

Bay Area Innovation Network Roundtable



BAY AREA SCIENCE AND INNOVATION CONSORTIUM

Identifying
Emerging Patterns
of the Next Wave
of Innovation

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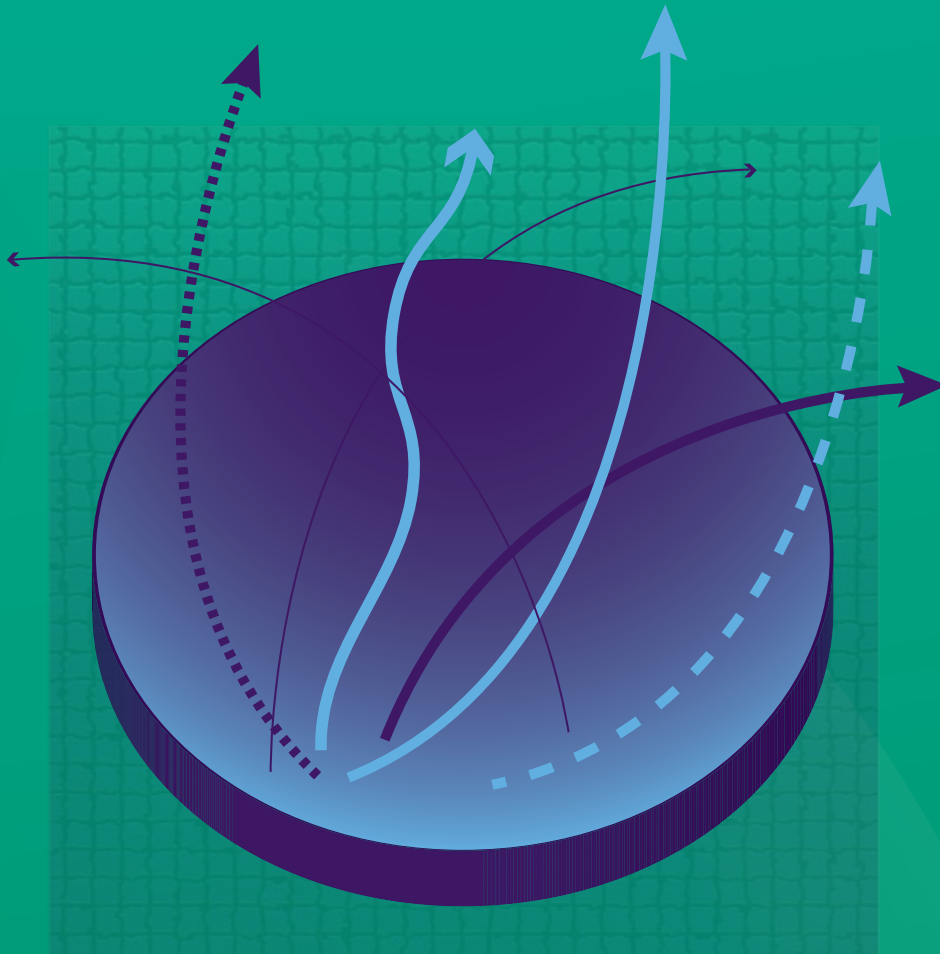
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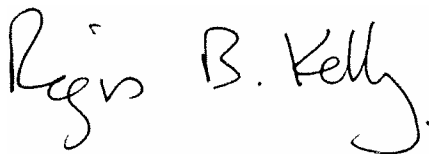
BASIC is a program of the Bay Area Economic Forum
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Message from the BASIC Chairman and the Innovation Network Roundtable Leader

On behalf of the Bay Area Science and Innovation Consortium (BASIC), it was a privilege to host the Bay Area Innovation Network Roundtable. We brought together some of the region's leading visionaries. We benefited from the knowledge, the experience and the excitement that these innovators shared with us.

