HARVARD BUSINESS REVIEW PRESS

COLLECTIVE GENIUS

THE ART AND PRACTICE OF LEADING INNOVATION

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BOSTON, MASSACHUSETTS

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CULTIVATING AN INNOVATION ECOSYSTEM

Many of today's toughest challenges are so big and complex that they don't fall neatly within the boundaries of existing organizations or traditional ways of structuring knowledge. Solving them requires the expertise and perspectives of multiple disciplines.

That calls for new ways of innovating across traditional boundaries—fields of knowledge, organizations, public institutions, governments, and even nations. It calls for innovative ecosystems or what we term collective genius 2.0—open innovation across organizations, networks, or sectors.[1]

More and more organizations are now experimenting with this approach.[2] They're trying to tap into pools of insight and expertise both inside *and* outside their borders.[3] As the size, complexity, and consequences of problems keep growing larger, these efforts and experiments will surely increase as well.[4]

Unfortunately, innovative ecosystems often fall apart, in spite of everyone's best intentions. Reasons aren't hard to find. Competing goals, self-interest, past practice, different operating methods, clashing cultures and values, a history of competition, a lack of experience with such collaboration—all these negative forces simply overwhelm whatever positive forces brought the group together initially.

A growing number of practitioners and researchers are working to understand what it takes to build such border-jumping ecosystems. Most of what's known so far has emphasized structure and governance, which are important, but not, from what we've observed, the only ingredients needed for them to succeed.

The role of the leader has received only limited attention. Leaders face many challenges simply trying to foster the willingness and ability of their own organizations to innovate. Add the extra complications of fostering collaboration among separate and diverse organizations and the process becomes all the more complex, difficult, and even chaotic. When partners outside the boundaries of a single organization must collaborate, leaders must create collective genius across external boundaries higher and wider than any they've faced internally. The implications for leadership would seem to be profound.

Because of the nature of the problems they hoped to address, two of the leaders we studied found themselves building such innovative ecosystems. Both were not only surviving, but thriving. It's reassuring to know that, though many ecosystems fail, some have been able to flourish for years. They can provide valuable insights.

In this chapter, we briefly profile two particularly ambitious ecosystems and share some of our thoughts about the critical role of the leader. It is certainly too simplistic to assume that leading innovation in an ecosystem is the same as leading innovation in a single organization, and we don't claim to have all the answers.

But it's worth asking the question, what do leaders of innovation ecosystems do? How do they foster a group's willingness and ability to innovate when that group comprises a collection of disparate organizations not accustomed to the kind of collective, close, creative collaboration that innovation requires—groups that previously pursued different interests and may even have been competitors?

The answer is important because whatever it takes, that is what breakthroughs will require in the future.

Calit2

Over a decade ago, the state of California created four research institutes intended to ensure that the state, in the words of then Governor Gray Davis, would "maintain and expand its role at the leading edge of technological innovation in the twenty-first century."[5] The chancellors of the University of California, San Diego (UCSD), and the University of California, Irvine (UCI), two state university campuses located about a hundred miles apart, applied as partners to establish one of these organizations, the California Institute for Telecommunications and Information Technology (Calit2, or the Institute).[6]

The goal was to create an environment outside normal institutional boundaries where researchers could move quickly to pursue large, complex projects that cut across multiple departments, campuses, and disciplines. Through the Institute, faculty would connect with partners around the world, including global companies and industries; local, regional, and state governments; and researchers at other universities and institutions.

While the development of the proposal for Calit2 was underway, Larry Smarr was recruited to help set up and head the Institute. A PhD in physics, Smarr had been founding director of the National Center for Supercomputing Applications (NCSA), which later evolved into the National Computational Science Alliance, a coalition of over fifty colleges, universities, government labs, and corporations whose purpose was to prototype the information infrastructure of the twenty-first century. In that and other positions he had played a transformational role in many of the key IT developments of the previous decade, including the Internet and the web.

Several features of Calit2 attracted Smarr. At NCSA he had already seen that powerful innovations could emerge when researchers from different fields worked together. He believed collaborative models of research and innovation were better suited for addressing today's complex problems and opportunities. Calit2 would be a place where those models could be explored and developed. Between the two schools, he said, the

Institute could "field a team of experts for every problem." That would give it the potential to make "unique, substantial contributions" to the great challenges of the twenty-first century in such fields as health care, energy, climate change, water sources, and digital culture. Finally, he felt that universities needed to fill a growing and troubling void—to perform the long-term research that companies no longer did because heightened competition forced them to focus on the near term.

Smarr knew the leadership challenges at Calit2 would be great. "We are disruptive in principle," he said. "We cut across twenty-four departments and many different schools on two separate UC campuses, and we can do things at a faster speed than almost any other part of the university." To fulfill Calit2's role as a catalyst for research that brought together engineering, physical sciences, digital arts, medicine, and public health, as well as the biological, behavioral, and social sciences, he had to get individuals who were used to great autonomy to collaborate *voluntarily*. He would have no formal authority to push them together. They would come together at Calit2 only because of their shared interests and passions.

