

# Learning from Failure in Innovation: Turning Setbacks into Advantages



**6 Brilliant Mistakes:  
Learning from  
Serendipity**

*Paul J. H. Schoemaker*

**22 Learning from  
Innovation  
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# Learning from Failure in Innovation: Turning Setbacks into Advantages

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## CONFERENCE EXECUTIVE SUMMARY

*Failure is part of innovation. Yet today's culture places such a strong emphasis on excellence that admitting to failure of any kind is avoided. Thus, many opportunities to learn from and transform failure are missed. The June 1, 2012, Mack Center conference, Learning from Failure in Innovation: Turning Setbacks into Advantages, featured speakers from a wide spectrum of industries—from health care to toys—who shared how their firms appropriate value from paying attention to mistakes and taking risks on new ideas that at first glance may seem counterintuitive. Developing a culture of learning rather than stressing excellence helps break down the resistance to looking at and learning from mistakes. Companies can gain from hosting “innovation contests” that elicit ideas from the people who know their business best—their employees.*

Questioning the pursuit of excellence in business is not an enviable task. Yet, **Paul J.H. Schoemaker**, research director of the Mack Center for Technological Innovation and author of *Brilliant Mistakes: Finding Success on the Far Side of Failure*, challenges managers to do just that. Managers never have perfect information and everyone has their own internal biases, he said, so oversights are inevitable and mistakes often hold valuable lessons. Therefore, rather than reduce mistakes to a minimum, create organizational cultures and strategies that allow (and ideally embrace) some level of mistakes in order to accelerate learning and innovation, Schoemaker suggested.

In the high-tech manufacturing arena in which W. L. Gore & Associates operates, failure is part of the experimental, push-the-envelope culture that has led to its financial success and a long-standing position on several “best places to work” lists. “Our culture is what sustains us,” said **Jack Kramer**, global technology leader and member

of the Corporate Leadership Team at Gore. Management built this culture by engendering an atmosphere of trust and respect. Best known for its GORE-TEX fabric, the company is organized into small, flat teams with little hierarchy. As much as possible, all functions in a project are colocated in small- to medium-size plants that are built in regional clusters or campuses. This arrangement gives teams more time to work together face-to-face, and employees can more easily switch their focus if they want. “Innovation is considered critical to our success,” Kramer said. Communication and networking among workers is encouraged. Anyone can pick up the phone and call anyone else in the company. This openness is essential to the company’s commitment to innovation.

Everyone expects excellence at a hospital and of doctors, and everyone knows mistakes happen. But not until the 1999 publication of the Institute of Medicine report, “To Err Is Human,” did the full magnitude of hospital errors come to light. While the majority of those errors have been corrected, mistakes still occur, said **Patrick J. Brennan**, chief medical officer at the University of Pennsylvania Health System. Brennan has focused on creating procedural systems to catch errors while building trust among hospital employees to make it safe to report errors. Employees must feel psychologically safe to speak up if they see something that appears unsafe, Brennan said. Then, when a near miss is discovered, such as an orderly noticing that the wrong patient was brought to the operating room, the institution needs to take the time to thank the employee. At the same time, a formal root cause analysis should be done so that a safer procedure can be implemented.

Remaining focused on its founding principle has kept the Cancer Treatment Centers of America (CTCA) innovating. “Our ability to filter out what seem like good ideas, but



which are not strategically relevant and thus will move us away from our founding principle, is key,” said **Stephen B. Bonner**, chief executive officer at CTCA. Any major decision or innovation is viewed through this strategic filter. The filter ensures that the cancer patient’s needs are placed first. If building an additional site or funding new research will benefit cancer patients, CTCA moves forward with it. And once a new program or service has begun, it is monitored to make sure it remains focused on the patient. For instance, CTCA’s foray into manufacturing infusion treatments at first seemed patient-centric. But once operational, it became clear that manufacturing medicines was actually taking away from the highly patient-focused care that is at the heart of CTCA’s mission, so the infusion business was dropped.

Since its founding in 1932 by a struggling furniture maker to its place today as one of the leading toy manufacturers, LEGO has gone through booms and busts. In the early part of the last decade, to restart its growth, LEGO tried boosting innovation in every way it could think of. This “frenzy” of innovation almost bankrupted the company. It also led to the company fine-tuning a system for managing innovation, according to **David Robertson** of the Wharton School and author of an upcoming book about LEGO’s innovation management system. “Before, I’d have described LEGO’s culture as creative. It has since transformed its creative employees into profitable innovators.” Now, managers measure new innovative initiatives at predefined time points with set metrics. The company also took a hard look at its current position and established financial and competitive goals to gauge its growth. This change to a systematic method of managing innovation took about four years to develop and put into practice. It involved creating new departments and changing LEGO’s entire organizational structure. Now, expectations for each innovative project as well

as employee responsibilities are set at the beginning of a project. “Good innovation guidance is about giving people the space to create but also the direction to deliver,” Robertson said.

In most companies, employees do their jobs and don’t usually have a say in the “big picture.” Adhering to this status quo risks losing out on truly innovative, game-changing ideas from people who know the business best: employees. Simply asking for employees’ ideas, though, will not guarantee that truly novel, impactful ideas make it to the implementation stage. Organizing and running innovation contests are becoming more common at companies. The University of Pennsylvania Health System (UPHS), with guidance from **Christian Terwiesch**, Andrew M. Heller Professor of Operations and Information Management at the Wharton School, and **Patrick J. Brennan**, held such a contest and narrowed down thousands of ideas to five final submissions that were then implemented in much less time than would have been possible in the usual budget process. The two winning ideas, both of which are currently in the implementation process, were selected in a process that used both online and in-person feedback from employees and the UPHS board. Participation among employees surpassed Brennan’s and the board’s expectations and will further improve the patient experience at Penn Medicine.

In conclusion, admitting to mistakes and taking the time to learn from them will reward companies with deeper insights into their businesses and markets. Getting employees to talk about previous errors can foster innovative thinking in a way that successes cannot. Mistakes offer us new portals of discovery, and that is their unique value. Without mistakes, we can’t really learn well.

# Brilliant Mistakes:

## Learning from Serendipity

Paul J. H. Schoemaker

*Most people, as well as corporations, would rather forget their mistakes. Doing so, though, can lead to missed opportunities for innovation and creative problem solving, according to Paul J.H. Schoemaker, research director of the Mack Center for Technological Innovation, who spoke at the June 1, 2012, Mack Center conference. Viewing mistakes as “portals to innovation,” rather than black holes, can lead to deeper understanding. “We all accept that without mistakes, there is little personal learning. Yet on an organizational level, especially in companies that tout a ‘culture of excellence,’ mistakes are not examined. This avoidance or even denial of mistakes must be better managed at the enterprise level,” Schoemaker said. “Companies need to create cultures of learning rather than cultures of perfection in which mistakes are eschewed.”*

Although not all mistakes can be called brilliant, lessons can be learned from almost all mistakes. However, individually and at the corporate level, very few of us like discussing mistakes. “It’s unpleasant, whether you went through a divorce, filed for bankruptcy, or lost your job. But it is this tension—making a mistake and not wanting to review it—that must be managed,” Schoemaker said. A mistake becomes brilliant via the learning that occurs afterward or the strategy before the mistake that puts you in a position to obtain unexpected opportunities. “The moment you begin to view mistakes as portals of discovery, they become less onerous.”

An action or decision that does not turn out as expected or is flat-out “wrong,” but then leads to great success due to new learning can be considered a brilliant mistake. While mistakes can initially be painful, they often open up new vistas and may result in innovation and discovery. “You

start to see the world—or yourself—differently. For example, you get fired from a job unexpectedly and it prompts a lot of internal questioning. Or you enter a new market or a new technology, and initially, many things don’t work out well, but the learning benefits eventually make that ‘mistake’ more than compensate for its cost.”

### CREATING LEARNING OPPORTUNITIES

Most mistakes carry a low cost with a low benefit: you miss a flight and you learn about showing up on time. Brilliant mistakes, which involve some degree of chance, have a high benefit and a low cost. Examples include Thomas Edison trying 800 types of filaments before finding the one that worked, or Alexander Fleming’s discovery of penicillin in a petri dish he forgot to throw out. The case of Fleming illustrates the importance of keen observation and a prepared mind, one that is ready to see what is not expected. “The reason

that Fleming was able to notice an aberrant growth is precisely because he was an eccentric fellow. He practiced the principle of limited sloppiness in his laboratory, something that today would not be allowed under NIH funding. He followed a strategy of creating anomalies from which he might learn something very new.”

