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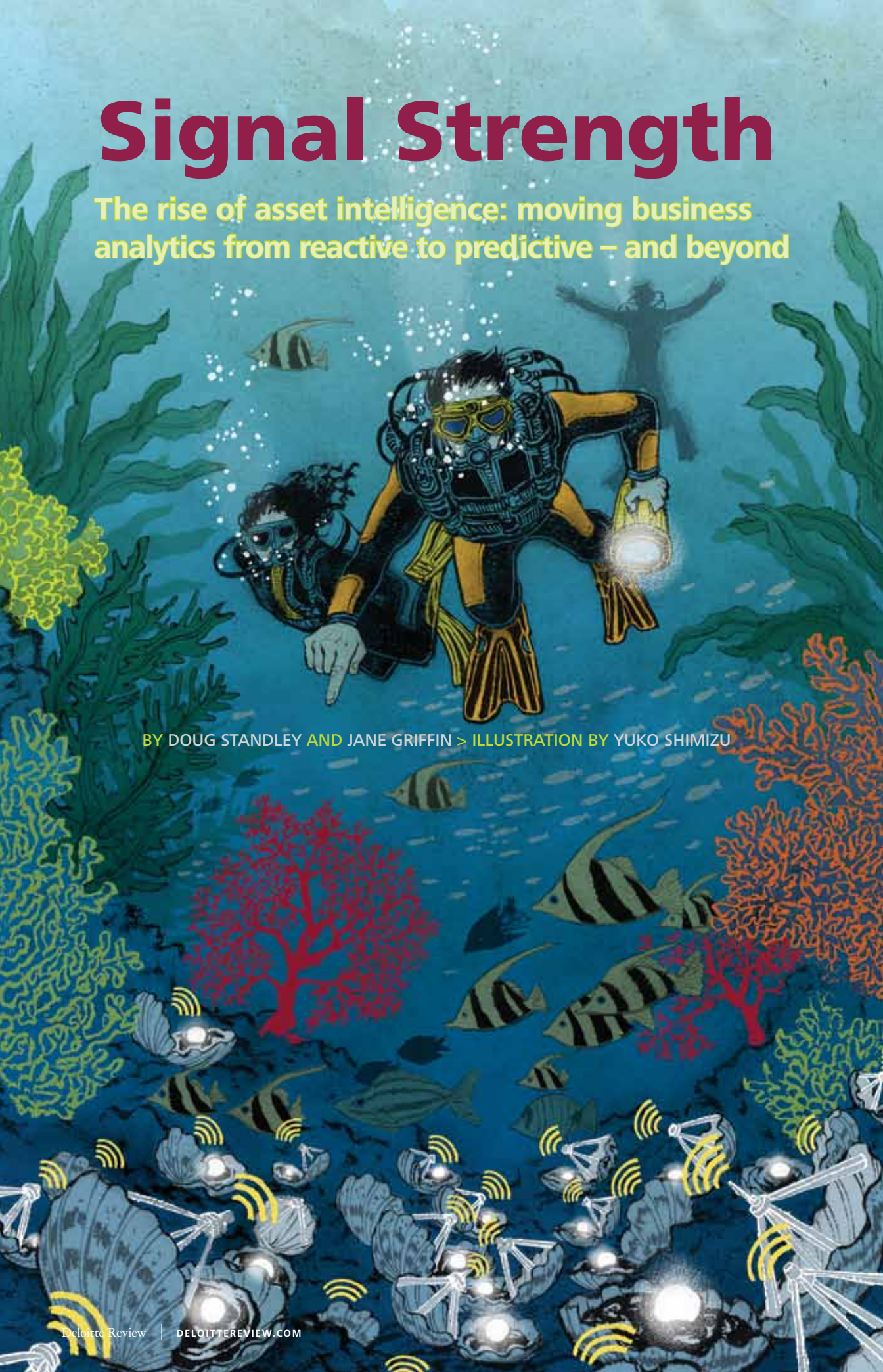
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Signal Strength

The rise of asset intelligence: moving business analytics from reactive to predictive – and beyond

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When the discussion turns to new technologies and their potential to shape strategy and rewrite the rules for decision-making, it can be hard to gauge their ultimate impact. That's especially true in the growing field of asset intelligence, where businesses are using a vast new array of sensors, signals, analytics and automation to create more value. Padmasree Warrior, the chief technology officer at Cisco, put it this way: the number of devices connected to the Internet will reach one trillion in the next three years, up from 500 million in 2007. We're heading, she says, into the *Internet of Things*.¹

The numbers are credible. And the enthusiasm is understandable, cynics might say, when your business depends on building networks that connect all those devices to the Web. But can asset intelligence provide a fast track to value for other kinds of companies? Or will it simply accelerate another crushing wave of more information than anyone can possibly manage?

