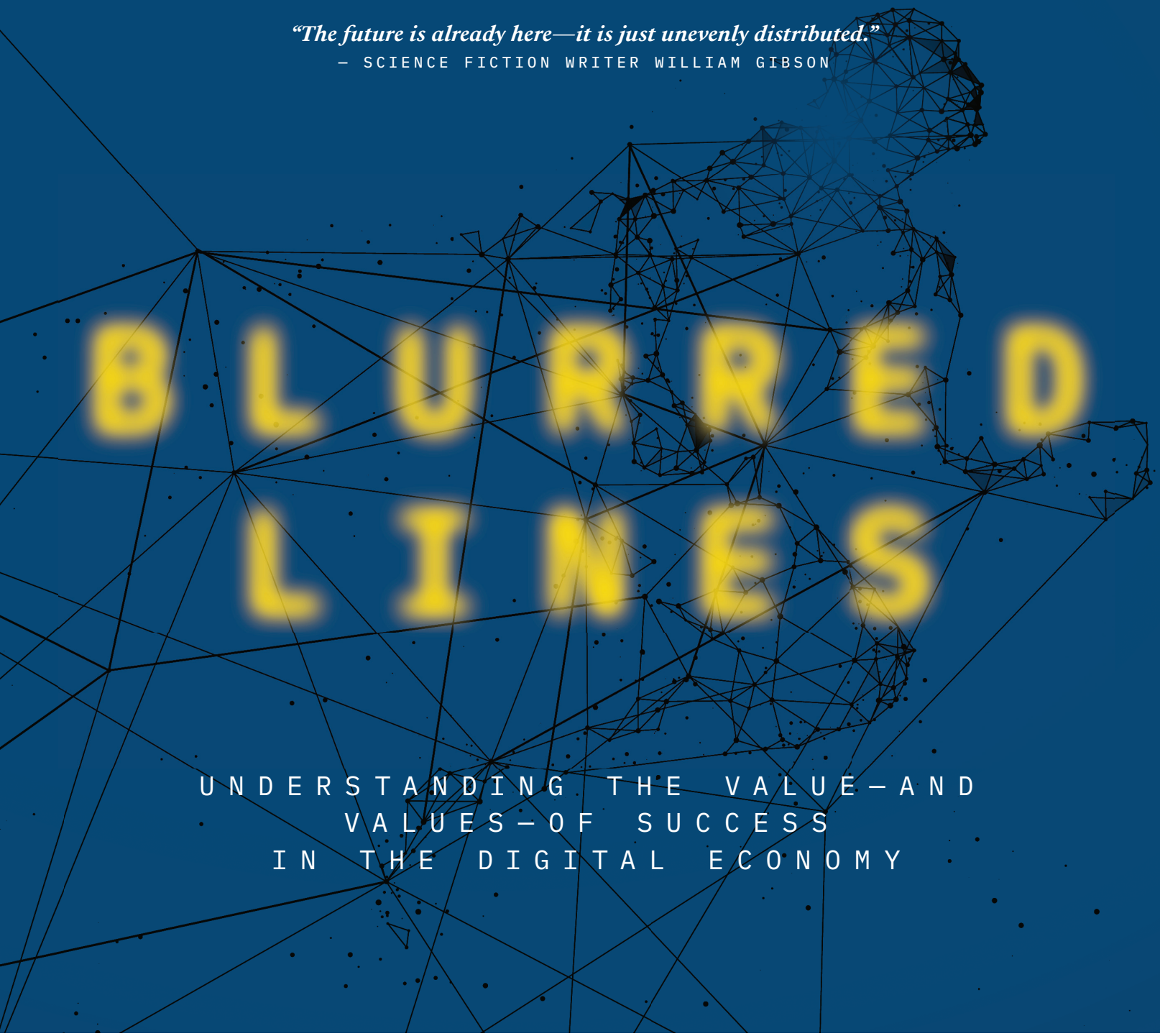
"The future is already here—it is just unevenly distributed."
– SCIENCE FICTION WRITER WILLIAM GIBSON



BLURRED LINES

UNDERSTANDING THE VALUE—AND VALUES—OF SUCCESS IN THE DIGITAL ECONOMY

THE ASPEN INSTITUTE
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EXECUTIVE SUMMARY

IN 2018, there is no such thing as a company that isn't a tech company, and the rise of the digital economy is forcing companies to rethink the traditional silos of leaders like CFOs, CIO, and CTOs. Technology has permeated every aspect of modern life, both personal and professional. Today, most business professionals spend almost every waking second of their day either interacting with a computer or carrying one on their person—and many people increasingly even sleep tethered to a computer like a FitBit.

For C-suite leaders, the realities of the digital age require a fundamental rethinking of business, as organizations recognize the impact of new trends and modern life. Tomorrow will be faster than today, and next week even faster than that. In fact, each day going forward represents the slowest pace of change we're likely to experience in our lifetimes. Technological adoption is moving ever more rapidly—we're only barely a decade removed from the introduction of the iPhone—and around-the-corner technologies like 5G, quantum computing, and edge computing present the possibility of change and societal advances at speeds we can't even fathom today.

