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Innovation through Co-creation:

Engaging Customers and Other Stakeholders

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Innovation through Co-creation: Engaging Customers and Other Stakeholders

Mack Center for Technological Innovation
The Wharton School, University of Pennsylvania
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CONFERENCE EXECUTIVE SUMMARY

"Co-creation strategies—once an occasional approach to product development—are rapidly becoming a necessity to build and maintain competitive advantage," said Harbir Singh, Co-director of the Mack Center for Technological Innovation, Mack Professor of Management, and Vice Dean of Global Initiatives at the Wharton School, during his opening remarks at the November 18, 2011, Mack Center conference, Innovation through Co-Creation: Engaging Customers and Other Stakeholders.

"At the Mack Center we study strategies and practices for improving the management of innovation, which leads us to ask such questions as: how do you choose an innovation strategy, how do you develop it, and where do you invest? We also look at innovation ecosystems and how firms work with multiple partners, customers, and suppliers to co-create innovations. An important issue is, how do firms develop mechanisms to appropriate value from innovation?" Singh added.

This conference featured presentations and discussions that focused on co-creation in the biopharmaceutical and IT arenas, the influence of stakeholders, and how the firm and customer co-create innovations.

From IT to pharmaceuticals, companies are engaging their customers in co-creation strategies that go beyond simple feedback surveys. As never before, firms are making customer and stakeholder input an integral part of their business models. Medical devices under development are showcased at academic medical centers while NASA invites anyone with access to the web to help them predict solar flares. The importance of engaging all stakeholders, not just shareholders, was illustrated through research by **Witold Henisz** of the Wharton School. He studied publicly traded mining companies, correlating the net present value (NPV) of the gold they had access to with the political and social environments in which they operated. He determined how much of the company's market capitalization was attributed to the political and environmental context in which a mining company operated and the support it had from stakeholders, and he found that these external factors accounted for *more than twice* as much of its market cap as the gold.

When a crisis does arise among a company's external stakeholders, **Alan Kelly** of Playmaker Systems, a consulting firm, has developed a lexicon for the "plays" companies can initiate. Kelly has developed 24 unique plays, which he defines as "a stratagem, irreducibly unique, employed by a person, organization, or surrogate to improve mutual or competitive advantage through methods and means of influence." Because all companies exist in a political and social landscape, whether they acknowledge it or not, learning the minute pieces of strategy plays in these environments is a necessary skill for success. According to **Scott Snyder** of Mobiquity, whatever the play, up-front discussions among the partners about how they will react to differing scenarios at different points in the co-creation process must be part of the equation. All parties must continually ask themselves if they have something that's worth bringing to the market.

In the context of rapid technological change, the current pharmaceutical business model is broken, said **Daniel Zweidler** of Daniel Zweidler & Associates.

Because patents are granted early, prior to commercialization, companies duplicate experiments to hedge their bets on technology, which can be a costly waste of resources. Zweidler recommends moving patenting to the later, proof-of-concept stage to avoid such duplication. Recently, pharmaceutical companies have begun sharing their databases with academic medical centers and other researchers. The Penn Center for Orphan Disease Research and Therapy uses a solution-driven form of co-creation. Research labs from around the world bring their ideas to the center to find a treatment or cure for one of the estimated 7,000 rare or "orphan" diseases. **Terry Fadem** of the Perelman School of Medicine said that the center encourages collaboration by allowing each party to retain its own share of IP rights. The center's only requirement is that a disease treatment reach the patient population within two years.

The U.S. government initiates similar public-private partnerships, according to **Tom Cellucci** of the U.S. Department of Homeland Security (DHS). The DHS oversees the approximate 25 million first responders through FEMA and is tasked with safeguarding the nation's critical infrastructure, 80% of which is privately owned. And **Kevin Werbach** of the Wharton School reminded attendees that the government's funding of billions of dollars in research each year is a form of co-creation. The America COMPETES Act empowers federal agencies to post co-creation challenges, leading to more than 130 challenges from 36 government agencies, all seeking private help and cooperation. Co-creation requires due diligence up front. Otherwise, conflicts can arise over what attorney **Tara Rachinsky** of Fox Rothschild calls "co-owned intellectual property," in which one or more parties can use the IP however they want without consulting their co-owners. Additionally, different legal systems around the world can make enforcing rights very difficult across borders.

In the IT arena, constant updates are the norm, and designing these updates with your customers via co-creation is the only way to stay ahead. The next release always has to "wow" your customers, **Scott Gnau** of Teradata Labs, told attendees. Gnau said unexpected extras can make a new release significantly powerful. "It turns out that these additions have become extremely important and critical for our long-term success at Teradata." **Alph Bingham**, co-founder of InnoCentive, helps companies such as NASA develop and post challenges. A challenge is a specific, detailed, and actionable description of a problem that needs a solution. They are posted to publicly available web sites and such crowdsourcing provides collective problem-solving that could not be accomplished at any company, no matter how large.

A continuous feedback loop of ideas is created through use of "engagement platforms" comprised of people, interfaces, processes, and artifacts that interact to create value-generating platforms, explained **Venkat Ramaswamy** of the Ross School of Business. "Co-creation is building value based on experiences through engagement platforms that expand ecosystems," he said. One example is the Nike Plus platform, an online forum that allows runners to log information on their mobile phones during runs and to share this information with other Nike Plus members.

The Power of Co-creation

Venkat Ramaswamy

Harnessing the creativity of customers and employees is the heart of co-creation. Professor Venkat Ramaswamy presented examples of four companies that built new engagement platforms that have transformed more than just their bottom lines. "Co-creation is much larger than just engagement. It's bringing together different ways in which people can contribute. It's about the human experience, and I believe it has the power to change our future by creating a better world environment around us, which is badly needed in these times," Ramaswamy said.

THE BUILDING BLOCKS OF CO-CREATION

Companies no longer simply push out their products and services to customers. Working in an ecosystem of stakeholders—customers, shareholders, and investors—co-creation invites ideas from customers on how and what products or services for a company to create. "Briefly, co-creation is creating value based on experiences through engagement platforms that expand ecosystems," Ramaswamy said.

An engagement platform comprises people, interfaces, processes, and artifacts, which then evolve into value-generating environments. The building blocks are dialogue, access, transparency, and reflexivity. Co-creation provides a continuous feedback loop of ideas that become part of the decision-making process of the enterprise. Only by becoming an integral part of a company with dedicated personnel and processes can an engagement platform continue to thrive and encourage innovation.

NIKE PLUS: PRODUCT AS PLATFORM

When is a shoe not just a shoe? When it's part of Nike Plus, an online platform that arose from the social network of runners. Via an armband sold for $25 by Nike, runners could log their runs, see how far they've run, check their heart rates, and see how many calories they've burned. The runners were already there, and Nike's employees came up with ways for runners to connect with their running experiences by creating a sensor that tracked these data. Allowing runners to share their runs with others via the Internet was the next step. Now runs could be mapped and stored. All data from each run could be shared live on the web. Friends could even cheer a runner on via Facebook. After partnering with Apple when the iPod and iPhone were introduced, the Nike Plus membership grew exponentially: from 600,000 to 3 million today. And the platform continues to evolve. "The value in this engagement platform flows back into the ecosystem and actually expands the ecosystem," Ramaswamy said. "There's a lot of innovation happening behind the scenes to make runners' experiences more compelling. It's important to always be paying attention to enhancing the quality of the engagement and dialogue in the ecosystem."

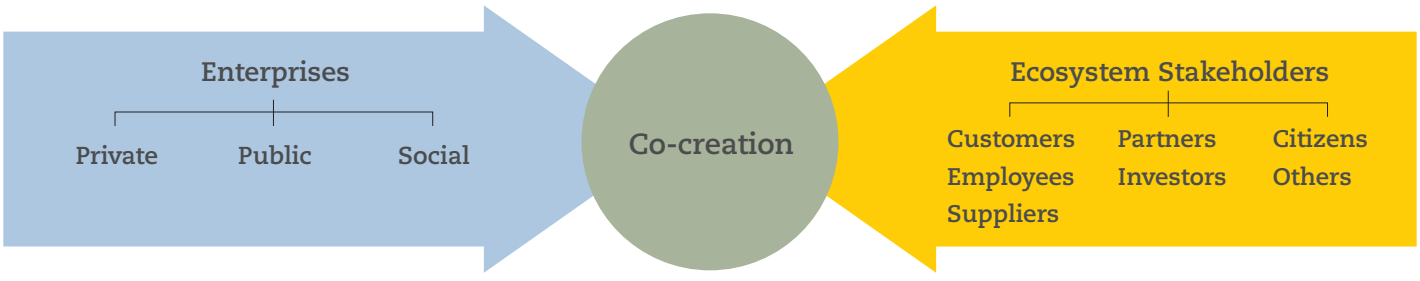
STARBUCKS: PLATFORM AS PRODUCT

In 2008, Howard Schultz returned as CEO to Starbucks and helped the company with its turnaround strategy. They were faced with competition on both ends of the economic scale: McDonald's was selling $1.99 lattes while local boutique coffee shops had the luxury of highly personalizing their customers' in-store experiences. So Starbucks, with its 8,500 stores, turned to the web and created MyStarbucksIdea.com. Anyone could log on and share their experiences or thoughts about Starbucks. "They could talk about product ideas, the experience of ordering, payment, picking up their coffee, the design of the store. Every month, two Starbucks employees work on a couple of initiatives and if they are feasible, they work through them and let the customer know the progress. They are engaging with their customers collectively." They also share enterprise experiences even if the idea doesn't work perfectly, such as when the company tried to reduce electricity consumption by 25%. "They only managed to reduce it by 1.6%, but as they continued to work on reducing it the company shared this limited progress with the community and invited ideas to achieve its goal," Ramaswamy said.