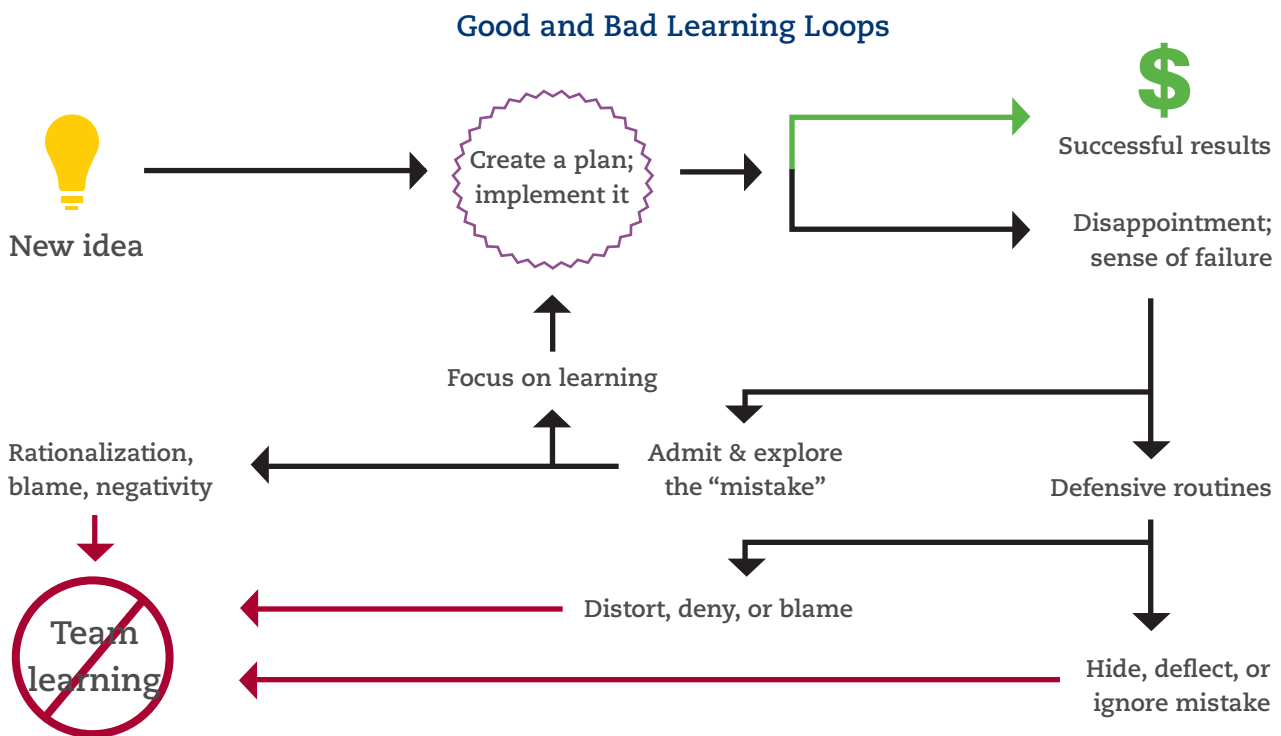
Translating this type of learning to the corporate environment is complex, Schoemaker admitted. “I think the arts world and the science world are very good at milking mistakes, either by creating them or making the best of them; business is not so good at this process.” So how can a business integrate failure as part of a success strategy? Businesses first need to understand what it takes for profound learning to occur; and then, they need to develop strategies that encourage the kind of learning that stimulates exceptional performance.

commit, or at least allow, mistakes? As a rule, most people are overconfident in their assumptions. “Most of us suffer from this bias. We see the world too narrowly, so by definition we are going to miss a lot of stuff,” Schoemaker said. Rather than waiting for the postmortem after an error, companies could accelerate the learning process by doing things against their better judgment. “Experiment outside of what would be reasonable—that is the difference between an option and a deliberate mistake,” he said. An option has a positive expected value, while a deliberate mistake has, by conventional standards, a negative expected value. The only reason to deliberately make a mistake is that you admit that your thinking may be wrong, but you don’t know exactly where or why. In essence, you place a bet on intuition, the kind of bet that cannot be analytically valued as an options play. There is some leap of faith involved.

**BEWARE OF CONFIRMATION BIAS**

When—and should—companies deliberately try to

The classic Wason experiment is a good illustration of why people often fall victim to the confirmation bias



and why falsification is such an important discovery principle. In the experiment, subjects are given a set of three numbers, such as 2, 4, 6, and then asked to guess the rule behind these numbers. They can do so by testing any three numbers of their choosing, say 8, 10, 12, and will be told whether or not this new triplet fits the rule. They can test as many new triplets as they wish until they are sure they have figured out the rule. What is interesting is that most people will only test triplets that confirm their thinking. So, if a subject believes the rule is “adjacent even numbers that increase,” they typically only test that kind. A better strategy is to *also* test numbers that violate your guess, such as 8, 10, 13. The correct rule behind the numbers is simple: any three ascending numbers. “Only 10% of people figure out the true rule because nearly all get stuck in their myopic hypothesis and they only test in a confirming manner.” As a result, they are only partly right and fail to see the entire truth, as in real life.

IBM’s founder, Tom Watson, is known for saying, “If you want to succeed faster, make more mistakes.” Don’t just test what you already think will work, as most people do in the Wason experiment. According to Schoemaker, Watson wants to encourage risk-taking because that is how people get beyond their bounded rationality. “By testing things that you don’t think will work, you expand your horizons. Of the approximately one million innovations introduced every year in the supermarket arena, for example, just about 1% survive beyond one year. So, you’ve got to play the numbers game of failing often, fast, and cheap (Procter & Gamble’s motto). Nature does this exquisitely via genetic mutations and then selection for the best.”

#### DARE TO BE DIFFERENT

Brilliant mistakes can also be viewed as hedges against conventional wisdom, Schoemaker said. “Suppose the wisdom of the crowd is wrong. Then it’s only those negatively correlated propositions that may get you out of it. That’s the role of innovators and entrepreneurs. They

challenge received wisdom. The question is how to adopt this type of thinking at the corporate level without getting into too much trouble. How can we create productive variance inside?”

While working with a consulting company, Schoemaker drew up a list of assumptions made by the management team. Each assumption was ranked by how certain the managers were that it was correct and also how important it was. Next, Schoemaker asked the managers to question some of these assumptions. He selected them by asking managers whether, if they knew that a particular assumption was wrong, they would change their behavior much? Digging deeper, Schoemaker guided the management team in examining their assumptions by ranking each one on five criteria: “Potential benefit of experiment relative to its cost is high,” “We make decisions repeatedly based on this assumption,” “The problems we now have to deal with are hard to solve analytically,” “Our experience base with this assumption is limited,” and “The external conditions surrounding our business have significantly changed.”

For example, a manager may question why his or her company has not, historically, hired a certain type of employee. “If you’re a large company, you certainly can hire one or two employees with different skill sets to see if it works. It’s a low-cost experiment.” On the other hand, if the problem is complex, then the chance you can optimize it is low anyway, Schoemaker said. In that case, experimenting, even to the point of making a deliberate mistake, could be a valuable strategy. “These counter-intuitive strategies can especially add much value when you face either high market uncertainty, high technological uncertainty, or both.”

This kind of approach gets at the heart of how companies learn. “We have a new idea, we create a plan, and if it’s great we all celebrate; if it doesn’t work, we’re



disappointed. And then leaders face a critical moment,” Schoemaker said. “Do they go into a defensive mode—hide, deflect, or ignore the mistake, or deny and blame? Or do they use the negative result to foster learning cultures that admit and explore the mistake, pointing the way to new learning instead of falling back onto rationalization and defense routines?”

#### GET EGG ON YOUR FACE—OR YOUR DESK

One company Schoemaker discussed created the Golden Egg Award at its monthly managers’ meetings. The president knew there were a lot of mistakes made, and he also knew they were hushed up. He saw these mistakes as company property, and thus, he felt employees and management had a responsibility to discuss them. So, with some gold spray paint and a plastic Easter egg, he created the Golden Egg Award. At each monthly meeting, a manager would be asked to discuss a mistake they had made and what they had learned from it. If they explained their mistake well, they were given the Golden Egg Award until the next meeting, when another manager would be selected. At first no one wanted to volunteer—the equivalent of having egg on your face. Over time, though, sharing mistakes (and receiving the Golden Egg) became one of the most popular activities during the monthly meetings.

“He effected a culture change with a spray-painted plastic egg. He steered his company from a performance culture, where perfection and not making mistakes (or being perceived as such) was the mindset, to a learning culture, where mistakes are deemed inevitable, crucial portals of discovery, and something that should be harvested.”

Going against the dominant mode of thinking—in other words, making a mistake—does not come easily to people or corporations. But, “to get to the truth faster, you have to accept mistakes,” Schoemaker said. Whether it’s Alexander Fleming’s method of “limited sloppiness” or

a premeditated hedge on a business decision, becoming less mistake averse can open up new vistas for business management and leadership.



#### Profile

**PAUL J. H. SCHOEMAKER**

Research Director, Mack Center for Technological Innovation; Adjunct Professor of Marketing, The Wharton School; and Chairman, Decision Strategies International

Dr. Schoemaker is an internationally renowned thought leader in the fields of decision making and strategy. He has written extensively on these subjects in theory as well as practice; the ISI citation index ranks him in the top 1% of scholars worldwide in business and economics. His latest book is *Brilliant Mistakes: Finding Success on the Far Side of Failure*. Dr. Schoemaker is research director of the Mack Center for Technological Innovation at Wharton, where he teaches strategy and decision making. He is also the founder and executive chairman of Decision Strategies International ([www.decisionstrat.com](http://www.decisionstrat.com)), which specializes in strategy consulting, leadership development, and associated product development.