As the UCI chancellor Michael Drake said:

> *As much as we say we want to do things in a new way, the fallback is to revert to our traditional patterns of working alone. Collaboration takes energy. We also have to convince our faculty that investing in multidisciplinary projects is a good use of their time. At research universities such as UCI and UCSD, faculty are rewarded for their individual contributions to their field. Assistant professors are granted tenure for original work that tends to be narrow and focused in one discipline. Then we turn around and encourage these faculty to work with other departments on wide-reaching projects. It's a bit of a leap of faith for them.*

Pfizer Legal Alliance (PLA)

Most people don't think of the law as a profession ripe for innovation. But Amy Schulman, general counsel and executive vice president of Pfizer, the global pharmaceutical company, didn't share that perception. When she joined Pfizer in 2008, she believed that her legal department had a strategic role to play at Pfizer, given the revolutionary changes—scientific, technological, and regulatory—sweeping through the health-care industry.

But to play that role, she believed her group had to reinvent how it partnered with Pfizer's business units and how it worked with the company's extensive network of outside counsel. Not only did she undertake a major reorganization of her division, but she also, to the surprise of many, created the Pfizer Legal Alliance (PLA), an ecosystem comprising nineteen of the company's external law firms that would perform the lion's share of its legal work. Perhaps the most striking sign that the PLA would take a different approach was that it abandoned the traditional, almost sacrosanct, "billable hour" for paying outside counsel and replaced it with a structure of flat fees.

Schulman wanted a new approach to legal collaboration and was saying to outside firms, in effect, that she wanted them to be a hybrid between an outside lawyer and an inside lawyer. As cases grew more complex and dispersed over multiple jurisdictions they required more collaboration among different firms. This pressure was making clear to many in the legal profession that the old model of "every firm for itself," based on the billable hour, no longer produced the best legal work for clients.

A firm like Pfizer relied on a national network of outside firms. A single blockbuster drug could spawn thousands of suits, filed in thousands of different jurisdictions around the country. Many of these cases revolved around the same or similar legal issues. They often required highly specialized expertise and in-depth research about particular legal or scientific matters; expertise that was difficult for any single firm to acquire and provide. Because "litigation is local," as one lawyer explained, Pfizer couldn't send corporate lawyers from one state to argue cases before judges and juries in other states, where they might be viewed with suspicion. Consequently, Pfizer often had to hire a cadre of firms across the country to meet their legal requirements.

Schulman knew that if companies like Pfizer could transform its network of law firms into a true collaborative community, the potential advantages would be enormous: for any specific case or type of case, the network could combine representation by different firms, each bringing its own strengths. It would be more efficient and less costly to have firms share knowledge, expertise, and research. Over the long term, it would allow deeper relationships to develop between Pfizer and the various firms, and as the firms got to know Pfizer better, they could deliver more proactive

legal advice. Such a community would also give Pfizer access to the best of the best lawyers from a collaborative collection of top law firms, allowing the company to assemble teams quickly that could deal most effectively with highly complex issues involving litigation, regulatory, compliance, securities, and health and safety components.

All this depended, however, on getting the outside firms to function as a single law firm. The traditional system of building a network of outside firms competing for a bigger share of the billable-hour pie could not produce any of these benefits. With the growing complexity and size of today's legal cases, that was a fatal shortcoming. Changing the system began with replacing the billable-hour model with negotiated flat fees. But the goal wasn't just to save money. It was to produce the best possible legal work, work that demanded innovative solutions, for Pfizer.

Figuring out how to turn the PLA into a community *willing* to work together and do innovative problem solving was Schulman's first order of business. All the firms shared the same client, Pfizer, and subscribed to a common professional ethic—that the client needed and deserved their best legal work—providing the basis for a sense of shared purpose. But the core question she had to address was this: can the practice of law across competing firms be a team sport when that's not how the legal profession has always operated? Schulman had to bring together lawyers from competing firms and lead them not just to cooperate but genuinely to collaborate, which required unprecedented trust.

Virtual law firms were notoriously difficult to manage. As a colleague of Schulman explained:

> *In a virtual firm, a client asks you to work with lawyers from other firms, but it's rare that a real team ever develops. All the lawyers look out for their particular firm's interests. People are reluctant to share information. People are paranoid that others are going to get more credit and therefore more business. It's the opposite of collaboration.*

Community Is the Key

Given such enormous obstacles, how have Calit2 and the PLA both survived and succeeded over several years? We don't have definitive answers, but comparing what we saw in them with what we saw in the innovative organizations we studied leads us to some observations.

What we saw did confirm the importance of structure and governance. As they gained experience with Calit2 and the PLA, both Smarr and Schulman found they needed strong governance structures. Where multiple distinct organizations needed to collaborate, clear boundaries and roles, along with standardized processes—ways of working together—became even more important. And, certainly, their ecosystems required a robust infrastructure of processes and tools that facilitated the work of collaboration and innovation.

However, the major challenge for Smarr and Schulman, as we observed, was not simply to create capability, but also to cultivate willingness among the different, often competitive and contentious individuals and groups that belonged to their respective ecosystems. Innovative groups inside the same organization at least begin with a rudimentary preexisting bond—their connection to the same firm or institution—but those in an ecosystem don't even enjoy that small advantage.

Given ecosystems' inherent complexity and high potential for conflict, it's no surprise that a leader's initial impulse is often to begin with a legalistic focus on structure and governance, that is, to define the relationships among members, their relative rights and privileges, and the rules that govern who gets to do and decide what.

Those are important considerations, but the flaw in focusing on them exclusively or primarily becomes apparent when you recall the first and most fundamental task of an innovation leader. Since all innovation is ultimately voluntary, it must begin with the *willingness* of those involved to do the hard work of innovation: collaboration, discovery-driven learning, and integrative decision making. If that was true for innovation inside a single organization, it's especially true for innovation in an ecosystem of diverse organizations.