LOCAL MOTORS: DESIGN, BUILD, AND DRIVE

Want to design and build your own car? For a segment of car lovers, this prospect is simply irresistible. By joining the Local Motors online community you can submit design ideas for review, help with ongoing concept cars, or submit your design as part of a competition. Anyone can join the community, and all members get to vote on which designs they like and decide which ones should go into production. Each region has its own favorites. In the United States, the Green Apple is popular in Manhattan, while in the Carolinas, the LM Extreme takes top honors. "All designs are protected with a creative common license to promote collaboration, but protect design ownership," Ramaswamy said. Building the car through design crowdsourcing and experience personalization is one of the most fascinating examples of co-creation he has seen. "Local Motors opens a micro factory, which creates permanent local jobs; for instance, in Phoenix, they opened a factory to build the Rally Fighter." Once the factory is built, the designers/owners come and build their car. Staff from Local Motors is there to assist, and cars are built over two three-day weekends. You can modify the exterior of the car any way you like and build and sell accessories. All the specs are available online. "Local Motors is also open source in action through co-creation," Ramaswamy said. It utilizes crowd source competition for designs, and its first competition winner, Sangho Kim, who designed the Rally Fighter, had his car featured on *Top Gear*.

Co-creation is Emerging as the Next Paradigm of Value Creation



Various types of institutional enterprises and ecosystem stakeholders create value together through co-creation.
Artwork adapted from Venkat Ramaswamy and Kerimcan Ozcan, *The Co-Creation Paradigm* (Stanford University Press, forthcoming).

ORANGE: CALLING FOR IDEAS

A public-sector company is not the usual place one would search for innovations such as co-creation. But the French telecom company Orange wanted to engage its employees, and has transformed itself with IdClic, a web site where employees are invited to share their ideas. Of its 88,000 employees, almost half have submitted ideas over a five-year period. But the ideas don't just go into a black hole. "What's hard to see is what's happening behind the scenes, which is the process for actually managing the ideas," Ramaswamy said. "They have an incredible flow of ideas." Once in the IdClic system, employees' contributions are sorted by local or national level and a corporate team reviews and rates each idea: if it is realistic and doable, it will move to the pilot stage. "Of the 100,000 ideas generated over five years, Orange has implemented 10,000 of them and netted €900 million [euros] in savings and earnings, so this kind of co-creation can happen in a large bureaucratic organization," Ramaswamy said. The flow of ideas begins with intracompany blogs where other employees react to, comment on, or expand on submitted ideas. Orange developed a network of 5,000 experts from all levels of the organization; it is the experts who build on the ideas, but they work with other experts. Anyone in the company can become an expert. One of the most important aspects of IdClic is that the employee with an idea retains ownership of his or her idea all the way through to implementation, with help from other employees from throughout the company. "Ensuring that the employee participates all the way through to deployment is a very important principle. There's complete transparency." The company uses a dashboard system so employees can track their ideas, just like you check the status of your FedEx delivery.

In summary, these examples of co-creation at existing companies, a startup, and a public-private firm show the power inherent in collaborating with your customers and other stakeholders. Technology is the tool that has helped build many of these engagement platforms, but the real power is the collective intelligence generated from both customers and employees and in building the structures and processes necessary to keep the engagements flowing.

Key Points

- Co-creation places the enterprise in a larger ecosystem in which customers are actively engaged.
- Ideas generated via co-creation become an integral part of a company's decision-making process.
- Human experiences are the foundation of co-creation.
- People want to be engaged in meaningful, creative, and transformative ways.

Profile

VENKAT RAMASWAMY
Professor of Marketing and Computer and Information Systems, University of Michigan

Venkat Ramaswamy is a Hallman Fellow of Electronic Business and Professor of Marketing at the Ross School of Business at the University of Michigan. He has authored numerous articles in top-tier journals. His award-winning 2004 book with C. K. Prahalad, *The Future of Competition*, introduced co-creation as a revolutionary business concept. His latest 2010 book is *The Power of Co-Creation*, with Francis Gouillart. His new forthcoming 2014 book is *The Co-Creation Paradigm*, with Kerimcan Ozcan. He helps organizations conceive and execute new business ideas through co-creation and build management capabilities for co-creation inside organizations.

Co-creating for Influence and Competitive Advantage

Witold J. Henisz and Alan Kelly

Your company's influence reaches far beyond your customers and shareholders, yet few companies are making an effort to understand the impact of "influence strategies" with external stakeholders—local communities, nongovernmental organizations (NGOs), government officials, nonprofits. Building your capacity for such "corporate diplomacy" is a co-creation technique that delivers value to your shareholders while at the same time creating shared value for stakeholders.

Combining "corporate diplomacy" with the discipline of influence strategy—designing distinct stratagems to influence key opinion leaders, competitors, or anyone else in your ecosystem—is another facet of co-creation, and together they offer positive synergies. Witold Henisz and Alan Kelly shared their co-creation strategies with conference attendees at the November 18, 2011, Mack Center conference, Innovation through Co-creation: Engaging Customers and Other Stakeholders. "A lot of complementarities exist in our research approaches and our practical engagements," Professor Henisz said. "The combination of our two approaches offers unique value for companies."

CORPORATE DIPLOMACY AND DUE DILIGENCE: COMPETITIVE ADVANTAGE

Corporate diplomacy is the balance of art and skills used to influence external stakeholders to advance your business. In today's globally connected and volatile sociopolitical environment, proactively engaging with community leaders, environmental groups, NGOs, government officials—any organization that has a political, social, or economic stake in the outcome of what you are doing—is a necessity, Henisz said. For example, in his research on 19 publicly traded mining companies, Henisz looked at the net present value (NPV) of their gold reserves as well as data on the political regime in the countries in which they operated and the extent of support the companies had from their stakeholders. "We looked at country-level characteristics but, more importantly, we also analyzed how individual stakeholders—NGOs, community leaders, and government leaders—perceived the mine." Using this data, Henisz calculated how much of the market capitalization could be explained by either the NPV of the gold or these political characteristics. The result? Variation in the political and social environment in which a mining company operates and the support it has from stakeholders in that environment together explain *twice* as much of the variation in market capitalization as variation in the net present value of gold.

How do relationships become more valuable than gold? "Think about the costs we're not usually paying attention to," Henisz said. "Where are our abilities to manage corporate diplomacy and influence strategies really driving value? If we don't maintain the support of our external stakeholders, we lose the ability to build future business. We might not get the rights to the next mine, or we might not get the trust of the customers in our next product launch." If you don't make paying attention to your external stakeholders part of your strategic plan, the result is that your executives and staff end up spending more time handling crises and less time running the business. "Overlooking staff time to deal with problems becomes very costly," Henisz said. Most companies expect their C-suite to spend no more than 15% of their time on political and social issues and the rest of their time on core business issues. In reality, these top managers report spending up to 35% of their time *on a good day* navigating political and social issues. When a crisis develops, that percentage jumps to almost 90%. As Henisz points out, companies need to start factoring in the costs and benefits of working with NGOs, local community organizations, and government officials in their overall financial calculations; if not, the cost of NOT working with these stakeholders becomes prohibitive in both dollars and time.

"Some of the key elements of corporate diplomacy are *due diligence*—knowing who's out there, what they want—and then *integrating* that information into your strategic planning systems. You need to do so in a *process* that engages the stakeholders and wins their trust," said Henisz.

