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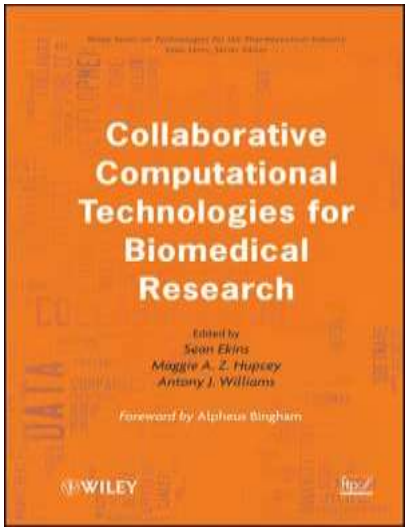
Chapter 2: Collaborative Innovation: the Essential Foundation of Scientific Discovery



By *Robert Porter Lynch* October, 2010

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Collaborative Technologies for Bio-Medical Research

2025 Author's Note: the ideas in this Chapter are still valid in today's world of Zoom meetings and Artificial Intelligence. We have continued to evolve these ideas and have built an Artificial Intelligence Engine to support the process of Collaborative Innovation in a wide variety of applications.

The Dawning of the Era of Collaborative Innovation

As the twentieth century ended, the computer, followed by the explosive growth of the internet, spawned a worldwide "Era of Information." Information that used to be proprietary, inaccessible, expensive, or limited to a few elite scholars is now available to virtually everyone and mostly free. Everyone on the planet with an internet hookup has access to virtually all the world's knowledge.

Information is a Commodity
Wisdom is Precious Resource

In the past, access to deep knowledge was the privilege of the college educated. Today the internet has changed all that. Any young child with a computer and access to the world-wide web can have just about as much information as the Harvard graduate. So it's not about the information; today it's about ambition, creativity, organizational ability, insight, and willingness to take risks.

With this profusion of information and data, knowledge itself, for the first time in the history of the human race, become a commodity. As a commodity, the value of knowledge is not in the information or data, the real value manifests when transformed into how it is applied, is integrated, and triggers innovation.

Unless people transform knowledge into one of the three areas, knowledge becomes data, trivia, or useless information – great for "trivial pursuit" but not valuable as a useful means of progress.

While we may be flooded with a wealth of data and knowledge, it takes more than a grasp of what's already known to solve the great problems on the planet: disease, poverty, energy, warfare, or global warming, to name a few.

Knowledge is rooted in what has *already* been learned; thus it's *historic* in nature – the reason why Einstein said "Creativity is more important than knowledge." Creativity, imagination, and inquisitiveness, coupled with our ability to cooperate in teams are some of the human being's most endearing qualities, and constitute the foundational essence of collaborative innovation.

These problems cannot be solved by existing knowledge, alone; they require a *collective creativity*, linking the ideas and insights of dozens, scores, hundreds, or thousands of people in collaborative networks focusing their combined imagination, dedication, and understanding on mutual discovery and problem-solving.

Neither is what's *known* necessarily imbedded in a context of what's *wise*; wisdom and the ability to innovate – the focus of this chapter -- are far higher in the order of human achievements than chronicling, organizing, and managing the profusion of data and knowledge.

Thus, the Age of Information will prove to be short-lived, as it is only a brief step-stone to the dawning of the next Era of Collaborative Innovation; an era based on the creative and cooperative capacities that are natural to nearly every human being. This creative talent is based on human's natural curiosity to explore, be curious, and ask innocently outlandish questions. It is this creative drive, when used synergistically with others, that we call "collaborative innovation;" it is the foundation of all the solutions to the world's greatest problems, as this chapter will describe.

As a reader of this chapter, you may be questioning the veracity of these statements. Traditional thinking has said that it has been the lonesome inventor or experimenter that has created the scientific breakthroughs of the modern age. You may be thinking of the founders of modern scientific inquiry – Leonardo

Da Vinci or Isaac Newton, or Louis Pasteur, slaving singly in their laboratories or pouring over textbooks alone late a night, in the desolation of their isolation.

