widely available program implementing public-key cryptography. While it was "incredibly tedious" to integrate PGP with a web server and client, Kohn said, the software was free and available for anyone to use. NetMarket's secure transaction, he said, would not have been possible without it.

Six months after the founders of NetMarket celebrated their milestone, they sold the company. Kohn went on to work at a satellite venture, a venture capital firm, and several other startups. Today, as the head of the Cloud Native Computing Foundation (CNCF), Kohn is changing the way companies do business on the Internet yet again. And he's doing it by advocating for the same spirit of technological collaboration that powered his history-making achievement in 1994.

“ You shouldn't be locked into a single cloud provider or a single commercial software vendor. ”

As the vendor-neutral home for many of the fastest-growing projects on GitHub, including Kubernetes, Prometheus and Envoy, CNCF advances cloud native applications and services, allowing developers to collaborate around existing and to-be-developed open source technologies. IBM became one of the organization's 28 founding members in 2015.

Developing applications remains a challenging undertaking, often requiring companies to assemble teams of experts that can integrate and maintain disparate technologies. CNCF technologies make that process easier. By shortening their development and deployment cycles and increasing their resiliency, companies can scale their online businesses faster. Major retailers, including eBay, Nordstrom, and JD.com, are among the nearly 300 CNCF members that are doing so.

“Our customers, partners, and investors have come to expect an unmatched online shopping experience. One key way we are able to deliver this is through a strong investment in open source technologies like Kubernetes, which is critical to our business infrastructure,” said Haifeng Liu, JD.com’s chief architect. “As a CNCF member, JD.com is able to guide and accelerate the development of major cloud native projects that we believe are critical to improving the retail experience in China.”

At 21, Kohn didn’t simply dream of selling CDs. He dreamed of fundamentally changing how retail worked.

“Were we really ambitious about this? Did we actually believe that huge amounts of how commerce took place was going to move from the existing model of retail stores and mail and telephone? Absolutely that was our vision,” he said.

Even today, in a world in which ecommerce is a hugely important part of retail, the vast majority of transactions occur in stores. But every day, millions of people go online and use their credit cards to buy things. All that started with NetMarket.

Kohn has big dreams for CNCF, too. But while some companies are barely one percent of the way on their cloud native journey while others are at 95 percent, Kohn said they’re at least headed in the right direction.

“It’s the future, and increasingly the present,” he said.

## Expert Insight

# How can blockchain bring transparency to the food supply chain?

Laurence Haziot, General Manager  
Consumer Industry Expert

Hear from our expert:  
[ibm.biz/Industrious3Ret](https://ibm.biz/Industrious3Ret)



# In the post-digital world, stores find their place

Jordan Teicher, September 10, 2018

“We’ve gone through three very distinct phases as it applies to digital technology,” said Doug Stephens, one of the world’s foremost retail industry futurists.

There was the pre-digital phase, he said, when digital technology was completely new. Then there was the adoption phase, when consumers found the applications of smartphones and social media totally fascinating. Now, Stephens said, we’ve entered the post-digital phase, an era in which “technology is no longer a fascination but a base expectation.”

“We walk into situations in our lives where we expect there to be a technological element that will somehow make the experience more frictionless or make it easier for us as consumers,” Stephens said.

“ I’d say we’re almost more surprised by the absence of tech in certain situations than by its presence. ”

That’s important for retailers to understand, Stephens said, particularly when it comes to the design of new stores. In an interview with *Industrious*, Stephens explained why that is, and how retailers can create successful experiences for customers in this new technological landscape.

## ***Industrious*: How are retailers using technology to make the store a great media channel?**

**Stephens:** One of the real benchmarks in the industry is Sephora. Sephora has done a really good job of recognizing that consumers use different channels for different purposes. With its mobile app, for example, once you step in the store, it immediately goes into store mode, with functionality you’d never use at home. Another example would be a brand like Reformation. They’re an online retailer but have a store in New York where they’ve taken a very different approach to selling apparel. They’ve recognized there’s friction in the buying process you can alleviate with the use of technology. They’ve done a great job of allowing consumers to scroll through different items of clothing on a screen and select the items they want to try on. Then they have those items delivered into a fitting room and the fitting room is then connected so when they try things on they can request different sizes.

## **Can technology in stores ever be counterproductive?**

Very often what happens is you’ll find retailers take a fundamentally mediocre store experience—and calling it mediocre is probably being generous—and look at technology as being a panacea. That’s like taking a stale cake and just putting fresh icing on it and thinking that will make it better. It won’t. You’re still dealing with a base experience that’s awful. Too often I think that we jump to technology and say, “If only we had a better mobile app or a better-looking website or beacons in our stores.” We latch on to these shiny things without first determining the experience we intend to design and whether technology is the answer.

## **You've argued that "media has become the store." What does that mean?**

What we're seeing is that media in all its forms—the smart speaker in your house, your smart TV, your tablet, even your car—no longer just serves as a call-out to get people to go to a store. Instead, they're all serving as direct portals to purchase. In essence, they're becoming stores. They are now doing the things that stores were traditionally built to do—namely, present assortments of products—but you can argue that media is doing a far better job of that than brick-and-mortar spaces. They have much better assortments, an infinite supply of product information, and an easier way of transacting sales.

## **So if media can now sell products, does that change what a store can offer consumers?**

My belief is what's happening with physical spaces is exactly the opposite of what's happening with media. As media becomes the store, physical stores are becoming powerful media channels. I'd argue they're actually becoming the most powerful and manageable and even measurable media channel in the market. When you think about the millions or billions of dollars being spent now by brands to connect with consumers on Facebook, in many instances that connection is the consumer watching five seconds of a YouTube video with the sound muted. Now compare that to the level of engagement that can take place in a physical store, where a consumer may spend upwards of 20 to 30 minutes engaging with the people and the products and the experiences in a physical space. The media value of physical stores is overwhelming.

## **Are you seeing retailers actually begin to think this way about their stores?**

We're seeing online pure play retailers really in numbers now coming into the offline world and opening stores—but not opening stores where the purpose of the store is the distribution of products. They're opening stores where the purpose is the distribution of brand experiences. Once retailers begin to look at their retail environment through the lens of a media distribution play rather than through the lens of a product distribution play, it's a 360-degree change.

## **Where is all this headed?**

Where I eventually see this future leading us to is really two different kinds of stores in the marketplace. On the one hand, you're going to have manufacturers that distribute their own products, and on the other you'll have these experiential retailers that serve almost as a media agency for their clients. And that second type of retailer won't really attempt to have the consumer leave the store that day with a product. These new retailers are essentially going to be in the business of creating experiences.



€ 39,00

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# The fastest woman alive is making speedy sponsorship deals thanks to AI

Jordan Teicher, August 8, 2018

Carmelita Jeter has built a career on moving quickly. At the 2009 Shanghai Golden Grand Prix, the sprinter blasted through the 100-meter dash in 10.64 seconds, making her the fastest woman alive—and the second-fastest woman in history. Two years later, she became the world 100m champion. A year after that, at the Olympic Games in London, she took home three sprinting medals.

But when it came to securing sponsorship deals—an important source of visibility and extra funding for any athlete—Jeter recently found herself yearning to pick up the pace.

In the past, she'd typically only inked deals through an intermediary, with the kinds of sport-centric brands with which you'd expect a runner to associate. Often, the engagements required Jeter to get on a plane and speak at an event. Frequently, payment for her work took as long as two months to come through.

“The benefit was that I could just run and compete and train and I didn't have to worry about getting sponsorships,” Jeter, who retired from track and field last year, told *Industrious*. “But then I think I was missing out on opportunities I thought I'd be a good fit for.”

This year, Jeter's sponsorship activity started accelerating when she learned about OpenSponsorship, an online platform that connects brands with athletes, events and teams to drive marketing and sales.