Understanding the links between your external stakeholders and their local communities, their provincial governments, your competitors, NGOs, and other business enterprises can identify influence gaps. In one example, Henisz saw that very few mining companies had links to local farmers and environmental groups. "There was a huge chasm between the company and the people who really mattered if that mine was going to go forward or not—the farmers and the environmental groups." Seeing this gap is only the beginning. The mining company also has to decide how to close the gap and what is the most cost-effective way to do so.

Using a tool developed by the International Finance Corporation and Deloitte, Henisz is working on ways to take basic project finance evaluation methodology and extend it to calculating the costs and benefits of different sustainability initiatives. "We can turn measuring these intangible assets into more of a science. We can use data

Corporate DIPLOMacy: From Insight to Action

Due Diligence	— Identify key stakeholders, their interests, strengths, linkages, and behavioral drivers
Integration	— Comparative strategic analysis and planning
Process	— Enhancing understanding, fairness, clarity, and ability to resolve disputes
Learning	— Feedback from political, social, environmental impact to engineering, financial, and legal plan
Openness	— Convey infomation so as to reinforce trust and reputation and to ensure compliance, accountability, and progress
Mindset	— Externally facing, long-term mindset

to see how much it would cost to hire more local workers instead of bringing them in from the cities, for instance. Many times they may be less literate and may need more training." The benefits gained by sustainable practices also need to be factored into the equation. "In the example of hiring more local workers, we'll see reduced staff time dealing with problems, reduced delays and disruptions. We've seen that the ROI on sustainability investments is massive, as much as 75% or in some projects as high as 10 times the costs."

Such methods are already used by NGOs, intergovernmental agencies, and the military. The World Bank is analyzing models of coalition politics to identify the key stakeholders who are currently opposed to a fiscal reform program in Africa, Henisz said. This process allows the officials to consider the possible outcomes to different structures of the reforms. Evaluating which outcomes will benefit key stakeholders could in turn lead to majority support.

Most importantly, corporate diplomacy stresses that sustainability efforts and political and social engagements are a critical element of global strategy rather than a philanthropic tack on or afterthought. "The key is to integrate this process into your strategic decision making, to help you decide where to invest, whom to hire, how to operate," Henisz said.

INFLUENCE: PLAYMAKER SYSTEMS

Exactly *how* to influence your varied stakeholders is the focus of Alan Kelly's business as an influence strategist. Making the right play doesn't happen by chance. Responses to the very public crises faced by General Motors, British Petroleum, and even Tiger Woods have been carefully planned and executed. "But do we really know what to call these things?" Kelly asked. "We do not have a standard way of communicating about them, but we are approaching the point where we are just beginning to create a common language."

"Given the importance of how value creation is so reliant on intangible assets, I believe we need to start having systems and frameworks in place so we can rationally judge and practice the process of influencing and creating value," Kelly said. "This is social science, but there's no excuse anymore for being afraid of the gray edges of this discipline."

As described by Kelly, an influence play is a "stratagem, irreducibly unique, employed by a person, organization, or surrogate to improve mutual or competitive advantage through methods and means of influence." The scaffold Kelly uses when deciding on the correct influence strategy is to first assess (through testing), then condition (divert, frame, or freeze) and lastly engage (press, preempt, or provoke). He has developed 24 unique "plays" that a client can enact when either responding to a crisis or preemptively avoiding a clash. These plays are the building blocks, the atoms, of every annual report, earnings statement, news release, newsletter, grassroots campaign, product launch, special promotion, advertisement, position paper, protest, blog, or tweet, according to Kelly. People have been using these strategies without calling them by any particular names. Kelly has given them monikers such as "Ping," "Jam," "Filter," and "Red Herring." Plays can be used to simulate outcomes through war games; mapped to reveal patterns, trends, tendencies, and sequences; and anticipated to reveal counter moves, likelihoods, options, and consequences.

As an example of how plays are used, Kelly gave several hypothetical examples. What if an imam suggests that he agrees with the French government's burka ban? Kelly would call the imam's action a "Ping" and suggests that the French officials would "run a Pause" and say and do nothing in response so that local Muslims do not think of the imam as the "Proxy" of the government.

In another example, Kelly mentioned a consumer products company using an influence strategy war game to

simulate and "stress test" possible messages and outcomes. "In this case, they found a problem with an NGO. They talked to members of the NGO and found a way to adjust their product launch in a way that they believed met the NGO's objectives. When they reran the war game, the launch was successful."

In his consultancy work, Kelly has observed a generational component to how well clients respond to his workshops and seminars. "The younger managers react well to this kind of language and systematization. The veteran sales and marketing people take a bit more time but they eventually realize they're running plays."

All companies are involved in some sort of political situation whether they acknowledge it or not. Thus, adapting a corporate diplomacy strategy and then learning the intricate plays needed to operate successfully in such an arena needs to be embedded into the strategic organization of the enterprise, alongside engineering, research and development, and marketing.

Key Points

- Maintaining the support of your external stakeholders protects your future business.
- Every business operates in a political and social arena that needs to be managed just like internal departments.
- Costs and benefits of engaging with external stakeholders can be calculated.
- The ROI on sustainability investments have been shown to be as high as 10 times the costs.
- Corporate standards and common operating languages are needed to manage intangible assets.

Profile

WITOLD J. HENISZ
Deloitte & Touche Professor of Management, The Wharton School

Witold J. Henisz is the Deloitte & Touche Professor of Management at the Wharton School, the University of Pennsylvania. His research examines the impact of political hazards on international investment strategy including efforts by multinational corporations to engage in corporate diplomacy to win the hearts and minds of external stakeholders. He synthesizes corporate best practices in this domain in his current book project, *Corporate Diplomacy: Engaging Global Stakeholders*. He serves as a consultant for multinational corporations as well as government agencies through his risk management consultancy, PRIMA LLC.

Profile

ALAN KELLY
Founder and CEO, Playmaker Systems, LLC

Alan Kelly is a visionary strategist, author, professor, political analyst, and award-winning Silicon Valley entrepreneur. Today he is the Founder and CEO of Playmaker Systems, LLC, a Washington, D.C., area management consulting firm that specializes in competitive strategy and whose services and products are based on a breakthrough decision system for influence professionals. The firm's clients and partners include Abbott, Booz Allen Hamilton, Dell, HP, Intel, Royal Dutch Shell, SAP, the U.S. Department of Defense, and VMware.

Co-creation Capacity: Integrating Academic-Industrial Resources

Terry J. Fadem

Never underestimate the power of collaboration. Even bacteria collaborate by massing together to complete tasks that a single organism alone could not achieve. At the other end of the microscope, the ways in which pharmaceutical and bioscience companies collaborate and co-create are evolving as the old model of internal R&D is disintegrating, giving way to more partnerships, sharing of assets, and an overall focus on customer solutions, according to Terry Fadem, Managing Director, Office of Corporate Research, Perelman School of Medicine at the University of Pennsylvania. "Everyone thought the idea of bacteria talking to each other was nonsense—until it was proven. At one level, what the bacteria are doing is what co-creation is all about. They make strong connections. Academia sends out signals by competing for grants, amassing the funds and the staff necessary to answer a research question, and getting to work," he said. Fadem discussed three dominant co-creation models in the bioscience/pharmaceutical arena: the solution-driven model, the time-share model, and the stealth model. Whatever co-creation model a company develops, the key to success, Fadem said, is perseverance.

QUORUM SENSING: WHO ARE YOUR PARTNERS?

"Many people in the industry know who is competing for which grants," Fadem said. This process leads to a phenomenon Fadem calls a "run on the idea bank." For instance, if an Alzheimer's researcher has a new theory, it's not uncommon for every single major pharmaceutical company to pay a visit to the researcher, even though they know all their competitors are knocking at his or her door as well. "I've seen this happen in cardiovascular disease and in pulmonary medicine every couple of years. There's tremendous value in a run on the idea bank to make it worthwhile, or companies wouldn't be doing it," Fadem said. Just as the theory of quorum sensing suggests that bacteria communicate by signaling to other organisms, figure out who is signaling ideas, and start partnerships with them. "Co-creation is not about controlling," Fadem said. "It's about making connections. One of the key problems I see every day in this industry—companies that think they are co-creating when they are controlling." A certain level of trust must exist between partners before co-creation can happen in this industry. And it is happening.

Of the thousands of clinical trials Fadem has seen through his role at Penn's medical school, he suggested that "about 80% of them just want answers, about 15% of them have really good questions but just want answers. And about 5% of them keep asking questions, and they are ones that

get things done." The importance of asking questions cannot be stressed enough, Fadem said. "Everyone wants answers, but you have to start with the questions."

Putting questioners together is part of what Fadem does. "I get to see a lot of start-up companies. One start-up CEO came to me and started describing what he couldn't do—not enough resources, engineers, and so on. My response to him was that you have access to all the resources in the world. Go out and find whoever can do what you need to deliver that value. This is the new form of the biotech company, one that doesn't need to own anything," he said.