#### Key Points

- Create a prepared mind in order to be favored by chance.
- Move toward a culture of learning, not just a culture of excellence and perfection.
- Understand that discussing mistakes—not ignoring them—leads to profound learning.
- Examine your basic assumptions to see if making a deliberate mistake is the right move.

# Managing the Cancer Treatment Centers of America Strategic Growth Plan

Stephen B. Bonner

*In the 1980s, cancer patients faced not only a devastating diagnosis but a harrowing journey through a gauntlet of tests, visits with numerous specialists, and constant haggling with insurance companies, all while undergoing chemotherapy treatments. Establishing a healing and nurturing environment for cancer patients was a bold idea when Richard J Stephenson founded the first Cancer Treatment Centers of America (CTCA) hospital in 1988. Unlike most other bold entrepreneurial ventures, CTCA has managed to flourish, with five hospitals now in operation throughout the United States. How? Stephen Bonner, the president and CEO, said that CTCA has developed a framework for strategic innovation by maintaining a strict focus on the cancer patient, admitting to and learning from mistakes, creating areas of excellence, and making decisions using “strategic filters.” CTCA has even turned down lucrative business options if their focus does not directly improve the care and medical treatments it offers to its patients.*

## WHAT’S THE BIG IDEA?

When the first CTCA hospital opened in 1988, the staff was committed to putting the patient first. Since then, prioritizing the patient remains central to every strategic decision, from selecting a new treatment regimen to designing patient rooms. CTCA continues to grow because it fosters a culture of innovation and continuous improvement. Over the years, the company has learned from failed business units. The culture at CTCA is never to hide a mistake but to be open about why such misaligned strategies did not succeed. Collaboration between and within each of CTCA’s five hospitals is encouraged and expected.

“From the beginning, we stepped back and asked fundamental questions,” said Bonner, CTCA’s CEO. “We

knew we needed to create a framework for good ideas to grow upon. It was this commitment to our culture—a culture of innovation—that has gotten us to where we are today.” From a staff of 30 in one hospital in 1988, CTCA has grown to more than 4,200 employees in five hospitals throughout the United States.

## LISTENING TO PATIENTS

“We began by focusing on a small, individualized market—patients with complex, advanced cancers and their families,” Bonner said. In 1988, offering a holistic approach to cancer care was not the accepted norm. “We started with 30 people, with no market share. We set out to surround each patient with robust alternative therapies: Reiki, exercise, Pilates, yoga, pet therapy, laughter therapy, nutrition; even the architecture

and landscape of the hospital were considered.” CTCA hospitals coordinate every aspect of care for each patient. It is not unusual for out-of-town patients to be met at the airport by a limousine. Their care begins with state-of-the-art diagnostics and continues through personalized treatment regimens. One of the newest diagnostic techniques offered through CTCA is chemosensitivity testing, which identifies which chemotherapy drugs will be most effective in an individual patient.

“The patient is the driving force at CTCA,” said Bonner. “It sounds simple and trite and not very differentiating, but when we started the doctors were the primary customers at hospitals, not the patients. Now everyone is reaching out to patients.”

The business model at CTCA is direct to consumer. “We intensely study the patient experience,” Bonner said. “Our treatment results are placed on our website, after they have been vetted by third parties. We led the industry in publicizing this kind of information. We believe in providing patients with quality information so they can make an informed decision, a fundamental difference from the days when doctors made all the decisions for patients.”

The CTCA CareEdge program guarantees patients will receive a complete evaluation in five days—a welcome breakthrough from the lengthy practice of having one test done at a time, stretched out over several weeks. At CTCA, patients receive most test results within the hour.

### Cancer Treatment Centers of America Strategic Components



CTCA clearly delineates strategic components, beginning with the patient as the driving force behind strategic objectives.

**KEEP IT SIMPLE**

Bonner credits CTCA's success to its culture of innovation and dedication to placing the patient first. Decision making is simplified by using the patient's best interests as a measuring stick. "We use the Mother Standard® of Care when making decisions regarding patient care. There are no committees; if you wouldn't treat your mother with a certain therapy, we don't use it. We think about the patient, not the bureaucracy." This clarity of purpose about what CTCA is and is not about yields an enabling capability for each employee to feel empowered to create and execute innovative solutions.

Keeping it simple also applies to CTCA's approach to strategic innovation. To receive approval, a new idea must be strategically aligned, balance risks and rewards, incorporate clear milestones and measurements, embrace reality, and allow for learning at crucial implementation steps. The company clearly delineates strategic components, beginning with the patient as the driving force behind strategic objectives.

To obtain those strategic objectives, CTCA keeps current on what its competitors are doing and how the market is changing, develops areas of excellence, and employs strategic filters in decision making. For example, the decision to select genomic therapy over proton therapy was reached after using its strategic filter. "There were still too many questions about it, so we have not adopted that regimen yet," Bonner said. Every stakeholder considers a new process or therapy through the lens of the strategic filter; if there are more negatives than positives, the idea is scrapped or delayed. With this methodology, the company learns the importance of both what to do and what to eliminate from its structure. For instance, for a while CTCA had operated a separate home infusion business, in which it made the infusions. However, because manufacturing medicine was not

strategically aligned with its fundamental mission of patient-centered cancer care, the company eventually closed that unit. It learned the same lesson from a brief trial of oncology clinic acquisitions. "The clinics were misaligned with our business model, as oncologists worked in closed networks where they got referrals, nor were these clinics targeted to patients with late-stage, complex cancers." The company learned from these mistakes by staying true to its original driving force—what's best for the patient.

**COMMUNICATE FOR CONTINUOUS IMPROVEMENT**

To maintain its culture of continuous improvement, CTCA uses an online network so an employee with an idea in Oklahoma can share it with the other hospitals in Philadelphia, Illinois, Arizona, and Georgia. The CTCA website posts the results and outcomes of its treatments, including life expectancies and quality of life for each type of cancer they treat. Not every hospital posts results and if they do, they can be reported inconsistently, making comparison difficult. CTCA uses an independent biostatistician to compare its results with a National

**Key Points**

- Focus your strategic decisions on improving services and results for your core consumers.
- Triage products, services, and processes to discard the worst and keep the best.
- Realize that even good ideas, if not aligned with your strategic focus, should not be implemented.
- Create robust communication networks for employees to share best practices.

Cancer Institution database of national survival rates. This transparency helps empower patients and connects to CTCA's driving force: putting the needs and wishes of the patients first.

#### CREATING A PATIENT-CENTRIC BUSINESS MODEL

Quality performance information for CTCA is available to patients, and cost information is quickly following. "How can a consumer make smart decisions and drive competition for better value if they don't know the cost of their care up front?" Bonner asked. "We provide information to empower patients to make key decisions about their care. They are abandoning closed networks of hospitals and doctors to find care they value."

"We still live in a fee-for-service world today," Bonner said. "We do serve Medicare patients and PPO members—in and out of network. But CareEdge is opening other segments to CTCA. It provides a swift, accurate diagnosis and a treatment plan at a guaranteed price at any CTCA facility; patients can take the treatment plan anywhere they choose to get their care."

"Value will drive the future of health care. We have a new national contract with CIGNA, who pioneered with us on quality payment incentives. If we do not deliver, we get paid less," said Bonner. "We are accountable for the care we deliver and for the reimbursement we receive. Value will be defined by the customer, which will lead the industry to a truly patient-centered system. Patient buying will force us all to provide better value across all aspects of our care. CTCA is one of the leaders of this shift."



#### Profile

**STEPHEN B. BONNER**

*President and Chief Executive Officer,  
Cancer Treatment Centers of America*

Stephen Bonner joined Cancer Treatment Centers of America (CTCA) in 1999 as president and chief executive officer and has served on its Board since 1996. A passionate advocate of patient-centric, quality-driven health care, he has championed the process of placing patients at the center of their own medical decisions by empowering them with comprehensive, unbiased information about their medical conditions. Mr. Bonner's commitment to unsurpassed patient care has recently earned him a place on *Modern Healthcare* magazine's prestigious list of the "100 Most Influential People in Healthcare." Prior to joining CTCA, Mr. Bonner was the executive vice president of Keyport Insurance Company.

