

FEATURE MANAGEMENT IS MUCH MORE THAN A SCIENCE





UNDERSTANDING MANAGEMENT'S VALUE

MANAGEMENT IS MUCH MORE THAN A SCIENCE

THE LIMITS OF DATA-DRIVEN DECISION MAKING

BY ROGER L. MARTIN AND TONY GOLSBY-SMITH

Underlying the practice and study of business is the belief that management is a science and that business decisions must be driven by rigorous analysis of data. The explosion of big data has reinforced this idea. In a recent EY survey, 81% of executives said they believed that “data should be at the heart of all decision-making,” leading EY to enthusiastically proclaim that “big data can eliminate reliance on ‘gut feel’ decision-making.”

Managers find this notion appealing. Many have a background in applied sciences. Even if they don’t, chances are, they have an MBA—a degree that originated in the early 20th century, when Frederick Winslow Taylor was introducing “scientific management.”

MBA programs now flood the business world with graduates—more than 150,000 a year in the United States alone. These programs have been trying to turn management into a hard science for most of the past six decades. In large measure this effort began in response to scathing reports on the state of business education in America issued by the Ford and Carnegie Foundations in 1959. In the view of the report writers—all economists—business programs were filled with underqualified students whose professors resisted the methodological rigor of the hard sciences, which other social sciences had embraced. In short, business education wasn’t scientific enough.

ILLUSTRATIONS BY MASA

It was in part to remedy this shortcoming that the Ford Foundation supported the creation of academic journals and funded the establishment of doctoral programs at Harvard Business School, the Carnegie Institute of Technology (the predecessor of Carnegie Mellon), Columbia, and the University of Chicago.

But is it true that management is a science? And is it right to equate intellectual rigor with data analysis? If the answers to those questions are no and no—as we will suggest in the following pages—then how should managers arrive at their decisions? We'll set out an alternative approach for strategy making and innovation—one that relies less on data analysis and more on imagination, experimentation, and communication.

But first let's take a look back at where—or rather with whom—science started.

IS BUSINESS A SCIENCE?



What we think of as science began with Aristotle, who as a student of Plato was the first to write about cause and effect and the methodology for demonstrating it. This made “demonstration,” or proof, the goal of science and the final criterion for “truth.” As such, Aristotle was the originator of the approach to scientific exploration, which Galileo, Bacon, Descartes, and Newton would formalize as “the Scientific Method” 2,000 years later.

It's hard to overestimate the impact of science on society. The scientific discoveries of the Enlightenment—deeply rooted in the Aristotelian methodology—led to the Industrial Revolution and the global economic progress that followed. Science solved problems and made the world a better place. Small wonder that we came to regard great scientists like Einstein as latter-day saints. And even smaller wonder that we came to view the scientific method as a template for other forms of inquiry and to speak of “social sciences” rather than “social studies.”

But Aristotle might question whether we've allowed our application of the scientific method to go too far. In defining his approach, he set clear boundaries around what it should be used for, which was understanding natural phenomena that “cannot be other than they are.” Why does the sun rise every day, why do lunar eclipses happen when they do, why do objects always fall to the ground? These things are beyond the control of any human, and science is the study of what makes them occur.

However, Aristotle never claimed that all events were inevitable. To the contrary, he believed in free will and the power of human agency to make choices that can radically change situations. In other words, if people choose, a great many things in the world can be other than they are. “Most of the things about which we make decisions, and into which we

therefore inquire, present us with alternative possibilities....All our actions have a contingent character; hardly any of them are determined by necessity,” he wrote. He believed that this realm of possibilities was driven not by scientific analysis but by human invention and persuasion.

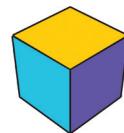
We think this is particularly true when it comes to decisions about business strategy and innovation. You can't chart a course for the future or bring about change merely by analyzing history. We would suggest, for instance, that the behavior of customers will never be transformed by a product whose design is based on an analysis of their past behavior.