Rules of governance and structural clarity can remove obstacles that might block people's willingness to innovate, but they cannot create that willingness. Something more is required. That "something" is the same for an ecosystem as it is for a single organization. It is community: the sense of being joined in a worthwhile cause, of pursuing a common compelling purpose built on shared values. Without this social fabric, no ecosystem can survive long enough to accomplish much.

What we observed at Calit2 and the PLA were leaders who understood this reality and worked hard to create the necessary social fabric. They understood the need for rules and structure, but they also knew that these elements alone would not counter the forces of disintegration constantly working to pull their communities apart. That required the willingness of the individuals and groups in their ecosystems to innovate together. Without willingness, there could be no collective genius. And the key to willingness was to create a sense of community around a common cause.

Building Community at Calit2

For Smarr, the process of building community began even before Calit2 formally existed. To prepare the proposal for creating the Institute, the two campus deans of engineering repeatedly brought together a multidisciplinary group of researchers from faculty at both UCSD and UCI, while Smarr was still being recruited. The deans, and later Smarr, led these groups through multiple, often grueling meetings to generate a detailed statement of what Calit2 would be and how it would operate.

Agreeing on purpose

One of the first and most important steps they took was to identify the four strategic applications, specific areas where Calit2 would focus its efforts: environment and civil infrastructure, intelligent transportation, digitally enabled genomic medicine, and new media arts.

Identifying these specific areas was important because the state's mission for the four research institutes—to "maintain and expand [California's] role at the leading edge of technological innovation in the 21st century"—was necessarily broad and aspirational. It was, however, too general to attract faculty researchers. To succeed, Smarr and the group had to translate it into specific areas that would attract academics interested in doing specific and real research that interested them. The four specific areas created the purpose that aligned the Institute's broad mission with researchers' passions and interests. As Smarr recalled, putting together the proposal was an important "forced march," a way to "identify and bring together the right faculty and collectively develop

a common purpose," which could serve as the foundation for a vibrant innovative community.

Leading in this way from the very beginning was critical for Smarr because he had virtually no formal authority to compel cooperation and participation. For that reason, he had to respect and work within the universities' existing and jealously guarded systems of rights, privileges, and infrastructures. Faculty retained their offices in their home departments. The Institute could not make academic appointments, and faculty reviews for promotion remained the prerogative of the departments. It would always be the faculty who ultimately chose their projects and partners. Smarr and the Institute would not dictate their research or the problems they addressed. He and the Institute would provide the necessary tools and resources, bring people together for fruitful collaboration, and act as a bridge between Calit2 and others around the world. Their role was to create a place where people from diverse domains could gather and innovate without determining or directing what they did.

As one of Smarr's senior Calit2 colleagues said, "Faculty work with Calit2 because we offer resources and a multidisciplinary collaboration environment that they don't find in their own departments. If we tried to tell faculty what to do, it would never work." From the very beginning, Smarr worked hard to foster the notion expressed by a UCSD dean of engineering: "Anything that helps Calit2 also helps us."

Agreeing on governance structures and rules for working together

Once the schools and faculty identified Calit2's purpose, Smarr could then work with them on the next step: creating governance structures that clarified decision-making rights, and developing the rules of engagement that guided researchers as they worked together and shared Calit2 resources.

The formal governance structure they developed was intended to allow and encourage inclusive decision making. Divisional councils with broad representation of faculty and staff were set up at both UCSD and UCI, each led by a division director who was a faculty member. Calit2 also had both internal and external boards. The internal governing board was composed of deans and the vice chancellors for research who made sure

that Calit2's disruptive practices were executed in a manner acceptable to the rest of the UC system. The external advisory board was composed of distinguished individuals from the private, public, and government sectors that weighed in on matters with regard to possible future directions, long-term strategy, and how to diversify funding.

Early meetings and deliberations of the governing board often ran long. Smarr knew that detailed discussion sometimes frustrated people, but he wanted to ensure that all opinions were heard and none dominated. For people to become committed and responsible citizens of the Calit2 community, they had to feel they had a voice in what the community did and how it worked. In particular, he sought to avoid fissures along traditional lines—for example, departments or schools. University constituencies sometimes had differing priorities and concerns that could easily have torn at the fabric of the Institute if he had followed a less transparent approach. His goal in these discussions was not compromise but, as he said, "qualified consensus"—in other words, creative resolution.

Rules of engagement included a cost-sharing model and agreement about how much to spend in support of Calit2's extensive state-of-the-art facilities and how to govern use of those facilities. Another piece was an understanding that Calit2 wanted faculty to use widely available IT equipment and freely distributable software whenever possible. That saved money and, equally important, facilitated the dissemination and replication of ideas; in other words, it fostered creative agility. For example, Calit2 researchers built different versions of tiled visual displays out of dozens of large commercial PC flat-panel screens and created both the software for running the displays and a wiki where instructions and the software were freely available to anyone.

As one of the researchers who participated in all this preparatory work said, "It took more than a year to reach agreement, but the process laid the groundwork for collaboration among faculty." (See the box, "Future Patient.")

Fostering a sense of community

Smarr and his team shared a belief with many of the leaders we studied, that physical work space can play a key role in fostering a sense of community. They wanted work space that not only provided cutting-edge research tools

Future Patient

Future Patient is a Calit2 initiative that brings together computer scientists, clinical researchers, medical doctors, and patients to investigate "how the big data we are gathering across medical records, patient record symptoms, clinical measures and genomic and microbiome data can be used to foster a more scientific understanding of health," noted Jerry Sheehan, Calit2's chief of staff. The microbiome is the 10 trillion microbes that live and do crucial work in every human gut. Little understood, the microbes' crucial role in human health has only recently been widely acknowledged.