That pace of change places huge pressures on companies and leaders, especially as new tools like artificial intelligence and machine-learning arrive. Change is happening both more radically and more rapidly. To succeed in creating value for customers, organizations need to prioritize the values of the digital economy. That requires understanding key changes in customer behavior, the life-cycle of products, and the skills required for insightful leadership. Today's digital economy is forcing organizations to think faster, more openly, and more flexibly. Success today requires understanding the blurred lines *within* organizations, within C-Suites among CEOs, CFOs, CIO, and CTOs, and throughout our daily lives.

THE BIG PICTURE

TODAY'S C-SUITE LEADERS need to be more creative and more open to ideas than every before, both from within their own organizations and from the outside world.

The first step to success in the digital economy requires recognizing there's no such thing as the "tech industry" anymore; every company and organization is in the technology business today. The digital economy means that lines—and competition—blur; arguably, Marriott Hotels' biggest competitor today is Airbnb. Airbnb, which began owning nothing but software code, is now moving into physical real estate; Marriott, which began owning and managing physical real estate, is meanwhile betting its future on software code—helping guests check-in on their smartphones and scribble ideas digitally onto the shower wall (no, really). Uber began with software code, and is rushing into autonomous physical vehicles; Ford began with real-world vehicles and is rushing into software code. Amazon, which began as an online bookstore, stands today as one of the country's largest TV studios, the owner of one of the country's largest grocery store chains and also the largest cloud computer contractor to the U.S. government. Apple, a computer manufacturer, is simultaneously one of the most powerful music retailers in the world and also in partnership with Hermès to make watches and, according to recent reports, about to launch a new credit card with Goldman Sachs, itself a new market for the storied financial firm. Meanwhile, more coders and developers work at Goldman Sachs than at Twitter and LinkedIn combined.

The blurred lines between companies and sectors represent only one set of the changes and shifts happening all around us as our lives shift from analog to digital. The same blurred lines exist in our daily lives. "We no longer have things with computers embedded in them. We have computers with things attached to them," technology thinker Bruce Schneier wrote in 2017. "Your modern refrigerator is a computer that keeps things cold. Your oven, similarly, is a computer that makes things hot. An ATM is a computer with money inside. Your car is no longer a mechanical device with some computers inside; it's a computer with four wheels and an engine. Actually, it's a distributed system of over 100 computers with four wheels and an engine."

These blurred lines—between sectors, between organizations, between products, and between customers—require a deep and fundamental rethinking of business strategies. These changes have also fundamentally blurred lines within organizations. Old silos between CEOs, CFOs, CIOs, and CTOs have all but disappeared—successful organizational leaders cannot afford to be focused solely on their own domain. Instead, they must understand the full scope of an organization's strategy and work across teams to implement a coherent vision that understands how the digital age is remaking expectations and opportunities with customers, clients, and co-workers.

It's clear most organizations aren't adapting fast enough. Companies are starting faster, growing faster—and dying faster. Of the ten largest companies by market cap, only three—Berkshire Hathaway, JPMorgan Chase, and Johnson & Johnson—were around to see the Nixon administration. Meanwhile four—Google, Tencent, Alibaba, and Facebook—weren't even around at the turn of the Millennium. In its 2016 poll of Fortune 500 CEOs, *Fortune* found that company leader's most cited the "rapid pace of technological change" as their biggest challenge.

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WE NO LONGER HAVE THINGS WITH COMPUTERS EMBEDDED IN THEM. WE HAVE COMPUTERS WITH THINGS ATTACHED TO THEM

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No wonder. A company listed in the 1960s had a 92 percent chance of still being there five years later; a company listed in the 2000s had just a 63 percent chance of surviving five years. Business models today just expire faster.

Understanding the pace—and the scale—of the disruption ahead is critical for corporate leaders. An EY study found that half of the CEOs it interviewed felt that their companies were inadequately prepared for the disruptions ahead. EY reported it found three distinct types of companies, what it identified as caterpillars, chrysalises, and butterflies. Most companies today are simply "caterpillars," staying the course and exploiting existing success; a smaller group are "chrysalises," that is organizations undertaking important transformations to respond to the opportunities of the digital age and foster an organizational culture of innovation. The rarest category are the so-called "butterflies," the small group of companies that have transformed and embraced the ethos of disruption, rather than simply pursuing innovation. As one CEO said, "We look at this as a 'here and now' and a 'tomorrow into the future.' And the trade-offs for the short-term and the long-term have to live together. It's not an 'either or.' It is necessary to be able to do both at the same time."

Living through—and anticipating—revolutionary change is difficult to recognize, process, and anticipate in real time. Futurist Roy Amara observed, "We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run." Below, we explore in more depth, the value of—and the key values necessary for—adapting for success in the digital age.