Yet transforming customer habits and experiences is what great business innovations do. Steve Jobs, Steve Wozniak, and other computing pioneers created a brand-new device that revolutionized how people interacted and did business. The railroad, the motor car, and the telephone all introduced enormous behavioral and social shifts that an analysis of prior data could not have predicted.

To be sure, innovators often incorporate scientific discoveries in their creations, but their real genius lies in their ability to imagine products or processes that simply never existed before.

The real world is not merely an outcome determined by ineluctable laws of science, and acting as if it is denies the possibility of genuine innovation. A scientific approach to business decision making has limitations, and managers need to figure out where those limitations lie.

CAN OR CANNOT?



Most situations involve some elements you can change and some you cannot. The critical skill is spotting the difference. You need to ask, Is the situation dominated by possibility (that is, things we can alter for the better) or by necessity (elements we cannot change)?

Suppose you plan to build a bottling line for plastic bottles of springwater. The standard way to set one up is to take “forms” (miniature thick plastic tubes), heat them, use air pressure to mold them to full bottle size, cool them until they're rigid, and finally fill them with water. Thousands of bottling lines around the world are configured this way.

Some of this cannot be other than it is: how hot the form has to be to stretch; the amount of air pressure required to mold the bottle; how fast the bottle can be cooled; how quickly the water can fill the bottle. These are determined by the laws of thermodynamics and gravity—which executives cannot do a thing to change.

Still, there's an awful lot they can change. While the laws of science govern each step, the steps themselves don't have to follow the sequence that has

IN BRIEF

THE PROBLEM

The big-data revolution has reinforced the belief that all business decisions should be reached through scientific analysis. But this approach has its limits, and it tends to narrow strategic options and hinder innovation.

WHY IT HAPPENS

The scientific method is designed to understand natural phenomena that cannot be changed—the sun will always rise tomorrow. It is not an effective way to evaluate things that do not yet exist.

THE SOLUTION

To make decisions about what could be, managers should devise narratives about possible futures, applying the tools of metaphor, logic, and emotion first described by Aristotle. Then they must hypothesize what would have to be true for those narratives to happen and validate their hypotheses through prototyping.

dominated bottling for decades. A company called LiquiForm demonstrated that after asking, Why can't we combine two steps into one by forming the bottle with pressure from the liquid we're putting into it, rather than using air? And that idea turned out to be utterly doable.

Executives need to deconstruct every decision-making situation into *cannot* and *can* parts and then test their logic. If the initial hypothesis is that an element can't be changed, the executive needs to ask what laws of nature suggest this. If the rationale for *cannot* is compelling, then the best approach is to apply a methodology that

will optimize the status quo. In that case let science be the master and use its tool kits of data and analytics to drive choices.