# Creating and Sustaining an Innovation Culture at W.L. Gore & Associates

Jack Kramer

*Failure is part of the development process at W.L. Gore & Associates. Founded in 1958, the privately held company relies on four guiding principles to sustain its culture of innovation and accountability. These guiding principles are focused on fairness, freedom to learn and grow, waterline (a concept to manage decision making and risk), and self-commitment. With annual sales of \$3 billion, the company is apparently doing something right by learning from mistakes during the innovation process. Gore encourages experimentation and pushing the boundaries of innovation within its four product divisions. This approach means not every idea will be an immediate success, but the company has a long record of successfully developing products that didn't make it the first time around. Its team-based atmosphere has helped it to repeatedly appear on the "best places to work" lists in the United States, France, Germany, Italy, Sweden, and the United Kingdom. Its commitment to "fitness for use" is embedded in its culture. "We say 'no' to new projects if we don't think we can stand by the product. We believe that the product has to do what we say it is going to do or we won't sell it," said Jack Kramer, global technology leader and member of the Corporate Leadership Team at Gore. Above all, Gore believes in challenging and supporting its people, a premise that allows natural leadership to develop and flourish.*

## THE ART OF MISTAKES

Gore doesn't always hit the target on the first try. "When we develop a new material we typically don't get it or the first application right," Kramer said. "For instance, our industrial products division developed a new material for a pump diaphragm, but it never lived up to our full expectations. The product was later modified and improved to be used in chemical and biological warfare protective products in our fabrics division and was somewhat more successful. The real winner, however, was when we used it to rapidly solve a concern we had

with endo-leakage in aortic stent grafts in our medical division. We see this happen again and again. When we push the boundaries of our material capabilities and performance, they deliver."

Gore focuses much of its R&D budget on fluoropolymer-based products, which stem from another "brilliant mistake." Discovered by accident by Dr. Roy Plunkett in a DuPont laboratory in 1938, polytetrafluoroethylene (PTFE), the first fluoropolymer, was later used as the key material in Teflon. Today, fluoropolymers, nicknamed

the “super plastics,” are used in products for aviation, electronics, telecommunications, automobiles and trucks, pollution control, and security.

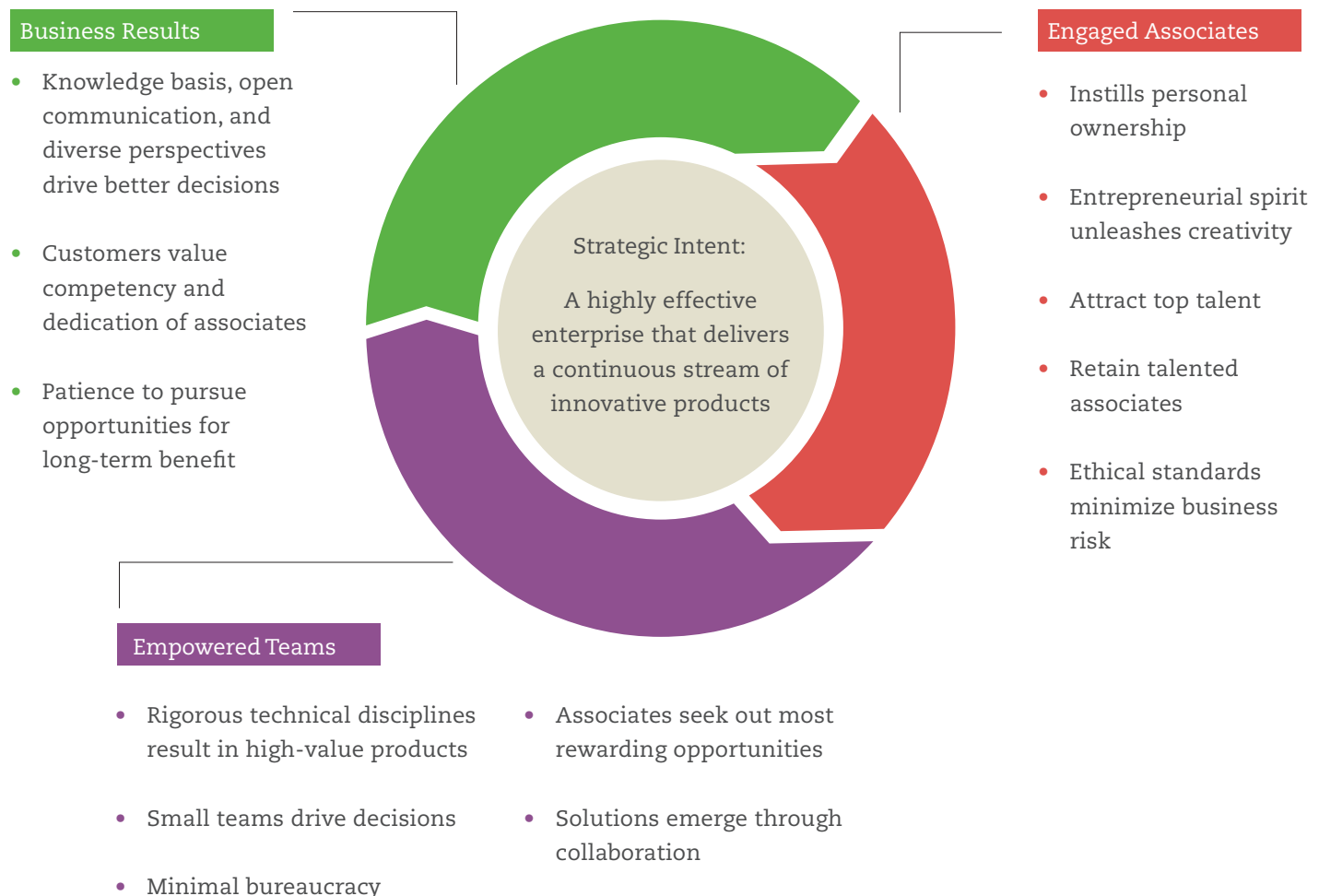
What started out as Gore’s initial product offering, computer cables, is now its smallest division. As Gore engineers discovered new applications for fluoropolymers, new divisions arose. While best known for its GORE-TEX fabric, its largest division is currently medical products. Besides fabrics and medical products, Gore’s other major divisions include electronic and industrial products.

**CULTURE: THE WARP AND WEFT OF THE COMPANY**

Gore credits its long history of innovation to its culture, which engenders trust, respect, and collaboration among associates. “Like every company, we face lots of external influences over which we have no control. Practices will come and go,” said Kramer. “Our strong cultural values and principles are what have sustained us. Innovation is considered critical to our success.”

Culture is not just window dressing at Gore. Founder Bill Gore believes that the objective of the company is to “make money and have fun doing it,” and, given Gore’s

**How Gore Leverages Its Culture to Drive Success**



repeated placement on numerous “best places to work” lists, the company is doing just that. A schematic of Gore’s beliefs, guiding principles, core values, key disciplines, and practices is placed in break rooms in the company’s facilities around the world. This “culture egg” serves as a visual reminder of Gore’s values for its associates (the word “employee” is not used at Gore). Belief in the individual, the power of small teams, taking the long-term view, and a sense that everyone is “in the same boat” are nestled at the heart of this culture diagram.

The company’s small teams form a flat, lattice organization with little hierarchy. All associates own part of the company, which is one of the 200 largest privately held U.S. companies. Because all associates have a real stake in the company, they are highly motivated to do their best. Teams form and re-form often as different opportunities and challenges arise. “Teams are critical to our success,” Kramer said. “And we strive to have minimal bureaucracy.”

“We use the term ‘waterline’ at Gore,” Kramer said, referring to the image of a ship. “It’s about risk-taking. We allow our associates to ‘drill as many holes above the waterline,’ in other words, to develop their own ideas for a new product, where there is little long-term risk to the company. But if you start drilling closer to the waterline, you should be consulting with someone so that you have the right group of people making that decision.”

This flat structure demands effectiveness through networking across the company; Gore has worked hard to avoid creating impenetrable silos. “Anyone can talk to anyone. There is no chain of command,” Kramer said. Associates know they can call anyone in the company. As a result, “You rarely get the response, ‘I’m too busy’ and you never hear, ‘It’s not my job.’”

#### FUNCTIONAL PROXIMITY, PASSIONATE CHAMPIONS

Another way Gore builds its community of collaborators

and innovators is placing all functions in the same location. For instance, sales and marketing as well as research and development are physically located at the same site as manufacturing. “We’ve created clusters of plants that are within 5 to 10 miles of each other so that teams in different businesses or different parts of the internal supply chain can have more face time together. Also, many times it allows our engineers to switch their focus from one business to another without having to relocate.” Worldwide, Gore has over 40 small plants with a goal of no more than 250 associates per plant. This structure allows for strong collaboration across functions, which gives each team a higher degree of autonomy and ownership.

“People do a better job when they are excited about what they are doing,” Kramer said. To create that excitement, Gore’s culture is based on a belief in the individual and the power of small teams. “People don’t need a command-and-control system. People are self-motivated. We hire good people and get them thinking about what creates value for the company.” Rather than stifling innovation, providing this kind of focus—creating value for the company—is what motivates Gore’s engineers to become “passionate champions” for the company. “Our culture is not just about being a great place to work,” Kramer said. “It’s about being highly effective at delivering a continuous stream of valuable new products.”

#### LEADERS DRIVE THE CULTURE

Innovation at Gore doesn’t just happen, Kramer admitted. “We find you have to allot time for innovation. All of the things that have made our company the most money have taken a decade or more to realize their potential. You cannot shortcut that by much; you have to be patient.”