At the end of that day, we did not toast the completion of a successful event. Instead, we acknowledged the challenge that these regional leaders had presented to BASIC. An exchange of ideas on the drivers of innovation is only the first step. The complete story must be told through the design and implementation of actions to advance the leadership role of the region, the state and the nation in an increasingly competitive global environment.

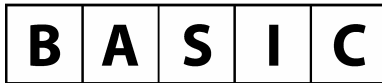
The Roundtable speakers emphasized that the challenge to the Bay Area is to change how we act, how we think and how we work together. The Bay Area Science and Innovation Consortium is committed to helping the region to meet that challenge.



Regis B. Kelly
Chairman, BASIC
Executive Director
QB3



Wayne C. Johnson
Innovation Network
Roundtable Leader
Vice President,
Worldwide University Relations
HP



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This report was produced by the Bay Area Science and Innovation Consortium (BASIC), an action-oriented collaboration of the region's major research universities, national laboratories, independent research institutions and research-and-development-driven businesses and organizations.

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Bay Area Innovation Network Roundtable

Identifying Emerging Patterns of the Next Wave of Innovation

Technology innovation in the San Francisco Bay Area is alive and well, but it is taking a different form from the wave of innovation a decade ago that spawned the dot-com bonanza and implanted the term “Silicon Valley” into the public lexicon. That is the conclusion of a select group of 40 influential men and women, seminal thinkers representing a broad spectrum of public and private research and development institutes and enterprises, mostly from the San Francisco Bay Area. These leaders were invited to participate in a day-long roundtable symposium aimed at identifying new and emerging patterns and key drivers for the next wave of innovation. The roundtable symposium was held on April 5, 2007, at the Quadrus Conference Center in Menlo Park, the heart of California’s Silicon Valley, and was jointly sponsored by the Bay Area Science and Innovation Consortium (BASIC) and the U.S. Department of Labor’s Workforce Innovation in Regional Economic Development (WIRED) program.

Wayne Johnson, Vice President, Worldwide University Relations for HP, was one of two keynote speakers who opened the event, saying,

The world is changing and the ways in which we do business and become successful are different. We believe that our prosperity and quality of life depend on understanding these new ways. The San Francisco Bay Area has been a leader in innovation. We’ve consistently been able to find ways of reinventing ourselves and new ways of creating value and exploring where innovation is going. One possible tagline for today’s event might be, “If only the Bay Area knew what the Bay Area knows.”

Regis Kelly, Chairman of BASIC, welcomed the participants and set the stage for the symposium/networking event with his opening remarks, saying,

Every politician and would-be politician is quick to tell us that innovation is important to our country, but what does it really mean to be innovative? Are we more or less innovative now than we were five years ago? How do you measure the success of innovation? How do we compare what we are doing here in the Bay Area with what is being done in terms of innovation across the rest of the nation or throughout the world?

BASIC put together this roundtable symposium/networking event with a goal of developing answers to these and other fundamental questions about the nature of innovation today.

Johnson gave an example of how the global landscape is changing with regard to education, which he deemed the “foundation” of any innovation infrastructure. He presented a chart that showed the U.S. badly trailing China, India, Japan and Russia and running neck and neck with South Korea in the number of college engineering students being graduated each year. He said that statistics consistently show that in the fields of science and engineering, the world’s “intellectual equilibrium” is decidedly shifting away from the United States. Equilibrium shifts are also taking place in economic performance and standards of living, a phenomenon of which astute businesses are very aware.

Today, everyone with good business sense is looking for that magic globalization key. As the world becomes more flat, businesses must seek new opportunities to gain an edge.

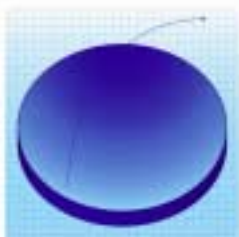
He contended that, unfortunately, too many companies have resorted to what he called the “ings”—as in downsizing, rightsizing, rebalancing, offshoring, onshoring, outsourcing, etc.—all of which have had negative impacts on workers and have not necessarily delivered the benefits anticipated.