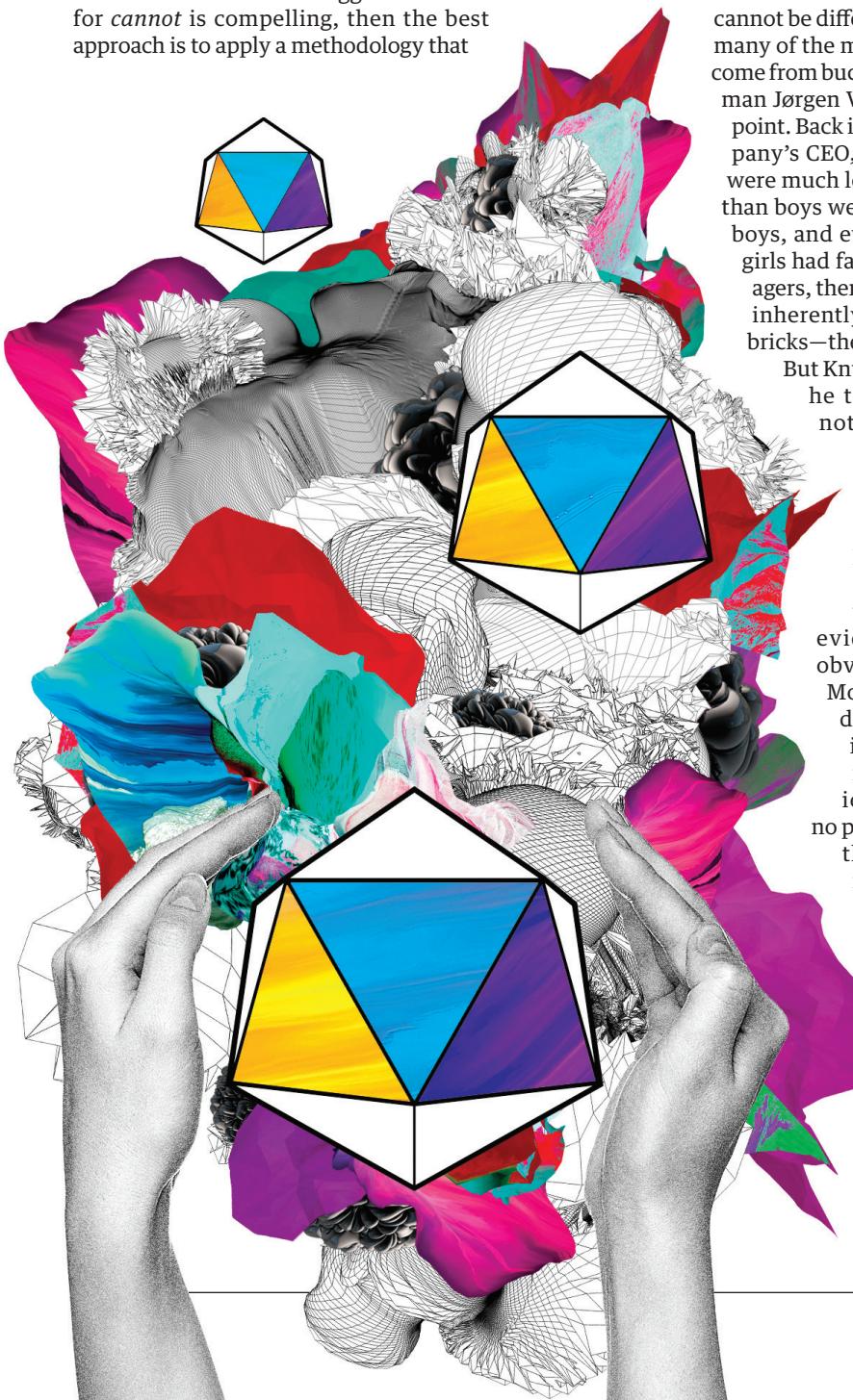
In a similar way, executives need to test the logic behind classifying elements as *cans*. What suggests that behaviors or outcomes can be different from what they have been? If the supporting rationale is strong enough, let design and imagination be the master and use analytics in their service.

It's important to realize that the presence of data is not sufficient proof that outcomes cannot be different. Data is not logic. In fact, many of the most lucrative business moves come from bucking the evidence. Lego chairman Jørgen Vig Knudstorp offers a case in point. Back in 2008, when he was the company's CEO, its data suggested that girls were much less interested in its toy bricks than boys were: 85% of Lego players were boys, and every attempt to attract more girls had failed. Many of the firm's managers, therefore, believed that girls were inherently less likely to play with the bricks—they saw it as a *cannot* situation.

But Knudstorp did not. The problem, he thought, was that Lego had not yet figured out how to get girls to play with construction toys. His hunch was borne out with the launch of the successful Lego Friends line, in 2012.

The Lego case illustrates that data is no more than evidence, and it's not always obvious what it is evidence of. Moreover, the absence of data does not preclude possibility. If you are talking about new outcomes and behaviors, then naturally there is no prior evidence. A truly rigorous thinker, therefore, considers not only what the data suggests but also what within the bounds of possibility could happen. And that requires the exercise of imagination—a very different process from analysis.

Also, the division between *can* and *cannot* is more fluid than most people think. Innovators will push that boundary more than most, challenging the *cannot*.