Jeter started using the platform in April, and has made about half a dozen deals since then, often with brands she never would have thought to represent before, including an eco-friendly laundry detergent brand and a pet-friendly cleaning product brand. Rather than flying out to events, she now mentions the brands she works with in her social media posts, which she shares with her 65,000 Twitter followers and her 88,000 Instagram followers.

“Everything is so quick. If I get a sponsor on a Monday, they'll say, ‘If you finish your deliverable by Thursday you'll be paid on Friday,’” she said.

OpenSponsorship, of course, isn't the only platform connecting brands to social media influencers. But the more than 3,000 athletes and 2,500 brands on the platform agree that it's among the most effective. A major key to its success? An enhanced discovery engine powered by IBM's AI system, Watson.

## Going digital

OpenSponsorship's CEO and founder is Ishveen Anand, who worked for eight years at a sports agency before setting out on her own when she noticed big shifts in media were going unrecognized by the industry.

“A lot of marketing dollars are obviously moving into digital. That can be social content, it can be online video. But the people selling sponsorship haven't really adjusted to that, nor have the people buying sponsorship generally,” Anand said.

With OpenSponsorship, she said, she's bringing both parties into a new era of digital marketing driven by transparency and measurability. And she's been able to stay ahead of the competition by powering the platform's discovery engine with IBM Watson, ensuring that her users don't spend hours trawling through profiles that don't suit their needs.

“We have 3,500 athletes on OpenSponsorship,” she said. “It's hard to extract information from them directly. Obviously they're busy. With IBM, what we have really been able to do is bring insights on the social side of things, which means we can make better quality deals and even higher value deals.”



Olympic sprinter Carmelita Jeter

Instead of asking every athlete on the site to self-report their social media activity, OpenSponsorship finds that information automatically by analyzing structured and unstructured data—including an athlete’s social engagement rate, reach, activity, as well as her most common talking points and the age, location, and gender of her audience. That helps give brands an infinitely more detailed and accurate prediction of how their messaging might perform through an athlete’s channels.

“When you’re spending tens of thousands of dollars, every extra data point you can get is really important,” Anand said.

### The perfect match

Finding a genuine spokesperson and a receptive audience were high priorities for Dustin Elliot, senior brand manager at The Vitamin Shoppe, when he went on OpenSponsorship looking for athletes to promote the retailer’s private sports nutrition brands.

“A lot of influencer services tended to be very broad and have a lot of capabilities and a lot of bells and whistles, but then you get on the services and you have trouble finding influencers that fit your specific needs,” he said.

OpenSponsorship, he said, was different. After posting the parameters of his brand’s campaign on the platform, he didn’t have to spend any time at all looking for interested and qualified athletes. Jeter wrote to him expressing her interest, and based on her social media data, OpenSponsorship was able to quantifiably confirm that she’d be a strong match for the campaign.

“Before I even opened up her profile I knew there was a good chance she’d be someone we’d want to work with,” he said.

Rick Fenner, vice president of supply chain at Qualitas Health, had a similar experience. When he went on OpenSponsorship to promote iWi, the company’s algae-based nutrition brand, he wanted to connect with track and field athletes that were “very conscious about health and what goes into their bodies.”

Again, Jeter expressed interest and fit the bill. And so in April she found herself standing in her kitchen, posing with a bottle of iWi’s Omega-3 supplement. In the caption for the Instagram post she made in that moment, she pondered how, with her packed schedule, she’s still able to “get everything done”—jump on planes, attend workouts, write emails, take meetings and conference calls. Then she answered her question: “Well, I’m a #phenomenalwoman and I also take @myiwilife Omega 3 Vitamins.”

### The future of sponsorship

Global sponsorship was a \$62.7 billion market last year, according to consulting group IEG, and it’s expected to grow 4.5 percent this year.

“Considering the huge amounts involved, you would imagine sponsors of athletes and events have clear answers when asked about their return on investment (ROI). You would be wrong,” wrote Jeff Jacobs, Pallav Jain, and Kushan Surana of McKinsey in 2014. “Industry research reveals that about one-third to one-half of US companies don’t have a system in place to measure sponsorship ROI comprehensively.”

As more sponsorship dollars go toward digital deals, that’s changing. But those kinds of analytics aren’t just a boon for companies. More data on successful sponsorships means a greater likelihood of future deals, and that’s ultimately good for athletes like Jeter, too.

“With Carmelita we started out with a small deal, where she just did a couple posts. But then we saw how it was performing and so we decided to do a longer deal over a couple months,” Fenner said. “The site helps you do that.”

# Will blockchain rock the event ticketing industry?

Jordan Teicher, June 5, 2018

Since 2015, Glostik Willy, a “hippy metal” band based in Indiana, has gathered local acts and music fans for an annual festival called Willy Town. It’s the band’s signature event, attracting more than 1,000 fans from the region for three days of camping, music and art.

Jameson “Jay Moe” Bradford is the band’s lead vocalist and guitar player, and for the past three years, he’s run ticketing for the event through his own homemade system.

When the band rolls into Troy, Ohio for the fourth edition of Willy Town, however, things are likely to be a lot less stressful. That’s because festivalgoers this year will be able to buy tickets through True Tickets, a platform built on the IBM Blockchain Platform, powered by the Linux Foundation’s Hyperledger Fabric.

“It’s going to solve a lot of problems for us,” said Bradford.

## Leveling the playing field

Matt Zarracina, Steven Dobesh, and David Piskovich founded True Tickets last year in response to some of their own frustrations with the event ticketing industry. But it wasn’t just the hidden fees in the primary market that bugged them, Zarracina told IBM, it was the secondary market—in which scalpers use automated bots to harvest tickets online and then resell them at a huge markup to genuine fans.

“Most ordinary fans simply don’t stand a chance. Within seconds of an event going on sale, the tickets are harvested in the thousands by a small but ruthlessly efficient army of [scalpers], many using multiple credit cards to bypass the limit on the number of tickets that one person can purchase,” wrote Rob Davies and Rupert Jones in *The Guardian*.

Blockchain is improving transparency and facilitating secure transactions across a number of industries. While True Tickets is still in the early stages of its development, Zarracina believes its blockchain-based system has the potential to revolutionize ticketing, not only by reducing fees and eliminating fraud, but by turning it into a vehicle for more dynamic and personalized relationships between venues, artists, and fans.

First and foremost, the True Tickets app verifies the identities of all buyers and sellers.

“It’s all about making sure that ticket is valid and it’s getting into the hands of the right person,” Zarracina said.

From there, the app acts as an immutable ledger, allowing artists, venues, promoters and fans to track a ticket through each stage of its life cycle, from creation to its use at an event. The app also allows ticket creators to establish rules around a ticket’s resale, helps artists benefit from the secondary market and ensures prices never get out of control.

## “A platform for connectivity”

Glostik Willy isn’t the only band getting on board with blockchain. Recently, Boston-based rock band The Maxims sold tickets for one of its concerts for the first time through True Tickets. Avi Meyers, the band’s lead singer and guitarist, sees the platform as key to a new way of engaging fans.

“It’s a platform that allows a transaction between a fan and the artist, but it’s also a platform for connectivity. The artist in the app has more tangible control over what goes into the ticket sales,” Meyers told IBM.

Eventually, Zarracina said, The Maxims and other groups could use True Tickets data to determine, say, their 50 most devoted fans, and then send out a special code to them for an exclusive, intimate concert. In this way, the app acts as a way to both encourage and reward loyalty.

In Bradford’s view, True Tickets won’t just improve the ticketing process at the festival, it will improve the experience of the festival on the ground. By analyzing the average attendee’s arrival time as reported by the app, for instance, he could determine how best to allocate event staff at the gate. Or he could send push notifications through the app to everyone at the festival to inform them of performance start times.

The end result of such interventions, he expects, will be an event that’s smoother, smarter and, ultimately, more likely to motivate attendees to return the following year.