Future Patient uses software tools developed by Calit2 that display a patient's microbiome, clinical biomarkers, and other self-tracked data on the Institute's room-sized display walls. The hope and intent is that these large displays will allow researchers to compare visually healthy and diseased individuals' microbiomes, find correlations, and generate hypotheses that drive future research.

Data for Future Patient comes from Smarr's own personal data, along with anonymized data from subjects in the Human Microbiome Project at the National Institutes of Health. Calit2 runs the data through its supercomputer software to produce a visual breakdown of over three thousand unique microbe species that may be present in a person's gut.

After it had done this for an initial fifty-five individuals, the Institute began bringing in clinicians and researchers working on specific diseases to query the data on the displays. Based on their reactions, Calit2 refined and matured its software and then began working with actual health-care providers who were interested in seeing and helping develop the kind of medical information that is now cutting-edge but will be widely used in five to ten years.

but also expanded knowledge flows, physically encouraged connections, and increased the odds of serendipitous encounters.

At UCSD, San Francisco-based architecture firm NBBJ, with input from the Calit2 cross-departmental teams, designed a six-story, 250,000 gross-square-foot building (later named Atkinson Hall) with few walls and offices, an open environment where faculty and technical staff could share work space. The UCSD division director, Ramesh Rao, specifically chose office furniture that could be reconfigured easily and quickly to bring together groups of various sizes. A second Calit2 building of 120,000 square feet, this one on the UCI campus, was also designed so its spaces could be easily reconfigured to fit the needs of the teams currently using them.

"Having a building on each campus," said a Calit2 leader, provided "the opportunity to explore innovative uses of high-performance telecommunications systems—to tie the two buildings into a common 'collaboratory.'" This was made possible by one of many technology platforms provided by Calit2, a state-of-the-art fiber optic network that connected collaborators not only within and between the two schools, but also worldwide.

Calit2 provided office and lab space for researchers collaborating on projects, but no researcher or department was assigned permanent space. Calit2 was intended to serve as a project hub for faculty from different departments. Researchers were encouraged to share such specialized facilities as clean rooms, photonics labs, and media spaces at both schools. (See the box, "KAUST and State-of-the-Art Visual Displays.")

Creating such shared spaces was not always the obvious or easy approach; nor was it standard practice on campus. The Nano3 Lab, for example, Calit2's clean room at UCSD, was a shared facility that brought together for the first time at UCSD three fields of nanoscale research and development (nanoscience, nanoengineering, and nanomedicine). "Creating Nano3 was one of the formative cultural moments for the UCSD Division of Calit2," Smarr said. "Institute leadership had to resist the prior campus culture of dividing up the clean room space by faculty member or department. Instead, the UCSD division director facilitated discussions and encouraged the faculty to come back with an agreed upon open and shared facility with pooled equipment available to all." The result was a larger and better-equipped laboratory than anything a single department could have built on its own. It too was a space that encouraged connections and collaboration, as well as fostering a sense of shared purpose.

KAUST and State-of-the-Art Visual Displays

One of the Institute's more ambitious global partnerships was with the King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. KAUST is an independent, merit-based, graduate research university of science and technology open to men and women from all cultures around the world.[7] KAUST aimed, like Calit2, to encourage bold and collaborative research that addressed both regional and global challenges.

Calit2 developed the KAUST Visualization Laboratory Showcase concept, then designed and deployed within the showcase large-scale LCD-panel-based collaboration and virtual reality systems, including the 3D NexCAVE, the REVE autostereo display, and a 40-megapixel tiled wall for SAGE and MediaCommons display, all the first and largest of their kind in 2009.

Calit2 worked with KAUST's Visualization Lab staff to install this technology on the new campus in Saudi Arabia, where it has been used to visualize huge biochemistry and earth sciences data sets, as well as to collaborate in real time with researchers worldwide.

Becoming a catalyst

The way Smarr and his colleagues led Calit2 was influenced heavily by the approach taken at AT&T's legendary Bell Labs where UCSD Chancellor Bob Dynes and several key Calit2 founders had worked.[8] (Recall that this was also true of Bill Coughran's group at Google.) The leadership structure there had been decentralized and relatively nonhierarchical. Formal leaders at Bell never felt it was their responsibility to set direction and get others to follow. Instead, according to one of the researchers who'd worked there, leaders acted as "the first among equals" whose principal role was to create an environment where talented people could work together to solve problems they were passionate about. Like Bell Labs, Calit2 was a fluid environment in which faculty could come and go

based on their current projects. Research would be self-organizing, with researchers ultimately choosing each other as collaborators.

Instead of being the one guiding or directing the action, Smarr saw himself primarily as a catalyst. It was his boundary-busting job to bring together the right people, perhaps plant some ideas, and get them talking. The rest was up to them. Thus, in his frequent interactions with faculty, he made a point of asking questions and listening deeply so as to understand how he could make connections among them.[9] As one faculty member said, "Smarr doesn't start with preconceived notions. He is more likely to make introductions." Another colleague called him a "dot-connector extraordinaire." He was particularly good in that role because of his deep scientific knowledge and curiosity about many fields, which enabled him to talk with and gain the respect of specialists in many disciplines. It was an approach that helped him deal with hundreds of faculty across two separate campuses, as well as hundreds of industry and government partners. A small but telling example: over time, he moved his office at the Institute three times in order to be closer to the action and encourage chance encounters. (See the box, "The Wildfire Initiative.")