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BREAKING THE FRAME



The imagination of new possibilities first requires an act of unframing. The status quo often appears to be the only way things can be, a perception that's hard to shake.

We recently came across a good example of the status quo trap while advising a consulting firm whose clients are nonprofit organizations. The latter face a “starvation cycle,” in which they get generously funded for the direct costs of specific programs but struggle to get support for their indirect costs. A large private foundation, for instance, may fully fund the expansion of a charity’s successful Latin American girls’ education program to sub-Saharan Africa, yet underwrite only a small fraction of the associated operational overhead and of the cost of developing the program in the first place. This is because donors typically set low and arbitrary levels for indirect costs—usually allowing only 10% to 15% of grants to go toward them, even though the true indirect costs make up 40% to 60% of the total tab for most programs.

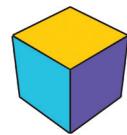
The consulting firm accepted this framing of the problem and believed that the strategic challenge was figuring out how to persuade donors to increase the percentage allocated to indirect costs. It was considered a given that donors perceived indirect costs to be a necessary evil that diverted resources away from end beneficiaries.

We got the firm’s partners to test that belief by listening to what donors said about costs rather than selling donors a story about the need to raise reimbursement rates. What the partners heard surprised them. Far from being blind to the starvation cycle, donors hated it and understood their own role in causing it. The problem was that they didn’t trust their grantees to manage indirect costs. Once the partners were liberated from their false belief, they soon came up with a wide range of process-oriented solutions that could help nonprofits build their competence at cost management and earn their donors’ confidence.

Although listening to and empathizing with stakeholders might not seem as rigorous or systematic as analyzing data from a formal survey, it is in fact a tried-and-true method of gleaning insights, familiar to anthropologists, ethnographers, sociologists, psychologists, and other social scientists. Many business leaders, particularly those who apply design thinking and other user-centric approaches to innovation, recognize the importance of qualitative, observational research in understanding human behavior. At Lego, for example, Knudstorp’s initial questioning of gender assumptions triggered four years of ethnographic studies that led to the discovery that girls are more interested in collaborative play than boys are, which suggested that a collaborative construction toy could appeal to them.

Powerful tool though it is, ethnographic research is no more than the starting point for a new frame. Ultimately, you have to chart out what could be and get people on board with that vision. To do that, you need to create a new narrative that displaces the old frame that has confined people. And the story-making process has principles that are entirely different from the principles of natural science. Natural science explains the world as it is, but a story can describe a world that does not yet exist.

CONSTRUCTING PERSUASIVE NARRATIVES



It may seem unlikely, but Aristotle, the same philosopher who gave us the scientific method, also set out methods for creating compelling narratives. In *The Art of Rhetoric* he describes a system of persuasion that has three drivers:

- **Ethos:** the will and character to change the current situation. To be effective, the author of the narrative must possess credibility and authenticity.
- **Logos:** the logical structure of the argument. This must provide a rigorous case for transforming problems into possibilities, possibilities into ideas, and ideas into action.
- **Pathos:** the capacity to empathize. To be capable of inspiring movement on a large scale, the author must understand the audience.

A multibillion-dollar merger of two large insurance companies offers an example of how to use ethos, logos, and pathos. The two firms were longtime competitors. There were winners and losers in the deal, and employees at all levels were nervous and unsettled. To complicate matters, both firms had grown by acquisition, so in effect this was a merger of 20 or 30 different cultures. These smaller legacy groups had been independent and would resist efforts to integrate them to capture synergies. On top of that, the global financial crisis struck just after the merger, shrinking the industry by 8%. So the merged enterprise’s leaders faced a double challenge: a declining market and a skeptical organizational culture.

The normal approach to postmerger integration is rational and reductionist: Analyze the current cost structures of the two organizations and combine them into one smaller structure—with the attendant layoffs of “redundant” employees. However, the leader of the merged companies did not want to follow the usual drill. Rather, he wanted to build a new organization from the ground up. He supplied the ethos by articulating the goal of accomplishing something bigger and better than a standard merger integration.