“We can learn things today that we need to know for tomorrow,” Bradford said.



# Greg Cross wants your next employee to be an AI-powered digital human

Jordan Teicher, June 28, 2018

“Humans can communicate in lots of ways,” said Greg Cross. “But when we actually want to have important conversations we always do those face to face.”

Cross, the CBO of Soul Machines, practices what he preaches. Though he lives in New Zealand, he took time out of a brief business trip in New York to meet me in person at IBM’s office near Union Square. We gathered to talk about his company, whose mission is to make face-to-face conversations like ours part of the most common interactions we have today—namely, the interactions we have with intelligent machines.

“We’re heading into a world where we’re going to spend a lot more of our time interacting with machines. We have a fundamental belief that these machines can be more helpful to us if they’re more like us,” he said.

To do that, Soul Machines’ team of AI researchers, neuroscientists, psychologists and artists are creating “digital humans”—fully autonomous, animated individuals that look and sound like real people. The key to their intelligence is a cloud-based virtual central nervous system called the Human Computing Engine, which sits atop IBM Watson and uses Watson Assistant.

When connected to that system, Soul Machines’ digital humans are amazingly lifelike. They hear and see the people with whom they interact, and their conversations with those people are made emotive through nuanced facial expressions. For businesses, Cross said, digital humans can revolutionize the economics of customer service, giving them the ability to provide personalized and consistent care at scale.

A face, Cross said, is a “reflection of the heart and mind of an individual,” and it can be key to successful digital interactions with customers. In the years to come, he bets, businesses across industries will agree and make digital humans an integral part of their workforce.

“The question we wanted to explore was: What happens when you create a digital face? Will people engage with it? Will they find that digital face more engaging than a chatbot or a voice assistant? Our view is that, yes, of course they will. That’s ultimately the market and business development we’ve been going on,” Cross said.

## “It completely captured my imagination”

Cross has been a technology entrepreneur nearly his entire career. At 18, he dropped out of business school at the University of Waikato, and began an internship at the high-tech manufacturer Trigon Packaging. Since then, he’s worked at technology startups in different industries all over the world. In 2007, he co-founded PowerbyProxi, a spin-out of the University of Auckland’s wireless power department, which developed high efficiency and high density wireless power products. The company sold to Apple last year.

“For me, there’s nothing more fun than taking on some sort of core technology or core idea, wrapping a team of people behind it, and exploring how you build a company around it. That’s still what gets me out of bed with a smile on my face,” he said.

Two years ago, Cross found his most recent opportunity to do just that when he met Dr. Mark Sagar, an Academy Award-winning animator who was then the director of the Laboratory for Animate Technologies at The University of Auckland. Cross had, in the past, seen Sagar present his work—a virtual animated baby called BabyX that learns and reacts like a real human infant. But when Sagar sat down with him one-on-one to show him the technology underlying his creation, Cross knew he had to get involved.

“It completely captured my imagination,” Cross said.

## First steps

When Cross and Sagar first started thinking about how to turn the technology into a business, they drew up a list of half a dozen industries they knew were facing “quite significant disruption,” and began imagining how digital humans could help. They then started talking about digital humans at technology and industry conferences. Soon, business leaders eager to drive change in their industries wanted to talk with them.

“It’s like any new technology; it’s well understood that there’s an adoption curve. There are the early adopters and then there are those who never want to be first. We’re always very careful about making sure we’re speaking to the right people,” he said.

So far, it seems, Cross has found those people. This year, Soul Machines debuted its first crop of digital employees at Autodesk, Daimler Financial Services and NatWest. It’s still early days, Cross said, but the employees—Cora, Sarah, and Ava—are paving the way for a future in which digital humans will be an integral part of the way people interact with businesses.

“ I like to think in five years we’ll create a very large population of digital humans who will be interacting with people and having hundreds of millions of conversations every day. ”

## Imagining the future

Where might digital humans pop up next? Cross couldn’t talk about some of Soul Machines’ upcoming projects. But the appetite for next-generation customer service solutions, he said, is strong across a number of industries, including retail and telecommunications. Digital humans could find a productive place in all of them.

In a fast-paced, digitally-driven landscape, customers have little patience for endless call center queues and customer service departments with limited hours. Increasingly, they expect quick, seamless interactions at any time of the day or night with representatives that understand and remember their preferences and history.

At the moment, Soul Machines’ digital humans are making their mark in customer service. But Cross is already investigating a wide range of future applications for his company’s technology. He imagines digital humans one day teaching classes or providing medical care. Celebrities, he said, could enlist their own digital twin to perform tasks they can’t fit into their schedule. The possibilities, Cross said, are endless—and he’s exploring as many of them as possible.

“One day I can be sitting in a board room doing a presentation for a CEO of one of the largest banks or the largest tech companies in the world. Another day I can be sitting down with the biggest celebrities in the world,” he said. “It’s a huge amount of fun.”

# Why fast movers will reap AI's biggest rewards

Amir Husain, Founder and CEO of SparkCognition  
August 9, 2018

We live in the AI century. Technologists, AI researchers, and an increasing number of visionary business leaders know this to be true. But decision makers at many companies remain less certain. What if this is just another passing fad? Amidst all the unbelievable buzz, it's hard to blame anyone for being skeptical. Will the hype just lead to another "AI winter"?

It won't. Not this time.

AI can no longer be relegated to a potentially fleeting trend. Its more basic manifestations—systems that can see, sense, predict, and categorize—are already being used hundreds of billions of times a day. What's different this time is that AI works well enough to deliver commercial impact. And soon, as deployments grow and AI capabilities improve, every aspect of society will be impacted. In a recent McKinsey study, analysts found that early adoption of AI may bring an unassailable lead to businesses that adopt it first in their category. Those that are left behind may never be able to overcome the competitive advantages that accrue to first movers.

So, how does a manager avoid becoming a cautionary tale about the pitfalls of slow technology adoption?

First, just do it. Don't be afraid of identifying a project that can benefit from AI, moving fast, and trying it out. If you succeed, great. If you run into trouble, your team will learn. And they must. There is no downside if you select the project well. Try again.

Second, don't give up your data. If you have data that differentiates you, think about what you hand over to providers who will only give you AI-powered insights if you give them your data. You may not know exactly how just yet, but in the fullness of time, as you deploy more AI capabilities, your data may end up being a core driver for your company. Don't be the one who ceded the advantage!

Third, it is unlikely you can win the "data science from scratch" game. Rather than building a team that attempts to code from the ground up, focus them on using packaged products that give them a speed advantage. AI talent is incredibly expensive, and true experts are few and far between. The best talent resides at a handful of leading software companies, and they like being there because they can apply their talents to a broad range of cross-vertical problems. But if you can't afford or retain dozens of the top AI researchers—and most companies can't—it doesn't mean you are precluded from using AI. An execution-focused team that can leverage leading AI products and doesn't waste its time reinventing the wheel has the power to transform your unique data into rich revenue streams. Dispense with the "Not Invented Here" (NIH) syndrome and get practical about partnerships and leverage.

## Don't bet your business on AI merely being hype. It isn't.

Lastly, tie it back to a business need. Is an existing human-centered, low-value process driving cost or inaccuracy while leading to a dissatisfied workforce? Think about how you use AI-powered automation to solve this. Is the monitoring of a system or process tied to revenue, but you are short on experts who can perform the monitoring? Augment your experts in terms of both quality and speed with AI. Are you using laborious, out-of-date methods for predicting key variables that are critical for your business? This could be any type of prediction, from the remaining

useful life of an industrial asset, to the expected price of a financial instrument, to the likelihood that a client will default on a loan. If better predictions mean more revenue for your business, think AI.

