THE CREATIVE DISCIPLINE

Nancy K. Napier and Mikael Nilsson

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Mastering the Art and Science of Innovation

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For Chase and Quinn, who are creating their own worlds

—NKN

For Bea and Malin, my patient darlings

—MN

For Stephan Zinser (1964–2006), our coauthor in spirit

In September 2006, Stephan Zinser died, along with his wife Gabriele and two young sons, Maximilien and Paul. In addition to this book project, which he helped design, he had several other projects in the works—ranging from an edited book of corporate experiences with workplace flexibility, to a residency program for masters students in Dresden to study abroad, to joint cross-border academic courses. With his tragic death, we assumed those projects would dissolve.

But Stephan has a strong spirit. His projects have been completed or continue to thrive, perhaps not in the same shape he would have imagined, but we hope in a form that would make him proud.

We dedicate this book to him.

—NKN and MN

Contents

Acknowledgments

I continue to be amazed and grateful for people who help books come to life. Thanks to so many of you.

First, I appreciate very much the willingness of the organizations I visited to allow me to learn from them. So many people—from those in the theatre to high tech, health information to football—provided their time and insights. I still can't explain what a running back does or what "going zone" means, but at least now I know something about how football coaches and players think creatively!

My ever upbeat graduate assistants, Serena Bergonzi, Larissa Lee, and Kengo Usui, played detective, found great streams of ideas, and allowed me to pick their brains about creativity and innovation for long hours.

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Jana Kemp, Cheryl Larabee, and Suzie Lindberg helped me wrestle through metaphors that made no sense, and then did.

Caroline Blakeslee generated scores of ideas on our morning runs. The members of St. Ogg's and MHC-Boise accepted with grace my curious connections between literature and creativity.

Alma Fisk has put up with my absentminded-professor life for more years than either of us would admit, and always has the right comment to bring me back to earth.

My father continues to exude more ideas in a year than most of us will hope to achieve in a lifetime. He and my brother, Bill Napier, put meat on the "disciplines" and the "aces" long before it was clear what they were.

Thanks again and always to my husband, Tony Olbrich, who once more "made it" through another period of creative slogging! Bewildered, but always encouraging, maybe one day he'll write his own book and understand "why."

Nancy Napier

You, readers of all kinds and shapes, have been a constant reminder of what we have been searching for and trying to communicate. Creativity and innovation are inspiring topics and many have been spurring us on, asking questions and inquiring as to what we say and do—all inspiring.

Now I am happy you have picked up this book and started to think about creativity and innovation. I think it will be a great experience for you, as it has been writing this book. Enjoy! And, thank you.

This book would have been nothing without the organizations we have met. For me, Cirkus Cirkör gave everything. You let me in on the experiences, the knowledge, and the hard-earned truths you have. I really appreciate all the good and inspiring discussions we have had, and will have, around creativity and how to develop it. Thank you so much.

This book would never have seen the light if it were not for my coauthor who has driven this idea all along and who has been a great coauthor, on this and many other pieces. Thank you, Nancy. Jeff Olson patiently guided us through this book. This has been a difficult process, and never a harsh word. The book is so much better for it too.

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Finally, thank you to Malin and Bea, who have given me the time and always patiently waited for me to finish. This time it was harder, and you've given more than ever. Thank you!

Mikael Nilsson

Introduction: Quarterbacks, Play Actors, and Engineers

If you can dream it, you can do it.

Walt Disney

Football Magic

For fans at the Fiesta Bowl in Phoenix, Arizona, on New Year's Day, January 2007, it was a day of nail biting and magic. A crowd of over 70,000 fans watched as David beat Goliath in what some reporters have called one of the greatest American football games in U.S. history. A team known more for its wacky blue football turf than for its undefeated record and high-scoring receiver, Boise State University surprised football fans with its smashing, overtime victory against a long-winning and powerful University of Oklahoma. The much smaller, little-known team gained much of its notoriety with plays that many commentators thought were unusual, wildly difficult to achieve, and risky—in a word, creative.

Boise State University's football program has historically been known as an underdog compared to other Division I programs, lagging in funding and resources. Its players are often less sought after and smaller in size and weight. The coaches have had to find creative ways to gain competitive advantage in training, inspiring players, and generating effective plays.