However, he needed the logos—a powerful and compelling case for a future that was different. He built one around the metaphor of a thriving city. Like a city, the new organization would be a diverse ecosystem

that would grow in both planned and unplanned ways. Everybody would be part of that growth and contribute to the city. The logic of a thriving city captured the imagination of employees enough for them to lean into the task and imagine possibilities for themselves and their part of the organization.

The effort also required pathos—forging an emotional connection that would get employees to commit to building this new future together. To enlist them, the leadership group took a new approach to communication. Typically, executives communicate postmerger integration plans with town halls, presentations, and e-mails that put employees on the receiving end of messages. Instead the leadership group set up a series of collaborative sessions in which units in the company held conversations about the thriving-city metaphor and used it to explore challenges and design the work in their sphere of activity. How would the claims department look different in the thriving city? What would finance look like? In effect, employees were creating their own mini-narratives within the larger narrative the leaders had constructed. This approach required courage because it was so unusual and playful for such a large organization in a conservative industry.

The approach was a resounding success. Within six months, employee engagement scores had risen from a dismal 48% to a spectacular 90%. That translated into performance: While the industry shrank, the company's business grew by 8%, and its customer satisfaction scores rose from an average of 6 to 9 (on a scale of 1 to 10).

This case illustrates the importance of another rhetorical tool: a strong metaphor that captures the arc of your narrative in a sentence. A well-crafted metaphor reinforces all three elements of persuasion. It makes logos, the logical argument, more compelling and strengthens pathos by helping the audience connect to that argument. And finally, a more compelling and engaging argument enhances the moral authority and credibility of the leader—the ethos.

WHY METAPHORS MATTER



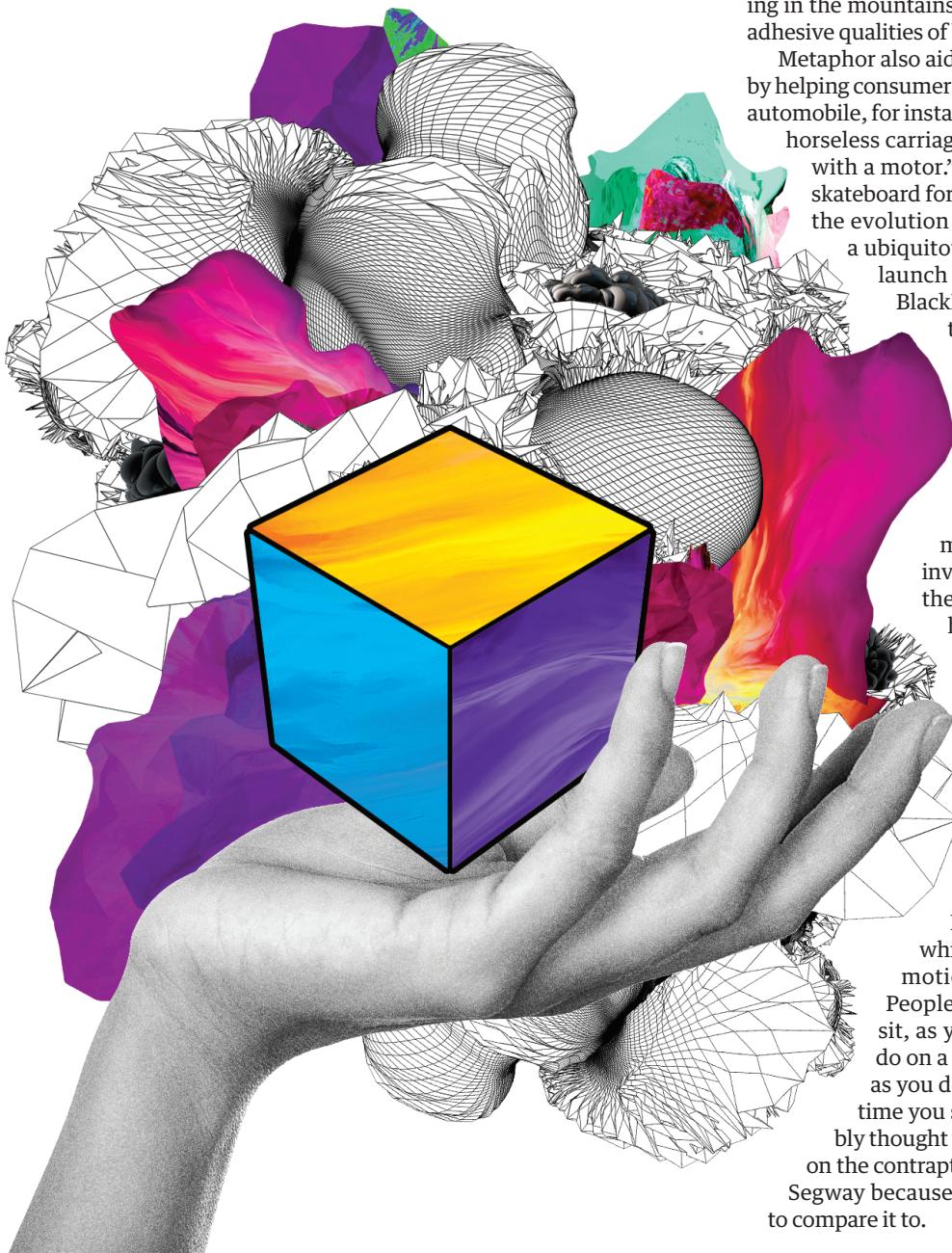
We all know that good stories are anchored by powerful metaphors. Aristotle himself observed, "Ordinary words convey only what we know already; it is from metaphor that we can best get hold of something fresh." In fact, he believed that mastery of metaphor was the key to rhetorical success: "To be a master of metaphor is the greatest thing by far. It is...a sign of genius," he wrote.