Now is the time to begin moving with AI. Once you try a few low-risk projects and find an approach that works, it is then time to scale rapidly across your enterprise. The business leaders who truly seize this opportunity will be the ones who get to re-imagine and reinvigorate their businesses months hence. When it is time to scale, an execution-oriented team, as opposed to a reinvention-oriented team, makes all the difference!

Think about use cases where you can test AI solutions. Think also about how AI changes the underlying economics for your company. Put together a small, fast-moving group of execution-oriented, open-minded executives. And get going. As they say, there is no time like the present!

## Expert Insight

# Why transform your network?

Craig Farrell, Distinguished Engineer  
VP and CTO Global Telecom Industry  
IBM Global Markets

Hear from our expert:  
[ibm.biz/Industrious3TME](https://ibm.biz/Industrious3TME)



# The hidden costs of a data breach

Lauren Jensen and Megan Powell  
September 4, 2018

It feels like every day, news outlets are reporting on yet another company that has experienced a data breach. No industry is immune, and the occurrences are becoming larger and more common. According to TechTarget, “a data breach is a confirmed incident in which sensitive, confidential or otherwise protected data has been accessed and/or disclosed in an unauthorized fashion. Data breaches may involve personal health information (PHI), personally identifiable information (PII), trade secrets or intellectual property.”

With the enactment of GDPR, data privacy and protection is of increasing concern not just for organizations, but for consumers, too. It is their records, such as social security and credit card numbers, that may have been compromised along with sensitive business data.

“It’s not a matter of if you are the subject of a data breach, it’s a matter of when,” said Dr. Larry Ponemon, Chairman and Founder of the Ponemon Institute.

In 2018, organizations stand more than one in four odds—or more precisely a 27.9 percent chance—of experiencing a data breach in the next 24 months, according to a 2018 Cost of a Data Breach report recently released by IBM Security and conducted independently by the Ponemon Institute. The report covers the impact a data breach has on organizations, including a multitude of cost factors from technical investigations and recovery to notifications, legal and regulatory activities, and cost of lost business and reputation.

Costs of data breaches are up across the board, year over year. The global average total cost of \$3.86 million is a 6.4 percent increase and the per-record cost of \$148 is a 4.8 percent increase over last year.

With an average cost of \$7.91 million, United States average costs are the highest of all country samples.

Examining the data through an industry lens is even more eye-opening considering the type of data held within these organizations. Three areas of concern are the cost of the data breach per record, consumer churn rate, and the number of days to find and mitigate a data breach.

## Cost of a data breach

Healthcare data breach costs top the most expensive ranking with a \$408 cost per record, which is nearly three times the cross-industry average of \$148. Financial services is ranked second with a \$206 cost per record, and professional services ranked third at \$181 per record. For these companies’ customers, the lost or stolen records can represent a medical record or a bank account setting up a situation for fraud or account takeover. While for a single company the impact is clearly monetary, it also can be detrimental for its brand and public persona.

## Churn rate

Costs reported to the street or publicized by a business following a breach are typically reflective of the easily quantifiable variables, but do not take the full set of cost components into account. One of the largest unreported financial consequences for any organization is the degree of lost business following a breach, or abnormal churn rate.

In the United States, a breach at a financial services firm triggered an average abnormal churn rate of 7.5 percent, a healthcare breach a rate of 6.7 percent, and a pharmaceuticals breach resulted in a 6.3 percent abnormal churn rate. No company wants to lose customers, since the cost of new customer acquisition is usually higher than the cost of retaining existing customers.

Furthermore, the negative perception of a company that experienced a data breach reduces the number of people that would want to use a particular hospital or bank—and this perception can carry on well beyond the announcement of a data breach.

## Identifying and containing a data breach

One of the most significant relationships the Ponemon Institute found this year is the higher data breach cost due to the failure to quickly identify and contain a data breach. This year the average time to identify a breach was 197 days. Entertainment, healthcare, and media companies exceeded these values at 287, 255, and 225 days respectively.

Interestingly, the average time to contain a breach was 67 days, but companies that contained the breach in 30 days or less saved an average of \$1 million.

Although data breaches will continue to occur, there are measures an organization can take to reduce the cost per record. For instance, an incident response team can shave off \$14 per record. For a breach of even 10,000 records, that adds up to a savings of \$140,000. The extensive use of encryption is the second most effective measure an organization can take to protect the bottom line, at \$13.10 per record. Business continuity management can save \$9.30 per record.

“While data breach costs have been rising steadily over the history of the study, we see positive signs of cost savings through the use of newer technologies as well as proper planning for incident response, which can significantly reduce these costs,” said Dr. Ponemon.

# How blockchain tracks diamonds from mine to manufacturer

Rich McKay, May 9, 2018

Getting engaged? Blockchain may have a hand in it. The technology may not make popping the question any less nerve-wracking, but it can help couples buying a ring breathe a little easier knowing that it's ethically sourced. Recently, a consortium of leading diamond and jewelry companies from around the world announced a unique blockchain collaboration called TrustChain. This consortium will track and authenticate diamonds, precious metals, and jewelry at all stages of the global supply chain, from the mine to the retailer.

"Consumers should be able to see the journey their gem has gone through. Soon ring owners will be able to look up their rings [on the same blockchain]," said IBM Senior Vice President of Global Industries Bridget van Kralingen in an interview with *Fortune*.

It hasn't always been so easy to trace the provenance of jewelry through the various steps of far-flung supply chain routes.

Traditionally, the jewelry industry has depended on certificates to prove that a gem is not counterfeit or sourced from a conflict zone. But that tracking process has been heavily manual, paper-based, and prone to inaccuracies.

That's where blockchain can make a difference—by creating a permanent, fully traceable record that can't be altered. The ledger is transparent and distributed across multiple computers. This creates an immutable audit trail for traded stones.

TrustChain is not the first initiative to apply blockchain technology to the jewelry industry. A UK-based company called Everledger is using blockchain to authenticate and trace the origin of high-value and luxury goods, such as diamonds and wine that are authenticated by trusted players like certificate houses.

Companies across industries are embracing blockchain technology to improve their supply chains. By putting their transactions on shared ledgers, they're tracking shipping

containers, enhancing food safety, and even funding Hollywood blockbusters with greater accuracy and transparency.

For automotive manufacturers, blockchain also holds a lot of promise. Blockchain can help solve visibility issues by tracking high-value goods from mines to factories. And, as with diamonds, it can discover the provenance of precious metals such as cobalt, a key ingredient in electric vehicle batteries.

“ Consumers should be able to see the journey their gem has gone through. ”

Blockchain works with other technologies to spot supply chain problems before they impact the bottom line. Connected to IoT and weather data, blockchain would “provide permissioned parties in the inbound chain to the plant with an accurate and transparent end-to-end view of part location, quantity, status and other useful information,” said IBM Blockchain Leader Matthew Jones.

Globally, about \$13 billion worth of rough diamonds is extracted every year, before being cut and sold in an industry worth \$72 billion. With as much as 65 percent of a product's value coming from suppliers, supply chain managers need to identify and prevent potential disruptions before they cause headaches.

“People do care about what they buy,” said van Kralingen. “Most consumers, especially millennials, will pay more to know.”



# How AI improves manufacturing quality

Rich McKay, August 15, 2018

Artificial intelligence that can see and hear defects in manufacturing? It's possible.

AI already helps us reduce traffic congestion, makes cities safer, and limits air pollution. And now it can be the eyes and ears of manufacturing quality checks—identifying wonky engines, missing circuit board components, and scratched screens to remove defective parts and products before they hit the marketplace.

## Almost any manufactured part could benefit from AI's gaze.

“Any industry where manufacturing flaws can be detected visually is suitable for AI,” said Jiani Zhang, Watson IoT Director of Product Management.

More than half of quality checks involve visual confirmation. Often manufacturers rely on highly skilled manual inspections, but these can be time-consuming, occasionally dangerous, and costly.