ASSET INTELLIGENCE: WHAT IT IS AND WHY IT MATTERS

From debit card swipes and cell phone calls to Web searches and on-demand movies, the volume of transactional data collected and stored today is staggering. Walmart alone adds a million interactions *per hour* to its 2.5 petabyte customer database, while elsewhere around the world, more than

34,000 Google searches happen every second.² But nei-

ther fact reflects the onslaught of new signals

being generated today by sensors associ-

ated with *things*. From factory floors

and finished goods to computers,

cars, construction equipment

and more, almost anything

you can imagine now has

the potential to produce

signals about its status

and become a trusted

element in your busi-

ness operations. Pro-

cessing these signals

to support business

decision-making and

drive automation lies

at the heart of asset in-

telligence.

Simply put, an asset

is any *signal* from any *thing*

from any *where* that is impor-

tant to you – the user. Asset intel-

ligence is how you use these signals

to transform your business from a reactive

to a predictive enterprise. It requires a systemic

approach to sensors, signals, analytics and automation.

This is not, for example, the equivalent of a go or no-go decision about RFID tags. RFID is simply one producer of signals in an expanding asset intelligence landscape.

An example of reactive asset intelligence is built into the dashboard of every car manufactured in the world today: the good old fuel gauge. Not long ago, these gauges were unreliable dials with mechanical needles. Before that, people used

“There is a fundamental issue and opportunity facing today’s organizations: the shift from explaining to predicting – and beyond. This shift is necessitated by the speed of the modern business environment, the availability of data, and the growing use of sensors to provide anywhere/ anytime visibility. Merely explaining what happened and then, with great latency, reacting to various signals (e.g., sales, markets, customer buying behavior, temperature) will not suffice. For organizations to survive, they must predict and act before events occur.”

BILL HARDGRAVE

wooden dipsticks they kept in their trunks – a good case of manual data capture that penalized users for opting out (and perhaps for smoking while checking the fuel level). But now they've gone digital. When you're at risk of running out of gas, a sensor in the tank sends a signal to your dashboard reminding you to re-fuel. The sensor can also feed a dashboard display that tells you how many miles you'll travel on the gas remaining in your tank. That's one signal you don't want to ignore.

Now imagine a more proactive example – where you establish a planned route in your onboard computer. As you drive toward your destination, you receive an automated notice that the last opportunity to fill your tank is just ahead. If you pass the designated exit, you get another notice to turn around – and have to manually override the signal to stop that annoying voice coming from your dashboard. If you still manage to run out of gas, your car can notify emergency services with an automated call for assistance, even if you don't have a mobile phone. In this case, you've moved from reactive to proactive to automated – and beyond.

Examples of advanced signals are plentiful, especially in the process industry, where machines communicate with other machines and people routinely. Instead of transmissions about fuel levels, those signals include data on raw materials, pump vibration, temperatures, production volumes and more. Add in a few billion other signals showing up-to-the-minute status on machinery and equipment spread across every continent in the world, and you start to get a feel for the wave that's building around asset intelligence. More sensors, more signals, more connections, more information, more choices – and more potential.

But the value of asset intelligence doesn't just happen; it has to be ingrained within a culture of empowerment, trust and continuous improvement. That's not happening in many organizations today. For example, assume your production facility uses sensors to monitor machine operating temperatures, and one of those sensors detects equipment that's overheating. In most cases, that signal goes to a human being who then has to push a button or turn a dial to shut down the machine. The sensors and signals aren't empowered to act automatically because there's not enough trust in the quality and reliability of the signals being sent.