They must have found something that works.

In 2006, the Boise State team finished ranked fifth in the country after the stunning 43 to 42 overtime victory against Oklahoma, one of the most successful college football programs in history. Foxsports.com's Michael Rosenberg captured the Idaho team's spirit: "Creative play calling dominates bowl season … [as] Boise State used everything in their playbook, including the game winning Statue of Liberty play."[1]

Yet to make that creativity work, the coaches have to mix it with something that seems just the opposite: hard work and discipline—creative discipline.

Cheeky Circus

In 1995 a group of independent circus artists in Sweden had the bold self-confidence and cheekiness to set about changing the world. As they expressed it: "Tired of dreaming big and living on a small scale, we decided to go for broke and make the dream a reality." From that time, the group has expanded rapidly to have an impact far beyond Sweden. Cirkus Cirkör has taken on challenges at places and in directions the initial group never could have imagined. Today, Cirkus Cirkör is focused on creative performances, playing in Sweden and abroad. In addition, it offers training courses for corporations and schools, tours in Sweden and abroad, and is internationally recognized as a leader in contemporary circus education. The group even trains ski acrobats!

In the show "99% Unknown," Cirkus Cirkör brought together world-renowned brain researchers, neurosurgeons, and circus artists to create a show that blends the magic of the human body and the elements—both scientific and artistic—that make it work. Finally, the group has had a dramatic impact on the physical environment in which it works. Cirkus Cirkör's main office, training ground, and staging area have transformed its local environment, one that went from being filled with troubled youth and crime to a place where opportunities are increasingly possible.

Cirkör works with a mentor from the famed Cirque du Soleil, a company that employs over 3,000 people, stages five shows in Las Vegas, and contributes to what has become an important export industry for Canada. From its humble beginnings, Cirkör today employs 300 people who work in an industry that was unheard of ten years ago. It is on the verge of its next stage. The group is reaching dreams it imagined years ago, because of effort and discipline—creative discipline.

Software "Throat Grabbers"

When you rent a movie, how long do you watch it at home before you decide to stop watching because you don't like it? Ten minutes? Fifteen? "Testing out" a film is similar to "testing out" a piece of software. When the typical software user tries out a new piece of software, how long does she give it before deciding to learn it or return it?

At least one software CEO, whose firm produces very complex business-analysis software, knows the answers. The movie industry figures that viewers will stay with a film for 10 percent of the total length of the film, typically from 10 to 12 minutes. A potential software user may give it just 1 to 2 minutes.

So how, wondered Bob Lokken, CEO of ProClarity (now a part of Microsoft), could his firm learn to grab users by the throat just like a great movie does, and hold them captive for 100 or 120 minutes?

The CEO found some answers when he mixed research with discipline—creative discipline.

Automated Parking … in Vietnam?

A young entrepreneur in Hanoi, Vietnam, has become one of the country's first builders of automated parking garages. Cars? Automated garages? In Vietnam?

In the years following "the American War," which ended in April 1975, Vietnam faced yet another crisis. The Soviet Union, its major trading partner, collapsed, and Vietnam struggled to survive, as regional neighbors like Thailand and China became stronger. But during the early 1990s, the government adopted market-based economic policies, began to train managers in business practices to compete globally, and unleashed entrepreneurs to pursue business opportunities.[2]

One entrepreneur runs a small firm that carries out specialized construction projects. Over the years, the founder's knowledge of soil conditions and how to build foundations in Vietnam has given him a competitive advantage that foreigners cannot replicate. He watched Hanoi's many traffic changes and anticipated the potential need for garages. In the early 1990s, there were few automobiles, only bicycles and a few motorbikes. By 2008, the vehicle mix reached at least 40 percent automobiles. Many of the autos were taxis, but, increasingly, private cars now barrel through the streets. However, Hanoi's streets are narrow, motorbikes zip in and out of them, and auto drivers are often inexperienced. People need space to park cars. Many drivers are still unfamiliar with the idea of parking in tight spots, however, and the entrepreneur saw the potential need for automated parking long before others did, as a way to reduce fender benders and solve a space problem.

The CEO recognized that an idea more common in other countries (automatic, robot parking) could be useful in Vietnam. He figured out a way to build automated garages given the poor infrastructure and limited space availability in Vietnamese cities. The firm has now built several garages, adapted to Vietnam's conditions.