And even when manufacturers use cameras, they are only capturing a fraction of the potential data. Manufacturers use cameras for quality control, but “all that tells you is if a product is a ‘pass’ or ‘not pass,’” Zhang said. “We can do so much more with those photos.”

By applying AI to visual inspections, organizations can identify defects by matching patterns to images that were previously analyzed and classified. And using 3D techniques, they can even classify the severity of a blemish.

Manufacturers also use sounds—or acoustics—in determining quality. Sensors on equipment can detect changes in vibration or sound that may indicate a defect. Acoustic inspections are a huge help for products or equipment that can be challenging to manually inspect. The misaligned jets of a dishwasher make a distinctive sound, as does the sound of a faulty engine.

And AI can learn quickly. It can be trained to recognize both good and bad parts with just a few hundred defect images or sound files. And it will get smarter and improve its accuracy over time as it's exposed to more defects.

### The cost of poor quality in manufacturing

For many manufacturers, quality costs as high as 15 to 20 percent of sales revenue are routine, chiseling away at the bottom line, tarnishing their brand, and frustrating customers.

Even thriving companies that strive to deliver the highest quality during every stage of their manufacturing processes are not immune to quality issues that lead to high rates of scrap.

“Manufacturing defects are a huge issue for the industry. In some cases, 50 percent of production can end up as scrap because of defects, while in some complex manufacturing lines the rate of scrap can be as high as 90 percent,” said Odd Myklebust, the IFACOM coordinator at the Norwegian University of Science and Technology in Trondheim.

## The Industry 4.0 data deluge

Industry 4.0 applications enabled by IoT are expected to create a new surge of factory productivity, creating value of up to \$3.7 trillion per year in 2025.

That increase in manufacturing productivity could be eaten away by quality issues. Finding new insights will be key.

“Manufacturers are sitting on a goldmine of data,” said Zhang. “We hear from customers that their machines have been spitting out data for decades, but they didn’t know what to do with it.”

With connected sensors, companies can gather real-time data about performance and quality to avert possible issues.

“IoT devices can be applied to machinery on a factory floor, capturing data on energy usage, temperature, and output. IoT devices can also be outfitted on checkpoints in the distribution process, where they can keep tabs on parts and products as they are shipped from factory to warehouse and beyond,” said Ari Zoldon, CEO Quantum Media.

With all that IoT data being collected, manufacturing companies need a better way to analyze and see patterns to improve quality. That’s where AI—and its ability to process mountains of data—comes in.

AI can “identify causal problems that led to quality problems”—analyzing data from raw materials, production lines, finished products, maintenance records, and customer complaints.

## Quality in the field

Manufacturers can also glean insights from their increasingly connected products after the sale.

“IoT sensors embedded within these devices and machines provide hard evidence around actual product operations, responses, and user interaction patterns,” said IBM Global Managing Director for the Electronics Industry Bruce Anderson.

By monitoring how customers actually use their products, companies can potentially alert customer service, warranty management, and even product design to shortcomings in product performance or unanticipated usage.

These combined insights pave the way for designing new innovative capabilities and products.

“Sensor data can also record how many times a refrigerator door is opened, or how often certain buttons are pressed,” said Anderson. “In the manufacturing process, companies can redesign components or sub-systems based on actual product usage and malfunction data. This will help reduce warranty and maintenance costs, with higher quality products and more satisfied customers.”





# Home, smart home: IoT and AI will make where we live more accessible

Rich McKay, June 13, 2018

Independence. For people with disabilities and the elderly, it's more than a word—it's a catalyst for fulfillment and dignity.

Home is where that independence can be realized. The elderly want to safely live in their own homes as long as possible. People with disabilities want a home designed for their specific needs. Ultimately, a more accessible home will help people feel connected and valued, and reduce loneliness.

## How technology enables aging in place

"My in-laws just turned 87 and 91, and my family is determining how to best care for them," said Scott Gerard, Senior Technical Staff Member at IBM Research. "It's a challenge, though some of my family can be at their house within five minutes. Others want to help, but live far away."

The growth of the global population over the age of 65 is one of the biggest demographic shifts ever seen. Is the world ready? In a word: no.

"There are just not enough caregivers to go around. Who is going to take care of us all?" said Gerard.

There are also financial considerations, since higher levels of care cost more and most people haven't factored that in their budgets.

"Everyone needs to be involved—government, industry, academia—to find coordinated solutions," Gerard said.

The solution, many believe, is to build smarter homes. By integrating IoT, AI, and analytics that will help monitor our aging population's general health and daily activities.

"We can add sensors to homes or living units to detect motion and see if a person is moving slower than normal or if they've fallen," said Gerard.

Every person is different, but major deviations from normal behavior could raise alarms and alert family and caregivers. AI and sensors can track and analyze a person's gait, fall risk, and daily activities, including hygiene and sleeping patterns. They can learn particular leg and arm movements, and even detect if someone is limping. They can also notice a gradual decline, something that might elude people who see their parents every day. Sensors can monitor atmospheric readings of carbon dioxide to help determine what time someone wakes up and goes to bed, where a person is and how long they've been there, or how many meals they eat and when.

With this much data captured, privacy concerns are real.

"We need to be ethical and tap into greater security," Gerard said.

## How accessible homes change lives

For people with disabilities, voice recognition and IoT technology can provide greater independence and dignity in their homes.

Imagine how a virtual assistant could help a person who is quadriplegic: Simple voice commands, across a constellation of connected devices, can turn on lights and unlock doors, adjust the temperature, turn on the oven, make phone calls, text, open window blinds, and order groceries.

“The ways people interact with machines will most certainly change,” said Dr. Ruoyi Zhou, Director of Accessibility at IBM. “We will soon move away from traditional desktop and mobile touch devices to solutions that are more intelligent and based on natural human interactions such as voice.”

That does create challenges for people who are deaf or mute, she acknowledges. But here, too, new human computer interfaces will play a larger role. Lighting connected to smart phones or virtual assistants could flash purple, for example, to alert people that someone is at the door. Machine vision could understand hand motions and body language. A person could use sign language to turn on the oven or gesture to change the channel.

And all the data gathered could inform the next generation of accessible design.

“As connected products become ubiquitous, more data around actual product usage is created,” said IBM Global Managing Director for the Electronics Industry Bruce Anderson.

By understanding how customers use their products, companies can quickly update features or adjust future models.

## Accessibility: a catalyst for innovation

The key to more accessible products, according to Drew LaHart, Program Director at IBM Research, is that accessibility must no longer just mean compliance. It must, he said, be a crucial aspect of design that leads to innovation and business transformation.

“It’s important for all organizations to create an enterprise-wide strategy for embedding accessibility in order to better manage compliance, improve user experience on any device or application, and create an inclusive work environment,” said LaHart.

Accessible technology can also help build a barrier-free society. “Accessible design really is just good design,” said IBM Research’s Erich Manser. “It ultimately improves usability for everyone.”

## Expert Insight

# How can electronics companies enable their products and people to live in a platform world?

Bruce Anderson, Global Managing Director  
Electronics Industry  
IBM Industry Academy Member  
IBM Global Markets

Hear from our expert:  
[ibm.biz/Industrious3Ele](http://ibm.biz/Industrious3Ele)



# Auto companies are quick to implement IIoT but slow to secure it, new study shows

Justine Jablonska, September 17, 2018

According to a recent IBM Institute for Business Value survey, 87 percent of automotive companies are implementing Industrial Internet of Things technologies into plants and assembly lines without fully evaluating risk or preparing effective responses.

To learn more, *Industrious* spoke with study authors Ben Stanley, Giuseppe Serio, and Lisa-Giane Fisher.

## ***Industrious:* Your study shows that auto companies are quick to implement IIoT in manufacturing facilities, but slow to implement effectively on the cybersecurity front. Why is that?**

**Stanley:** Auto companies want their plants to be intelligent. They are installing smart devices that collect tons of data to see how the machines are running, inspecting how parts are being built, and helping manage the complexities of their plants. What typically lags behind is the security. There may be a “it won’t happen to us!” mentality. Taking that extra step to make things secure sometimes gets lost in the process of getting things up and going.