With advances in sensors and signal monitoring capabilities, however, cultures of empowerment and trust are beginning to find their way into business of all kinds. From monitoring carbon outputs for an aircraft fleet to tracking the flow of raw materials through the pharmaceutical value chain, almost anything you want to know about how a business operates can be measured and monitored remotely. That's true in public sector operations, too. From highways and health care to water and warfare, *things* are becoming a larger part of the information puzzle. They communicate with one another. They report and respond. They know when

a product or service has been delivered. And they will even send out an invoice automatically. These advanced applications push automation to the outer limits of the value chain—sometimes called edge intelligence—where signals themselves initiate and terminate business transactions.

Beyond being a new way of producing signals and managing transactions, asset intelligence is also an opportunity to use information to drive smarter action and reduce process or service latency associated with human decision-making. Combined with deep capabilities in business analytics and automation, asset intelligence can assess what's happening *right now* – and act on that information sooner, instead of after the fact.

ANY PORT IN A STORM?

The business of shipping perishable goods suffers an estimated \$35 billion in annual waste.³ Using in-transit sensors, unique identifiers and GPS, agribusinesses can receive signals about the location, temperature and vibration levels for individual shipments of fresh fruit. This asset intelligence allows companies to remotely control conditions inside its ships and trucks to reduce spoilage and even improve ripening before the products reach a retailer's shelf.

AFTER THE FLOOD

This year alone, mankind will create 1,200 exabytes (one exabyte is a billion gigabytes) of digital data⁴ – a number that's growing at a compounded annual rate of 60 percent.⁵ New streams of structured and unstructured data are coming on line every day, threatening to drive the accumulation of information to exponential heights. The trend has stretched processing capabilities to the breaking point, and there's no end in sight. Futurists, geeks and nerds are eyeing the path from bits to zetabytes and onward to unimaginably huge units: yottabytes, xonabytes, wekabytes and vundabytes – terms that didn't even exist 10 years ago. It's more than enough information to leave even the most devout number crunchers swimming for shore.

Unfortunately, most of this data resides in disconnected, proprietary environments that are limited in their ability to form communities and advance collective intelligence. The result is oceans of data and no way to navigate them to your destination of choice.

The challenging work of making sense of so many signals is where business analytics comes into play – the practice of mining huge volumes of information to drive business strategy and performance. Most companies have waded into analytics far enough to cover basics like compliance and reporting, but the rise of new

signal sources is demanding more sophisticated statistical techniques, more computing power, more collaboration more automation, and a simpler user experience.

Core analytics capabilities address data management and business intelligence fundamentals. These are table stakes – used mostly for looking into the past for patterns of performance. The deeper analytics capabilities needed to drive asset intelligence shift the focus from hindsight to foresight – from reactive to predictive to automated. By assembling the proper rules, notifications and technology resources, systems can actively push decision support to the people who need it and require them to respond appropriately, no matter where they are in the extended enterprise. This approach engages the full spectrum of talent management, processes, technology and governance to look into the future and enable faster, smarter responses to threats and opportunities. Deep analytics embeds capabilities throughout the organization, inspiring a culture of right-time decision-making that's key to sustainable value.



BEFORE YOU DIVE IN

With “things” becoming intelligent and the Internet on the verge of ubiquity, how can businesses prepare for this next big shift in technology innovation? As is often the case, readiness starts with asking tough questions – and answering them honestly.

- How is Information Technology positioned within the culture of your business? Is it mostly considered a cost center? If you're not sure, try this thought experiment. When someone submits a technology request, is your first question, “How much will this cost?” If that feels familiar, IT is most likely a cost center – not a strategic value driver.
- When a new opportunity to capture more data is presented, do you want to change the subject? Or is your business culture hungry for better analytics?
- Is your organization quick to implement changes that reduce process latency? Hint: If you're not thinking about process latency and your customers aren't screaming for you to speed up, the answer is probably “no.”
- Does your business have wide swings in levels of process performance? If not, capturing more intelligence may not be the highest priority.
- Does your organization have an executive chief technology officer (CTO)—not the CIO—with specific responsibility for integrating emerging technologies into your business strategy? Is your CTO on a level footing with the other members of your executive team?
- What technology experiments and simulations are you running this year? Mature businesses often require experimentation to operate outside the normal business model, where things can move faster and more efficiently, with less bias from the existing business model.