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RETHINKING CUSTOMERS

THE RELATIONSHIP BETWEEN an organization today and its customers begins long before they first interact with your business—and it continues long after. Technology, digital tools, and the rise of smartphones have rewritten long established tenets of customer engagement and client relationship management, a process that increasingly happens around-the-clock on social media at a time and place of the customer's choosing.

1. CUSTOMERS EXPECT TO BE TREATED AS INDIVIDUALS: In the digital age, there's no excuse for not knowing your customers when they walk through the door. There's perhaps no clearer example of the trend that every company is a tech company than the rise of the Starbucks mobile app. The iconic and ubiquitous Seattle coffee chain doesn't see its future as selling coffee—it sees its future in understanding its customers better and more individually.

Starbucks, which had been seeing disappointing growth, helped turn around same-store sales not through new products, but a better customer experience—one that emphasized technology and rewarded its most loyal customers. "Looking to the future, this is all about how our digital relationships with customers intersect with experiential retail in our stores," Starbucks CEO Kevin Johnson, himself a veteran of Microsoft and Juniper Networks, told investors during an earnings call in 2017, a call during which executives invoked the word "mobile" two dozen times. The company's loyalty rewards program—and the associated app—is used by nearly one out of five of its 75 million customers, but those most loyal customers account for nearly two out of five sales. By the end of 2017, roughly 30 percent of all sales were paid for using the company's mobile app—and a rising share of its sales and orders are placed on the app before a customer even walks through the door.

Now the company is pushing to make the experience even more local and personal, with push alerts for deals tied to specific weather or times of the day. Starbucks is rewiring itself to help rewire its customers, changing the way they order and pay for its products.

Other consumer-facing companies face similar transformations; Nike, long used to interacting with its consumers anonymously, now is a

major force in personal technology—which is forcing it to realign its enterprise to better understand how data from one portion of the company affects another—and shifting the organization's focus from wholesale to retail, making itself a companion in the daily lives of its customers. "If I've signed up for two marathons, registered 300 runs, and made 500 FuelBand entries, I expect that you know me fairly well," Chris Satchell, Nike's Consumer Technology Officer said in 2016. "Then if I go into a store and you don't know who I am, and you recommended something stupid—well, I don't know why I want to deal with your brand. This idea of seamlessness is a huge force in the consumer world. But our company is very used to channels and product categories, and now we have to somehow blend those together to make the consumer experience seamless."

2. CUSTOMERS LIVE AT DIGITAL SPEED: Today, in a world where everyone seems to be wired all of the time, customers expect fast transactions and fast reactions. Speed matters—and friction kills. An increasingly large segment of consumers and customers no longer know anything *but* the digital world—today's college students have had smartphones since middle school and ubiquitous connectivity nearly their entire memories.

Tech companies religiously "A/B test" their pages, their wording, and their calls to action, showing how small layout or language tweaks can result in large improvements in customer engagement, purchases, or conversion.

Seven out of ten customers expect a response on social media to complaints within an hour—and speed is actually more important than thoroughness. Customers actually prefer a quick but ineffective answer over a slow but effective solution.

Part of what makes this trend particularly difficult is that reputations, made and earned slowly over many interactions, can quickly become victim to a negative story or customer interaction that goes viral. Customers today have high expectations for user privacy and the weight of the trust they put in brands and companies in the digital environment.

3. YOUR BEST CUSTOMERS ARE YOUR BEST PARTNERS—SO ASK THEM FOR HELP: No company today should believe that all of the smartest people work for them. In fact, some of your most valuable contributors may not. An easy way to thank supporters for their support—and to encourage the building of better products—turns out to be simply asking for help.

Walmart, operating at a scale unimaginable to most businesses, typically stands as a uniquely conservative business, so the fact that it has embraced the "open source" movement shows just how far into corporate America the movement has reached. In October 2016, WalmartLabs released the application platform that powers Walmart.com, known as Electrode, as open source, encouraging others to help develop the software further and hoping it will help other developers move their projects towards launch more quickly; as it turns out, Electrode is just one of more than 140 open-source projects embraced or launched by Walmart. "We consume and contribute tons of open source, so it's important for us to give back whenever possible," Alex Grigoryan, the director of engineering of WalmartLabs, told TechCrunch when the project launched. "Electrode has improved performance of our apps and increased developer productivity, among other things. By open sourcing Electrode, we're encouraging the OS community to help make it better—for us, and other developers who will use it." Plus, of course, WalmartLabs gets free support, testing, and work from hundreds of collaborators around the world on its products.

Companies far afield of technology are learning how to solicit help from their customers, understanding that there's value in developing products and loyal customers by treating marketing as a two-way conversation.

4. TECHNOLOGY IS NO LONGER A LUXURY ITEM—BUT THE USER EXPERIENCE CAN BE:

It's easy to forget how transformative labor-saving devices have turned out to be over the last half-century. Most of the tasks that used to consume most of our lives either no longer exist or have been automated almost entirely—from washing machines at home to running payroll at work.