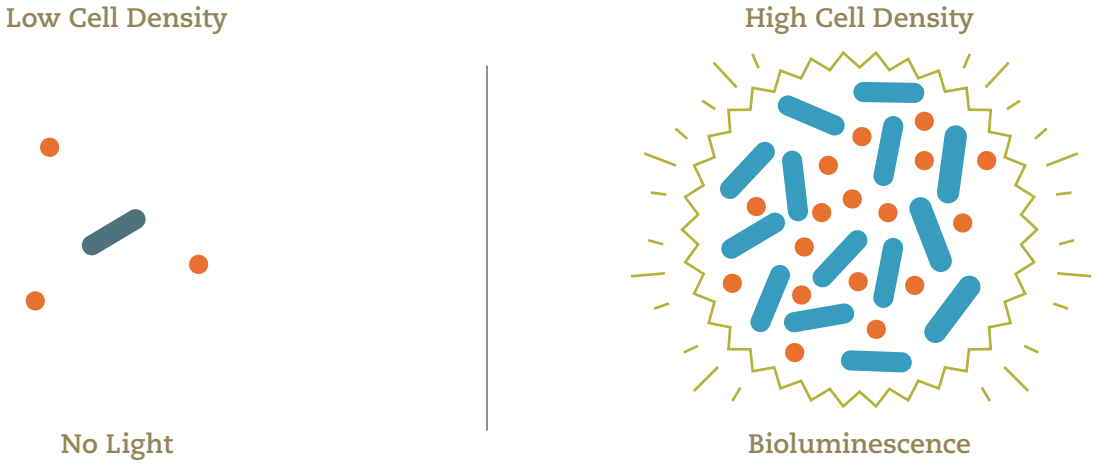
Ashish Chatterjee, Managing Director of Connect+Develop at Procter & Gamble (P&G) and an attendee at the lecture, shared his knowledge about this P&G program, one of the earliest iterations of the partnerships that Mr. Fadem had mentioned. "Over the 10 years of this program, we have learned that partnerships come in all shapes and sizes. We got into the open innovation space because our own 'idea stockroom' was running low," he said. When P&G analyzes each potential partnership, "we ask ourselves where is the value in this partnership? It's a one-by-one process."

THE CONFLICT-OF-INTEREST CONFLICT

Unique to the medical marketplace is the perception of bias that comes from a conflict of interest, Fadem said. This issue is the one underpinning problem that must be addressed.

Some people believe there is too much interaction between academia and industry; and the more academic researchers are paid by industry to conduct clinical trials, the easier it will be for them to introduce pro-industry bias into the marketplace. The conundrum is: who else does industry want running their trials—inexperienced medical school graduates? The University of Pennsylvania's School of Medicine is reviewing the effects of industry and academic ties. "The data so far show us that the faculty who work with industry are some of our most productive members," Fadem said.

Quorum Sensing in Bacteria: An Example of the Power of Collaboration



Molecular biologist Bonnie Bassler found that bacteria communicate with each other using a chemical language to carry out tasks that they could never accomplish as individuals. This is the case in Vibrio fischeri, *a type of bacteria that uses bioluminescence—producing and emitting light—when a certain number of them are present. Fadem suggests that what these bacteria do represents what co-creation is all about: making connections and collaborating to achieve what you may not be able to achieve on your own.*

SOLUTION-DRIVEN FOCUS

The Penn Center for Orphan Disease Research and Theraphy is an example of a solution-driven model of co-creation. Currently there are 7,000 identified rare diseases, also called "orphan diseases" because not enough patients have the disease for it to be economical for large pharmaceutical companies to develop treatments. But for a patient or the family of a patient with one of these diseases, economics doesn't really matter. Finding a cure or a treatment does. What's different about Penn's Orphan Disease Center, according to Fadem, is "we don't care about owning or licensing intellectual property (IP). We care about the solution. Our one criterion is that the solution has to be in the patient population within two years." Ideas are welcomed from any lab anywhere in the world. The Center uses its philanthropic funding toward two-year grants. "We can take an idea from one lab and another idea from somewhere else, and put them together and maybe we'll have a solution. Everyone is happy because they get to keep their IP."

Another solution-driven model can be found in a pharmaceutical marketing project. To tackle the problem of patients not taking the medicines their doctors prescribe for them, Merck partnered with the startup RxText. The startup had access to Merck's customer vaccine database to conduct a study. They only had access to the data they needed for the one study they were asked to conduct. "This is a financial problem for companies that have products for which our physicians write prescriptions that people don't fill. Only 25% to 50% of people prescribed a medicine actually get the prescription filled. Merck is investing a lot of time, money, and effort into solving this problem. There are a lot of stakeholders involved in this solution-driven project."

KNOWLEDGE SHARING: THE TIME-SHARE MODEL

The old model of drug development relied on large, legacy pharmaceutical companies keeping their research data in-house. This information was—and still is—their most valuable asset. But more than 90% of their experiments result in failure—the tested compound did not have the desired impact on a disease or its toxicities were too high. "As an academic, I don't see these failures as negative information. It tells us what doesn't work, so we've learned something." But because companies' databases were kept in-house, this information was not shared. As a result, an estimated $7 billion is spent annually by *other* companies basically repeating the same experiments with similar compounds and coming up with similar results. "The entire system is inefficient; I don't know how to fix it but I do see companies trying out new models, which I label the time-share model. Companies are starting to share their data."

Partnering with academic medical centers (AMCs) is a form of time-share. Pfizer's Centers for Therapeutic Innovation (CTI) are located adjacent to academic medical centers. One site is at the University of California at San Francisco. Faculty at the university's medical school make research proposals to the company and, if the company agrees, the funding for that study is appropriated. In these CTIs, the faculty and researchers from the medical school actually move to Pfizer to conduct their research. Participating AMCs and principal investigators retain the ability to use all intellectual property, joint or otherwise, for research purposes. The researchers gain access to Pfizer's relevant compound libraries, proprietary screening methods, and antibody development technologies.

GlaxoSmithKline's time-sharing model is set up differently. Its Discovery Partnerships with Academia program provides management oversight of academic research projects, specifically in early drug discovery. GlaxoSmithKline provides a drug-discovery expert for every partnership and financial support for the project on a stepwise basis.

THE STEALTH MODEL

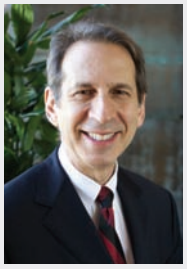
To gain quicker time-to-market, some bioscience companies use what Fadem terms the "stealth" model. "They'll package up a new medical device or idea and literally take it on the road, visiting as many as 20 academic centers to share their idea with faculty and get their feedback. By the time they finish their road trips, they usually have quite a different device or idea, which is the one they put out in the marketplace."

MAKING THE MOST OUT OF CO-CREATION

In real estate, the three most important aspects of selling a property are location, location, location. It's not that simple with selling a new drug or medical device. Deciding who owns the IP rights, meeting FDA regulations regarding clinical trials and adverse event reporting, and handling public perceptions of bias and conflicts of interest are paramount in the life sciences industry. Aside from the regulatory steps, the steps of adopting co-creation methods for drug discovery and development and being transparent with academic-industry ties can help create strong connections between researchers and technologies to bring new solutions to patients.

Key Points

- **Co-creation is not "controlling."**
- **Address the conflict-of-interest quandary head on.**
- **Listen and respond to the "signals" in your industry.**
- **Ask questions!**
- **Co-creation models in life sciences include:**
  - *Solution-driven models—focus on patients*
  - *Time-share model—collaborate anywhere with anyone*
  - *Stealth model—gather input and redesign on the fly*



Profile

TERRY J. FADEM

Managing Director, Office of Corporate Research, Perelman School of Medicine at the University of Pennsylvania

Terry Fadem is the Managing Director, Office of Corporate Research, at the University of Pennsylvania, Perelman School of Medicine, where he is responsible for all industrial research relationships for Penn Medicine. In addition, he is Director of the Commercialization and Entrepreneurship Program (CAEP) for the Institute of Translational Medicine and Therapeutics. As a Core Team member of the Mack Center for Technological Innovation at Wharton, he focuses on the BioSciences Crossroads Initiative.