Technology has made it possible to quickly transfer goods, ideas, money, etc., and has created a global community of increasing communication, trade and shared interests. Problems have now become so complex that the go-it-alone approach no longer works. Various players, be they nations, regions, enterprises or individuals, must come together because their common interests compel them to work together.

Globalization is ushering in a “next wave of innovation,” in Johnson’s words. To catch this next wave, innovators, both individually and collectively, will have to change the form and structure of what they do. He cited the San Francisco Bay Area as a prime example:

In the past, innovation in the Bay Area has happened in a bottom-up, relatively unorchestrated manner, building on the results of the social fabric and the intense creativity and entrepreneurial spirit of the region, and taking advantage of an infrastructure which has taken decades to build up. Innovators thought globally and acted locally. However, to

Navi Radjou on the Global Innovation Networks Model



Johnson's vision was amplified in the second keynote address, which was presented by Navi Radjou, Vice President for Forrester Research, Inc. He noted studies that have projected that in the future, the BRIC economies (those of Brazil, Russia, India and China) will in all likelihood surpass the economies of many G-6 nations (the United States, Japan, the United Kingdom, France, Germany and Italy). Only the United States and Japan are expected to rank among the top six national economies by the year 2050.

To sustain its long-term competitiveness, the San Francisco Bay Area needs to reframe its regional innovation ecosystem in the context of global innovation networks. In the old days, companies tried to meet demand by depending exclusively on internal capabilities. Large corporations tried to fund, design, and market new products and services all themselves.

This old innovation model, which Radjou portrayed as an expanding brace of concentric circles, is too rigid to meet today's evolving challenges. The new model for global innovation must be flexible, like a sustainable ecosystem. Echoing Johnson's comment about innovation becoming disintermediated, Radjou described what he called the "global innovation networks model," in which innovation becomes a four-way network of separate entities which he labeled "inventor, transformer, financier and broker."

Under this global innovation networks model, inventors serve as the intellectual powerhouses that conduct basic science research and/or design products and services that result in patentable inventions. Transformers provide multifunctional production and marketing services that convert inputs from inventors or other transformers into valuable business innovations for either internal or external customers. Financiers provide funding for both inventors and transformers, usually in return for intellectual property rights. Brokers serve as the matchmakers or facilitators in this system who find and connect the other three network

entities, either through buying and selling, or through the delivery of enabling services:

The role of the brokers is new and evolving. Brokers can be seen as the trust-builders who act as proxies to make the networking of the other three entities frictionless.

Radjou provided a number of real life examples for each of these four entities. His examples included Microsoft Research in the role of inventor, IBM's Business Consulting Services in the transformer role, Kleiner Perkins Caufield and Byers in the role of financier, and yet2.com in the role of broker. However, he stressed that roles are "not set in stone." A single entity can serve in more than one of these roles, or serve in one role for one invention or service, and a different role for something else. Flexibility is the key.

The global innovation networks model is a collaborative ecosystem that allows businesses to innovate faster and grow more quickly. With it, firms can seamlessly weave internally and externally available invention and innovation services to optimize the profitability of their products, services and business models.

As examples of successful global innovation networks in action today, Radjou cited Proctor & Gamble, which has fulfilled the roles of transformer, financier and broker in bringing new brands such as Prilosec and Swiffer into its product line-up. A look at Proctor & Gamble's success matrix, he said, reveals that since implementing the global innovation networks model, their new-product hit rate (the percentage of new entries that deliver a return above the cost of capital) rose to better than 90 percent, up 20 percent since 2002. Sales have grown 40 percent since 2000, and both profits and market caps have doubled. The company's profitability per R&D worker has also gone up, as have the number of external inventions. Proctor & Gamble is also in the process of brokering new network hubs in India and China.