How did the entrepreneur anticipate and then participate in such changes? In part, because he mixed knowledge with discipline—creative discipline.

Disciplines and More

Despite the quite different industry sectors they inhabit, these organizations are winners in their fields, in part because of similar and dedicated approaches and attitudes affecting creativity and innovation. These organizations represent what we have found as we have studied and worked to understand *how creative organizations work*.

First, the organizations blend and exploit the critical links between creativity and innovation and three types of discipline. Second, such creative organizations also appear to systematically mesh the three disciplines with other factors—people, locations, and catalytic efforts. These factors, which we call faces, places, and traces, enhance their ability to be effective at creativity and innovation, at a given time.

Interestingly enough, each of the organizations also seems to be "on the fringe," geographically, as well as in their attitudes. Most are outside what many would call creative hotbeds. Yet, these organizations find that "being on the fringe" can force an attitude of seeking creative ways to stand apart. In such an environment, they fight harder to prove they can succeed against stronger or better known competitors. Being on the "edge" of most action also allows for much experimenting and progress before others, especially competitors, realize what innovation is going on.

Creativity and discipline are two terms we will be returning to often in this book. We define creativity as "the development of new or novel ideas, appropriate for their context, that have value."[3] This definition seems to resonate with the people in organizations we have worked with. Discipline is the other recurring theme in this book. First, it refers to an area of knowledge and competence, a discipline, that members of an organization need and develop over time (within-discipline expertise). Second, it embraces the openness to ideas that members need to foster creativity (out-of-discipline thinking). Finally, it includes a systematic approach, or disciplined process, to generating, testing, and using ideas. Together, they comprise creative discipline.

Are these organizations unusual? Not in obvious ways. They are in industries that have experienced successes and failures, and the organizations themselves have had their ups and downs. They are mid-sized; they have generally limited budgets compared with many of their competitors. On closer examination, however, the organizations are unusual in subtle and important ways that are hard to recognize and often more difficult to replicate.

WHY THIS BOOK?

> The biggest threat to the U.S. economy is lack of creativity … it's really a question of innovate or die.
>
> Ray Bingham, CEO, Cadence Design Systems

Bingham is not alone in calling for organizations to "innovate or die." From consultant Tom Peters to Google's "innovate or die" contest for a new pedal machine, innovation is in the news. In addition, the shrillness of recent discussions about flat and spiky worlds forces us to turn our heads, partly to move away from the sharp sounds and partly to move toward things that appear to make organizations creative and innovative.

Our Creative Work Needs to Start

So why another book on creativity and innovation? One reason is that some people seem more ready to listen and learn about how to enhance creativity and innovation. Some people argue that "creativity is for children," or only for certain types of fields, like art or music. We think it can happen—and should happen—just about anywhere, even in unexpected places and sectors. So, this book is for those people ready to listen and start moving.

The current hype and general consensus on the importance of creativity is not transformed into action as much as one would hope for, and certainly seldom with the zeal of successful creative organizations. This is partly because many have not understood the profound impact creativity will have on their organizations, which chapter 1 describes. It is also partly because the step between knowing something is wrong and starting to address it is sometimes very long and hard.[4] Using a variety of examples, this book strives to show how to transform "knowing" into "doing," in your organization. It is not easy, but it's worth it.

The Creative Art and Discipline

When we started our investigation of organizations, we chose ones that seemed to be at opposite ends of a continuum of art and science: theatre and software engineering. How could they be more different: actors who talk about "creating a character"; engineers who focus on logic and analysis. And yet, we were surprised to learn how much they had in common about approaches to creativity and innovation.

Then came sports.

A couple of years ago, Nancy learned that one of her students was a kicker for the Boise State football team. To support the student, she started watching the games. During several games, the ESPN and CNN reporters made comments like "What a risky move!" and "Did you see that creative play? We just don't see things like that!"

Her reaction: "Creativity, in sports? In *football*?"

So, rather than focus on a single sector like business or the arts, we examined organizations in what appear to be widely differing fields—from the arts to engineering, from sports to consumer services. We looked at organizations in the public, not-for-profit and profit-making sectors. We talked with people from the Nordic countries of Sweden and Finland, to people in Germany and Austria, and in England and Ireland. We talked to people in Asia and the United States. In all, we spoke with more than 250 people, in over fifty organizations, and enjoyed learning from all of them.