**Serio:** What is specific to the auto industry is that the product they are delivering is dramatically changing. And it’s not just the connectivity, services, electrification, usage, and business model that are changing. It’s also a dramatic shift in the notion of what a car is and what it does.

That puts a lot of burden on manufacturing processes, which have been the same for the last 20 years. It takes a long time to design and deliver a car—approximately between three and four years.

**Stanley:** Companies are being extremely challenged by changing product requirements, R&D, consumer requirements that can’t wait, shareholders that want growth and investment. The approach becomes: “We need to get it up and running, but do we really need to secure it at this time?”

## **What are the risks of having ineffective cybersecurity for the industrial IoT in automotive plants?**

**Fisher:** When you deploy IoT technologies in industrial environments, the result is cyber-physical systems; a convergence of IT and OT (operational technology).

Cyber-physical systems are a combination of advanced manufacturing technologies and advanced computing technologies in a digital representation. This enables better modeling of interactions and outcomes and yields better insights so people and the machines they work with can drive operational improvements.

That’s why this is such a big risk: these are physical environments and a successful breach can have physical consequences. The potential for destruction or failure of equipment is significant, as is the risk of injured workers.

And it’s not just the company that is at risk. These online, interconnected environments can encompass suppliers, partners, and end customers. You’re putting an entire eco-system at risk if you don’t secure the IIoT environments properly.



IIoT technologies can improve operational efficiencies, but organizations need to be mindful of the risks. It's important to focus on managing these risks on an enterprise level, and have a clear strategy for IIoT security. Companies can, for example, look at what we've identified top performers are doing, and use it as a template for how to proceed with their IIoT security efforts.

In automotive, the greatest IIoT-related risks are exposure of sensitive and confidential data, supplier and partner contracts and IP, proprietary manufacturing processes, and advanced engineering designs. These are sources of future growth for the company. In the hands of malicious actors, they represent a threat to the future of the business.

There are also concerns around regulatory requirements and environmental harm. GDPR deals with sensitive and confidential data of not just the clients but the organization and its employees. And there are other regulations that need to be complied with. A potential breach may cause damage to the environment and result in non-compliance with an environmental regulation. The reputational risks are significant, as well as the risks for potential future investment.

### **So the scope of the threat is significant.**

**Fisher:** The scope is the entire supply chain and beyond. A breach of the operational system that controls a physical process can result in injured employees, damage to equipment, production stoppages, or the production of faulty products.

From the broader eco-system perspective, if supplier IP is exposed as a result of a breach, the company can lose contracts and future business. The scope keeps getting broader and broader.

### **You write that cybersecurity capabilities for these plants need to be contextual and adaptive. What does that mean?**

**Serio:** As with IT security, once you've identified a breach, you want to understand how long the breach has been around. There's a very long potential period of time where you've been hacked but don't know it. It's difficult to know the degree of infection, how much data you've lost, or even what has been exploited. It takes a very long time until you eventually realize you're out of control of your own systems.

### **When you say a very long time, what does that mean?**

**Serio:** The average time to detect a data breach in the IT industry is 191 days, and then 66 to contain it. That's a total of 257 days to fix things up.

Many things happen in a plant. When we say a company is a leader, or advanced in handling cyber security, they have the ability to understand what defines a normal use case. And then this use case, put into context, will give indication of compromise, a sense of abnormal behavior. That contextualizing will give you early signs of detecting a breach.

**Stanley:** A breach can be as simple as someone going in and looking around. You may not be able to tell something happened to you. Or that someone went in and planted something that will activate at a later date. Using manual or traditional methods to look for those things is not going to work well in the future. You'll need AI capabilities to look for those things and notice them earlier. Maybe they're normal things, but put into context you can pick them out and determine that maybe there's an issue there.

## And where does the adaptive part come in?

**Fisher:** Machine learning systems can analyze IIoT data streams and automate building adaptive models of what is “normal.” They can then track this “normal” behavior to constantly try to spot deviations that may signal potential threats. Adaptive means that the systems in place can continuously learn from and adapt responses to known and newly emerging threats.

**Stanley:** When hacking first began, a hack would happen, and a company like McAfee would react and push out a fix for it. Now we’re trying to get ahead of it.

The stakes are quite high. If somebody hacks your computer at home, that’s bad, maybe you didn’t back up your data. If someone hacks a vehicle that’s driving down the road, or a machine that’s in a plant, physical injuries can happen.

The more you can get ahead of the game, the better.

## Though your focus is on the manufacturing side of things, where does the consumer come in?

**Stanley:** As a consumer, awareness is a factor. If people knew a plant where the systems responsible for building their car was hacked, with the potential of their personal data being exposed, they would be concerned. Or, the potential of the plant in their neighborhood being compromised and hazardous material exposed to the environment. We didn’t study this, but there is an indirect relationship based on sensitive data, environmental data—especially for shareholders.

## What can manufacturers do to be more secure?

**Serio:** One of our major findings is consistent with what we know about security in general.

It’s not about one specific tool or skill. Security is about people, technology, and processes. All need to be well orchestrated in order to work properly. It’s a multi-discipline domain. No company can tackle everything alone. It’s an effort of the entire eco-system: the equipment providers, the clients, the security vendors.

**Stanley:** When we looked at what companies had a formal security program—not piece-mealing—only 47 percent of the top performers did. With the auto companies that aren’t part of that top performer group, only one in 10 companies has a program. If you don’t have a vision in place, how can you adequately protect yourself?





# How manufacturing companies can address disruption and change

Allan Behrens, August 15, 2018

The views of industry doyens on the final episode of “The IoT Show” focused on how manufacturing companies address disruption and change in today’s increasingly technologically-driven manufacturing world. For those not in the know, “The IIoT Show” delivers insights for industrial organizations on the industrial internet of things (IIoT) and topics touching the broader internet of things (IoT). The series of episodes within the show cover several hot IIoT topics, where knowledgeable guests advise on situations, opportunities, recommendations, and gotchas.

Some change, of course, is evolutionary. That’s certainly the case for many in the manufacturing industry. One can always make things smaller, faster, lighter, better, etc. But some changes are revolutionary. These might in part be due to new developments in materials, processes, software or hardware technologies. They can also be driven by affordability of what was expensive (and historically complex) equipment.

A company I’m familiar with—let’s call it Company X—presents a good case study. Company X makes custom production machinery for their clients. This machinery takes raw material and moves it through a production process that turns this into finished goods. For example, a rectangular block that turns it to steel becomes a support bracket for a car.

Historically, many months of effort went into designing sophisticated mechanisms to take the raw goods and move them through milling, drilling, and machining to produce a final bracket. It required lots of mechanical design expertise and book research to define the kinds of cams, gears, followers, and roller mechanisms needed to move the part from A to B to C.

Today, this same company buys a \$20,000 robot arm and augments it with a vision recognition system. The new assembly takes a day or two to program. It transports the same parts from start to finish often in less time than it did previously. It detects flaws in the manufactured part as it progresses, helping save material costs, processing time, and machine damage and downtime, mainly through early detection of failure and out of tolerance machinery behaviour.

That’s not all, because the robotic assembly is essentially standard. As customer requirements change it’s a simple matter to redeploy the robotic assembly to handle new parts, or even move it to perform completely new tasks.

The radical change in design methods and tools needed to achieve this new product and workflow was, as expected, a major challenge for the manufacturer. The transformation of design, production, and service skills changed dramatically from predominantly mechanically-focused to software-centric. This wasn’t just a surprise—and big change—for the employees, it was also an immense learning experience for management.