While the declining cost of sensors and computing power means that technology itself is less and less of a luxury, delivering a high-quality user experience remains critical. Apple has thrived by delivering exquisite technology and user experience; Tesla has a half-million-customer waitlist for a car light years ahead of most vehicles, even as it struggles with manufacturing implementation; prepared food services like Blue Apron deliver the appearance of a luxurious meal at home; travel and hospitality companies find that consumers, particularly Millennials, increasingly prefer luxurious and unique experiences to the accumulation of traditional markers of success.

Wrapped up in the questions of the user experience is the fundamental overarching question of modern technology: *What do I get?* As Michael Palmer, Aetna's Chief Innovation & Digital Officer, explained, "Consumers are willing to connect to devices if they get something back for it."

Relatedly, customers expect their choices, preferences, and relevant recommendations to be baked into their user experience—that apps and online tools instantly deliver them the most relevant and most interesting news, TV shows, sports scores, and other personalized tastes. Delivering a middling product to a broad audience or user base is no longer acceptable; delivering a highly personalized, high-quality feed of information or entertainment is key to satisfying modern consumers.

> "CONSUMERS ARE WILLING TO CONNECT TO DEVICES IF THEY GET SOMETHING BACK FOR IT."
>
> MICHAEL PALMER, AETNA'S CHIEF INNOVATION & DIGITAL OFFICER

RETHINKING PRODUCTS

THE ARRIVAL OF THE DIGITAL AGE has drastically lowered the cost of numerous goods, disrupting long-established markets while creating numerous new ones. Understanding the intersection of what an organization sells with what insights it can provide to customers or clients is the new gold standard for the digital age.

1. THE PRODUCT—AND ITS VALUE PROPOSITION—DOESN'T END AT THE WAREHOUSE DOOR: The combination of cheap sensors and ubiquitous connectivity means that an organization's engagement doesn't end with the sale of a product; in fact, in more and more fields, companies are realizing that where they once sold products, they should now sell services. Everything can be connected, always, everywhere. That rise of the so-called "Internet of Things" (IoT) profoundly reshapes how—and where—companies focus their resources and turn a profit.

New tire sensors can track millimeter-scale changes in tread wear, helping manufacturers forecast demand and large-vehicle fleets better understand their daily use. Manufacturing companies like Siemens, Samsung, and Bosch are developing "smart" appliances that fundamentally alter their relationship to customers, creating an ongoing relationship with a consumer long after the refrigerators or washing machines have left their warehouses. This reality, of course, also imposes new responsibilities on companies: They have an ongoing commitment to the user or customer to keep a product safe and secure.

The high-performance construction tool manufacturer Hilti has developed new apps and trackers to help its users track their assets better, identify wear-and-tear, and improve worker safety. As Hilti's Andreas Wagner explained, "For one example, we track usage times of tools on job sites, so customers can distribute tools more efficiently. For another, there are very tight health regulations on how much vibration a worker can be exposed to. So we have a device like a smart watch that can tell how long employees can continue to work with our tools and compare this to the allowable time with competitors' products—because Hilti products, being premium, produce fewer vibrations."

Similarly, the giant equipment manufacturer Caterpillar is moving aggressively into the "Internet of Things," as it recognizes the insight that can come from connecting its vehicles. Today, there are more than 560,000 connected Caterpillar vehi-

cles—and it managed to save a single mining client over $600,000 in lost downtime by making its machines smarter and better predicting maintenance needs. "Our business model runs on uptime for customers. If we run at a lower cost than our competition, we win," Caterpillar CEO Doug Oberhelman said. "We better disrupt ourselves in our own way before somebody does an Uber to us."

> "WE BETTER DISRUPT OURSELVES IN OUR OWN WAY BEFORE SOMEBODY DOES AN UBER TO US."
>
> DOUG OBERHELMAN, CATERPILLAR CEO

2. THE VALUE OF PRODUCTS STEMS INCREASINGLY FROM VIEWING THEM AS PLATFORMS AND ECOSYSTEMS: The most successful companies in the digital age are those who most successfully imagine their core products as just the beginning of the customer experience. Facebook and Apple have built entire ecosystems around letting others work and play in their "sandbox."

As Paul Ballew, the global chief data and analytics for Ford Motor Company, says, "Any of us that have grown up in the industry, when we think of 'platforms,' it's the physical architecture of a vehicle. There was a small utility platform. There's a mid-car platform. And the evolution of the last few years have been talking about Vehicle-as-a-Platform. When we describe a platform now, it as an interface point, an insight-generating point, or the ability to leverage and connect vehicles." Today, the average connected car generates 25 gigabytes of data an hour, measuring everything from road conditions to engine performance, but within a few years the average autonomous vehicle might generate as much as 2.6 *terabytes* of data an hour—presenting both an incredible opportunity for data crunching and a terrifying tidal wave of data storage needs. It's estimated that the potential market for car-generated data by 2030 will be north of $500 billion a year—a world that didn't exist just a few years ago.