Part of our surprise and delight has been uncovering systematic approaches to nurture creativity and innovation, whether from circus directors or gas utility managers, special teams football coaches or software engineers. But it's

one thing to say that creativity can exist in a variety of sectors; it's another to find that systematic and consistent focus on finding ways to enhance such endeavors. And that appears to be part of what separates some of the stronger and more creative organizations.

As we came to know several organizations, we realized one of their common themes was "discipline," which emerged in a variety of ways. In contrast to people who think creativity is chaotic, has no rational approach, and thus is hard to manage or control, members of the organizations we looked at insist that at least three types of discipline are critical for success. For them, those disciplines become fundamental to how they create and develop new ideas that thrive. They are *within-discipline expertise, out-of-discipline thinking,* and having a *disciplined process* for creativity and innovation. The organizations also showed a common thread in the environment, what we call the "aces"—*faces*, *places*, and *traces*—that support creative and innovative endeavors.

In addition, during our discussions, we found a mix of "art and science" in the execution of activities. Members within organizations talked of the art and science of both the disciplines and the "aces": there was logic and structure to the creative and innovative activities, but within each organization, members acknowledged a less tangible, more artful aspect. A football coach who often receives requests from reporters, other team coaches, and fans who want to know "what makes the team work" is happy for them to observe and learn all about the "pieces." He doesn't fear that the "secrets" will be taken, because he knows that it is the art of putting them all together, designing and delivering them, that makes the entire organization work. And that comes from having a fully operating system of disciplines and "aces." Management scholar Gary Hamel puts it another way: "It's also tough for rivals to replicate advantages that are *systemic,* that encompass a web of individual innovations spanning multiple management processes."[5]

Finally, we realized that being "on the fringe" also seemed to matter. While many wonderful examples of creativity exist in some larger organizations, like Apple or Nokia or Sony, we were intrigued with the organizations and locations that are on the fringes, out of the way and perhaps not as well known, places like Boise, Idaho, Stockholm, Sweden, and Hanoi, Vietnam. Indeed, several leaders of the organizations we worked with commented that being on the fringe was a factor in their ability to be creative. Because they were small and out of the mainstream, some competitors did not really take them seriously. One CEO felt his firm could operate "behind the mountain," out of the way of prying competitors, before they had any idea of what new products his company had coming onto the market. Likewise, following the Boise State football Fiesta Bowl win, numerous people called or wrote asking, "where did this team come from, out of the blue?"[6]

So why this book?

For its focus on the *disciplines* and "*aces*" or environment critical for creativity and innovation.

For its focus on *unexpected organizations*—from business to circus to sports—as hotspots for creativity and innovation.

For its focus on *art and science*—in sectors—and art and science in how the organizations approached their creativity and innovation activities.

And, finally, for its focus on *the fringe*—locations and organizations—as fodder for creative and innovative endeavors.

LAYOUT OF THE BOOK

We've divided the book into three major sections: The Context, Disciplines, and "Aces." The Context in part I, chapters 1 and 2, sets the stage for the importance of creativity and innovation and lays out the key concepts of the book. Chapter 2 provides an overview of the six factors that we found in the organizations we investigated.

In part II, the 3D's or three Disciplines are the focus for each chapter. Chapter 3 examines within-discipline expertise and mastery and its benefits to enhancing creative and innovative efforts. Chapter 4 focuses on out-of-discipline thinking: the ability to bridge, blend, or transfer ideas from one field or discipline to another to generate ideas or solve problems. Chapter 5 looks at the disciplined processes that organizations use to come up with ideas, experiment and test them, and carry them out. The basic processes are remarkably similar across types of organizations, yet the amount of time they devote to various stages and the ways groups collaborate within organizations do appear to vary.