The primary reason individual quests were responsible for most of the historical scientific innovation is because their world was neither structured for ease of collaboration nor for sharing of ideas and data across boundaries. Travel, communications, and information systems were limited and difficult. The structural changes of the latter half of the last century changed all that.

Ninety percent of all the scientists who have ever lived are alive today. Science of the past was isolated and individualistic; science of the future will be (and is rapidly becoming) far more connected and collaborative

The Collaborative Imperative

Driving Forces in Scientific Discovery today

Technology has not become the great simplifier of our lives, as once predicted. Instead, technology has *enabled* and *accelerated complexity* and *change*. Within our fast-moving, rapidly changing world, innovation has shifted its venue from the individual to the group; most all innovation today is done collaboratively, either in teams, networks, or alliances. This is true not only for scientists, but also those who must commercialize innovations, and those who must address the legal complications of bio-ethical decisions.

To grapple with this complexity, multi-disciplinary teams are essential, because, in most cases, it is impossible for one person to grapple with all the intricate information required to create breakthroughs. And most breakthroughs are not happening within a field or specialty, but between fields. These multidisciplinary breakthroughs are not just complex, they are also very expensive. Thus it becomes imperative for companies, universities, and laboratories to work a seamless, synchronistic, and synergistic manner.

The Lander Laboratory at MIT is a perfect example, as Dr. Robert Langer describes:

> "My lab has people with 10-12 different disciplines in it – molecular biologists, cell biologists, clinicians, pharmacists, chemical engineers, electrical engineers, materials scientists, physicists, and others. Many of our ideas, such as tissue engineering – require these different disciplines to move from concept to clinical practice. It makes it possible to do nearly anything 'discipline wise' in the lab." [1]
>
> Our work is at the interface of biotechnology and materials science. A major focus is the study and development of polymers to deliver drugs, particularly genetically engineered proteins, DNA and RNA, continuously at controlled rates for prolonged periods of time.

Power of Differentials

The value of multi-disciplinary teams is founded on the basic principle that all innovation comes from differentials in thinking:

> ***If two people think alike, there is no innovation. Innovation occurs when someone decides to think differently – either by asking new questions, to challenge the status quo, to have a vision that there must be a new/better way, or is dissatisfied with the results produced by current solutions.***

Harnessing the multi-disciplinary power of the differential thinking should be one of the strategic methodologies to generate breakthrough innovation. To be creative requires *divergent* thinking -- generating many unique ideas -- and then innovation demands *convergent* thinking -- combining those ideas into the best result.

Collaboration triggers the sparks between people that brings out their natural (often suppressed) creativity and enables their differentials in thinking to generate a massive stream of idea, then converge, integrate, and align those ideas into real innovations.

People who innovate collaboratively (as opposed to independently) have a greater chance of learning from others and building the networks that actually enable innovation to become implemented.

Einstein's Rules for Creating Breakthroughs

1. We cannot solve the problems of today with the same level of thinking that created the problem
2. Creativity is more important than knowledge
3. From Discord make Harmony From Chaos seek Order
4. In the middle of Difficulty Lies Opportunity
5. There is a simplicity of design behind every level and layer of complexity (if we search for it)

For example, one of the foundational breakthroughs in bio-medicine was the joint insight by Watson and Crick regarding the double-helix structure of DNA. Crick had migrated from the field of physics, and Watson was just a young graduate student. They both came from a place of "not already knowing," an openness to new ideas, rather than thinking of themselves as "experts" in the bio-medical profession.

They never conducted any experiments, instead looking at the data of others, but interpreting it from a fresh perspective. Like Edison seventy-five years before, they meticulously integrated work of others in other fields – such as crystallography – and saw the unique patterns in the data that enabled them to envision the double helix.

Making collaboration the *central organizing principle* for all research, discovery, development, commercialization, and proliferation for innovative new products, services, and business models will result in a far higher chance of producing a breakthrough in thinking and results.

Creating the Culture of Collaborative Innovation

Nearly every study done on the issue of innovation has concluded that the number one factor in producing innovation depends not upon the quality of the scientists, technicians, and researchers, but the *culture* that supports and reinforces them. (See Figure 1: Success Factors for Innovation)

Most scientists, upon deciding they must engage in a collaborative inquiry, will launch the initiative starting with the technological problem. Herein lies the first and biggest trap in collaborative innovation, because it's like learning the words to a song, without the music. The music of collaboration is the method of engaging people in the co-creative process of discovery and development – the essentials of the innovative process. Without the music of collaboration, it's highly likely the players will be out of tune, each discordantly playing to the beat of a different drummer.