Proctor & Gamble made a decision to be a company that collaborates, and their goal was to be the absolute best at spotting, developing and leveraging relationships with best-in-class innovation partners. They set out to be a magnet for the best-in-class inventors, and they have been quite successful.

Other companies cited by Radjou as successfully practicing the global innovation networks model included Boeing, Best Buy and IBM.

There are two major lessons to learn from these examples of success. The first lesson is that you don't need to invent to innovate. Knowledge is not power; finding and sharing knowledge is power. Market value, not patents, is the best indicator of innovation, and smart firms will trade ideas with competitors.

The second lesson pointed out by Radjou is the importance of picking the right role or roles for your particular company.

Think of Hollywood. The making of a film brings together a network of creative specialists who play specific roles: actors, writers, producers, directors, et cetera. In Hollywood, you can choose to be a talented specialist like Meryl Streep, a gifted actress, or you can be a Renaissance man, like Robert Redford, who can act, produce, and direct movies. If you are really resourceful, you can play all four roles: inventor, transformer, broker and financier.

Both Exelixis and Renovis started out as technology platform companies, but both subsequently morphed into drug discovery platforms. Goodman says the key to their continued success is the willingness to be flexible and adapt. Companies that have stubbornly tried to remain true to their original technology platform visions have, for the most part, gone down:

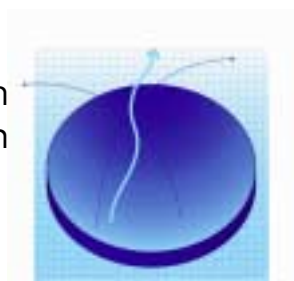
Don't stay married to your original technology vision. Times change and you must too—business models morph, great companies adapt, and success is rarely achieved based on the original vision.

Among the other lessons Goodman draws from the Exelixis and Renovis experiences are that venture capitalists invest in people as well as technology, and that they also invest in business models and exit strategies. This means that while the scientific founders may provide vision and initial technology, the business founders are equally important because they know how to build and acquire funding for technology:

Look for a CEO who is strong and nimble and surround that person with strong team players. Take money when you can, but remember that not all money is the same. As for intellectual property, file early and often; in contrast to other industries, much of biotech value is in the IP.

Goodman also cautioned scientist/entrepreneurs to manage uncertainty by balancing technology portfolios with some lower risk projects, and to “accumulate all the assets you can to broaden or strengthen your technologies.” Above all, he said, “Lose any ‘not-invented-here’ mentality.”

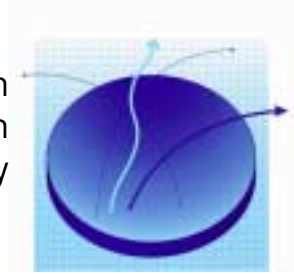
Pankaj Dhingra on
Nanotech



The second speaker to relate personal experiences was Pankaj Dhingra, CEO of Nanostellar, Inc., a nanoengineering firm specializing in computational nanoscience and advanced synthetic chemistry in the development of nanoscale catalytic materials for diesel emissions control.

diesel engines to reduce noxious emissions by as much as 40 percent more than existing pure-platinum catalysts at equal cost. Platinum is the most expensive component of the diesel oxidation catalysts required to meet the new, stringent emission regulations for the 14 million light-duty and 2 million heavy-duty diesel vehicles which are produced annually worldwide. Gold is currently about half the price of platinum.

Marissa Mayer on Information Technology



The emergence of bio and nano technologies as hotbeds for innovation has not diminished the status—or the clout—of information technology (IT). As the Internet transitions into the next generation of IT, commonly referred to as Web 2.0, the ability to innovate on a global scale has clearly become a major determinant of commercial success. The first speaker to share personal experiences of innovation from an IT standpoint was Marissa Mayer, Vice President of Search Products and User Experience for Google, a company that is widely considered to be the standard-bearer for Web 2.0 and is arguably the greatest success story of Internet-based enterprises.