Building bridges to the outside world—and the future

Once the Institute was under way, Smarr's role as catalyst and connector took him beyond the two universities and led him to build bridges between the Institute and the wide world outside. Some of this was as simple as attending the best conferences in search of new ideas across a broad range of disciplines. The goal, in Smarr's words, was to "sense the emerging future before it's widely recognized" and give a head start to Calit2's innovation teams. He was also often on the road talking to diverse groups about the new ideas bubbling up at the Institute. "Getting more people aware of early-stage innovations and innovators," he said, was a way to attract the best talent and partners to Calit2.

Through faculty research, the Institute has connected with others around the world—including researchers in many locations such as Italy, Saudi Arabia, and Mongolia. Many projects have involved global partnerships that allow faculty to create and test solutions in real-world contexts.

The Wildfire Initiative

Smarr and his colleagues built strong local, regional, and state relationships. In the Wildfire Initiative, for example, the Institute worked with emergency first responders in southern California to develop information technology for crisis response.

Recent firestorms, considered in aggregate the worst natural disaster in that region's history, revealed the importance of reliable and timely information. To save lives and property, crisis responders—firefighters, police, county officials, health-care providers, and others—need good information about what resources (for example, police, firefighting, rescue) are available where, the state of civil and transportation infrastructures (for example, roads and bridges still open), and not only the current location of a fire but also the direction it's likely to take.

Calit2 experts took a multidisciplinary approach in working with responders to apply the power of IT to these problems. They put together teams of experts in IT, social sciences, organizational behavior, and disaster management. They built on the powerful infrastructure of the San Diego Supercomputer Center's High-Performance Wireless Research and Education Network. According to a description of the effort on the Calit2 website, its goal was "to radically transform the ability of responding organizations to gather, manage, use, and disseminate information within emergency response networks and to the general public."

The Institute also had major engagement with such industry partners as Qualcomm, Ericsson, Boeing, and Emulex. The nature of the private-sector relationships has varied. Some commercial partners have posed specific problems, and Calit2 formed a team with representatives from the university and industry to focus on finding a solution for each. Some industry partners have used the Institute as a center to test prototypes or commercial products. Still others used the unique facilities

at the two buildings, such as clean rooms or telecom labs. Creating and maintaining these relationships quickly became an important aspect of Calit2's work and a growing part of the Calit2 leadership team role. These partnerships, in which both sides had much to learn from the other, allowed the Institute to investigate a wide variety of research questions and issues.

A key part of Calit2's and Smarr's roles was to be out on the edge. (See the box, "CineGrid.") Smarr commented:

> *As a leader, it is important to be looking for new multidisciplinary emerging opportunities and then convene the faculty, staff, students, and industrial partners to discuss how to get a working prototype going before the funding calls come out. That way the team has gotten to know each other and a lot of the rough edges have been smoothed off. This "team-building before you need to" is one of the reasons Calit2 has been successful.*

CineGrid

Calit2 helped to give birth to CineGrid, a public-private partnership with the US entertainment industry, especially that portion located in California, to explore how emerging digital technologies will transform that industry. In moviemaking, for example, it covers everything from the impact of ultrahigh definition to the way technology will change every stage of the process from conception to shooting, editing, and distribution.

Calit2 has played a double role in CineGrid. Working at the intersection of industry and academia, it was able to act as a convener that transcended the two worlds and could bring together both university researchers and Hollywood talent to talk about overlapping interests. Then, having created this forum, Calit2 could play its second role as a technology developer. In that role, it has showcased some of the emerging technologies it's working on that illustrate potential opportunities. "You get together a multidisciplinary group," said Sheehan, "and then you show them a new capability with data relevant to them, and that becomes a synergy for thinking about future collaborations."

Smarr's role as a bridge builder both inside and beyond the universities quickly became self-reinforcing, and people and institutions began to approach him. The CEO of a local organization dedicated to growing San Diego's innovation economy said, "I work in the research community every day, and yet when I have to really figure out some complex technology," she would go to Smarr because he was a "walking inventory of who's doing what." She commented further,

> *The other great thing about Calit2 is how they are connected to lots of places around the world where we don't really have contacts. And so to be able to access the faculty's outside connections is hugely important. Calit2 is looked at favorably and has really become, in terms of the business community, the go-to place for looking at big problems.*

Now more than a dozen years old, the Institute has clearly succeeded in what it set out to do. The number of researchers, industry partners, and federal grants, and the amount of money received from industry and government have exceeded initial projections. It has also captured the attention of academic peers around the world. UCSD and UCI faculty have been clearly engaged, judging not only from the number of projects initiated but also from the number of faculty who have simply shown up at Calit2 meetings and taken an interest in its work.

Even now, as we write this, the Institute continues to evolve and grow. It still focuses on the areas outlined in the original proposal. But to those areas, in response to events subsequent to its creation—for example, the 9/11 attacks, California wildfires, and Hurricane Katrina—Calit2 has added a new application area: public safety and disaster response. The Wildfire Initiative is an example of its work in that area.

Also based on its experience, the Institute recently revised its mission statement to read: "The mission of Calit2 is to unite faculty, students, and research professionals at UCSD and UCI with private and public sector partners to explore how emerging information technologies and telecommunications can transform areas vital to the state's economy and its citizens' quality of life."