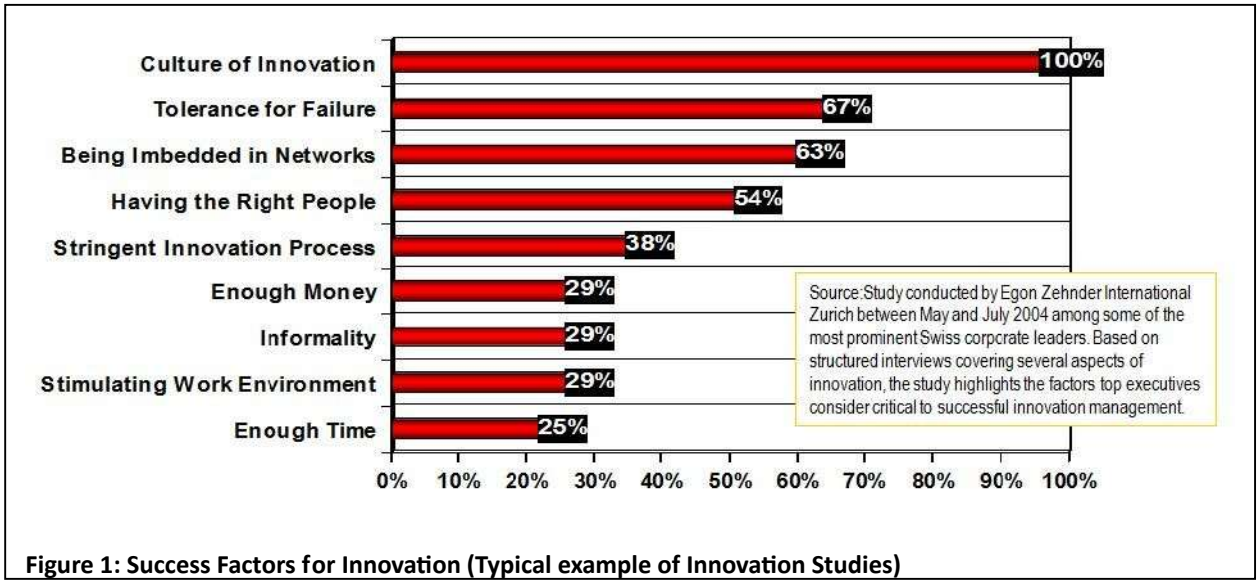

Figure 1: Success Factors for Innovation (Typical example of Innovation Studies)

To avoid the cacophony of discord, let's look at *five key principles* that will create a powerful culture of innovation:

1. **Select the Right People**
2. **Establish a System of Trust**
3. **Create a Spirit of Inquiry**
4. **Eliminate Failure**
5. **Empower Champions**

About "Principles"

Principles are *guidelines,* not laws. A principle is used in conjunction with other principles; together, they produce a powerful and successful result. (A *law* can usually stand alone, and is inviolate – it works all the time.) Principles tend to be timeless, while methods, processes, and practices evolve with time.

It doesn't matter where one is located in the innovation process – research, discovery, development, or commercialization – these five principles will always make the difference between success and mediocrity.

➢ Principle #1: Select the Right People

What first characterizes a highly innovative culture is the quality of the people who lead and serve on the innovation team. There are six factors to consider in the choice of people.

✓ 1. Competence: Knowing that the members of the team are highly qualified to conduct research, make modifications to procedures, and thoroughly comprehend the results is the basic standard of excellence. This is not necessarily determined by the number of papers published or the proliferation of speeches at technical conferences. Often the most competent people have the most diverse backgrounds and have the widest variety of engagements, which gives them a deeper wisdom and breadth of understanding.

But competence is not the only criteria. Most scientific and technical collaborations make the first mistake when they assume that all that is needed is a team of highly qualified/competent individuals. After all, without well qualified people, not project will be successful.