It's perhaps ironic that this proposition about an unscientific construct has been scientifically



confirmed. Research in cognitive science has demonstrated that the core engine of creative synthesis is “associative fluency”—the mental ability to connect two concepts that are not usually linked and to forge them into a new idea. The more diverse the concepts, the more powerful the creative association and the more novel the new idea.

With a new metaphor, you compare two things that aren’t usually connected. For instance, when Hamlet says to Rosencrantz, “Denmark’s a prison,” he is associating two elements in an unusual way. Rosencrantz knows what “Denmark” means, and he



knows what “a prison” is. However, Hamlet presents a new concept to him that is neither the Denmark he knows nor the prisons he knows. This third element is the novel idea or creative synthesis produced by the unusual combination.

When people link unrelated concepts, product innovations often result. Samuel Colt developed the revolving bullet chamber for his famous pistol after working on a ship as a young man and becoming fascinated by the vessel’s wheel and the way it could spin or be locked by means of a clutch. A Swiss engineer was inspired to create the hook-and-loop model of Velcro after walking in the mountains and noticing the extraordinary adhesive qualities of burrs that stuck to his clothing.

Metaphor also aids the adoption of an innovation by helping consumers understand and relate to it. The automobile, for instance, was initially described as “a horseless carriage,” the motorcycle as “a bicycle with a motor.” The snowboard was simply “a skateboard for the snow.” The very first step in the evolution that has made the smartphone a ubiquitous and essential device was the launch in 1999 of Research in Motion’s BlackBerry 850. It was sold as a pager that could also receive and send e-mails—a comforting metaphor for initial users.

One needs only to look at the failure of the Segway to see how much harder it is to devise a compelling narrative without a good metaphor. The machine, developed by superstar inventor Dean Kamen and hyped as the next big thing, was financed by hundreds of millions in venture capital. Although it’s a brilliant application of advanced technology, hardly anyone uses it. Many rationalizations can be made for its failure—the high price point, the regulatory restrictions—but we would argue that a key reason is that the Segway is analogous with absolutely nothing at all.