Since its inception in 1998, Google has grown to a workforce of more than 4,000 with revenues approaching \$4 billion a year. Mayer, who holds an M.S. in computer science from Stanford, joined the Google staff in 1999. She was the company's first female engineer and was brought in to lead the user interface and webserver teams. Her list of accomplishments includes designing and developing Google's vaunted search interface; internationalizing the site to more than 100 languages; defining Google News, Gmail and Orkut; and launching more than 100 features and products on Google.com. She has also taught introductory computer programming classes at Stanford, for which she was recognized with both the Centennial Teaching Award and the Forsythe Award.

The first key principle for innovation at Google is that ideas come from everywhere. We also encourage employees to

share everything they can. Google has fostered an atmosphere in which management tries to share as much information with employees as possible. By being super-open, we give our employees a really strong sense of ownership and a greater sense of responsibility for company decisions.

To show how Google puts into practice its belief that good ideas can come from anywhere within the organization, especially when knowledge is shared, Mayer described an internal program for employees called “Snippets.” Every Monday, employees or teams of employees can post on the company e-mail list a short message—a snippet—that describes a particular task or problem they’re working on:

We find it’s a good way for employees to get help from others who are active in the same area of concern. It also helps reduce redundancies so we don’t have people from different parts of the company working on the same thing with no idea as to what’s been done before or what’s being done now.

Employees are also given one day a week, or 20 percent of their time, to work on their own pet projects:

We call this a license to dream. We believe that if you hire really smart people and give them a lot of information, you also need to empower them with time and freedom. We feel we get much greater productivity from our employees in return.

Another key Google principle is that innovation is not instant perfection:

My mantra is to launch new products early and often. Google has won a reputation for its quality so people have come to expect new products to be great right out of the box. That’s pretty ironic to me, because we have always launched whatever we’ve had to launch, whenever it could be launched. Then we iterate it (based on user feedback) to make it better.

Among the other Google principles for innovation discussed by Mayer were: “data is apolitical,” “creativity loves constraint,” “users, users, users,” and “you’re brilliant, we’re hiring.”

It is Google's primary mission to organize the world's information and make it universally accessible and useful. To accomplish this, Google focuses on finding out what products users need and how will they make use of those products. Google then hires very smart people and puts them in a creative environment—they call it the GooglePlex—where ideas are encouraged to thrive. However, Mayer cautioned that success itself can become a major obstacle to innovation if a company allows itself to become paralyzed for fear of not meeting raised expectations:

The bigger and more successful you become, the greater the fear that we can't do this any more. That's why we say innovation is not instant perfection and why we launch early and often. It helps keep you fearless.

Stan Williams on
Information
Technology



Google, for all its gargantuan prosperity, is still barely into its corporate adolescence. For a glimpse at how innovation is kept alive in a company that has been in existence since 1939, Stan Williams, HP Senior Fellow, and Founder and Director of HP's Quantum Science Research group, shared some of his experiences.

Williams, who holds a Ph.D. in physical chemistry from UC Berkeley, is one of just five active HP Senior Fellows out of a total technical staff of more than 40,000. For the past 30 years, his primary scientific research has been in the applications of solid-state chemistry and physics to technology, with his most recent emphasis on nanostructures and chemically-assembled materials. Among a plethora of accomplishments, he organized and co-edited, respectively, the workshop and the book, *Vision for Nanotechnology in the 21st Century*, which led to the establishment of the U.S. National Nanotechnology Initiative in 2000.

The Quantum Science Research (QSR) group that he created and directs was established in 1995 to prepare HP for the challenges and opportunities ahead in electronic, photonic and mechanical device technology as

technology transitions from the micro-scale to the nano-scale era. QSR now has a staff of more than 60 scientists and engineers.

From the standpoint of science and technology, the opportunity for creating new products or multiple new products—not just modifying or improving existing products but creating entirely new things—has never been better. In many areas, there has simply never been a better time to be a scientist.