Co-creation Means Value Creation

Daniel Zweidler

The biopharmaceutical ecosystem is complex, irrational, and, because human health is involved, emotional. Trust among the stakeholders is low, research and development productivity is shrinking, and global uncertainties all combine to paint a picture that business as usual will not work anymore. "The pharmaceutical business is in trouble and we all know it," Daniel Zweidler told attendees at the November 18, 2011, Mack Center conference, Innovation through Co-creation. Companies willing to fundamentally recreate their businesses with co-creation models will find value. "Co-creation means opening up your doors and letting someone in who will work alongside you. It does not mean control," Zweidler said. In the biosciences arena, new public-private partnerships are one avenue of co-creation. "You have to rethink your business model and how you're actually going to operate in this space. Co-creation is not just a bolt-on. Your whole company doesn't have to use this model, but at least one business unit in your company tree has to start behaving 50-50 in some way."

DIFFERENT VALUES FOR DIFFERENT STAKEHOLDERS

The biosciences industry is made up of divergent players: physicians, academic researchers, biopharmaceutical companies, patients, payers, and the government. Each of these segments perceives value in different ways. For patients it's a cure or a treatment for their disease; for companies it's revenue to fund their research and development pipeline and to pay dividends to their shareholders; for doctors it's finding the best way to treat their patients; for payers it's finding the most cost-effective treatments; and for the government it's to oversee safety.

So it's not surprising that each of these groups see themselves very differently from how others perceive them. A recent Quintiles study of the biopharma industry revealed that the payers believe they are doing a good job but the others think they are doing a terrible job. "At a point like this, I see self-insight turning into delusion," Zweidler said. Learning to close these perception gaps is crucial to the industry solving this dilemma. "The idea is to get these two parties together and to improve the situation," Zweidler said.

A BIOLOGY LESSON

Biopharma's products are not just manufactured widgets; they are new molecular structures that are given to people. Unless you have worked in the biosciences, it's hard to grasp the huge cost and timeframe it takes to get a product to market: 95% of your investigative compounds

will never become a medicine and will essentially be failures. Approximately $3 billion is spent for each drug approved for sale in the U.S. market by the Food and Drug Administration (FDA).

The first stage of drug development is the discovery, or research, phase. The next stage is the proof of concept stage, where the molecule is first tested in animals for efficacy but mainly safety. Subsequently the molecule will be tested in healthy humans for safety in clinical phase I trails, and later, in patients who have the disease the molecule is trying to target, in clinical phase II trials. "We are trying to prove that the molecule we have will engage the target and the mechanism of action in the way we predict it," Zweidler said. In all of these stages, "the measure of value is clinical innovation. What's the percentage of added innovation this molecule will have compared with the standard of care? Will it be safer? Will it be more effective?" By phase III trials, the compound is tested in larger groups of patients with the targeted disease. "At this point, the compounds can be assigned a probable revenue stream and a net present value (NPV), which is a classic financial measure. I'm saying that we need to move away from the NPV measure in the proof of concept phase and replace it with a measure of clinical innovation," Zweidler said.

THE PATENT RACE: MOVE THE STARTING LINE

Currently, patents on new molecular entities (NMEs) are granted for a molecule at the beginning of the proof of concept stage. All you know about the molecule is its targeted mechanism of action, and the patent clock starts ticking. The horse race begins. A patent is granted for 20 years, well before a molecule becomes a marketed drug. What ends up happening is that all the pharma companies work on the same mechanism of action, each with a slightly different molecule. "The originally described and patented molecule is rarely the one that gets developed into a marketed drug," Zweidler noted. "You often end up having to improve its structural characteristics to remove unwanted side effects."

But once a patent is granted, at the early preclinical stage, it becomes a race to see who is going to be the first to receive marketing approval for a drug, with costs totaling an average of $3 billion. For instance, the FDA approved Incivek and Victrelis just 10 days apart, which means Vertex and Merck began marketing the competing hepatitis C drugs essentially at the same time.

RETHINKING INTELLECTUAL PROPERTY: THE SWEET SPOT

Large drug development costs are also where the highest risk of failure is—at the proof of concept stage. Zweidler pointed to public-private partnerships that begin their collaborative research earlier, at the mechanism of action phase, such as the Penn Center for Orphan Drug Research and Theraphy. Such partnerships create more value for patients because the focus is on finding an effective

Drug Development's Co-creation Sweet Spot

Zweidler suggests that regulators, payers, and patients could all be more involved in what he calls drug development's co-creation "sweet spot"—the proof of concept stage.

mechanism of action for a specific disease rather than companies racing to get a patent on a single molecule. "I'm asking if we could actually work together—co-create—at the mechanism of action level, and push the limits of IP toward the end of the proof of concept stage," Zweidler said. This is what he terms the "sweet spot" in the drug development cycle—proof of concept. "It's also the phase where we waste the most money in terms of companies repeating experiments that come to the same conclusion—the mechanism doesn't work." This stage of the drug development process generally lasts five years, and costs about $700 million for each drug candidate that moves into phase III trials. But only 10% of them do.

At the proof of concept stage, which includes preclinical, phase I, and phase II studies, Zweidler suggested bringing together the regulators and the payers to get their perspectives. Knowing whether payers and regulators would approve or reimburse such a drug is vital information early in the process. Even patients outside of the clinical trials need to be heard at this earlier stage. Patient advocacy groups are doing just that, as seen with Lou Gehrig's Disease (ALS) and breast cancer. One such group is an online entity, PatientsLikeMe®. The value of PatientsLikeMe® is the real-life data on how drugs possibly work or don't work in actual patient populations, not just highly screened clinical trial participants. In fact, PatientsLikeMe® alerts patients to clinical trials for specific diseases that are actively enrolling, thus helping create value for the companies conducting the trials.

PUBLIC-PRIVATE PARTNERSHIP: ARCH2POCM

An example of a public-private partnership (PPP) in the biosciences arena is Arch2POCM; its name derives from an archipelago (Arch) of academia, industry, regulatory, and public funders, as well as patient advocacy groups, and "proof of clinical mechanism" (POCM). So far, Takeda, Pfizer, Johnson & Johnson, GlaxoSmithKline, and Roche are working with Arch2POCM to help create operations and governance structures. Its initial target diseases will be in the oncology and neuroscience fields. Expected to launch in 2012, it will file no IP patents and will place all of its preclinical and clinical data into the public domain. All of its negative POCM data will be immediately published so that similar studies are not needlessly repeated. Positive POCM data is offered for purchase to industry partners with attendant data exclusivity periods. "The concept is not to totally remove the horse race but to say, at least from a mechanism of action standpoint, we're not going to play the horse race for high-risk types of targets," Zweidler said. The value created by entities such as Arch2POCM is in "cost avoidance because negative studies are not going to be repeated, and we will get to the result much faster, which is a huge gain for the patients."

BRINGING CO-CREATION TO THE C-SUITE

Co-creation goes against the grain with many CEOs who built their careers with quite different mechanisms. However, more medical doctors at the C-suite level may change this. Medical doctors tend to share data, as opposed to leaders coming from academia, where data are not shared but held close. "Most people now in the C-suites acknowledge that data is power and possibly competitive advantage," Zweidler said. And with public-private partnerships starting to form in the biopharma area, the industry is poised to be fundamentally changed. But which companies will take the most advantage of co-creation? "The companies that will be successful will be the ones that don't just give lip services to co-creation, but who create the space and actually do it," Zweidler said. "Carve out the space and let these players really work in this new environment. You have to set it up in such a way that you are not controlling the process."

"The rules that companies have are very, very strong and so are the models that they are working in," added Terry Fadem, Managing Director, Office of Corporate Research, Perelman School of Medicine at the University of Pennsylvania. "There is great trepidation about what new model will work, so many are just sticking with what they know even though they know that business model is not working. Not all CEOs are convinced about the need for co-creation."

THE LAST MILE—FOCUSING ON PATIENTS

The pharmaceutical business model has always been a supply-driven model—some might say, a failure-driven model. This fact is illustrated by the 50% failure rate compounds experience between the phase III and market approval stages. Application of more co-creation at that point in the process would definitely improve the failure rate. But more than just focusing co-creation at the proof of concept stage, Zweidler said, involving patients is "absolutely critical. Most of the diseases today are chronic and they require a lot of different medication." Patient advocacy programs, such as the PatientsLikeMe®, are starting to push patient involvement in phase III studies and even post-marketing studies. As opposed to the current "irrational" system of healthcare and drug development, Fadem added, PatientsLikeMe® is a "rational system that can allow us to have patient-directed therapy and patient-directed medication. In the future, I think this group will allow us to define subsets of patients who will become more in control of their health."

A parallel development is that physicians are less often in private practice and are joining large institutional practices. One offshoot of this trend, perhaps, is that patient office visits are declining. "So patients are moving away from doctors and doctors are moving away from patients and something has to fill that space and I think PatientsLikeMe® may be one of the early indicators of how that market space is going to be filled," Fadem said.