Part III covers the three "Aces," the factors in organizations that create an environment or surroundings that can enhance or inhibit creativity and innovation. Chapter 6 discusses three "faces" or roles critical to such activities: the creative entrepreneur, the creative leader, and the creative team. Chapter 7 covers the spaces: the organizational and physical infrastructures that come into play, from the layout of buildings and office space, to the organizational arrangements that support interaction among groups in and out of organizations. We also look at some of the ways creative regions and communities on the fringe are seeking to build their capacities to allow and promote flourishing creative and innovative activity. Chapter 8 focuses on what we call *traces*, as in trace elements. Trace elements, like their biochemical counterparts, represent the catalysts in an organization that enhance and support creativity and innovation. Sometimes they are quite subtle, nearly microscopic, or invisible; and sometimes they are artifacts. We talk about three types of catalysts or trace elements: (1) trace elements for environment (culture); (2) trace elements for practice (human resource policies); and (3) trace elements for connection (networks in and out of organizations).

Finally, we conclude with chapter 9, which brings up the big picture again: focusing on creativity and innovation as a competitive advantage for organizations, communities, and countries.

Now let us move on to discuss the creative myopia that is holding back our development.

NOTES

1. See, for example, articles about the rankings and the game: 2006 College Football Rankings—Week 17 AP Top 25 Ranking, http://sports.espn.go.com/ncf/rankingsindex; Fox Sports on MSN, http://msn.foxsports.com/cfb/story/6350780.

2. Vietnam initiated policies of *doi moi*, or market renovation, in 1986, but they really took hold starting in the early 1990s. The challenges facing managers, both local and foreign, in such transition economies are documented in several books and articles. See, for example, Nancy K. Napier and David C. Thomas. 2004. *Managing Relationships in Transition Economies.* Westport, CT: Praeger.

3. The three-part definition—novel idea, fits context, and has value—has been around for many years. Several scholars have used it repeatedly, most recently and perhaps most emphatically Robert Sternberg, former Yale professor, now Dean of Arts and Sciences at Tufts University. For example, Robert J. Sternberg (Ed.). 1999. *Handbook of Creativity.* Cambridge: Cambridge University Press; others include Herbert Simon, "Understanding Creativity and Creative Management," in Robert L. Kuhn (Ed.). 1988. *Handbook for Creative and Innovative Managers.* New York: McGraw-Hill: 11–24; Teresa M. Amabile. 1996. *Creativity in Context.* Boulder, CO: Westview.

4. An interesting argument on this dilemma and ways to address it is made in Jeffrey Pfeffer and Robert I. Sutton. 2000. *The Knowing-Doing Gap: How Smart Companies Turn Knowledge into Action*. Boston: Harvard Business School Press.

5. Gary Hamel's latest book argues for innovation as a fundamental approach to the discipline of management itself. See Gary Hamel. 2007. *The Future of Management.* Boston: Harvard Business School Press. A similar argument is made by Jan Rivkin and Nicolaj Siggelkow, who have addressed this question using a combination of complexity theory and longitudinal case studies. See, for example, Nicolaj Siggelkow. 2001. "Change in the Presence of Fit: The Rise, the Fall, and the Renaissance of Liz Claiborne." *Academy of Management Journal* 44:838–857; Jan W. Rivkin and Nicolaj Siggelkow. 2003. "Balancing Search and Stability: Interdependencies among Elements of Organizational Design." *Management Science* 49:290–311.

6. In fact, a documentary called "Out of the Blue," about the Boise State team and its surprising season, was released in September 2007.

Part I

The Context for Creativity and Innovation

> Underlying the seeming differences between science and magic are more similarities than you might imagine. Both disciplines rely on a process sparked by mystery and nurtured by curiosity.
>
> Albert Einstein

Some people hear "creativity" and think of artists or chaos or wild ideas that appear by chance. We once mentioned the possible value of creativity to a German professor, who shrugged and said, "Kinderspiel (child's play). Creativity is for children. Why should companies worry about creativity?"

But as Einstein suggested, science and magic are similar mysteries, nurtured by curiosity. Good for artists, maybe for scientists, but what about organizations? Why should they be concerned about creativity and innovation?

In fact, organizations that ignore creativity and innovation may do so at their own risk. Throughout this book, we'll talk about reasons why it's important for organizations to make creative and innovative thinking and activity part of their culture. Some quite successful organizations from wildly different sectors are doing just that.

In the introduction we gave examples of organizations that pursue creativity and innovation in ways that some see as odd, but they are remarkably disciplined in the ways they approach it.