As much as everyone talks about "big data" today, the era of really, *really* big data is right around the corner. New models of Pratt & Whitney's jet engines generate as much data in a single 12-hour flight as all of Facebook created each day in 2014—roughly 600 terabytes of information. That level of detail is providing insights at levels companies have never seen before; GE Aviation realized in studying the data from its new engines that planes fly-

ing between Asia and the Middle East experienced subtly more wear and tear on the engines, because of the region's poor air quality, than other identical flights elsewhere in the world, so it reshuffled engineers and mechanics to provide more frequent repairs on those routes.

That idea—of using technology to spot problems before they arise—is helping to drive a shift towards envisioning "products as services." The German manufacturer Kaesar Compressors, one of the world's leading makers of air compressors, realized that its customers don't really want to *buy* compressors—they need the compressed air the equipment provides. Thus, the company relied on a network of cloud-based technology and diagnostic sensors to offer "guaranteed air," focusing on preventive maintenance and a thoughtful global supply chain of spare parts to ensure that customers always had what they needed to keep machines running. This move to so-called "Servitization" requires companies to think more creatively about the value they provide.

These new levels of data and customer insights will only grow as we all connect our lives to the digital world. Apple, Google, and Amazon, meanwhile, are locked in a battle to win the "smart home," hoping, in Amazon's case, for instance, that its Alexa virtual assistant will encourage consumers to lock into an ecosystem of other Amazon cameras, sensors, and other tools.

To capitalize on these opportunities, company leaders have to understand how technology and data moves through their organization. Who knows what—and where does the data start and stop?

3. CORE COMPETENCIES MATTER—SO STOP DOING WHAT YOU'RE NOT THE BEST AT:

The onrush of the digital economy has put in stark relief how much core competencies matters. Companies today have little need to run much of the technology they once ran—and leaders like CFOs need to be thoughtful about identifying business units and cost centers that are strengths and outsourcing those that aren't. These conversations can be difficult—and disruptive—but are critical to success today. The rise of technologies like cloud services

> "THE POTENTIAL MARKET FOR CAR-GENERATED DATA BY 2030 WILL BE NORTH OF $500 BILLION A YEAR"

means that companies need to "own" less—there's little reason for most companies to own their own servers.

At the same time, this process of identifying relative core strengths and unnecessary enterprises best outsourced may also end up highlighting opportunities for new business lines. Amazon's power comes today less from its inventory, but from the way it harnesses its sales data and the power of its logistics network. As it was building out its digital infrastructure, the company realized it had almost accidentally built a peerless network of data centers—hence the launch of what's now known as Amazon Web Services, a $10 billion-dollar-a-year cloud computing system of its own. In doing so, Amazon reduced the friction necessary for other companies to launch or host tech infrastructure themselves to a fraction of what it was before.

That move to cloud computing, in turn, was transformative for other companies: Therese Tucker in 2016 became the first woman to lead a venture-backed L.A. company to an IPO, when her firm Blackline debuted 44 percent above the expected price range in one of the biggest tech IPOs of the year. The success of her company, which offers financial accounting software aimed at automating repetitive tasks, hinged in no small part from the 2007 decision to stop offering software and instead turn entirely to the cloud.

4. THERE'S VALUE IN GIVING AWAY YOUR BEST WORK: Today, many of what used to be proprietary secrets are increasingly commoditized—the value in business is helping others make sense of decisions, not in providing access to a secret sauce. A decade ago, when Gary Cohn took over as the president of Goldman Sachs, he told a colleague that he couldn't imagine licensing the firm's proprietary risk analysis tool for less than $5 billion. Yet in 2016, Goldman Sachs started giving away the tool to clients for free—deciding that the tool's ability to win clients over the long-term, to impress upon potential clients how smart and savvy the firm truly was, would be more valuable than cash upfront.

The movement towards open source technology and open source processes represents one of the most powerful values—and potential sources of value—in the digital age. Much of tech today can be a commodity—it's how you use the tech, apply and derive insights that provides the true value.

5. SOMETIMES DONE IS BETTER THAN GOOD: Silicon Valley has taught organizations that it's easy to overthink a launch or a new product. The concept of a "minimal viable product," outlined and celebrated in books like *The Lean Startup*, showcases how companies work to field products quickly, without waiting for all the bells and whistles to be ready.

As it turns out, there's great value in pushing new products and projects to market faster than usual. The financial giant Intuit, maker of TurboTax and Quickbooks, handles nearly one-third of the U.S. economy, in terms of powering payroll, invoices, and taxes. Traditionally, a new line of business for the company has taken between 5 and 6 years to build to $50 million in revenue; today, though, the company celebrates multiple +$50 million businesses that are less than three years old, in part because it so prizes innovation and an adaptation culture internally. The company has "innovation catalysts," staff who devote 10 percent of their time to running workshops that inspire creativity and customer engagement. As one innovation team leader outlined, "I said, 'Okay, let's quickly figure out and assess the ideas that have the most potential upside?'"