Cultural readiness will make or break your capital and strategic return. If, today, your culture rewards manual processes and tomorrow you want to jump into automation, be certain your culture, strategy and executive team will embrace that technology.

GOING DEEP

Mehrdad Baghai, author of *The Alchemy of Growth*, likes to compare business analytics to the deep sea. “The way to find answers is by swimming in the data,” he has said. But what if the data you’re swimming in looks like a tidal wave? With the proliferation of signals from things, yesterday’s information pools are becoming today’s deep oceans, and those unprepared could find themselves sinking.

Going deep in business analytics is not mainly about tools and technology, though they certainly come into play. It’s more about understanding which questions matter most and creating and rewarding a right-time culture through appropriate automation. These are the core elements to keep in mind as you explore the intersection of asset intelligence and deep analytics.

Know which questions matter most

Asking the right questions is the first step in unleashing the right signals. While some questions extend beyond the boundaries of a particular industry or sector, the most important ones tend to be highly specific, even to an individual company. What changes in your product’s performance when it’s exposed to a one percent increase in relative humidity? Do your systems anticipate those changes and respond accordingly? What are the most critical signals to your customers? Are you capturing them? Are you using your customers as assets? Which dimensions of service quality matter most? To whom? When can you delay a shipment without triggering blowback? How much value could your business create if you could reduce latency and anticipate your customers’ needs effectively? The ability to generate a stream of reliable signals around these kinds of questions depends on having a deep analytics and intelligence capability to support front-line action at every level of your organization. The secret is to focus first and completely on potential value – not on designing the technology solution, which will likely bring out naysayers in your organization

Get great at early signal detection

Ask any executive when he or she wants to know about a problem and you’re likely to hear this response: *Before it happens*. Who wouldn’t love to be able to use predictive signals, for example, to schedule maintenance work at the exact right time, with no delays or downtime? That is zero latency – and it’s increasingly part of the vision of any high-performing organization. No one wants to be caught flat-footed without the information needed to make—or automate—smart choices. Just like no one wants to make that dreaded call to a customer about a delayed shipment.



HOW TO GET STARTED

Most organizations have plenty of physical things and associated data that drive their business. But not all objects lend themselves to the business results of asset intelligence. Start by asking the following questions:

- What is an asset? It need not be on the balance sheet or within a depreciation schedule.
- Which assets play a significant role in targeted business processes?
- What information would be valuable to extract from each asset?
- What signals do you already capture, and how?
- What actions can each asset potentially undertake?
- What are the critical interactions or relationships between assets?
- What improvements or innovations could occur with better visibility or automation?
- Where is the latency in your value chain?

The analysis should be done across a company's operations – from receiving dock to shipping dock to customer delivery, from shop floor to accounting to the CEO's office. Some scenarios will be obvious – like the importance of understanding location, movement, temperature, and contents of a shipping vessel. But others could be more subtle. Take your time to think through all the possibilities. Explore the intangibles to the fullest.

Once opportunities are identified, advancements in sensor hardware and automated data capture make the next—signal generation—relatively easy. Building in the “intelligence” is where the complexity lies: Allowing proprietary technologies to work together, defining the business rules, and implementing workflow and security to allow trusted automated decision-making. While many IT organizations have already begun investing in these disciplines, it's important to fit asset intelligence into an overarching information strategy tied to business objectives. If you approach asset intelligence focused on infrastructure and sensors, the real potential of will not likely be realized.

Use “right fit” analytics

In the face of growing data volumes, some companies go wild for the most advanced technologies and cutting-edge statistical techniques. Sometimes that's warranted, but not always. It depends mostly on whether you have the culture and the talent to use those tools effectively. Yet underpowered solutions carry risk too: They can miss important insights or rely too heavily on people to make choices when automation would be a smarter route. Make sure you strike the right balance of analytics capabilities for the range and volume of signals you need to process.

Unlock the value of information with visualization and intelligent systems

Organizations that embrace large-scale data capture quickly discover they have the capacity to produce far more information than people can manage. On the

factory floor or in the corner office, too many signals can be just as problematic as too few – and can even undermine trust in signal quality. The challenge gets even tougher because companies often have different systems to review information – systems that don't talk or share with each other. Each produces its own distinct outputs, with no effective way to pull them together into a single source of insight and action. How many different places do you log into in order to review your business? If you have to go to five different places to answer five different questions, that's four too many.