Chapter 1 outlines trends and factors that we hope convince you that something needs to be done. The aim is to set the stage for the subsequent chapters, and urge thoughtful leaders and successful managers in organizations, communities, and countries to boost their creativity and innovation efforts.

Chapter 2 gives an overview of the basic framework that we have developed to understand what factors creative organizations have in common. In addition, creativity and discipline are defined and described, as key concepts throughout the book.

Chapter 1

Creativity Myopia

> The level of [a country's] dynamism is a matter of how fertile the country is in coming up with innovative ideas having prospects of profitability, how adept it is at identifying and nourishing the ideas with the best prospects, and how prepared it is in evaluating and trying out the new products and methods that are launched onto the market.
>
> Edmund S. Phelps, 2006 Nobel Laureate

During an executive MBA session, we once presented the arguments that Edmund Phelps makes regarding links between creativity and economic dynamism.[1] Heads nodded, and people slumped back in their chairs. Yes, of course, said their body language. That's what the United States does, better than any other country in the world. What's the big deal about that?

The instructor then presented data that challenged the assumption that the United States dominates in creativity and innovation. The twenty-eight participants in the room sat forward, wrinkled their brows, and shook their heads. They were bright individuals, each with over ten years of managerial experience. Many had traveled and worked globally, in high-tech firms, as well as at companies in energy production, bioscience and agriculture, and in fields like insurance, construction and housing, and environmental consulting. No one worked in an industry unaffected by global influences. But they just didn't buy the notion that the United States could be declining in its creative powers. Their comments were similar to others that come up in discussions like this one.

"How can the U.S. be in trouble? We have more patents and Nobel prize winners than anyone."

"Just about all of the world's biggest companies are here."

"Look at Apple. Look at the entertainment business. We're slamming the world."

"We still start a lot of companies. Maybe more than lots of other countries."

Finally, Ben Slaughter, a reserved young lawyer, spoke up from the back of the room. "You know, if *we* aren't willing to question whether we need to do anything differently for our companies or this country, who will?"

Silence.

Are we being shortsighted?

Could we be facing creativity myopia?

In recent years, while other countries systematically have built more creativity and innovation into their education systems, their organizations, and their communities, many in the United States are less alarmed. Bob Lokken, CEO of software firm ProClarity (purchased by Microsoft) calls it the "fish in water syndrome." Because the United States has always led the world in creativity and innovation, because American culture celebrates new startups and entrepreneurs, because risk taking and failure are part of the norm, the United States has been less aggressive about explicitly addressing the need to focus on creativity and innovation. It's part of the built-in assumption about who and what the United States has been and is, as a country. As Lokken puts it, "Americans may not see what's changing around us, just like a fish in water"—just like some of those smart executive MBA participants. But is there a drought coming?

Edmund Phelps pinpoints key factors that affect a country's willingness and ability to engage the attitudes and activities that can exploit the benefits of original ideas. He is optimistic about the United States because we still encourage creative thinking and consumers still seem willing to try new products. But as other countries change, where will we be then? Can we react fast enough?

Such watershed books as Thomas Friedman's *The World Is Flat*, Shoshana Zuboff's *The Support Economy,* and Richard Florida's *The Flight of the Creative Class* dramatically illustrate and track the way the fish's water and centers of gravity are shifting.[2] Economic principles that we thought were fixed are in flux: the centers of economic gravity have changed from primarily agriculture to manufacturing, to service, and to knowledge-based economies, with a recent twist toward idea-based creativity and innovation. For countries, communities, and organizations worldwide, this means a gradual shift in resource bases from more tangible resources, like land, labor, capital, or technology, to less tangible ones, such as knowledge, creativity, and innovative capabilities.[3]

The shift means that some regions that were considered slow to develop economically may move faster in the future and even become powerhouses themselves, perhaps even before the rest of the world is aware of what is taking place. In some cases, their heritage means that the infrastructural and cultural changes needed are less drastic, giving them the opportunity to start a new trajectory. We're seeing inklings from China, South Korea, and India. Other countries are likely not far behind. On the first trip Nancy made to Vietnam in the early 1990s, a Vietnamese colleague greeted her with an astounding statement: "We conquered the Americans in the war. Now we will conquer

the Americans in business." At the time, the man owned a bicycle, two changes of clothing, and his belt was wrapped one-and-a-half times around his waist, to the middle of his back, because he was so slender. He knew nothing of business, management, marketing, or any other "Western" business concepts. Indeed, the Vietnamese language has few words for those terms. The university of 20,000 students had one flush toilet, for the foreigners who worked there, and a single fax machine. Yet, fifteen years later, the same man—and many of his counterparts—owns a house, is a leader in his university, travels, and has received his doctoral degree. The courage, determination, and moxie the Vietnamese showed even when they were very poor goes to the heart of the concern for the United States' leadership in creativity today.