In terms of keeping innovation alive and well in a mature company, Williams noted the advantages of having a large multidisciplinary and multicultural team in his QSR group, a team that not only includes scientists and engineers, but even philosophy scholars. “The scary thing about my group is that practically nobody was born in the United States,” he joked. “But because we are so multicultural and multidisciplinary, we’ve had to learn to communicate across what have been traditional barriers. We can now freely exchange ideas.”

What has transpired within his QSR group is a microcosm of what is transpiring regionally, nationally and throughout the rest of the world, and Williams said that it illustrates the enormous potential to be had from global innovative networks. Among the major principles he cited for innovation at HP, specifically in his QSR group, are a willingness to take big risks, a willingness to be systematic and persistent about invention, and a willingness to break a lot of rules and accept the consequences:

You have to not be afraid to fail, and you have to learn from your failures. In terms of being systematic and persistent about invention, you must be able to ignore what is deemed urgent to take care of what you know is important. As for the willingness to break rules, remember, I break rules, not laws; but it helps to have a very understanding management!

Williams attributed much of his own innovative successes to the ample presence of both mature and young talent at HP; the critical mass of intellect, skill, competitiveness and environment that exists in Silicon Valley and the San Francisco Bay Area; and, most importantly, the low fear of failure that permeates the culture here.

What really keeps me awake at night is the worry that I am playing it too safe. In order to move forward, you have to continually be taking chances, and as long as you don't do it stupidly—as long as your risks are calculated—your chances of innovative success are good.

John Kao on Architected Innovation Ecosystems



Anchoring the personal experiences portion of the Bay Area Innovation Network Roundtable event was John Kao, best-selling author of the book, *Jamming: The Art and Discipline of Corporate Creativity*, and a leading authority on corporate innovation and transformation design and the future of business.

Kao, who has been heralded as a “serial innovator” by *The Economist*, has made a career out of helping organizations go from “getting the importance of innovation” to “getting innovation done.” The embodiment of keynote speaker Radjou’s Renaissance man, he has taught at Harvard Business School and the MIT Media Lab, and he served as Distinguished Visiting Professor of Innovation at the U.S. Naval Postgraduate School in Monterey. Kao has also worked with a wide range of Fortune 500 companies, start-ups, and government agencies around practical issues of strategic innovation and organizational transformation, and has recently completed a new book entitled, *Innovation Nation: How America Is Losing Its Innovation Edge, Why It Matters, and How We Can Get It Back*. To write this book, he carried out in-depth research in such countries as Singapore, Denmark, Dubai, China, and Brazil.

Innovation is the capability of continuously achieving a desired future state. You can look at this from the perspective of an individual who wants to follow his or her bliss, or you can look at it in terms of a company that wants to follow its vision or mission statement, or you can look at it from the point of view of a civil society, regional, national or global. From each and every one of these perspectives, innovation

becomes the answer to the question of what do we want for ourselves.

Kao joined the chorus of speakers calling for new models of innovation, but he cautioned that before effective new models can be created, we must first dispel certain assumptions that have become no more than myths:

Foremost among these myths is the notion that we (America) will always be the innovation leader because of our can-do, wild-ass entrepreneurial culture. Other myths include: We will always be number one. We will always be upstream; they will always be downstream. We are originators; they are copiers and low cost implementers. The American model will always be the global model for innovation.

Because far too many of our political and business leaders have clung to these myths, Kao says the United States is losing the global innovation fitness race. Also, contrary to what Friedman and others have said with regards to globalization acting as a flattening force on the world, Kao argues that through globalization technologies, i.e., the Internet and Web 2.0, the world is “emphatically” not flat:

Countries around the world are addressing innovation to create new sources of competitive advantage and thus they are unflattening the world to their own advantage. It used to be that there was one big mountain peak with a red, white and blue flag on it. Now we have several new mountain peaks, such as Scandinavia, Singapore, Bangalore and Shanghai.