More recently, because the company has more (and smarter) electronics and sensors built around their products, they’ve been able to take advantage of the IoT/IIoT and make much better use of analytics to the benefit of both their products and their customers. New paid-for services such as production line and part intelligence, as well as predictive maintenance, have created additional revenue streams.

To summarize some observations from Company X President and CEO:

- Don't just evolve. Consider how you might do things differently using new technologies.
- Don't limit your remit to the original objective. Consider what else you can do to improve your customers' experience or your business model (for example with predictive maintenance).
- People and evolution of their skills will be much more challenging than technological hurdles.
- Applying automation to one's products/business doesn't require fewer staff. It requires more staff, but with different skills. Staff need to evolve to support new technologies and methods for the business to become—and remain—more competitive.

## Some change is evolutionary. But some changes are revolutionary.

The ongoing growth and success of this manufacturing company highlights some of the valuable benefits of digitization happening in the manufacturing industry. But change hasn't been easy. Company X has found that assimilating their new tech has been less of a problem than dealing with human factors. The need for skills change, and encouraging and engaging employees, making them a part of the journey was and remains a key focus. These remain significant challenges. As the adage goes, "plus ça change, plus c'est la même chose."

# A digital renaissance is coming for the oil and gas sector

Jordan Teicher, September 6, 2018

These are turbulent times for oil and gas companies.

Finding new sources of oil is becoming increasingly difficult, forcing companies to spend more money on exploration and development in remote and environmentally sensitive areas. New entrants and new regulations are changing the economics of the business. And then there's the looming staffing issue. Thousands of Baby Boomer workers will retire in the next decade, but the industry lacks workers between their late 30s to 50s to replace them in senior management roles—a phenomenon known in the industry as the Great Crew Change.

The only way forward, said IBM business services leader for the industrial sector John Sullivan, is for oil and gas companies to rethink their businesses holistically. Across the sector, he said, leading companies are beginning to do just that by investing in large scale digital technology projects.

“Digital transformation is very much the theme of the industry right now,” Sullivan said.

In years past, Sullivan said, favorable business conditions meant oil and gas companies didn't need to invest heavily in emerging digital technologies to remain successful. The investments they did make focused largely on cost reduction and improving efficiency—that is, nothing fundamental to the way they worked.

“They've done all the easier stuff in terms of taking out costs out of back office functions, but they've not really embraced the new digital technologies to the extent they can to transform. I think that's what's changing now,” Sullivan said.

One sign of the coming renaissance is the sweeping partnership recently announced between IBM and the energy service giant Wood, a global leader in the delivery of project, engineering and technical services to energy and industrial markets in more than 60 countries. In the coming years, Wood, with IBM's help, will use artificial intelligence, predictive analytics and blockchain to transform several industries. First up: oil and gas.

“As you see this technology being adapted, those that don't transform will be acquired and left behind.”

AI, Sullivan said, can be used to address the challenges presented by the Great Crew Change. Wood could, for instance, use the technology to build digital advisors, which could use the structured and unstructured data compiled by industry veterans to train new generations of workers. Employees at Woodside Energy, Australia's largest independent oil and gas company, are already using a similar system to access information quickly and easily on 38,000 company documents.

With predictive analytics, Sullivan said, Wood can help oil and gas companies see equipment failure coming and take steps to prevent it, thereby maximizing the amount of time they spend working productively. Blockchain, meanwhile, could prove immensely beneficial to facilitate the transactions Wood makes with oil and gas companies across the supply chain. By using a secure and immutable ledger, oil and gas companies can increase transparency and reduce disputes, ultimately leading to substantial savings.

Taken together, Sullivan said, these technologies would represent a fundamental transformation for Wood. And as more companies follow suit, that will amount to a core transformation of the industry at large, making it incumbent on companies to start acting now to better adapt.

“I think as you see this technology being adapted, those that don't transform will be acquired and left behind,” Sullivan said.



# Artificial intelligence is about to change your business forever

Ari Zoldan, August 31, 2018

In pop culture, representations of artificial intelligence often conjure the worst. Whether it's the cold-hearted machines of Skynet in "The Terminator," the robot uprising in "I, Robot," or the sentient computer Hal 9000 in "2001: A Space Odyssey," AI typically ends badly for humanity in Hollywood's estimation.

In reality, AI is nothing to be afraid of. Having already made significant positive inroads in virtually every industry, its use cases will only expand as it evolves. Here's a look at where AI is today, and where it's headed tomorrow.

## Defining AI

The precise definition of AI is difficult to pin down, but essentially boils down to creating machines that are able to imitate human thought processes and adapt to changing circumstances. That's a broad definition, however, and AI takes different forms depending on its intended task.

"A key component of the benefits AI offers is the capability to quickly review disparate data points, identify patterns, and connect dots," said Shlomo Mirvis, CEO of Intelligo, an SaaS AI platform for background checks.

## How are AI and machine learning used today?

Perhaps the most visible example of AI in use today is the personal assistant. Software like Alexa uses machine learning and natural language processing to function, helping users set tasks, search the internet, and control smart appliances in the home.

"In general, executives can look to AI to simplify and improve labor-intensive processes," Mirvis said.

AI is also commonly used in search engines, helping them create ranking algorithms. In fact, Google's search engine incorporates a machine learning algorithm to manage the majority of its queries.

"AI may potentially increase corporate profitability in 16 industries by an average of 38 percent by 2035, leading an economic boost of up to \$14 trillion," said Daniel Fainman, CEO and founder of the AI-powered higher education cryptocurrency Larecoin. "In the education sector, an 84 percent increase in economic benefits [would add] up to \$1.6 trillion."

Another industry AI has a high potential to disrupt is the healthcare IT space, where large amounts of patient data need to be contextualized and efficiently communicated, often in real time.

"Applying AI to the increasingly large amounts of data gathered along the healthcare journey has the potential to dramatically improve solutions to major public health issues," said Justin Fulcher, founder and CEO of decentralized electronic health record company IRIS. "AI and machine learning algorithms will be able to serve as early warning systems to potential upcoming public health issues, as the processing and analytical abilities of these technologies outpace that of all the smartest humans."

## What can we expect for AI and business in the future?

The benefits AI offers both industry and society are vast. It remains an open-ended question as to how, exactly, it will develop. However, major companies are hard at work developing their own brand of AI solutions, and their current projects provide a window into what the future might hold.

IBM, for example, is focused on three major areas for AI development, including moving the technology toward human-level intelligence, developing an AI platform for businesses, and improving upon the hardware and physics of AI. This research includes everything from boosting the memory and computational power of AI to making it more human-like, for example establishing the ability for AI to debate humans on complex topics.

AI could even revolutionize still-emerging technologies, such as blockchain. Coupled together, these technologies could even allow things we traditionally think of as tools, such as robots, to behave more autonomously than ever before.

“It seems like AI is about creating the worlds of machines living parallel to the human world and co-working with humans,” said George Goognin, a board member of the Mile Unity Foundation. “For the robots, blockchain is a perfect match. Imagine your housekeeping robot has earned or minted some coins, then automatically sent them to the factory, and they will produce the new ‘baby-housekeeper’ robot. Voilà! Robots can reproduce themselves! And we’ve got to pray they will be kind to the people.”

How far off is this AI-powered future? Judging by the breakneck, exponential speed of technological development, odds are it’s just around the corner. The business that begins adopting AI and meaningfully integrating it into its operations today will undoubtedly gain a competitive advantage.

## Expert Insight

# How is AI transforming the oil and gas industry?

Luq Niazi, Global Managing Director  
Oil & Gas Industry

Hear from our expert:  
[ibm.biz/Industrious3OG](http://ibm.biz/Industrious3OG)



# Can AI help reduce Beijing's smog?

Rich McKay, September 4, 2018

Environmental health experts have estimated that 16 percent of all premature deaths worldwide were linked to pollution in 2015. Air pollution caused the majority of those deaths (6.5 million people), and more than a third of those deaths occurred in China—which has sparked intense interest there to build a greener and safer future.