RETHINKING LEADERSHIP

ORGANIZATIONAL LEADERSHIP for the digital age, particularly in the C-suite, requires understanding that the walls are gone—everything about the 20th Century corporate structure has blurred or disappeared. We've long misunderstood the scale of change we're living through, thinking this is a technological revolution, when the "tech" is actually just a small part of the change. Customers, employees, and stakeholders of all hats simply expect a different relationship to leaders, brands, and companies. This means companies must adapt quickly: Customers expect to be able to speak directly with an organization's leaders and its employees; there's little distinction between internal and external communication; your organization's best contributors might not work for you.

1. UNDERSTANDING COMPLEXITY—AND EMBRACING CREATIVITY—IS EVERYTHING: Today's business environment requires a deeper well of creativity than ever before; new opportunities to add value or create value increasingly appear at the intersection of fields, driving new cross-sector innovation. As the world's connections expand—both globally and technologically—it's important to see and understand trends at both the micro and the macro level, whether it's examining the possibility of blockchain or evaluating the political risk of doing business in one country versus another. IBM's study of global CEOs concluded, "The effects of rising complexity calls for CEOs and their teams to lead with bold creativity, connect with customers in imaginative ways and design their operations for speed and flexibility to position their organizations for twenty-first century success."

This trend, for cross-sector and cross-organization understanding, is stark even in formerly highly specialized fields: Korn Ferry's 2017 CFO study found that the most critical skills for a Chief Financial Officer today are general management (27 percent) and strategy (26 percent); meanwhile, traditional skills like controllership and risk and compliance were cited as the most critical to success by just 7 percent and 2 percent of senior executives respectively. CFOs, who have long seen their role as tracking performance and efficiency, now must understand the top-to-bottom strategy and be creative about understanding how to measure success.

2. EMBRACE OPENNESS—BOTH INSIDE AND OUTSIDE. The open source movement is much more than simply a technological movement. It is the defining intellectual movement of our age, reflecting three core traits that are now expected by all stakeholders of an organization, from employees to customers to community members: Transparency, accountability, and a sense of ownership. Together, the openness trend requires a commitment to authenticity and an understanding that, in the era of social media, ubiquitous smartphones and easy video, an organization or a leader can't represent one face to the public while being something else behind closed doors. There is no closed door or back room anymore. There's an expectation that communications should always be treated as two-way conversations. Learning to embrace "openness" as a leader is central to understanding the values of the digital age.

Few people today understand the philosophy guiding the technological and societal revolution we're living through. A good place to start is the June 1999 Cluetrain Manifesto, arguably the founding Declaration of Independence of the digital age, which presented 95 theses modeled on Martin Luther's famous document that kicked off the Protestant Reformation. The first thesis of the Cluetrain Manifesto? "Markets are conversations."

3. EVERYONE IS A CHIEF TECHNOLOGY OFFICER: Today, IT is everything—technology strategy and business strategy have unmistakably merged. A generation ago, a company's information technology was usually something done entirely in the back office—payroll processing and other such needs largely removed from the daily life of an organization's employees. Companies today rise and fall based on how they use technology to reduce friction—in their customers' lives, inside their products, and within their own organization. Engaging with this new reality—and embracing a tech and data culture—can no longer be the sole purview of a CTO or CIO alone.

To adapt—and adopt—a digital culture, the strategy and guidance must come from the top of an organization and be consistent throughout, from CEOs to CFOs to CMOs. Studies consistently show that companies are underinvesting in the culture and strategy necessary to conquer today's world. An Accenture study showed that only about five percent

"ONLY 5% OF COMPANIES SAY THEY'VE MASTERED DIGITAL"

of companies, just one in twenty, feel that they have "mastered" digital to the point of differentiation from their competitors, numbers remarkably consistent to Dell Technologies' own study, which found 15 percent of corporate leaders feel their firm is a "digital laggard" while just 14 percent feel they've even "adopted" a digital strategy and just five percent describe themselves as "digital leaders."

Beyond the overarching question of tech strategy, C-suite executives across an organization need to be tuned in to questions of cybersecurity: What are my company's crown jewels? What data do we hold that our employees and our customers expect us to protect? The first two decades of the rise of the digital age have demonstrated that governments and companies have systematically underestimated the creativity of adversaries online. The U.S. government put enormous efforts into protecting defense and nuclear secrets, but didn't appropriately focus on securing its personnel records—leading to the theft of all federal employees' personal details by China, a massive intelligence failure that exposed just how *uncreatively* the U.S. was thinking about what mattered to it. Does your CISO or CSO understand what's valuable across the organization and where potential areas of failure might be?

4. TALENT IS EVERYTHING: Organizations increasingly compete on a global playing field for talent, as educational opportunities proliferate across the world and communication technologies make work increasingly less tied to a physical location. Success in the modern workplace increasingly relies on "soft skills," like creative thinking, rather than trade skills, a shift that educational systems have not yet caught up with. That means that even as the world opens up, talent—and particularly top talent in high-demand fields—remains unevenly distributed, confronting many firms with a mismatch of employment needs, skills, and physical locations.