Key Points

- Co-creation is not control.
- The current business model in biosciences is not working.
- Public-private partnerships offer a new model that focuses on the proof of clinical mechanism (POCM) stage.
- Value means different things to the different players in biosciences; for biopharma companies, the value derived from co-creation is clinical innovation.
- Co-creation means totally rebuilding your business model, at least in one or two business units.
- Patients are becoming an important partner in the co-creation process.

Profile

DANIEL ZWEIDLER

Founder and President, Daniel Zweidler & Associates, Inc.

Dr. Zweidler is the Founder and President of Daniel Zweidler & Associates, a boutique management-consulting firm. Formerly he was Senior Vice President at Merck & Co., Inc., where he managed the R&D support organization and was responsible for guiding strategy formulation, portfolio management, business planning, pipeline execution, and performance review. Before joining Merck, Dr. Zweidler held numerous positions at Royal Dutch Shell. He is currently a Senior Fellow at the Mack Center for Technological Innovation at the Wharton School.

Co-creating IT/Data Mining Solutions with Global Enterprise Customers

Scott Gnau

Just delivering something that the customer wants isn't what Teradata, a global leader in enterprise data warehousing and analytic technologies, is about. If the new release isn't "exciting" or fun, and interesting as well, the engineers know they're not delivering the full value. Since its founding in 1979 in a garage in Marina del Ray, California, Teradata was acquired by a large company, subsequently acquired by an even larger company, then finally spun out again as a stand-alone company. Through all that change, the company kept its focus on customer co-innovation strategies and its core value proposition—always delivering your best to your customer. Teradata Labs President, Scott Gnau, credits the company's lasting success to adherence to this core value. Teradata continually improves the value it provides to its customers and helps customers stay at the top of their game, which means they'll remain loyal to Teradata.

Being a successful high tech company year after year isn't easy, but Teradata has been able to maintain its edge through "a combination of intimacy and co-innovating with our customers, plus a huge helping of paranoia that we've missed something," Gnau said. "These two things working together have enabled us to keep our focus, do the right thing, and show up with very good products." While co-innovation is the key, the paranoia helps Teradata avoid getting comfortable with the status quo. Teradata's integrated data and analytic solution portfolio allows its customers to "integrate knowledge about everything in their business to support the best decision possible," Gnau said, in describing the company's customer value proposition. As a business grows and adds more customer touchpoints—from POS devices to smart phones—the amount of data grows exponentially. In today's quickly evolving technology world, a company that gets comfortable with the status quo will soon be out of business.

BUILDING COMPONENTS TOGETHER

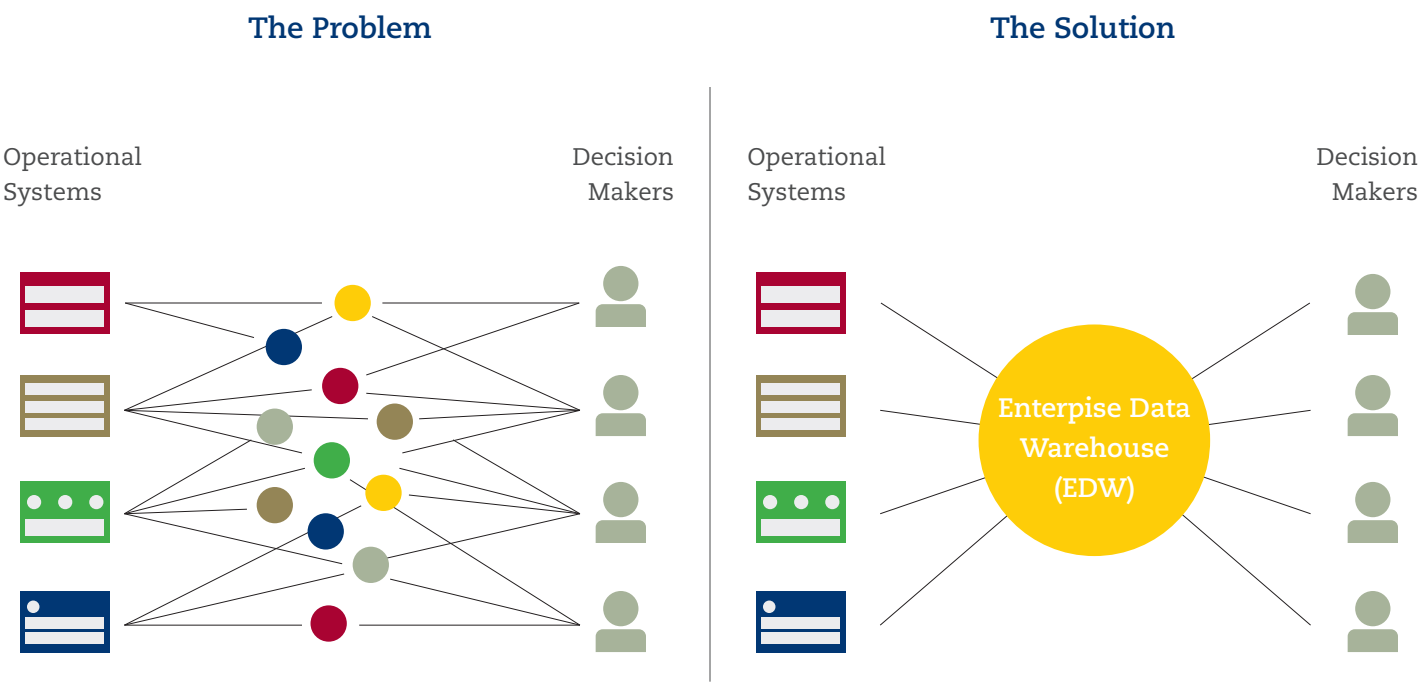
One of its e-business customers needed to meet a specific requirement, an idea which Teradata recognized could actually be useful to all its customers. The customer invited Teradata to send some engineers to work on the new functions. "This was a key example of a win-win," Gnau said. "We would never have been able to do this work so quickly without co-creation. And if we had done it on our own, we may not have hit the mark." The

e-business customer got the upgrade immediately, and the upgrade went out to all Teradata customers during the next scheduled release.

MAINTAIN A DIALOGUE WITH CUSTOMERS

Understanding why a company's solution is valuable to customers helps Teradata continue to innovate. "We engage in true partnerships with our customers," Gnau said. "We maintain an open dialogue with our customers about where they're going and where we're going, and we make sure those two paths are aligned." For instance, "Our customers don't want releases every 30 days, with small updates. They want the big stuff." So Gnau and his department calculated the optimal rate for new upgrades to be released, which turned out to be every 12 to 18 months. Next, they calculated how they could spend "every dollar possible on the new stuff," and established an optimum level of testing and quality assurance (QA). "We have quality metrics and we must meet them, but we asked ourselves, 'How do we streamline the QA stage to make ourselves more competitive in that space?'" Quality matters.

For the past six years, Teradata has used a "customer value score card." Each new release is assigned a customer value score. Engineers, marketing professionals, and members of the company's product advisory council get to vote and assign a score. They discuss the different features and discuss how much it will help the customer. "We add up the score—say, for example, that we got a 37. What does that mean? It's intensely interesting because over time we can see how we are trending—better or worse. Some of our most interesting insights come from the trends



The proliferation of data marts has resulted in fragmented data, higher costs, and poor decisions. The solution to this problem is integrated data, which provides data consistency, lowers costs, and allows for better decisions to be made.

contained in these scorecards." Teradata Labs now considers the customer value score card an essential step in its requirement-gathering process.

BIG ROCKS

During the many years he has worked with clients, Gnau has come to realize the importance of focusing on the significantly new and powerful additions to each release—the "big rocks." "I use a 'bucket analogy' where you put the big rocks in first and then the sand," Gnau said. "These are things that would not normally fit if all you're trying to do is average in a whole bunch of little things. We've found out that this emphasis is extremely important and critical to our overall long-term success." He knows the "big rocks" focus has been working, because the company's customer value scores have gone up. "We always reserve space for two or three big rocks right at the start of the release process." Not only are customers delighted, but Teradata's engineers are thrilled to get to work on breakthrough technology.

Depending on the type of "rock," Teradata may co-create with clients or use its developer exchange, an online space open to developers anywhere. "It's 100% non-Teradata. We host the environment and get out of the way." For its Temporal big rock, which allows customers to create a full picture of an organization's business at any historical point in time, Gnau said, "we added folks from academia who had written papers on the topic" as well as some customers who were vetted before joining. On another "big rock" project, involving a bigger calendar, "we actually had very little co-innovation because there was a large body of existing work on this and the problem was very well-defined, and we were able to just go and build it."