Much of its ability to function and succeed goes back to its leader's wisdom in focusing from the very beginning on working inclusively with

potential members to build a purpose-based community. One of Smarr's colleagues said:

> *There was a critical importance to developing our strategic mission. The initial Calit2 proposal was developed by a community with faculty input from both campuses. It helped tease out what contributions they could make individually and collectively. The unique research projects that followed were then a virtual road map for achieving that mission.*

Will Calit2 survive when its founding leader eventually departs? Former UC president Richard Atkinson commented on that question:

> *Calit2's biggest challenge will be transforming itself from an experiment into an enduring part of the two campuses and the University of California as a whole. But great institutions continue to thrive after their founders depart. Calit2's track record and momentum will make it attractive for Larry's successors to continue the institution.*

Building Community at the PLA

The Pfizer Legal Alliance was Schulman's second ecosystem. Before joining Pfizer, she had been a litigation partner at DLA Piper, one of the world's largest law firms with over three thousand lawyers in twenty-five countries.[10] Her client roster included a number of *Fortune* 100 companies, including Pfizer.

Like most large corporations, Pfizer had relied on hundreds of outside firms to do its legal work. But that approach had grown unsustainable, and in 2005 it announced that henceforth it would place nearly all its product liability work with a small group of external firms—preferred providers. It chose Schulman and her team at DLA Piper to serve as lead national counsel specifically to handle lawsuits involving COX-2 inhibitors. In this role, Schulman had to lead a group of hundreds of lawyers spread across twenty firms around the country in developing and executing a strategy for dealing with the lawsuits. She was determined to create a real law firm out of these diverse and competitive players, almost all of whom worked for traditional—that is, hierarchical and status-driven—law firms.

This approach hardly functioned perfectly all the time, but overall it was considered a great success. The number of billing lawyers decreased by over 60 percent. Assignments were better and more efficiently deployed, and the legal work was superior, Schulman thought, to that typically done by traditional collections of outside firms. Where there were problems, she found, the root cause was often the billable-hour model. Not only was it expensive, but it promoted inefficiency, discouraged proactive legal counsel, and was a barrier to building the client-firm relationships and cross-firm collaboration that clients deserved.

Joining Pfizer as general counsel gave her the opportunity to address this issue directly. When she set up the Pfizer Legal Alliance, building on her experience with her previous ecosystem of outside lawyers, a key part of the relationship was a system of flat fees that replaced the billable hour. Some outside firms balked at the arrangement and didn't apply to join the PLA.

Schulman and her Pfizer team were careful to accept only top-flight firms that were willing to experiment not only with a new payment system but a new way of doing legal work. As one team member said: "In addition to their skills and geographical footprint, a key criterion in selection was a willingness to collaborate with other firms, a willingness to experiment in how their fee was calculated, and an interest in being a pioneer."

That was only a start, however, in building a sense of community.

Inclusive leadership

Calit2 and the PLA differed in that the Institute was entirely voluntary, while outside firms in the PLA worked for Pfizer, the client, once they consented to join. Nonetheless, Schulman understood that a shared approach to leadership would be essential for the PLA to work. From the start, she clearly expressed her expectation that member firms should learn and work together to address Pfizer's evolving needs.

While Schulman technically headed the PLA, her position involved other responsibilities as well, and so she quickly concluded that the PLA needed a point person, a real hands-on leader to provide the nurturing and constant attention it required. She appointed Ellen Rosenthal as the

PLA's chief counsel. After a careful review, Rosenthal set up a steering committee that, besides herself, included the lead Pfizer lawyers for litigation, corporate governance, and research and development. Among other responsibilities, this steering committee set the annual flat fee for each PLA firm.

The flat fee arrangement, a key element of the rules that governed how the PLA worked, was so radical for all involved that it required careful and regular attention. Pfizer didn't dictate a fee for each firm and then work with it in traditional ways. Instead, the steering committee worked closely with each firm every year to understand its anticipated workload for the year ahead, including possible contingencies, and based the fee on that mutual assessment. As Rosenthal said:

> *We spend a lot of time with our firms working on how to manage on a flat fee. In a land of unlimited resources, you just call a lawyer and say, "Do this project for me." Now we call the law firm and say, "This is how we think we should manage this together." We don't want a fifty-page memo that we're never going to look at ... We like the one-paragraph answer. Don't caveat it fifty different ways. Just say, "Our gut reaction is X, Y, Z. Should we go forward and do some more work on it?" So it's the kind of thoughtful work most helpful to our in-house lawyers and clients. It's more efficient. It gives us better, quicker answers. And it allows us to make decisions more intelligently. The PLA collaborative allows us to work closely with all of our PLA lawyers to focus on delivery of targeted, efficient, and strategic legal advice.*

Besides the steering committee, Schulman and Rosenthal created a group of roughly fifteen senior lawyers about equally split between Pfizer and the outside firms that had no formal title but was generally referred to as the "PLA Leadership." This group met regularly at roundtable meetings in the United States and Europe where it made key decisions, addressed the many evolving challenges the PLA faced, and set strategic direction. For example, it took on the difficult task of developing performance metrics for PLA members and a 360-degree performance review process in which both Pfizer and PLA lawyers received feedback twice a year.

Over time, the number and mix of outside firms in the PLA evolved. Most changes were due to shifts in Pfizer's legal needs. But some relationships did not work as intended. Some firms left and new firms replaced them. Senior partners from PLA firms participated in the interviewing and selection process of these new firms.