The right organizational structure and focus is essential for driving innovation and organizational effectiveness simultaneously. Gore is just over 50 years old and hasn’t always been focused on innovation and organizational



effectiveness. “For a long time we thought we could live or die by innovation alone, but success also depends on organizational effectiveness and productivity. It took us many years to develop our ideas on how to embed organizational effectiveness in our entrepreneurial and innovative culture. We feel we are just now starting to fully implement them.”

Part of the organizational effectiveness is having the right leadership. “What kind of leadership you have determines how the company handles failures. Leaders drive the culture and need to set a consistent tone in good times and bad. It’s just as important how leaders deliver performance in Gore, not just what they deliver.” From its beginnings, founder Bill Gore wanted to create a different kind of work environment, one that would let natural leadership develop—a radical concept in 1958.

Valuing both organizational effectiveness and innovation can make achieving both a difficult task, but it is a polarity that Gore has learned to balance. “You don’t innovate individually in a box. You have to embed value for innovation broadly in the company. You need to hire the right people, educate them on what is truly important and valuable, and then empower them so that they can make the best decisions on where to focus their creative energy with a broad view and perspective.” The right focus and leadership help channel all the creativity into synergistic areas, which allows a company to build the critical mass of capability and opportunity necessary for successful, high-value innovation.



### Profile

**JACK KRAMER**

*Global Technology Leader,  
W. L. Gore & Associates*

Jack Kramer has been Gore’s global technology leader and a member of Gore’s three-person senior Corporate Leadership Team since 2005. As such, he is responsible for helping to develop and drive Gore’s business and technology strategy and assure Gore’s overall success. Prior to his current corporate roles, Mr. Kramer was involved in product and process development for Gore’s fabrics division and held numerous leadership positions there, including technology leader for the division. He has also been a member of Gore’s People and Intellectual Property Committee, which sets and oversees Gore’s HR and IP philosophy and practices.

### Key Points

- Innovation takes time and resources—be prepared to sometimes miss the mark on the first try.
- Encourage “pushing the envelope” and looking for new ways to use existing products, even ones that previously failed.
- Engage and empower employees so they feel motivated to do a great job. “All in the same boat” attitude engenders teamwork.
- Culture is key, and leadership drives culture.

# Perspectives from Pathology in Medicine

Patrick J. Brennan

*Hospitals are complex systems, and like any system they come with faults. Until the 1999 release of the Institute of Medicine (IOM) report, “To Err Is Human,” mistakes by doctors and hospitals were kept quiet. The report estimated that anywhere between 44,000 to 98,000 deaths in hospitals were due to errors. At the root of these errors were poor communication, a lack of teamwork, and a lack of focus on the patient. Since then, medical errors have received extensive media attention, leading to more transparency and stricter safety measures at hospitals. Despite these efforts, mistakes still occur. In no other profession is excellence so expected, and rightly so. The struggle to achieve zero defects is not an easy task. Studying “near misses”—mistakes that almost happened—while building strong patient-care teams, creating a culture where both patients and employees have stronger voices, and implementing system-wide process improvements are the steps Patrick J. Brennan, chief medical officer at the University of Pennsylvania Health System (UPHS), has implemented on his watch. “Safety-minded people are what make the difference in complex systems,” Brennan said. “Best practices have to be embedded within the organization through an iterative learning process.”*

## TO LEARN FROM MISTAKES, YOU NEED TO OWN THEM

Reducing errors in a large, complex health care system is no easy task and requires a system-wide approach to avoid constantly being in “damage control” mode. “Health care performed very poorly on the Six Sigma front,” said Brennan. “Many in the field refused to believe the 1999 IOM report. These data had been accumulating for decades, and there was debate about the actual number of deaths, whether it was maybe as low as 9,800 not 98,000—as if 9,800 unnecessary deaths is a ‘better’ number,” Brennan said. “Underlying the large number of mistakes was a lack of teamwork and an inability to listen to the patient.” Despite the publicity that the IOM

report generated and the subsequent efforts to reduce medical errors, Brennan noted, “the desired safety effect still had not been achieved. We still saw horrific mistakes such as a patient having the wrong leg amputated and a mismatched heart transplant.” Such mistakes resulted from process issues that were overlooked, Brennan said. These errors and others led to shorter work shifts for interns, however, this has caused problems of its own: “Shortening the hours that interns worked in one shift did not appear to have the return in safety that we had hoped for and is in fact creating new hazards because there are more and more handoffs of patients,” Brennan said. To address this unintended hazard, Brennan’s hospital

introduced standard operating procedures during shift changes that include face-to-face interactions with the shift personnel, mandated verbal read-backs, and use of a standard template. Interruptions during shift changes are limited to encourage active listening and ensure the focus of the interaction remains on the patient.

#### TO FIX SOMETHING, YOU NEED TO KNOW ABOUT IT

Creating a culture of safety is essential in the health care arena. Because narrowly averted mistakes can be just as instructive as actual, harmful errors, employees must feel safe reporting either type of incident. “We have to get rid of what I call the ‘no harm, no foul’ culture,” Brennan said. “By this I mean ignoring incidents in which the patient was not hurt but could have been gravely hurt. I call these the ‘near misses,’ and they need to be reported so we can do a root cause analysis.”

One such “near miss” occurred at Brennan’s hospital. A patient’s metal gurney was accidentally allowed into the magnetic resonance imaging (MRI) room. Staff were barely able to protect the patient as the magnet powered down, but they did. However, it was not reported through formal channels, which meant it was

not reported at all. This incident embodies the “no harm, no foul” culture that Brennan has spent his career at UPHS trying to eradicate. “This event led to significant changes,” Brennan said. “We created cold, warm, and hot zones as patients were moved toward the magnet.” At each stage patients are now checked repeatedly for any metal jewelry, implants, or pacemakers.

Reporting actual errors is also important. You can’t fix what you don’t know is broken. In another incident Brennan shared, a patient had the wrong lung punctured because of a misplaced “left” indicator on an x-ray film. “This event led us to begin a root cause analysis to find the holes in our radiology system,” Brennan said. “This is where we identified problems with our radiology information technology. It was a great system that let you focus on small areas, enhance the digital images but it allowed for a flipped x-ray film to be saved. We found that the emergency department team read the film but didn’t carefully read the report, which was correct. So the goalkeeper in this instance, the resident, turned out to be fallible and vulnerable. He admitted to misreading the film and failing to check both lungs with ultrasound before

## The University of Pennsylvania Health System’s New Approach to Safety

### Old Paradigm

- People are the cause
- Culture of silence
- Culture of blame—“Who?”
- Remediate hazards

### New Paradigm

- Systems are root cause
- Responsible reporting
- Nonpunitive culture—“Why?”
- Safe design

*The University of Pennsylvania Health System has shifted from the old paradigm, in which people are the cause of medical errors, to the new paradigm, which focuses on responsible reporting and a nonpunitive culture.*

doing the puncture. From then on we require ultrasounds of both sides of the chest before proceeding with needle procedures.”

Brennan views this incident as the turning point for the culture at UPHS. “Our old paradigm had been that people were at the root of mistakes, and our culture was one of silence and blame. Our new paradigm is to look at the system, to have responsible reporting, and to create a nonpunitive culture.”

#### CREATE “PSYCHOLOGICAL SAFETY”

For a patient-care team to be effective, anyone on the team needs to be able to challenge the diagnosis. But to do so, a sense of psychological safety has to be in place. This psychological safety net is required to achieve the high-reliability culture that is essential in the health care field, Brennan said. During the past 3 years, UPHS has created close to 50 unit-based clinical leadership teams. What makes these teams unique is that each includes a physician lead, which is rare in most hospitals. These teams have taught UPHS that the view of collaboration varies among the team members. For instance, early on, residents reported that the collaboration level was great—they gave orders and people did what they told them to do. At the same time, however, the nurses felt as if no one was talking to them. This finding was critical in building true teams, Brennan said.

“Our medical intensive care unit now has a motto, ‘If the nurse doesn’t know the plan, there is no plan,’” Brennan noted. When rounds are done in the intensive care unit, “the very first thing when arriving at the patient’s room is to find the primary nurse. The primary nurse is the one who starts the talking. He or she makes the report on the patient, and then the attending physician, residents, and interns chime in from there.” This approach recognizes the impact nurses have on patient

care and gives them more authority among the health care team.

#### TEAMS DON’T JUST HAPPEN

This intensive care model is being used to build optimal teams on other units throughout UPHS. “Teams don’t just naturally come together. It’s not an automatic consequence of putting people in the same room,” Brennan said. Teams aren’t about just following orders either.

UPHS has funded unit-based clinical leadership teams as a way to optimize teamwork at the patient-care level, Brennan said. What he has noticed about these and other teams is that very often, “somebody who knew the right thing to do didn’t want to talk to the right person because he or she did not feel psychologically safe in doing so.” By funding these leadership teams, UPHS is attempting to combat the roadblocks to effective teamwork in the health care arena. These roadblocks include the fact that medical team members change frequently and the heightened stress and time pressures of hospital settings. Furthermore, medicine is highly specialized and thus inherently non-team oriented.