Kao said that successful models of innovation in the future will require new stewardship strategies and infrastructures. Such models will also have to allow for better technology foresight, environmental scanning and knowledge building. In creating these new models, innovators will have to take into consideration new paradigms, such as cultural intelligence and the catalytic role of the public sector, and they will have to create global bridges and new commons.

In a world in which innovation has gone global, we must ask ourselves, What is our role and distinctive competence? We

must ask, What can the world do here, and what do we choose to do in the world?

Obtaining answers to such fundamental questions on a national level will require an entirely new technology roadmap—one that will entail a reinvention of the critical technologies process and a national knowledge-building effort. Such an effort will be galvanized by the government’s resources and ability to generate data, and fueled by private sector initiative and technology.

Emerging Patterns

After the conclusion of the presentations in the Living Studies segment of the program, the key points identified by the morning's speakers were summarized by BASIC chairman Reg Kelly and BASIC director Wayne Johnson.

The emerging patterns of the next wave of innovation include:

- A networked environment—in which ideas are brokered both within and between organizations—is critical to creativity.
- Regional capabilities must be connected to global networks.
- Maintaining and attracting a talented workforce is a critical factor in an innovation infrastructure; businesses need to draw on the best talent from wherever it can be found, including globally.
- Companies must be flexible and adaptable to changes affecting their markets and technology platforms.
- Ideas come from everywhere; companies must lose any “not-invented-here” mentality.
- Taking risks and not being afraid to fail are essential.
- Innovation on the business side of the process can be as important as the science.
- The four network roles of inventor, transformer, financier and broker are at the core of the new global innovation model, so it is important to pick the right role or roles for your particular company.

Bay Area Action Challenges

The participants were then organized into three subgroups and asked to discuss innovation practices and trends that pertain specifically to the San Francisco Bay Area.

Because of its wealth of resources, the Bay Area has capable players in all four of the critical global innovation roles: inventor, transformer, financier and broker. This places the region in the enviable position of being a global integrator and innovation hub. But companies and countries elsewhere are expanding their capacities; the Bay Area will not remain a global innovation leader if we fail to take risks and invest in our knowledge base.

When the participants reconvened in full session, each subgroup reported a set of emerging innovation practices that are rooted in their experiences, and they commented on assumptions, expectations and cultural norms that are region-specific. They also discussed a list of issues which the Bay Area Science and Innovation Consortium (BASIC) could consider incorporating into an action plan.

BASIC chairman Reg Kelly then synthesized the recommendations into a set of challenge issues for presentation to the BASIC Board of Directors.

1. As the emerging patterns of innovation are identified, the region must work collaboratively—across both public and private sectors—to address the challenges, manage the complexities, and build on existing strengths.
2. The region should promote innovation leadership by operating within a global innovation environment while retaining a local innovation leadership position.
3. Innovation is enhanced through the creation of a networking or “brokering” environment.
4. It is of paramount importance for a regional leader in innovation to continue to attract and retain a highly talented workforce.

To address these challenges, specific actions must be designed and implemented. “Knowledgeable discussions must be followed up with concrete actions,” Kelly said. “This is the challenge to which BASIC

Appendix

Post Conference Follow-Up Actions by the BASIC Board of Directors

In May of 2007, based on recommendations from the Bay Area Innovation Network Roundtable, the BASIC Board of Directors revised its 2007–2008 action plan to focus on the following priorities:

1. **Build Collaborative Networks**
Build networks across industry, university and governmental sectors to address science and technology problems and support opportunities for advancing regional leadership.
2. **Promote Global Innovation Leadership**
Promote entrepreneurship in a global environment while retaining local innovation leadership.
3. **Strengthen Talent Base**
Address specific issues impacting the science and technology segment of the Bay Area's highly talented workforce and enhance its continued leadership in innovation.

BASIC is now designing specific projects to address each priority issue area. As the projects are developed, they will be listed on the Mission and Action Plan page of the BASIC website (www.bayeconfor.org/basic).



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