Rosenthal also introduced operational tools, including an online communications hub, the PLA Exchange, which connected the more than seven hundred Pfizer and PLA lawyers spread around the country. An online "commons," it was a useful tool that not only linked everyone but helped build transparency and trust and encouraged sharing of information and insight. In addition, to manage work flow and any operational issues that came up through the year, senior Pfizer lawyers, called Pfizer Alliance Leaders (PALs), worked closely with designated counterparts, called Firm Relationships Partners, at each PLA firm.

Like de Meo with his design labs at VW and the partners at Pentagram with their biannual partners' meetings, Schulman created opportunities for her legal colleagues to get to know each other and build relationships and trust the old-fashioned way—by facilitating conversation, interaction, and connection. She and her team put in place practices and policies that required all of them to try out new patterns of communication and interaction—to act *as if* they trusted each other and were part of a community. It wasn't just outside counsel who were initially skeptical about this revolutionary approach; members of the Pfizer legal division were uncertain, too; they had to give up long-standing relationships and learn to work with their new partners in the PLA.

There were PLA-wide "SMART" meetings once or twice a year to review alliance goals and priorities, ensure collective learning, and foster collaboration. There were practice area summits where PLA lawyers involved in the same legal areas met to discuss litigation and share knowledge. And there were monthly continuing legal education courses tailored specifically to Pfizer and PLA lawyers on topics germane to the PLA's work.

In addition, Schulman and Rosenthal encouraged frequent contact and collaboration in the way Pfizer delegated and distributed legal work to PLA firms. In spite of the potential for some inefficiency, they decided

very consciously to cross-pollinate tasks so that no firm owned an entire piece of anything.

A different kind of leader

Like Smarr, Schulman eschewed the role of the visionary director. It was a role she could have played—she represented the client, after all—but one she chose, for the most part, to avoid. As one of her senior colleagues at Pfizer said:

> *By nature, she is very decisive. [But as] a leader, I think she wants to consciously pull herself back and let the conversation take place, and not jump in too early, because when she does, often because of her intellect and because of her position, the conversation tends to stop and people say, "Yes, we all agree with Amy." She has done a good job of holding back and letting other lawyers have the conversation—even though she may know the answer, and allow that conversation to take place, and then get us to the right place.*

Schulman was known for routinely seeking feedback and input about the PLA from her team. Equally important, through her unusual transparency, inclusive style, and obvious desire to learn and improve, she role-modeled, down to small touches, the behaviors, attitudes, and values she wanted all members of the PLA to live by. Not least, she made a habit of sharing credit. Another colleague said, "What she has taught me, and I think my colleagues, is that ... if it's done to you, you do it to others, and so we try to pass it down, and that is give credit where credit is due."

The first four years

Though the PLA continues to be a work in progress as we write this—Schulman still calls it an "uphill climb"—the outcome after the first four years has been a success by almost any measure. Fifteen firms in the PLA were handling over 75 percent of Pfizer's legal work, and Schulman and her colleagues at Pfizer considered the quality of their work to be much higher than that previously produced by individual law firms. They could tell that the PLA firms were investing more in learning about the pharmaceutical industry in general and Pfizer in particular. Though cost cutting was far from the only goal, the fact that Pfizer had reduced its outside legal expenditures by 20 percent was a telling measure.

Rosenthal said of those first few years: "We have successfully litigated mass tort actions and resolved them, successfully fighting these cases with multi-firm teams and experts in many different subject matters collaborating to address incredibly complex problems."

For Schulman, an equally important outcome was that the PLA firms had truly embraced this radical new approach to legal work, in spite of early skepticism. An important sign of this was the unique level of information sharing that was occurring among PLA firms, as explained by one of Schulman's senior colleagues in reference to new firms as they joined the PLA: "The new firms see the PLA firms who are readily willing to share their witness questionnaires and witness notes, or key insights with respect to a particular judge. These are proprietary [pieces of] information that firms have traditionally been less willing to share with other firms."

So strong did the sense of community become, engendered by these and other practices, that the PLA came to *act* in some ways like a real firm. For example, it began, as a group, to develop the next generation of lawyers. For that purpose, it created an Associate Roundtable and a Junior Associate Program.

The Associate Roundtable brought together about fifteen partner-track associates from various member firms and quickly evolved into a network in which associates could seek legal and career advice from each other. Every associate participated in the roundtable for two years and was paired with a Pfizer mentor to help him or her identify developmental opportunities, including the kind of high-profile work critical to building a personal franchise. Members of this group, often paired with their Pfizer mentors, oversee monthly continuing legal education sessions which are conducted live at Pfizer and webcast to all PLA firms. "It's an opportunity for them to show off to a big client," Rosenthal said.

The Junior Associate Program consisted of high-potential lawyers right out of law school (hiring new graduates had not previously been a common practice). Junior Associates rotated assignments between Pfizer and one of the PLA firms and, in their third year, were given the choice to join Pfizer or one of the PLA firms.

In addition, PLA members have joined forces on programs designed to drive change in the legal community and beyond, including

a diversity and inclusion initiative (PLA LEAD) that provides personalized development opportunities for rising minority lawyers at PLA firms and Pfizer. The LEAD program builds skills and profiles of diverse associates at PLA law firms and members of the in-house legal team by providing specifically identified opportunities to engage in meaningful work or initiatives. By sponsoring these individuals, Pfizer gives them the support they need to reach the next levels in their careers. A key success factor is the way the LEAD program naturally aligns with the PLA's existing structure and strong culture of collaboration. Capitalizing on the collaborative environment within the PLA, the LEAD program provides a broader range of professional opportunities and sponsorship than what might be available in a more traditional one-on-one client-firm relationship. Furthermore, the LEAD program leverages the culture of teamwork and existing cross-firm relationships that the PLA already has fostered.