"Over the last two decades, the Internet has grown in intelligence from a newborn to a small child: it's still cute, makes fun noises, but can be ever so frustrating when it doesn't know how to respond to our needs. Fortunately, the R & D push today will help the Internet grow from a child to an adult with remarkable capabilities to assimilate vast amounts of real-time information so that it can anticipate, use intuition and make decisions ... The companies which get on this trajectory first will lead the way to realizing the full opportunities of the interconnected global economy."

GEOFFREY C. ORSAK

Fortunately, new systems are emerging that reach across diverse information architectures, signal streams or data sources to assimilate a limitless range of inputs. In a world where asset intelligence is on the rise, this kind of neutral operating platform for visualization and automation can be indispensable and perhaps even a corporate life preserver.

Automate to accelerate – and drive down costs

Mark White, chief technology officer at Deloitte Consulting LLP, talks frequently about the value of automating what you need to *know*, as well as what you need to *do*. That means pushing information directly to people who make decisions – but also bypassing those people when other approaches can do the work faster, cheaper and more reliably. Both kinds of automation can drive tremendous operational efficiency, but the benefits don't stop there. As organizations become more adept at streamlining decisions and accelerating action, the value of automation can spill into business processes, workforce planning, risk management and governance, creating a virtuous cycle of continuous improvement.

Smart machines, smarter people

Standalone initiatives involving asset intelligence can have significant value. There is ample low-hanging fruit, especially in the areas of supply chain management, customer relationships, and fraud and security. Moreover, solving a problem in one area often leads to solutions that can be extended throughout the enterprise. But the real rewards can come from weaving together the full range of sensors, signals, analytics and automation tools into a culture that exploits the power of system intelligence and network effects. This requires pushing capabilities and outputs deep into processes all across the enterprise, delivering knowledge to the people who need it before they have to ask for it. Instead of floating on the surface of information, the workforce learns to swim in the signals, finding the insights they need to innovate, to manage risks more effectively, and to solve problems before they happen.

ASSET INTELLIGENCE AND DEEP ANALYTICS

Information today is flooding into organizations, presenting new opportunities to take faster, smarter actions using real-time signals that produce real-time alerts and real-time responses from real-time organizations. And while things and the signals they can produce are important in asset intelligence, they're far from the only ingredient. Data are assets, and customers are assets, too, complete with traceable digital trails that can reshape business operations.

Beyond growth and productivity, asset intelligence can play a big role in risk management, delivering significantly enhanced capabilities to deal with threats, fraud and corrupt practices. By using sensors and signals to monitor for unauthorized activity—and then analyzing the outputs in real-time—companies can choose a more intelligent approach to risk taking.

BANK ON IT

From the Northern Bank in Belfast to the Central Bank in Baghdad, history tells us that cash is a valuable asset and a frequent target for theft. Sensors can be used to track this asset in real time. For example, cash is typically transported in closed, dark bags. What if bags came with simple light sensors and GPS trackers? If one were opened prior to reaching its destination, two signals would trigger the appropriate responses and improve the chances of recovery.

Assets don't add intelligence simply by creating more raw data. Intelligence hinges on interpretation and insight – taking context and relationships into ac-

count. It's the signals that assets produce, not the sensors, that drive value. When you establish trust in those signals, you empower a fundamental shift that changes the customer value proposition and competitive landscape.

DISRUPTION AHEAD

Asset intelligence thrives on early signals woven together into systems that can anticipate and act. Instead of waiting for people to conduct physical inspections of a distribution center, asset intelligence taps into the *things* themselves that fill that facility, enabling machine-to-machine interactions that bypass human intervention. Some call this the *predictive enterprise*, but whatever you call it, the benefits are compelling. Being able to detect signals earlier and extract more value from them faster is a new front in the battle for customer intimacy and competitive advantage.

As margins narrow and competition intensifies, advantage in many industries will boil down to how well a company defines and empowers its valuable assets. And remember, you are the one who decides what an asset is. CEOs who take command on this new business battleground can create disruptive value. Those who forego the opportunity may find themselves outgunned and outmaneuvered, with no more costs to cut.

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Endnotes

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