While there is a great deal of truth to this assumption, it masks the reality that competence alone is normally insufficient to trigger success in joint scientific endeavors. Often highly competent people can become entangled in battles about who gets the credit, or even engage in unethical practices, such as plagiarism or doctored research reports. Machiavellian behavior can destroy a great research team. That's why the next characteristics are so important.

✓ 2. Character: Individuals with good character are essential to ensuring that team members trust each other and will do the right things for the right reasons.

The most important factor is honesty; does the person tell the truth. Those who bend the truth may skew data, distort reality, or fail to give credit where it is due. Integrity means a person will do what they say they will do, so you can count on them to fulfill their commitments.

Does the person exercise good judgment? Do they have the perseverance to carry on under pressure? Do they have a tenacious work ethic? Teams without these characteristics can easily fall apart, jeopardizing the research result in the process.

Ethics play a vital role in the assessment of key investigative decisions in bio-medicine. Key questions must be addressed pro-actively, not after damage has been done. Does the intervention create harm? Is it a real breakthrough over other treatments? What are the risks and negative aspects of the new treatment? What is the right dosage? How toxic is it? Who will respond well, or adversely? Unethical decisions can have huge ramifications downstream.

Yet these characteristics alone do not make a great team. More is necessary.

✓ 3. Collaboration: Many people who enter the field of scientific research are inherently introspective or shy; others possess minds are highly logical and analytic.
Many scientists were loners in school, perhaps never participating in team activities, such as sports or group governance. This can present difficulties when a large project requires close coordination and human interaction. Teamwork requires communication, sharing information, understanding the human side of research, and mutual support, particularly in times of adversity.

People without great collaborative skills may engage in criticism, blame, negativity, and back-biting, often when under high stress. They may horde information for fear it will be used improperly. They may withdraw when others need them most, or engage in manipulative behavior to get the attention or credit they yearn for. They many not communicate well, especially listening carefully to understand the human side of technical information.

Collaboration is often the most effective means of pulling success out of disaster. Effective leaders often use a group to find new insights or to build something big out of a perceived failure. Collaboration, combined with cognitive diversity (see point #6) can turn the mundane into the magical. Collaboration is the enabling force that opens the pathway to group genius.

> "We're drawn to the image of the lone genius whose mystical moment of insight changes the world. But the lone genius is [largely] a myth; instead, it's group genius that generates breakthrough innovation. Our research [demonstrated] that innovations once believed to be the creation of a [single] genius actually emerged from invisible collaborations, and that collaboration was responsible for the famous creations throughout history.
>
> "When we collaborate, creativity unfolds across people; the sparks fly faster, and the whole is greater than the sum of the parts. Collaboration drives creativity because innovation always emerges from a series of sparks – never a single flash of insight … lots of small ideas … each spark lighting the next … each critical to the [ultimate] success."[2]

In building a great research team, it's worthwhile ensuring that, at a minimum, the people in it can work productively.

The old adage: "one bad apple spoils the barrel" is a lesson never to be forgotten.

Collaboration is the essence and unseen backbone of great innovation.

> "Many stories of innovation, once you get past the smoke and mirrors, reveal a backstage filled with other people, ideas, and objects that were as critical – if not more so – than the one presented onstage. Ultimately, the amount of credit we insist on giving to individuals in the innovation process is absurd."[3]

✓ 4. Creativity: Being creative has a massive advantage for a clinical research team. Creativity, as Einstein advised, is more important than knowledge, because knowledge is rooted in the past – what has become known – while creativity enables our future – what will be.

The quality of creativity is not limited simply to imagination. It includes a variety of qualities, such as collaborative resourcefulness, inquisitiveness, curiosity, progressive thinking, problem solving capacity, and even the desire to jump over any obstacle to see ideas carried through to fruition.

Often the most creative people are not necessarily the most academically qualified, because most academia rewards knowledge, having the "right" answers, and analytic skills.

Highly creative people are often not primarily analytic, but are typically multi-disciplined, eclectic, cross-functional, and filled with more questions than answers. Thus, they don't always fit into bureaucratic, highly structured environments; they tend to like less structure and thus often able to live better on the edge of uncertainty because they use a personal set of internal principles to guide themselves rather than external procedures.