Through these and other similar practices, the PLA became a place where the practice of law was more satisfying for the lawyers in it. It was a place where they were expected and encouraged to do the kind of good work they wanted to do. And, far from least, because of the high level of collaboration, it was a place where each lawyer could learn from talented peers. Like the world-class designers at Pentagram, they chose to join because they were better for being part of that community.

Like Colin Forbes, a founder of Pentagram, Schulman understood that financial rewards were important, but they weren't the glue that could hold a community together through the trials and pressures of innovative problem solving. Even the most senior partners in PLA firms appreciated the opportunities to learn from peers in other firms and broaden their professional networks. With the PLA and the predictable income it represented, they could devote more of their time to what attracted them to law in the first place: the satisfaction of tackling complex strategic problems that demanded huge chunks of ingenuity to solve and the pleasure of coming up with innovative solutions to a client's needs.

In this way, the PLA was becoming a genuine community because it began to connect people at the level of personal identity. It demonstrated what we saw across all the innovative groups we studied: that the innovation

process works best in a community where everyone feels able to contribute their slice of genius in solving problems they care about, where their own passions and talents—their personal identities—are aligned with the collective. Schulman was pleased when she learned that PLA firms had decided to take on social issues of common concern through collective pro bono work. It suggested that the members were beginning to feel like a true community.

Schulman's own assessment was this:

> *I think four years into it, everybody who participates in it believes in it. We launched this big experiment, and has it worked? The answer is unequivocally yes. Have we learned things along the way that I wish I had known from the beginning that I would do differently? Absolutely. It required a lot of personal conviction. I believed that doing away with the billable hour was the right thing to do, and I was willing to work through the hard issues that came up.*

The Lessons of Calit2 and the PLA

Both Smarr and Schulman relied sparingly on top-down interventions and instead worked to connect others and provide opportunities for them to do innovative work. Through their own behavior, they modeled the kind of open, collaborative, inquisitive thinking that innovation requires.

Both also took care to install clear systems of governance and structure. Once purpose and shared values had been clarified, these rules of engagement became critical components of the glue that kept their innovative ecosystems together.

What set them apart from other leaders, however, was that both were careful to create and maintain these systems in transparent and inclusive ways that helped create and reinforce members' sense of community.

Modeling the right mind-set and behavior

Leading an innovative ecosystem requires constant nurturing and tending. The leader has to be prepared to make him- or herself vulnerable and role-model for others the expected values, attitudes, and behaviors so others are willing to take the risk and learn how to behave in new and often unnatural ways.

A colleague said of Schulman:

Amy is so unbelievably different from most law firm partners in that she knows she's not an island. She takes input from everyone, from the lowest member of the team to the highest, because she knows that's what you do if you want the best results. When she gets a compliment, she almost always says, "Well, I couldn't have done it without Loren or Heidi or John." She's really generous; it's like she wants to get credit so she can give it away. She has given me opportunities associates never get. At meetings, I'm often mistaken for a partner because no one else brings along their associates.

The limits of formal authority in creating a community

For all the similarities between Smarr and Schulman as leaders, the settings in which they worked were different in one key aspect. That difference helps illuminate an important point.

The PLA was a collection of outside legal firms chosen by Pfizer that served in a flexible manner that was not prespecified. Whatever the working arrangement between Pfizer and the PLA, no matter how open and inclusive, the company would always be the eight-hundred-pound client in the relationship.

The situation was completely different at Calit2, which truly was a collection of volunteers. To an extent that did not apply to Pfizer and the PLA, Calit2 had to respect the preexisting rights and privileges of the various departments and groups in the two UC universities. Calit2's innovative strength was also a danger. As Smarr said, "We are disruptive in principle." His paradoxical task was to be disruptive without seeming to contradict established roles, status, reputation, or rights and prerogatives. He had to do this through persuasion, without formal authority, by aligning all those groups' own interests and goals with those of Calit2. How he did that was a case study of how to do it without any ability to push people together.

What's noteworthy in Schulman's leadership of the PLA was that, wisely, she exercised her formal power only on rare occasion. She could have used it more extensively, and the outside firms would have had to choose to go along or forgo working for a major national client. But she

proceeded in many important ways without relying on that big stick. She knew that regular, blatant use of it would surely undermine the sense of community that was so critical for eliciting the superior innovative work she needed from the PLA firms.

Community building consists not only in *what* the leader does but also in *how* it's done. Every act of the leader—from working with and respecting member organizations to structuring the ecosystem to creating and enforcing the rules that govern it—is done to foster and sustain that fragile but all-important sense of common purpose and shared values.

We've hardly solved the mystery of how to build sustainable ecosystems that can address the increasingly complex problems we face today. The stories of Larry Smarr and Amy Schulman offer inspirational examples of what we think is the next frontier, collective genius 2.0, leading innovative ecosystems.

But our observations of them, combined with what we saw in the many innovative organizations we studied, lead us to two basic conclusions. Without a sense of community—of being pulled together by common purpose, shared values, and clear rules of engagement openly developed—an innovative ecosystem is likely to flounder. Without a leader who understands this and works diligently to build and sustain that sense, the ecosystem will likely remain a mere collection of players who cooperate and coordinate, not a community capable of breakthrough work.