Brennan shared the story of a young man who came to a New York emergency room with chest pains. Because the doctor felt the patient was too young to be experiencing a heart attack, he sent him home. Within two days the patient had a more severe heart attack and suffered significant muscle damage to his heart as a result. “The root cause in this type of judgment error is the anchoring bias, and in situations like this it is very important for the team of people surrounding the diagnostician to be willing to step up and challenge him or her.” A team member is only able to act in such a case within a culture that is psychologically safe, Brennan said. In one instance, an operating room nurse discovered that the wrong patient had been prepped. The nurse

spoke up and prevented what would have been a very serious mistake. “He followed all the process steps and caught this mistake—the patient’s name was correct but the birth date was wrong. There were two patients with the same name in the hospital, and the wrong one had been prepped,” Brennan said. The hospital gave this nurse a lot of attention for catching the error, not only to thank him but to build awareness of how important it is to follow procedures and to have the courage to speak up.

#### PROCESS IMPROVEMENTS

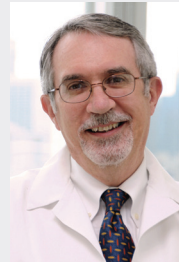
In addition to the physician-led or nurse-manager-led teams, UPHS has added specific communication tools. UPHS was the first hospital in the United States to implement an online incident reporting system in 2002. “We now get about 14,000 reports a year. Every report is read and while it is impossible to respond to each report, they are categorized, with the most important ones rising to the top. Those reports undergo a root cause analysis.” Of the 14,000 reports, Brennan estimates about 3 per day are from physicians, what he considers a significant number. “We see multiple reports on the same incident, which means we are creating a culture of safety.”

UPHS has also begun using a website, MedView, to augment information transfer at duty handoff. “Technology is not the solution to all of our problems, but it is a tool,” Brennan said. “When duty hours change, all patient information goes into MedView, but residents also do face-to-face handoffs. We get better transitions using both methods.”

Recognizing staff when they follow procedure and stop a mistake before it happens is another way to build a culture of psychological safety. Something as simple as read-backs has caught significant errors before they happen.

Underlying all of these reforms is a renewed focus on doing the best thing for the patient, Brennan noted.

“The focus historically has been on the operational side and on people and individual errors—the bad apples, so to speak. But our attention in the last decade has really turned to systems and the contributions that systems make to the issue of health care errors.”



#### Profile

**PATRICK J. BRENNAN**

*Chief Medical Officer and Senior Vice President, University of Pennsylvania Health System*

Dr. Patrick J. Brennan is an infectious diseases physician, professor of medicine, chief medical officer, and senior vice president for the University of Pennsylvania Health System. He leads patient safety and quality initiatives focusing on reducing health care-associated infections and unplanned readmissions and on improving medication safety. He also developed the Center for Evidence-Based Practice to apply scientific evidence to clinical operations. Dr. Brennan is a member of The Joint Commission’s Patient Safety Advisory Group, which develops national patient-safety goals to prevent unexpected occurrences involving death or serious physical injury.

#### Key Points

- Conduct root cause analyses on errors and “near misses” to find the holes in your system.
- Reward employees who stop errors before they happen.
- Build systems that include “psychological safety” for employees to speak up.
- Embed best practices throughout the organization.

# Learning from Innovation Tournaments

Christian Terwiesch and Patrick J. Brennan

*Just as American Idol can winnow down thousands of wannabe singers into one potential superstar, companies can use a tournament strategy to manage innovation and capitalize on new ideas. From January to May 2012, more than 1,700 ideas were submitted during an innovation tournament conducted at the University of Pennsylvania Health System (UPHS). With only a handful being selected for implementation, there were, by definition, failures. But the tournament process itself was a win for UPHS. All of the entries came from employees who were energized and enthusiastic about making a difference. Holding an innovation tournament isn't as simple as asking employees to email their ideas: the focus of the tournament needs to be identified, the structure defined, a marketing campaign rolled out, and a judging process established. Christian Terwiesch and Patrick J. Brennan shared the process of, and the lessons learned from, UPHS's innovation tournament when they spoke at the June 1, 2012, Mack Center conference.*

In most companies, getting a good idea into the works is usually out of reach for regular employees, be they technicians, lawyers, doctors, engineers, researchers, or members of the administrative staff. As in many large organizations, the budget is a top-down process. "It's really hard to get ideas upward bound in the organization from the rank-and-file," said Brennan, chief medical officer, UPHS. At UPHS, middle managers and higher are involved in the budget implementation process, so running a tournament adds new perspectives.

Uncovering the nascent talent within an organization does not have to be daunting. Terwiesch and coauthor Karl T. Ulrich wrote *Innovation Tournaments: Creating and Selecting Exceptional Opportunities* (Harvard Business

Press, Boston: 2009), which introduces a model for managing innovation and driving innovation throughout even large organizations. "We have done research on creativity/idea generation for many years. Around 2005, we were collaborating with Merck on improving innovation in their research labs. We were asked to help Merck think about which was the best method to manage the 'idea contestants' in the race for the next block-buster drug," Terwiesch said. "So we were thinking about the best way to think about the idea generation and selection process and we found that the *American Idol* methods were actually quite powerful. At the input, you have thousands and thousands of wannabe singers—or breakthrough drugs—and by applying a rigorous process, you come out at the other end with a star."

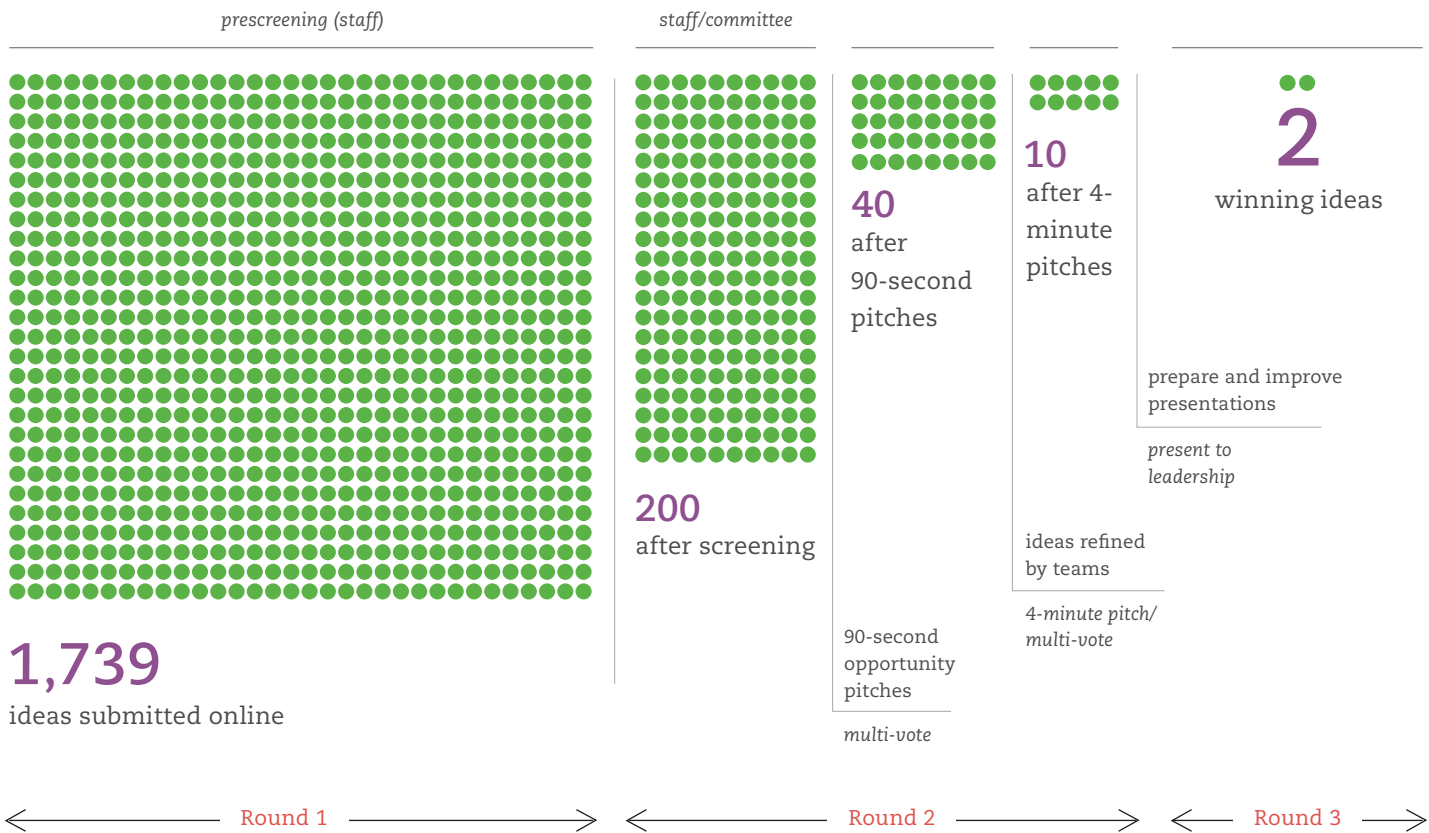
AMERICAN IDOL, MARCH MADNESS

“There was enormous participation in terms of submissions,” Terwiesch said of the UPHS tournament. “But there was even greater participation in terms of interest in the ideas and the rating of the ideas. We expected some 500 submissions, given the size of the organization. But we hit that number in the first couple of weeks; in fact, we had to cut off submissions at one point.” There were 1,739 ideas submitted altogether. Dubbed “Your Big Idea,” the tournament was launched in January 2012 and the winning ideas were announced in May 2012.