What is sought is a "fluency of ideas and flexibility of approach that characterizes scientifically creative individuals working together on a problem."[4] In highly complex environments, Welter and Egmon[5] point out that collaborative innovation teams will demonstrate five important qualities:

- Freedom to Explore beyond the Mainstream of Conventional Thought
- Ability to Trust using Shared Vision and Values
- Genuine Curiosity and Exploration of Possibilities and Opportunities
- Compelling Commitment to Make a Difference
- Genuine Self-Awareness of Differentials in Thinking and Learning Styles

Some very creative people can lack discipline because they are not easily controlled, preferring to be free spirits. In this case such people may better serve the team in an advisory role.

✓ 5. Courage: Great research teams face many challenges from inception of their idea through to final delivery of a successful product or procedure to a patient. These challenges can often be daunting, as the team faces adversity after adversity. The ultimate measure of a successful team is how they face the challenges of difficulty, controversy, and uncertainty, while maintaining their honor and integrity. This type of courage sets apart the mediocre who crash or sputter in the face of adversity, and those who rise, and even get better.

Moving a vision from concept to conclusion requires a championing spirit, a strong commitment to the possibility not yet proven.

The championing spirit is focused on both collaboration and innovation. Champions bring a confluence of passion for the vision, strategy for moving forward together, and commitment to the ultimate result.

> "Ideas do not propel themselves; passion makes them go. Passion is the fuel that generates an intense desire to move forward, smashing through barriers and pushing through to conclusions."[6]

Tenacity and optimism in the face of adversity, and unwavering commitment to ideals in spite of the dark nights of the soul are qualities of the true champion. Edison, in his search for an ideal filament for the light bulb, "for eighteen to twenty hours a day experimented with all sorts of materials…. He had to find the best type of fiber…. He tested more than 6,000 materials, and his investigations, and his investigations on this one thing alone cost a small fortune."[7] Edison was courageous and tenacious enough experience over 6,000 failed attempts to get one right solution.

The formulation of rubber by Charles Goodyear is equally compelling:

> "Goodyear was sick, malnourished, and poverty stricken… living in a third-floor walk-up studio apartment crammed with gum and chemicals…Goodyear could not pay his debts. His family was in want, yet he pursued his dream of making rubber a workable product. Millions of dollars had gone into rubber research with no satisfactory results. The problem was that rubber got hard and brittle when cold, and soft, gooey, and smelly when hot. The supreme optimism exhibited by Goodyear while surrounded by the debris of false starts and failures eventually led to the discovery that saved the rubber industry."[8]

Resilience is another dimension of courage. Resilient people are typically optimists, holding onto their vision and ideals when the skeptic has given up.

> "Great achievers understand intuitively that the human brain is the most profoundly powerful solution-finding mechanism in the known universe. And they recognize that persistence is the key to keeping that mechanism engaged…. Optimists get better results in life; and the main reason is simply because they are less likely to give up. As Dr. Martin Seligman emphasizes, pessimism is self-defeating because it 'short-circuits persistence.'…. The real key is…to maintain our enthusiasm in the face of seeming failure. Resilience in the face of adversity is the greatest long-term predictor of success for individuals and organizations. Persistence in the process of experimentation, when desired or expected results are elusive, is the way that resilience is expressed."[9]

Dr. Paul Stoltz and Seligman have pioneered our understanding of resiliency in the human predicament. They have found that

> "those who respond to adversity as *stable, internal, and generalizable* to other areas of life tend to suffer in all areas of life, while those who explain adverse events as *external, temporary, and limited* tend to enjoy benefits ranging from performance to health…. Seligman describes these differences as *pessimism* and *optimism.* … Optimistic salespeople outsold pessimists by 88 percent, and the pessimists were three times more likely to quit, regardless of talent."[10]

> Further, "those who responded optimistically to adversity *outlived* those who responded pessimistically."[11] "Like optimists, resilient individuals possess the ability to spring back from adversity… This ability stems not from the adversity itself, but from how they *respond* to it."[12] "Those who respond to adversity more optimistically are predictably more aggressive and take more risks, where the more pessimistic reaction to adversity resulted in more passivity and caution. People who respond constructively to adversity are more apt to maintain energy, focus, and vigor required to successfully compete. Those who respond destructively tend to lose steam, or simply stop trying. Competition is largely about hope, agility, and resilience, which are highly determined by how one deals with life's setbacks and challenges."[13]

Resilient people have the ability to flourish on the edge of creative uncertainty, that ambiguous grey area that rigid people perceive as the lack of control.