THE $100 QUESTION

Another way Teradata co-innovates with its customers and prospects involves asking the $100 question. When meeting with clients or prospects to see what specific features they need in their IT package, Teradata asks two questions at the end of the conversation: 1) Have we missed anything? and 2) If you had $100 to spend building new stuff into all of these categories, how would you spread it and why? "This is an immensely powerful way for us to get concise and targeted feedback."

The company also constantly assesses market trends. Are any big disrupters coming that could affect your customers' needs? "We consider it our responsibility to make our customers successful for the long term. They shouldn't have to worry about these disrupters," Gnau said. The company uses a dedicated staff to monitor the IT industry to find out "what the disrupters are, and how can we get in front and leverage them for our customers."

COMPETITION AND CO-CREATION

A member of the audience posed the question of competition in the enterprise technology industry especially since it's common for a company to license someone else's technology on one product and compete against them on another product simultaneously. Gnau agreed that, not surprisingly, competition is a big issue in the industry. "Competition is out there and it's kind of exciting. If you're afraid of it, you have no confidence in the value of what you are doing." It's also important to segregate projects. "We partner with some of our biggest competitors and we are very clear about what we will and won't talk about." Companies need to establish a balance with collaborative projects. "I've never heard of anything successfully being kept a secret in Silicon Valley. We may not talk about exactly how we're going to do something, but we'll share where we are going. This complements the co-creation process."

FAILURE IS AN OPTION

Competitive analysis is practiced routinely. Teradata's engineers make a list of what they think the competition is doing that they want to do better; the list is shared with customers, client chief technology officers, and industry analysts, who all contribute to a ranking of these upgrades to generate an integrated score. "90% of the time we are right," Gnau said. "And the interesting part is, that 10% of the time we weren't right, we learned from that and we actually adjust our releases based on what our customers and prospects ask for. We use this feedback when selecting what to put in the new release."

Gnau believes in what he terms stretch innovation. "You've got to make sure that your culture of innovators and engineers is rewarded properly." But how do you define "properly?" In the past, the company rewarded its employees for getting a difficult feature done on time, in scope, and on budget. But this sometimes created a "reverse incentive." Why should an employee stretch his or her neck out to commit to something that's really cool and interesting, but might not work? "So we had to find a way to create a reward system that allowed people to fail. That sounds very counterintuitive, but it's a very important part of innovation at Teradata," Gnau said. Failure can be good, within limitations. "You want to fail really fast and you want to fail for the right reasons. This is a new approach for us, only a few years old. We are incentivizing our engineers to step up. We've found that if a team meets 80% of their metric that's great; if they get 100%, that's spectacular. Anything above the 80% range is what we never would have gotten before this process was initiated," he said.

Key Points

- Technology today is quickly evolving. To stay in business, companies must avoid getting comfortable with the status quo.
- Within limitations, failure can be productive.
- Remember to focus on the "big rocks"—the new and important pieces.
- Teradata's $100 question helps the company get concise and targeted feedback from customers. What is your $100 question?
- "Stretch" innovation fosters a culture of innovation by rewarding employees while allowing room for failure.

Profile

SCOTT GNAU

President, Teradata Labs

Scott Gnau, president of Teradata Labs, provides visionary direction for all research, development, and sales support activities for Teradata's integrated data warehousing, big data analytics, and associated solutions. The execution of the vision empowers the world's leading organizations to create a sustainable competitive advantage. He oversees a talented pool of more than 1,300 technologists located in Silicon Valley, Southern California, Toronto, and other global locations. The technologists are a driving force behind Teradata's position as the leading analytic data solutions company.

Challenges of Co-creation: Co-creating via "Challenges"

Alpheus Bingham

Would you post your company's biggest strategic challenge on the Internet? Alph Bingham, co-founder of InnoCentive, encourages companies to do just that. His client list includes the U.S. Air Force, NASA, car manufacturers, pharmaceutical companies, and consumer products companies. "We remind companies that the secrecy they hold so tightly usually makes very little contribution to their success," Bingham told attendees at the Mack Center conference. A challenge is just one tool in the co-creation toolkit and is not applicable for every situation. One of the keys to using a challenge is to ensure that it is specific, detailed, and actionable.

Using crowdsourcing via the Internet is one of the co-creator's tools. Bingham has helped hundreds of companies, foundations, and government agencies compose "challenges" that have not been fully resolved with their own internal resources. Not every issue, problem, or question should be placed out on the web; and those that are on the Internet need to be carefully worded to attract the right minds and the right solution.

BOUNTY HUNTING ON THE WILD, WILD WEB

Just as Wild West bounty hunters went after the outlaws whose pictures were nailed to the sheriff's door, Bingham likened the Internet to "the world's biggest sheriff's door." Companies aren't looking for train robbers, horse thieves, or gunslingers, but they are looking for software designs, disease treatments, or even a way to help astronauts exercise in space. How do companies usually address stubborn issues or unanswered questions crucial to their businesses? Frequently they hire more staff to think about the problems. They're making the assumption that when they hire a bookkeeper because they're experiencing a bookkeeping problem today, that bookkeeper is the person most likely to solve other bookkeeping problems in the future, problems not even defined yet and hard to effectively recruit against. Often, they're selecting from a limited pool of applicants tied to one specific geographic location. No wonder "most of the smart people work somewhere else," as Bill Joy once quipped. But an even greater problem-solving potential lies in the population not even defined as "smart" in this quote. "There are people out there who individually have a low probability of solving your problem but collectively they have a high probability of solving your problem, because there are so many of them." They occupy related fields; they are composed of "amateurs" in the sense that most early science was done by amateurs until university curricula and degrees were codified.

By posting a challenge on the Internet, companies are not limiting the pool of people who can view, and ponder, their problem. What Bingham has noticed in helping his clients build challenges is that "when the solutions come in, the best solutions, the solutions selected by the seeker clients under blinded conditions, very often come from someone not qualified to solve the problem"—not qualified in the sense that they don't have the credentials companies would have looked for in hiring a problem-solver for this particular problem. Many of the solutions received through a challenge come from the people who would not have been hired as either employees or consultants. How can this be? Aren't problems solved by experts in the field of the problem? Apparently, not always.

THE POWER OF CROWDSOURCING: THREE TRAITS

Several universities have studied crowdsourced challenges to understand why they are so effective. They looked at who solved the problem, why they solved the problem, and how they solved it. The bigger question focused on the *collective* power of a crowdsourced solution. How does a crowd collectively derive this capability of providing a unique amount of problem-solving? Bingham cites three areas: heterogeneity, marginality, and serendipity.

Heterogeneity

Every submission to a challenge can, of course, be traced back to each submitter's profile, including qualifications, gender, and geographic location. When this is done for all submissions, the sheer diversity is amazing. Besides locations on every continent, challenges attract people from different cultural and experiential backgrounds. "In fact, we get pretty large clusters of responders in locations where I'd bet—if

Global Diversity for Solutions

Challenges attract people from different cultural and experiential backgrounds. The solution to a company's problem can come from an unexpected person in a far away place.

you're running a company—those are not the places you'd go to outsource your consulting, your research labs, your problem-solving, your contract research or other kinds of undertakings," Bingham said.

Marginality

"Expertise brings restraints," Bingham noted, quoting a paper on optimal marginality. "Individuals become socialized to the norms and beliefs of their fields and organizations," thus marginalizing a different set of perspectives and heuristics than those at the core of the professional establishment. "The more they teach you to be an expert the more they've taught you to not think outside of that expert box and the more barriers there are to your problem-solving ability," Bingham said. "It's not a fault of the system—it's a *feature* of the system. As the author of *Guys and Dolls*, Damon Runyon, puts it, 'the race is not always to the swift nor the victory to the strong, but that *is* how you bet.'" And when betting on an employment candidate, use every handicapping piece of data at your disposal: degrees, experience, past performance, everything. *But*, if you can bet *after* the race is won; you'll be surprised because it is not always to the "swift and strong." By using a challenge-based system like InnoCentive, you place your bets *after* the race. And you invite more horses, more jockeys, more perspectives from the edge, ones to which you wouldn't otherwise have had access. A challenge-based and open innovation system increases the odds that you'll find the right solution and often in a surprising quarter.

Serendipity

Bingham defines serendipity as the coming together of three characteristics: 1. A set of experiences and circumstances that are unique to the individual involved, 2. Skill and training, and 3. A clear challenge.

Everyone knows the story of Archimedes's "aha" moment of lowering himself into a bathtub and realizing he has the solution for calculating the volume of an irregularly shaped object. "But this wasn't Archimedes's first bath," Bingham said. "What made this one different than just scrubbing off grime? I believe it's because the question he was pondering was well articulated. When articulating a challenge, you've got to pay attention to the language with which the challenge is cast." Many companies don't pay attention to such level of detail, but without a clearly articulated challenge it won't be worthwhile to engage in co-creation, "especially broad, distributed co-creation," Bingham said.