Focus

The first challenge was to define the focus of the tournament, said Brennan. At the beginning, all Brennan and other executives knew was that they wanted to involve the whole organization. If the focus of the tournament was too narrow, many employees would have been excluded. For instance, one early focus was improving hand washing by physicians and nurses, but this topic was deemed too narrow. “As we got narrower with our focus, we found we were getting underneath some of the processes and perhaps cutting out many groups of people within the organization,”

The Penn Medicine Innovation Tournament: What Happened



Brennan said. “At the end of the process, we decided that the issue that was really burning a hole in the organization at the moment, and one that everyone could wrap their minds around, was the patient experience. That became the focus of the tournament.”

Of the approximately 1,700 submissions, almost a quarter were suggestions for patient amenities; the next-highest category of ideas submitted was for technology optimization.

#### Structure and Execution

Once the focus was defined, the executives at UPHS decided to use a sports tournament structure, where ideas, rather than teams, would go through elimination rounds. Employees could go online and rate the ideas; Terwiesch explained that of the 1,739 ideas submitted, there were 66,000 ratings submitted via the tournament’s website. Even employees who did not submit ideas nevertheless participated by ranking the entries.

“We originally planned to keep the submissions open for 6 weeks, but we had to cut it short because we had more than we had expected and we began to see repetitive ideas, and repetition on top of repetition,” Brennan said. As ideas moved through the filters at the different stages of the tournament, they were modified, expanded, and developed further. “The submissions consisted of two- to four-sentence descriptions of an idea. Then the organization voted. On the Big Idea website there was a constant stream of ideas that were also being reviewed,” Brennan said.

In March 2012 (“March Madness”), ideas were prioritized through crowdsourcing and prescreened by a steering committee. This narrowed down the field to some 200 ideas. In the next step, the authors of those 200 ideas were invited to a workshop. There, they were given time to prepare and present short “opportunity pitches.”

These pitches went through a voting phase by the other workshop attendants, leading to ten ideas coming out of the workshops. These ten ideas were then presented to a panel of judges.

The panel included the CEO, the board chair, nurse managers, physicians, and other executives. Absent from the judging were financial considerations, Brennan said. At the end of the ten presentations, the executive team uploaded summaries of each presentation and all employees were able to vote online or using cell phones, similar to *American Idol*. As the votes came in, the judging team could see them in real time. The ballots from the executive team and the crowdsourced votes were considered in selecting the ultimate two winners: patient kiosks and online scheduler.

Interestingly, neither the highest-rated idea nor the two winning ideas were considered as very radical innovations. “While the ideas submitted were not as novel as we had hoped for, they were not without impact. The most significant impact was a cultural one,” Brennan said. “There was enormous interest and engagement. Approximately 10% of the workforce submitted ideas. And the pace of this process was extraordinary. What we saw in this process was an ability to move the organization quickly from a concept to an organizational phase and come out at the end with an idea that was implemented fairly quickly.”

#### EMPOWERING EMPLOYEES

Employees whose ideas were not ultimately selected as one of the final five were recruited into teams to work on the remaining ideas and help move them further on in the process, and management provided training for the teams. “This training will help develop the skills of people at a variety of levels of the organization in terms of selling their ideas and putting them in touch with others who will be able to help



them,” Brennan said. As Brennan sees it, an innovation tournament doesn’t have any losers. Even if a winning suggestion is not ultimately successful after implementation—and there are specific metrics to determine success—just getting employees involved is a win for the organization. “We wanted this tournament to be an egalitarian process, where we gave everyone an opportunity to submit an idea,” Brennan said. Knowing that management is listening to them can empower employees.

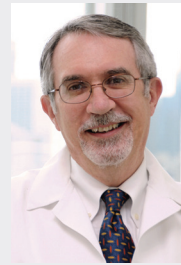


### Profile

#### CHRISTIAN TERWIESCH

*Andrew M. Heller Professor of Operations and Information Management, The Wharton School; Senior Fellow, Leonard Davis Institute for Health Economics at the University of Pennsylvania*

Christian Terwiesch’s research on Operations Management and on R&D and Innovation Management appears in many leading academic journals. Professor Terwiesch has researched with and consulted for various organizations, including a project on concurrent engineering for BMW, supply chain management for Intel and Medtronic, and product customization for Dell. Most of his current work relates to health care and innovation management. His latest book, *Innovation Tournaments*, was published in 2009. The novel, process-based approach to innovation outlined in the book was featured by *BusinessWeek*, the *Financial Times*, and the *Sloan Management Review*.



### Profile

#### PATRICK J. BRENNAN

*Chief Medical Officer and Senior Vice President, University of Pennsylvania Health System*

Dr. Patrick J. Brennan is an infectious diseases physician, professor of medicine, chief medical officer, and senior vice president for the University of Pennsylvania Health System. He leads patient safety and quality initiatives focusing on reducing health care-associated infections and unplanned readmissions and on improving medication safety. He also developed the Center for Evidence-Based Practice to apply scientific evidence to clinical operations. Dr. Brennan is a member of The Joint Commission’s Patient Safety Advisory Group, which develops national patient-safety goals to prevent unexpected occurrences involving death or serious physical injury.

### Key Points

- Innovation can be managed through a rigorous process, with a clearly defined focus, within any organization.
- An innovation tournament’s winning ideas are often not as novel as expected.
- Innovation tournaments can energize the culture of an organization.
- Employee participation and enthusiasm in an innovation tournament is a positive side effect.

# The Seven Deadly Truths of Innovation:

How the Accepted Wisdom on Innovation Management Almost Bankrupted LEGO

David Robertson

*Unless you know where you are going, even the best innovation strategies can leave you floundering. LEGO, the maker of the ubiquitous plastic building brick, nearly collapsed from doing innovation by the book. The story of how LEGO almost disintegrated and then rebuilt itself is the subject of Wharton professor David Robertson's forthcoming book, Brick by Brick: How LEGO Reinvented Its Innovation System and Conquered the Toy Industry. LEGO had embraced the seven truths of innovation—practicing disruptive innovation, finding blue ocean markets, walking in your customers' shoes, building an innovative culture, hiring diverse and creative people, using open innovation, and exploring the full spectrum of innovation—and nearly went bankrupt. What went wrong? These innovation strategies are only half the picture, Robertson said at the June 1, 2012, Mack Center conference. It is not enough to just innovate. Without proper management structures and a clear plan to guide creative and innovative projects, a company is rudderless in a vast and turbulent ocean. LEGO's story is a cautionary tale that yields lessons for managers in any field.*

LEGO was founded in 1932 by a struggling Danish carpenter who turned to toy making, so the company has been learning from mistakes from the beginning. After obtaining one of Denmark's first plastic injection molding machines in 1946 and patenting the plastic building brick in 1958, LEGO went on to see years of annual growth and success by any measure. The introduction of the minifigure in 1978 ushered in the "golden age" of LEGO; for the next 15 years, the company grew by 14% or 15% per year, doubling in size every 5 years, according to Robertson. Then things began to fall apart. Sales growth stopped in 1994.

In an effort to restart growth, LEGO tripled the number of new toys it introduced; but sales remained flat, profits declined, and LEGO experienced its first loss in 1998. One thousand employees were laid off. The CEO, Kjeld Kirk Kristiansen, who was also the grandson of the founder, stepped aside and brought in a turnaround expert named Poul Plougmann to run the company.

Plougmann saw that LEGO had become insular, complacent, and out-of-touch with its customers. By this time, video and online games were their biggest threat as kids moved online, leaving their LEGOs

behind at younger ages than previously. In addition, toy sellers like Walmart and Toys “R” Us had become much more sophisticated, and most toys were manufactured in China. LEGO, whose toys are manufactured in Denmark, took a hit as the Danish krone strengthened, causing their prices to rise. Finally, as a final insult to injury, LEGO’s patent on its plastic building brick expired.

**A FRENZY OF INNOVATION**

To combat these changes, the company instituted what Robertson called a “frenzy of innovation,” drawing on recommendations from business schools and consultancies.