THE BOTTOM LINE: The courage factor identifies those with a champion spirit; the resilient optimists with the tenacity to produce the persistent actions that get results, not just good intentions.

Ultimately, the team must want to win together, be committed to extra-ordinary results, and be willing to engage in any way to achieve success. Anything less is called: "mediocrity."

✓ 6. <u>Cognitive Diversity</u>: All innovation comes from differentials in thinking – people who challenge conventional assumptions, ask uncomfortable questions, and see possibilities in the middle of difficulties. For this reason, cognitive diversity is a fundamental ingredient for success.

If two people in the same room think alike, one is unnecessary for innovative ideas to blossom.

An early example of the importance of cognitive diversity spurring innovation comes from one of the greatest inventors of all time, Thomas Edison:

> "Although Edison was an incomparably brilliant independent inventor, he understood and valued the importance of working with others. He knew he needed a trustworthy team of collaborative employees who could illuminate his blind spots and complement his talents. Over the course of his career, Edison cultivated an inner circle of roughly ten core collaborators, each contributing materially to the technologies generated by his laboratories. Edison brought together individuals from diverse disciplines who he would indoctrinate in his methods, then release to freely experiment without his immediate supervision. The diversity of disciplines added tremendous breadth and depth of insight to the laboratory, allowing them to navigate effectively across industry boundaries….they were extensively cross-trained. The teams were bound together by common values of respect and integrity [trust], and a desire to be the best in the world….. he placed the value of 'team accomplishment' at the heart of his laboratory."[14]

Diversity of thinking, while the stimulus to all innovation, can be a double-edged sword. Many managers are threatened by diversity, desiring instead conformance to a standard set of rules, procedures, and mode of thinking. When organizations are segregated into specialties, such as biology, or marketing, or administration or any other form of segregation, it is often the case that these specialties become fiefdoms of power and isolation, perhaps isolating themselves because "those others don't think like us." Conflict and competition characterize these groups. They are stuck.

However, in highly innovative organizations, people cherish the differentials in thinking that spur cocreation as sparks of imagination jump the gap between people's minds, in a synergistic outburst of new ideas and new possibilities.

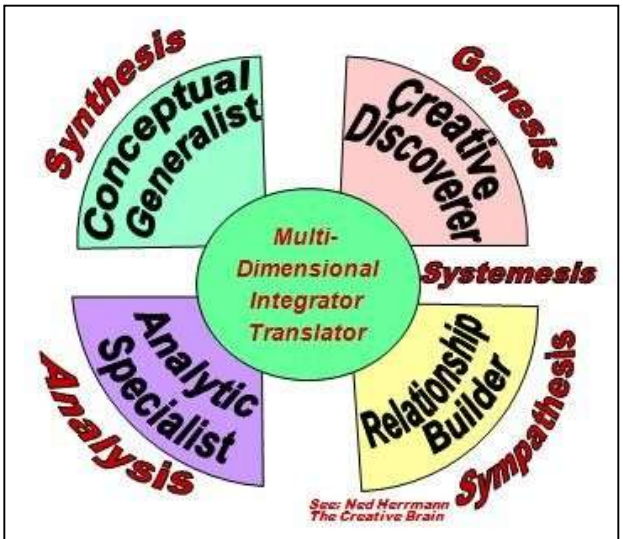

Figure 2: Different Brain Dominance Patterns (adapted from Ned Herrmann, the Creative Brain)

When seeking people for the innovation team, a very useful framework is based on the work of Ned Herrmann's and Brain Dominance.[15] Every human has a preference for how they like to think and learn. In Figure 2, the four basic brain patterns are outlined.