It is a little wheeled platform on which you stand upright and largely motionless while moving forward. People couldn’t relate to it. You don’t sit, as you do in a car, or pedal, as you do on a bicycle, or steer it with handles, as you do a motorcycle. Think of the last time you saw a Segway in use. You probably thought the rider looked laughably geeky on the contraption. Our minds don’t take to the Segway because there is no positive experience to compare it to.

We're not saying that an Aristotelian argument can't be made without a metaphor; it is just much harder. A horseless carriage is easier to sell than the Segway.

CHOOSING THE RIGHT NARRATIVE



When you're facing decisions in the realm of possibilities, it's useful to come up with three or four compelling narratives, each with a strong metaphor, and then put them through a testing process that will help you reach consensus around which one is best. What does that entail? In the *cannot* world, careful analysis of data leads to the optimal decision. But in the *can* world, where we are seeking to bring something into existence, there is no data to analyze. To evaluate your options, you need to do the following:

Clarify the conditions. While we have no way of proving that a proposed change will have the desired effect, we can specify *what we think would have to be true about the world* for it to work. By considering this rather than debating what is true about the world as it is, innovators can work their way toward a consensus. The idea is to have the group agree on whether it can make most of those conditions a reality—and will take responsibility for doing so.

This was the approach pursued many years ago by a leading office furniture company that had developed a new chair. Although it was designed to be radically superior to anything else on the market, the chair was expensive to make and would need to be sold at twice an office chair's typical price. The quantitative market research showed that customers reacted tepidly to the new product. Rather than giving up, the company asked what would have to be true to move customers from indifference to passion. It concluded that if customers actually tried the chair, they would experience its breakthrough performance and become enthusiastic advocates. The company went to market with a launch strategy based on a customer trial process, and the chair has since become the world's most profitable and popular office chair.

Soon after, the company's managers asked themselves the same question about a new office design concept that eliminated the need to build walls and install either flooring or ceilings to create office spaces. This product could be installed into the raw space of a new building, dramatically simplifying and lowering the cost of building out office space. It was clear that the company's customers, building tenants, would be interested. But for the new system to succeed, landlords would also have to embrace it. Unfortunately, the new system would eliminate the revenues they typically made on office build-outs, so it was unlikely that they would cooperate in applying it, despite its advantages to the tenants. The project was killed.

Create new data. The approach to experimentation in the *can* world is fundamentally different from the one in the *cannot* world. In the *cannot* world, the task is to access and compile the relevant data. Sometimes that involves simply looking it up—from a table in the Bureau of Labor Statistics database, for example. Other times, it means engaging in an effort to uncover it—such as through a survey. You may also have to apply accepted statistical tests to determine whether the data gathered demonstrates that the proposition—say, that consumers prefer longer product life to greater product functionality—is true or false.

In the *can* world, the relevant data doesn't exist because the future hasn't happened yet. You have to create the data by prototyping—giving users something they haven't seen before and observing and recording their reactions. If users don't respond as you expected, you plumb for insights into how the prototype could be improved. And then repeat the process until you have generated data that demonstrates your innovation will succeed.

Of course, some prototyped ideas are just plain bad. That's why it's important to nurture multiple narratives. If you develop a clear view of what would have to be true for each and conduct prototyping exercises for all of them, consensus will emerge about which narrative is most compelling in action. And involvement in the process will help the team get ready to assume responsibility for putting the chosen narrative into effect.

THE FACT THAT scientific analysis of data has made the world a better place does not mean that it should drive every business decision. When we face a context in which things cannot be other than they are, we can and should use the scientific method to understand that immutable world faster and more thoroughly than any of our competitors. In this context the development of more-sophisticated data analytics and the enthusiasm for big data are unalloyed assets.

But when we use science in contexts in which things can be other than they are, we inadvertently convince ourselves that change isn't possible. And that will leave the field open to others who invent something better—and we will watch in disbelief, assuming it's an anomaly that will go away. Only when it is too late will we realize that the insurgent has demonstrated to our former customers that things indeed can be different. That is the price of applying analytics to the entire business world rather than just to the appropriate part of it. ☐

HBR Reprint R1705L



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