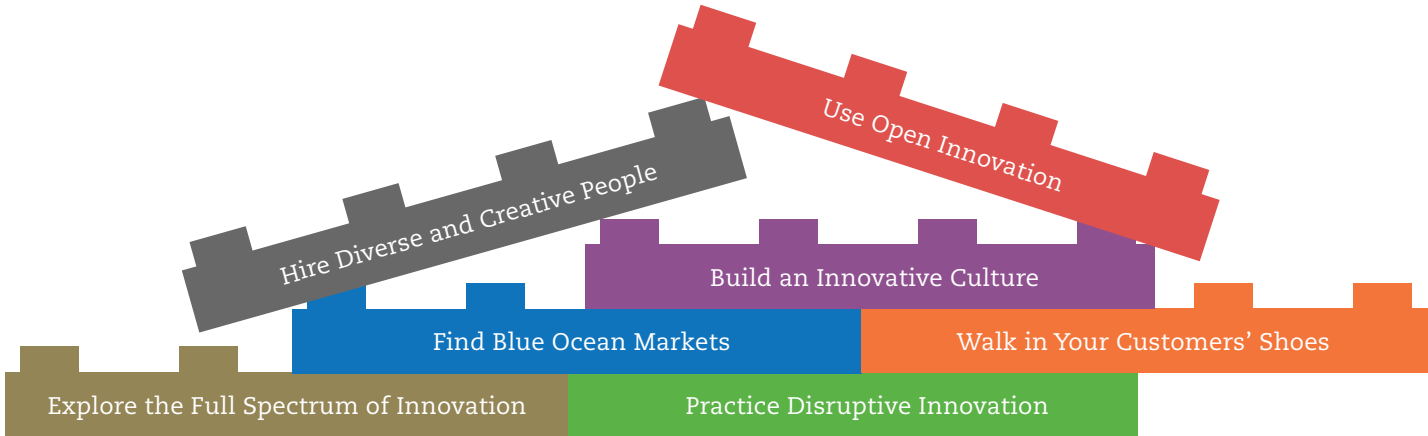
Not only did the company expand geographically, it entered new product areas such as plush toys and dolls. It opened retail stores, released electronic toys with associated movies and video games, and created an online experience. LEGOLAND theme

parks opened in the United States, United Kingdom, and Germany, and a design center was established in Italy to develop toys for very young children.

LEGO tried a blue ocean approach to innovation when it developed after-school learning centers. “This was a whole new area of innovation for the company,” Robertson said. “Together with a partner, LEGO created an after-school program to teach science, technology, math, and engineering.” While this innovation strategy did not work in the United States, it was successful in Korea and Japan, and it is still operating in Korea. Another blue ocean effort was opening a movie studio with Steven Spielberg that allowed builders to do stop-motion animation to create their own movies.

“To really understand their customers, LEGO commissioned surveys, and what they learned was that three-quarters of kids really don’t like building, so LEGO created the Jack Stone line,” Robertson said. “In

**The Seven Truths of Innovation**



Using multiple strategies to boost innovation will only get a company so far. As LEGO has shown, the other crucial piece is to provide focus and direction for innovation.

the full-spectrum innovation arena, LEGO created the Galidor line of electronic toys. LEGO partnered with an outside company to create a *Galidor* television show and video game. Children could watch the *Galidor* television show and have their toys act out parts of the episode. A whole story line was developed, which included books and cartoons, to create a total offering.” In the toddler market, LEGO replaced its successful DUPLO line with a new line of electronic toys under the Explore brand.

In short, LEGO became a very creative company. But a creative company is not necessarily a profitable company, Robertson pointed out. LEGO, after following all of the best advice about innovation, almost went bankrupt. “The problem was not that those seven truths of innovation didn’t work. The problem is that they did. But it was beyond what LEGO could control...they had lots of innovation, but not much profitable innovation.”

#### INNOVATION NEEDS FOCUS AND STRUCTURE

Applying every innovation strategy, among multiple product lines and departments throughout the company, caused LEGO to lose focus and direction, Robertson said. “All of those innovation strategies worked, but they worked too well. It was like strapping a jet engine onto a car: when they lit up the engines of innovation, the company became an unguided missile. If a company is going to accelerate innovation, it needs a different way to guide itself.”

LEGO has learned how to channel the creativity of its designers and other employees. “Good innovation guidance is about giving people the space to create but also the direction to deliver,” Robertson said. To focus its innovation efforts, LEGO installed disciplined processes, created new roles, and gave its teams new tools to focus and direct all its innovation efforts. It created new departments and changed its entire organizational

structure. With this new structure, employees are clear about who is responsible for every type of innovation, and what the expectations are for each type. “It’s not scattershot anymore,” Robertson said. “Before, I’d have described their culture as creative. Now it is a culture that is focused on profitable innovations. The company is much more disciplined.”

After its near-death in 2003, LEGO spent the next 4 years developing its new system for managing innovation. And it has paid off handsomely. “Since 2007, they’ve been growing sales by 24% per year, every year, for the past 4 years,” Robertson said. “And profits have grown at almost twice that rate.” By 2012, it had seen its best-ever financial performance.

#### KEEPING AN EYE ON THE HORIZON

Watching for the next disruptive technology that could impact its industry is another lesson LEGO learned during its near-collapse and turnaround. For example, in 2005 LEGO introduced a much-anticipated, user-centric product called LEGO Factory. Aimed to capture the attention and imaginations of online gaming fans, LEGO Factory combined an online community ([www.LEGOFactory.com](http://www.LEGOFactory.com)) and a downloadable 3-D design program so that users could design a LEGO product, share it with other community members, and have LEGO ship the pieces directly to them. The company saw this as a disruptive technology that would open up new channels. The problem? LEGO Factory was costly to maintain, and few designers actually wanted to physically build their creations—only about 1 in 200.

Now, however, affordable 3D printers are on LEGO’s horizon. With price tags now as low as \$500, these printers represent a potential threat to LEGO. Reminiscent of LEGO Factory, these printers could offer customers the ability to design and manufacture a plastic toy in their own homes without having to

wait for a delivery. Will the ability to design and build at home change customer behavior? That is the big question right now for LEGO management, Robertson said.

In summary, having a strategy (or two or three) to boost innovation is not enough to be successful. Before launching any innovation-boosting initiative, companies must identify where they want that initiative to take them and how they will control the effort to keep it on track. The company must have a clear vision for what a successful innovation will produce and have the personnel and resources to monitor and guide its execution.

### Key Points

- Managing innovation is a balancing act: you have to give your innovation teams the space to create and the direction to deliver.
- Much of the writing about innovation has focused on strategies for boosting innovation. As LEGO has shown, this is only half the story. A company that boosts innovation also has to provide focus and direction.
- To provide focus and direction, LEGO implemented new processes, roles, structures, departments, tools, and committees.
- If a company can balance creativity with structure and discipline, the rewards can be tremendous.



### Profile

**DAVID ROBERTSON**

*Professor of Practice,  
The Wharton School*

David Robertson teaches Innovation and Product Development in the Wharton School's undergraduate, MBA, and Executive Education programs. From 2002 to 2010, Robertson was the LEGO Professor of Innovation and Technology Management at Switzerland's Institute for Management Development (IMD). Prior to IMD, Professor Robertson was a postdoctoral research fellow at the MIT Computer Science and Artificial Intelligence Laboratory, a consultant at McKinsey & Company for five years, and an executive at four enterprise software companies. He has been published in the *Harvard Business Review* and *Sloan Management Review*, among other journals. His next book, *Brick by Brick: How LEGO Reinvented Its Innovation System and Conquered the Toy Industry*, will be published by Crown Business.



**ABOUT WILLIAM AND PHYLLIS MACK**

William L. Mack (W'61) is a former Vice Chair of the Board of Trustees of the University of Pennsylvania and now a Trustee Emeritus. He has served on the Wharton Board of Overseers since 1998 and is presently the Vice Chair; he has provided invaluable counsel as a member of the Undergraduate Board since 1989. He was Vice Chair of the Advisory Board of Wharton's Zell/Lurie Real Estate Center. Mr. Mack is the Founder and Chairman of AREA Property Partners, a major global real estate investment company. Mr. Mack is Chairman of the Board of Mack-Cali Realty Corporation, one of the nation's largest real estate investment trusts (REITs).

Mrs. Mack has served on Penn's Institute of Contemporary Art and has hosted many Wharton/Penn events.



**ABOUT THE WHARTON SCHOOL**

Founded in 1881 as the first collegiate business school, the Wharton School of the University of Pennsylvania is recognized globally for intellectual leadership and ongoing innovation across every major discipline of business education. With a broad global community and one of the most published business school faculties, Wharton creates ongoing economic and social value around the world. The School has 5,000 undergraduate, MBA, executive MBA, and doctoral students; more than 9,000 annual participants in executive education programs; and a powerful alumni network of 91,000 graduates.



William and Phyllis  
**MACK CENTER**  
for TECHNOLOGICAL INNOVATION

**ABOUT THE MACK CENTER**

Emerging technologies and technological innovation have the potential to create and transform industries, while simultaneously introducing new risks and uncertainty to established firms. The Mack Center for Technological Innovation, led by Co-directors George Day, Harbir Singh, and Nicolaj Siggelkow, is a Wharton research center that functions as a multidisciplinary learning network for business leaders, academic researchers, and students.

The Mack Center's research community studies how firms compete, survive, and succeed in the face of innovation. They share their findings and knowledge through publications, conferences, and workshops and by providing guidance to decision makers in technology-driven industries.

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