Given those staggering statistics, sustainability won't be a choice in China, said IBM Global Managing Director for the Energy, Environment & Utility industries Brad Gammons.

“Citizens will demand that companies, governments, and their neighbors act in a sustainable and environmentally responsible way as it impacts everyone.”

Breathing Beijing's air, according to a study released last year by US-based nonprofit Berkeley Earth, is comparable to smoking 30 cigarettes a day. Emissions from coal, vehicles, and dust from construction sites, intensified by three decades of breakneck growth, have led to significant human costs and a notorious smog that routinely blankets the city.

“When we are traveling around Beijing, my son becomes very excited if he sees a blue sky,” said Jinyan Shao, IBM Researcher. “Something so common for previous generations is currently a luxury in many cities.”

Beijing put new ambient air quality standards in place in 2012 to try to curb pollution. But measuring these standards, and potentially identifying and punishing transgressors, remains a challenge. And because air quality fluctuates so wildly, it's difficult to give residents ample warning to protect themselves.

To drastically lower pollution levels, the Chinese government began partnering with IBM in 2014 as part of the company's Green Horizons initiative—which helps improve the relationship between the environment, energy and utilities companies, and governments, supporting cleaner air and increasing the use of renewable energy.

As part of this initiative, Beijing is using advanced technology like IoT and AI to predict, identify, and track sources of pollution. The numerous factors that contribute to air-pollution levels—traffic levels, weather, humidity, wind patterns—are ingested by connected sensors all over China's capital.

IoT technology can produce a lot of valuable data, but it needs to be analyzed. That's where AI comes in. AI finds insights and patterns in data where previously there was chaos to better predict pollution trends up to 10 days ahead. And AI learns, improving its accuracy over time.

Using this technology helped IBM and Beijing generate high-resolution one-by-one-kilometer pollution forecasts 72 hours in advance, giving citizens and businesses more warning.

And as for reducing that dreaded dome of smog? The initiative is helping pinpoint and manage contributors to the problem (traffic and factory output), so Beijing can reach its goal of reducing smog-generating particulate matter in the capital by 25 percent by the end of next year.

And it is well on its way. “Blue sky” days increased and pollutants fell by 35 percent from 2012 to 2017—a success that has led to the expansion of the initiative into other cities in China, India, and South Africa.

## How utilities can optimize renewable energy

Alongside the focus on air quality management, Green Horizons supports the global shift from fossil fuels to renewable energy to help reduce CO<sub>2</sub>—the biggest cause of climate change.



Energy and utilities companies can integrate more renewable energy into the grid by better understanding how much solar or wind power will be available—and when—through weather forecasting.

Solar farms can use sky-facing cameras to monitor cloud movement and calculate their potential impact on blocking solar radiation. Wind turbines are fitted with sensors 80 meters above the ground to monitor wind speed, moisture, and air pressure.

This saves thousands of megawatts of energy that would otherwise be lost and is the key to creating an optimal balance between supply and demand in energy markets. China was able to add 10 percent more renewable energy into the national grid between 2014 and 2016.

### Optimizing a company's assets

Energy and utilities companies need to get the most out of their assets. But they often struggle with old infrastructure, an aging workforce, skills gaps, and a lack of asset performance visibility.

Green Horizons helps companies become greener by monitoring and modernizing equipment and infrastructure, and even anticipating maintenance needs before there's a failure or outage.

“Efficiency and effectiveness in your operations does have an impact on sustainability,” said Gammons. “If you better predict and plan maintenance or inspection work, you can schedule crews and dispatch trucks for only the work you need.”

According to McKinsey, the management of all these assets can account for 20 to 30 percent of an energy company's operating expenses. Becoming more efficient and reducing their carbon footprint across their assets will also meet rising customer expectations regarding sustainability.

“Sustainability is good business,” said Gammons. “It has a direct impact on improving operations and customer relationships.”

### Expert Insight

## What does the future of the energy economy hold?

Brad Gammons, Global Managing Director  
Energy, Environment & Utility Industries

Hear from our expert:  
[ibm.biz/Industrious3EEU](http://ibm.biz/Industrious3EEU)





# At United Airlines, Jason Birnbaum aims for transformation without the turbulence

Jordan Teicher, September 7, 2018

When Jason Birnbaum joined United Airlines as VP of operations technology in 2015, the airline was in the middle of a transformation.

For years, United had been increasing the number of mobile devices available to its front-line employees. In 2011, the airline announced that 11,000 of its pilots would get iPads to replace paper flight manuals. In 2015, it began to roll out iPhones for their 23,000 flight attendants.

The devices—more than 50,000 of them by 2017—were arriving in the workforce quickly. But United's process of building applications for those devices wasn't moving fast enough, told *Industrious*. That's because each app was essentially a bespoke creation with its own distinct design and user experience.

The transformation, in other words, had yet to prove truly transformative. Birnbaum wanted to change that.

"My job was to help create a vision, align the team, and fulfill that promise that we all knew existed, which was that if we leveraged technology we could really create a competitive advantage for United," he said.

## A true transformation

Last year, that promise got closer to reality when United announced it would partner with Apple and IBM to transform their application development and would use IBM's Mobile at Scale for iOS model to quickly and efficiently design, develop, deploy, and maintain a suite of new iOS apps for its employees.

"We really looked at that partnership to make the apps more consistent, to accelerate them and enable a lot of sharing," Birnbaum said.

Key to that acceleration, he said, was the development of a DevOps platform and the creation of a reusable library of code.

"As we built more code in the code library, each piece of functionality was less expensive to create. As the cost of the applications went down and success had been proven, it was easier and easier to justify," he said.

The United team focused on engaging its front-line employees throughout the entire development and deployment journey. Their input helped inform the design of each application. Users, as a result, felt true ownership of the final product.

"It's had a really positive impact on our employees in terms of their understanding of our commitment to them. It's allowed them to feel confident in engaging our customers in a lot of different situations, and ultimately our customers get their service more quickly and more effectively," Birnbaum said.

## The mobile employee

Across the organization, Birnbaum said, United employees are able to do their jobs more efficiently than they were just a year ago.

Onboard, flight attendants are using mobile devices to perform retail transactions and resolve customer care issues in-the-moment. In airports, gate agents are changing seat assignments and checking bags with their devices, and using the freedom of portable computers to help customers wherever and whenever they need assistance.





“If you think of a situation where customers need assistance at the airport, the biggest constraint is the number of terminals. People line up behind those two terminals,” he said. “In a world where every employee has a mobile device, more people can help and respond quickly to customers. They can step out from behind the podium.”

Airplane technicians are enjoying a similar kind of freedom with their devices, Birnbaum said.

“In the old world, if a plane needed maintenance attention, the way it would work is the technician would have to go to the plane, figure out what’s going on, walk back to the base, get manuals, go back to the plane, figure out what parts they need, go back to the terminal, order parts, go back to the plane, and then fix the plane,” he said. “Now they can do all that without leaving the plane.”

## Changing expectations

A lot of companies have been eager to provide great mobile experiences for customers. But it’s taken longer for them to get excited about providing those kinds of experiences for employees. Now the tide is changing as customer expectations shift.

Today’s customers, Birnbaum said, expect employees to solve problems “in the same real-time mobile manner in which they solve problems themselves.”

United isn’t the only airline to catch on to the new normal. In 2016, Finnair announced it would work with IBM to develop apps for its employees. Singapore Airlines announced a similar partnership last year.

But for Birnbaum, the decision to create enterprise apps wasn’t about following trends. Instead, it was simply about making United employees more efficient at their jobs—and ultimately, making United customers happier.

“We wanted to enable our employees to be more efficient with what they do every day and be more connected with each other,” he said. “And we didn’t want to spend five years doing it.”



## Expert Insight

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