The security firm Trend Micro recognized that hiring in the cybersecurity field was increasingly a zero-sum game. The top talent were just moving in between companies in a game of musical chairs that drove up wages and costs for everyone. So they expanded the playing field: For recruiting, Trend Micro today offers fully-paid three-month bootcamps to new workers with no experience in the field. In recruiting for the bootcamp, COO Kevin Simzer said that the company targets successful people from other fields and other areas of life—people, he says, likely to be self-motivated to succeed. "We had an Olympic swimmer who was really successful. He won a bronze," he said. At the end of the three months, the company hires only the top 20 percent of the bootcamp performers, the best of the crop, and allows its peers and competitors to snap up the rest, all of whom graduate with a certification from Trend Micro. It's smarter—and cheaper—for them to build new talent than to compete for existing talent. And it's an approach that Simzer thinks in today's tight employment arena, should be used more outside of tech firms. As he said, "We don't have a patent on it. And it could definitely work for Acme Corp."

Looking for talent in unexpected places isn't just smart business—it's critical to success. As a larger pool of workers globally and a more diverse generations domestically enters the workforce, companies are finding that diversity and flexibility aren't just important values, but actual market differentiators. "Millennials, the most educated, diverse, connected, and worldly generation yet, expect companies to reflect the world in which they live. It is a talent attraction that is imperative and vital for business innovation," says Tom Loeffert, SAP's UK Director of HR.

The 43 most diverse public companies were an average of 24% more profitable than the average of the S&P 500, and companies with a larger percent of women as senior managers were 50% more profitable than their peers. These high-value, high-achieving employees are more creative—but require a different workplace culture: A survey by the research firm Gensler found that the most innovative employees are twice as likely to have flexibility built into their professional life, choosing where and when they work. "An organization with a reputation for inclusiveness becomes a magnet, attracting top talent," reports the search firm Korn Ferry. "A diverse talent mix also can spark greater creativity and propel innovation that can help organizations distance themselves from their competition."

5. ARTIFICIAL INTELLIGENCE ISN'T—IT'S *AUGMENTED* INTELLIGENCE: Much of the public anxiety around the rise of artificial intelligence stems from the disruption caused by this advanced automation, the jobs that will disappear and change as computers and robots begin to be able to do more and more of what workers are accustomed to doing. This isn't exactly a new phenomenon—single products can eliminate entire levels of an organization, as the advent of voicemail, emails, and Microsoft Word eliminated in corporate America layers of secretaries whose days had been filled with dictating memos and letters for executives. Today, there are fears that autonomous vehicles will do the same to 1.7 million U.S. truck drivers, that artificial intelligence algorithms will displace radiologists, and that robots will increasingly depopulate factories and warehouses—according to *Quartz*, Amazon in 2017 added 146,000 employees, as well as 75,000 robots. PwC estimated last year that fully 38% of American jobs could be at risk of automation. Even highly educated professions like lawyers will not be immune: Startups like Atrium believe they can automate much of the routine work and tasks law firms perform for their clients. The numbers can be staggering: A recent study of the Indianapolis workforce posits that 338,000 jobs might be at risk of being lost to automation. Phoenix could see 650,000 jobs at risk. The study's authors wrote, "Automation

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24% — AVERAGE AMOUNT BY WHICH THE COUNTRY'S MOST DIVERSE COMPANIES OUTPERFORMED THE S&P 500

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will have a widespread impact on jobs in the Indianapolis region in the years ahead, and especially on low-skilled jobs and especially on female workers. In some cases, technology will eliminate high-risk jobs. In many more cases, technology will change them—sometimes dramatically."

The anxiety around automation, though, tends to approach a truly profound transformation in work and productivity too bluntly. Analysis by McKinsey holds that only about five percent of jobs are *entirely* replaceable by machines. Even with machine augmentation, human workers will remain important mediators and collaborators. Work will simply be different. The World Economic Forum estimates that 65 percent of today's schoolchildren will work in jobs and professionals that haven't been invented yet; the global scale of this shift will be huge. The McKinsey Global Institute estimates that up to 375 million people—roughly one in seven workers worldwide today—will see their careers disrupted by technological change. To be sure, there are major societal shifts ahead for "routine" work and policy-makers need to be considering ways to help retrain and reskill workers for the future, but companies face a more immediate challenge in the age of AI: How can machines help workers think better, faster? IBM Chairman, President, and CEO Ginni Rometty says she thinks AI is misnamed and that "artificial intelligence" should actually mean something subtly different. "If I considered the initials AI, I would have preferred augmented intelligence. It's the idea that each of us are going to need help on all important decisions," she told Bloomberg in 2017. Instead, IBM calls the technology "cognitive computing," because, "Look, we really think this is about man and machine, not man vs. machine."

Understanding where technology is useful—and where it isn't—is critical to modern corporate leadership. Learning to embrace the coming robot-driven disruption of our world will help leaders thrive in the years ahead. "We're not being replaced by AI. We're being promoted," said chessmaster Garry Kasparov, who knows something about losing to computers. "Machine-generated insight adds to ours, extending our intelligence the way a telescope extends our vision."