ACTIONABLE CHALLENGES

Just challenging people to "find a cure for cancer" is virtually useless, Bingham said. "On the other hand if I express the problem in terms of certain proteins in a certain state being bound to one another . . . the point is to be as specific as possible." By doing so, you provide information that is really stopping you from accomplishing that task today. Another best practice in challenge definition is to avoid jargon or even disciplinary clues; the language you use should be equally accessible to an engineer, a physicist, a biologist, a biochemist, a chemist, and a bunch of other people who normally aren't part of that problem-solving domain, who are normally excluded from it."

At InnoCentive, such challenges are described as "boundary objects." To envision this concept, imagine a prototype that "allows you to bridge across different perspectives and ways of looking at things," Bingham said. Paul Carlisle of Boston University, who has written extensively on boundary objects, defines them in terms of what the boundaries are between; as Carlisle has said, "usually it is time and space." A challenge can mean the difference between a novel solution occurring *here* and *now* as opposed to *there* and *then*.

As an organization, InnoCentive has teased out the science of figuring out how to create a challenge that is

articulated in such a way that it will allow the solution to be found *here* and *now*. "And it really is a science. It seems like a very easily stated problem but it turns out that it's quite a challenge in itself to create one of these boundary object structures," Bingham said.

CASE STUDY: PUMPING IRON IN SPACE

Gravity is an important part of getting any physical benefit from an exercise regimen. In space, there is no gravity. NASA approached InnoCentive for help. By the time NASA had posted 7 challenges (they continue posting and many more challenges have been tackled to date), they had 2,920 project rooms opened by potential solvers all around the world, and 407 solutions had been sent in. There was no mechanism by which NASA alone could have that level of outreach. Alex Altshuler, the Leningrad-born Massachusetts transplant, found the solution to the lack of gravity in space. As he commented on his winning the challenge, "if you're an outsider, you can suggest new ways of looking at things without feeling crazy."

THE 25-YEAR-OLD OVERNIGHT SUCCESS STORY

In summary, change is not easy and change takes time. Adapting the use of online challenges—opening up your most perplexing problems to the world—is not a course of action companies take to overnight. But by using "this little thing called the Internet," companies can tap into the expertise not only of people anywhere on the globe but from people they wouldn't originally have hired to solve their problem. Just as Southwest Airlines has been described as an overnight success story that took 25 years, companies today need to break out of old mindsets to realize the power and competitive advantage of co-creation.

Key Points

- Crowdsourcing taps into knowledge anywhere in the world and from people from many domains and areas of expertise.
- Challenges must be well articulated to be solved via crowdsourcing.
- Challenges can be posted on an intranet, blog, or the entire web.
- The collective power in crowdsourcing comes from heterogeneity, marginality, and serendipity.

Profile

ALPHEUS BINGHAM

Co-founder, InnoCentive, Inc.

Alph Bingham is a pioneer in the field of open innovation and an advocate of collaborative approaches to research and development. He is co-founder, and former president and chief executive officer, of InnoCentive, Inc., a web-based community that matches companies facing R&D challenges with scientists who propose solutions. Through InnoCentive's platform, which connects the whole planet of people through the Internet, organizations can access problem-solvers. He is the co-author of *The Open Innovation Marketplace*.

PANEL

Managing the Co-creation Process Proactively

Tom Cellucci, Tara L. Rachinsky, Scott A. Snyder, Kevin Werbach

Co-creation is a valuable tool that will increasingly influence how businesses innovate. Yet significant questions on intellectual property rights, fair compensation, and managing co-creation projects across borders indicate that co-creation is not a one-size-fits-all solution for innovation. At the November 18, 2011, Mack Center conference, Innovation through Co-creation: Engaging Customers and Other Stakeholders, a panel of representatives from the legal profession, private industry, academia, and the U.S. government presented their perspectives on what they had heard and learned throughout the day's presentations. The panel also discussed best practices often proposed for co-creation strategies.

TOM CELLUCCI
Chief Commercialization Officer and Senior Counselor to the Under Secretary for Science & Technology, U.S. Department of Homeland Security (DHS)

Public-private partnerships are something **Tom Cellucci** develops in his position at the DHS. These partnerships offer a "win-win-win" outcome because new products are developed quickly with very little taxpayer money. And, with current budget restraints in Washington, Cellucci predicts a growing attitude of "let's work together" between the public and private sectors.

Articulating your needs is the first step in co-creation, Cellucci said. While "commercialization" is in his title, when he arrived at DHS, that term was not well understood. "I questioned why we spent so much time and money developing technologies, products, and services, when the private sector will be ready, willing, and able to help," he said.

TARA L. RACHINSKY
Attorney at Law, Intellectual Property Department, Fox Rothschild LLP

Using co-creation strategies in today's global environment can lead to conflicts over what **Tara Rachinsky** called "co-owned intellectual property," in which one or more parties can make decisions regarding the use of the

IP without consulting the other co-owners, possibly slowing down the commercialization of any new discovery. For example, there may be a great deal of concern about co-inventors claiming their ideas were stolen. Although not always warranted, this type of fear does "contain some kernel of reality. If left to its own devices, co-creation can lead to issues of co-ownership of IP or allegations of co-ownership," Rachinsky said. In addition, different legal systems around the world can make enforcing IP rights across borders very difficult. Rachinsky further indicated that there are currently some international harmonization efforts in terms of how intellectual property rights are obtained but less cooperation in terms of enforcing them. It is important to be proactive and develop best practices around IP, including having all parties agree who will own it and how owners will be compensated.

SCOTT A. SNYDER
President, Chief Strategy Officer, Mobiquity

Scott Snyder agreed with the need for direct involvement of the legal team. "The more you can do the heavy lifting up front, where you work with the lawyers and design the right revenue model, the right legal model, the easier it will work." Many times, especially in custom ventures, the exact formula isn't known. "The question is, what steps do you need to take to get to gate one, and once you're there, do you have anything that's worth bringing to the market? The partners need to answer that question together."

Co-creation is not just important in the mobile space, it's *essential*, Snyder told attendees. "You can't succeed without it. Mobile applications are fundamentally user-centric. If the user is not engaged in the co-creation process, the applications won't work. We see that again and again. We see lots of examples in the consumer space of co-creation, of companies putting their product out there, letting consumers play with it and then those products show up in the product catalog." Large companies are often unequipped to tap into this kind of model, but "there is no way you can possibly come up with all the things you need to do on your own," Snyder said. "You have to engage your users."

KEVIN WERBACH
Associate Professor of Legal Studies and Business Ethics, The Wharton School

The government sector is not a separate entity from the private sector, **Kevin Werbach** said. He pointed to the U.S. government's funding of billions of dollars in research each year as a form of co-creation.

"Now we're seeing government being even more creative and explicit in its thinking about how to bring in those stakeholder communities in creative ways," Werbach said. Under the America COMPETES Act, federal agencies are empowered to post challenges; so far, more than 130 challenges from 36 government agencies have been developed and are seeking private help and cooperation. For example, NASA ran a contest to find a better way of predicting solar flares, as its own experts could only predict the flares with 25%

accuracy. Someone totally off the grid—a retired radio frequency engineer in New Hampshire—worked out a solution that predicted solar flares with 75% accuracy.

Via the web site www.data.gov, anyone can now access volumes of data collected by government agencies, from the National Weather Service to the Bureau of Labor Statistics. The first-ever federal Chief Information Officer (CIO) is working to make government data more accessible. "The site has almost 400,000 datasets, which now can be accessed by corporations, or anyone in the private sector, who can leverage them and use them in valuable ways," he said.

Lastly, Werbach spoke about the function of government in facilitating private-sector innovation. "Regulation tends to be a dirty word in the private sector . . . but I see government acting as a thermostat," he said. "The system itself is what is doing the regulation and the thermostat (i.e., government) is the mechanism by which the system is self-regulated."

Panelists (l-r) Tom Cellucci, Tara Rachinsky, Scott Snyder, and Kevin Werbach at the November 18, 2011, Mack Center conference.

Key Points

- Co-creation is an essential tool in today's rapidly evolving marketplace.
- To avoid delays in commercialization, establish IP ownership issues up front.
- Crowdsourcing offers a user-centric model for engaging consumers in co-creation.
- Government—private sector partnerships are on the rise, including co-creation projects.

ABOUT WILLIAM AND PHYLLIS MACK

William L. Mack (Wharton '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.

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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.

CONFERENCE SUMMARY STAFF: Writer—Martha C. Vollmer Designer—Irving Navarro Project Manager—Sabina Borza

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