Avoiding creativity myopia also means recognizing creativity and innovation as contributors to competitive advantage for both developed and developing countries, the role that creative talent plays in building that advantage, and the threats to building and retaining such talent. For the United States, long considered a creative juggernaut, such shifts represent a silent but growing threat to its strength in creativity and innovation worldwide. And the transition might not come easily. Richard Florida, speaking in Stockholm, even suggests that the perceived width between the industrial society and the emerging "knowledge-based" society is creating such a frightening perspective that the pull towards the *status quo* is all the more violent. That is one reason we see a resurgence of strong traditional values, extreme religious expressions, and the excessive use of military and police power in some nations.[4]

SHIFTING CENTERS OF GRAVITY: WHY WORRY?

Recent reports have raised a clarion call about the shifting positions of countries' and regions' levels of innovation and what this might mean for economic development. The president of the Council on Competitiveness, Deborah Wince-Smith, comments that while the United States faced almost no competition in innovation during the 1980s, it should no longer expect to hold the lead indefinitely. The United States has only 5 percent of the world's population, but employs almost one third of all science and engineering researchers, and its researchers publish 35 percent of scientific articles worldwide. But, she warns, "our lead is narrowing."[5]

Disparate, yet increasingly visible, trends confirm that shifting centers of gravity are likely. A single factor is perhaps insignificant; taken together they are a wake-up call. Other countries have responded proactively, yet there is much more to be done. A few of the trends follow.

The "Quiet Crisis"

Shirley A. Jackson, president of Rensselaer Polytechnic Institute and former president of the American Academy for the Advancement of Science, has

spoken repeatedly of an impending "quiet crisis" in the United States.[6] She fears that the United States' leadership position in science, engineering, and innovation will erode, if not addressed. The "quiet nature" of the crisis suggests that the environment is changing slowly enough that few may notice or react to it in time, like the familiar story about the frog who won't jump out of a pot of water that is slowly coming to a boil.[7] Jackson likewise has said that the quiet crisis she fears is evolving so slowly that many policy makers, business people, and educators have not picked up on it. She predicts that, without action, the United States will face a crisis of education, numbers, and ambition within the decade.

A basis for this argument is that science and technology are key drivers of creativity, innovation, and competitiveness in an economy. While the overall message—that there is a quiet crisis stifling creative action—holds true, we will also argue that it is equally, if not more, important to energize other types of innovation and creativity.

The Crisis of Education

Jackson's "crisis of education" stems from poor performance in math and science by American students at the secondary school level, compared to other high school students worldwide.[8] Furthermore, fewer American students are choosing to study math and science, particularly at the more advanced levels, in both high school and college.

Chief executive officers of companies in many U.S. states have recognized the need for skilled and educated workers for their firms' future performance. In fact, in nearly all U.S. states, CEOs have formed groups to advocate for improvements in education. For example, one area that CEOs in the Idaho Business Coalition for Educational Excellence focus on is improving the quantity and rigor of math and science at the high school level. This is especially important given the number of high-tech firms, such as Hewlett-Packard and Micron, that have major facilities or headquarters in Idaho.

In addition to formal education, an increasing need is emerging for on-the-job training and other ways to guarantee that countries have access to a skilled workforce for long-term economic vitality in all sizes and types of organizations. Sweden, for example, has begun to formally encourage young people to enter skilled employment jobs that were previously perceived as having less value or interest.[9]

Convincing some legislators, especially in the United States, of the value of education, however, can sometimes be an uphill struggle. One (shocked) CEO encountered a legislator who claimed that the education he received in high school, in the 1950s, was good enough for him, and should be good enough for his kids. Why change?

The CEO's response to the legislator, who was from a rural area of the state, was to use an analogy with agriculture, since the legislator was also a