> "WE'RE NOT BEING REPLACED BY AI. WE'RE BEING PROMOTED"
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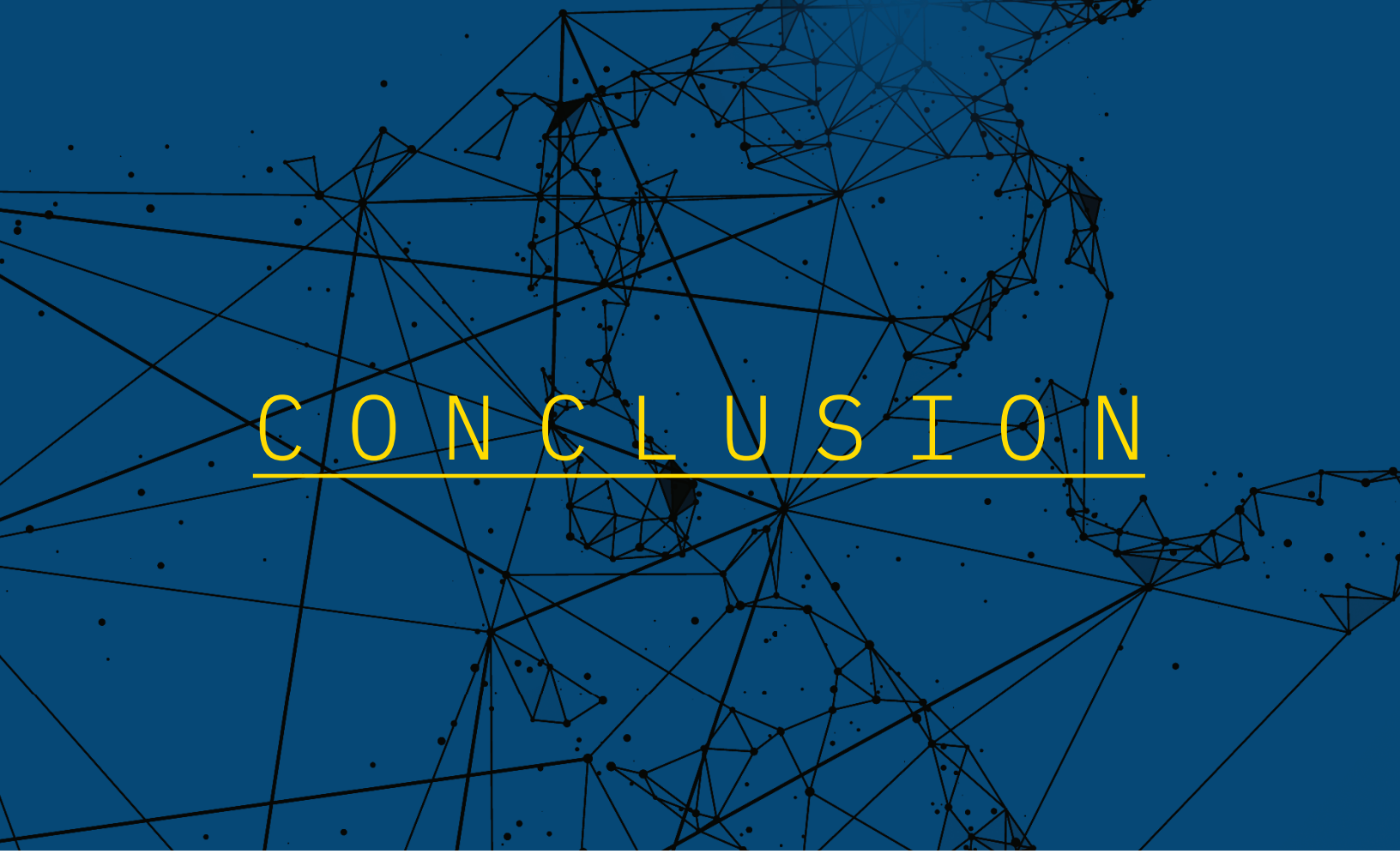
> GARRY KASPAROV, CHESSMASTER



CONCLUSION

ADAPTING TO THE NEW REALITIES described above require thinking more creatively about customers, products, and leadership. In thinking through how to apply these new rules of the digital age, here are six sets of questions that can help shape and an organization's success:

— How do we treat customers and clients like individuals at scale? How do we enlist customers as partners and evangelists? Are we as fast as our customers?

— What data does my organization have on what our customers want? Who owns that data and who is responsible for turning that into insights?

— How do we reimagine the core competencies and responsibilities across the C-Suite and leadership team to capitalize on the way technology has blurred the lines between positions and strategies?

— How do we be more open—with our customers, among our leadership, and with our employees? Can everyone in the organization articulate our technology strategy?

— How do we reimagine our products as platforms? How can we partner with our customers on products for longer? What products do we offer that could be services instead?

— What's our core value proposition and competency—and what should we *not* be doing ourselves anymore?

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ABOUT THE ASPEN INSTITUTE CYBERSECURITY & TECHNOLOGY PROGRAM

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