While the majority of people tend to be dominant in a single mode, a minority people will be comfortable in two or even three modes. A very few will have four modes. These are called "multi-brain dominant. Many of us are

thought of as "left" or "right-brainers," referring to whether we are tend to be more analytic (left brain) or more sensitive to people (right brain).

Herrmann's framework is more granular and useful because it makes important distinctions in selecting a great innovation team, which should be made up of people with diverse brain patterns. This diversity enables a research, discovery, or development team to see their experiments from all angles, and find opportunities where others who are more narrowly perceptive will get stuck.

One of the important roles on any diverse team is the role of the "integrator,"[16] the person who can translate across boundaries, connecting diverse thinking from one arena to another. This person typically is multi-brain dominant, which does not make them smarter than anyone else, but enables them to see situations and people from a kaleidoscopic perspective, sorting through data, vision, emotions, strategy, and implementation.

➢ Principle #2: Build a System of Synergistic Trust

Ask any person adroit in collaborative innovation about the key factors for a success, and you can be assured that trust will be near the top of the list.

Trust is a crucial factor for collaborative innovation because it creates the fertile ground for creativity, innovation, and synergy. Without trust, teams disintegrate, infighting predominates. All innovation is, by definition, a force of change; change is destabilizing to most organizational systems and structures, threatening to upend established hierarchies, power structures, procedures, and accepted thinking; preventing the establishment of the linkages of resources and implementation alliances necessary for the innovation to succeed. Thus, without trust, innovation will appear as a threat, fear will overwhelm opportunity, and the organizational immunal rejection response will trigger: manifesting as massive resistance to or exclusion of the forces of evolutionary change.

> Trust is the essential foundation of synergy—where the innovation team truly becomes greater than the sum of its individual.
>
> Often referred to as "chemistry" (in the psychological sense), trust has unique properties that are more like alchemy: it is simultaneously the *glue* that bonds people together and the *grease* that eliminates interpersonal friction.

Trust is absolutely essential in generating creativity among innovators. Distrust is the greatest impediment to all innovation. Mistrust causes everything to be more complicated, slower, and far more fragmented. What's more, distrust puts a major limitation on collaborative innovation, internal teamwork, and external relationships with suppliers, customers, stockholders, and our community.

Few scientists ever spend the time to create powerful trust-enabled innovation cultures. Often building trust is elusive, filled with platitudes, slogans, and aphorisms such as "trust must be earned," "be skeptical before you trust," "be sure to have an exit strategy," "trust but verify," and so on. Unfortunately, none of these approaches really produce any trust.

> In clinical research and delivery: "Without trust there simply is no success." Thomas Kara – MD, PhD College of Medicine, Mayo Clinic

Highly legalistic attempts to ensure against breaches in trust usually backfire and poison the well before the alliance gets started. Often, by trying to protect against distrust, we actually create the conditions we are trying to avoid, which manifests as enormous legal agreements (sometimes over a thousand pages!) and protracted negotiations that may result in no agreement at all.

Ultimately, no amount of pages in a legal contract can substitute for or replace weak trust. It's the single most important thing that separates alliances that thrive from those that fizzle. Trust enables everything to move faster, more effortlessly, and with less conflict. In spite of its importance, trust is too often taken for granted.

It's imperative that innovators today know how to establish a "trust system" that enables collaborators to act honorably with each other, that makes intellectual property safe from incursions, that establishes joint principles of engagement, and that honors the differentials in thinking that stimulates the creative energy so fundamental to all innovation.

Trust, like all disciplines, has an internal "architecture" that can propel the honorable scientist to great heights, and weed out the small percentage of "sharks" who would abuse collaborative relationships for their own selfish ends. To understand the nature of trust, it is first important to know the nature of its opposite – distrust. *Cause of Distrust*

What causes distrust? In a word: fear; such as fear of being taken advantage of, or fear of being put in a disadvantageous position, or fear of not receiving proper credit, or fear of being manipulated, or fear of being discredited, or fear of one's beliefs and knowledge being subjected to attack. *Building Trust*

> To have trust, at a minimum, one must sense that there is a level of *safety* and *security* in the relationship, knowing that I will not be worse of for having this interaction.

Just as the elimination of a disease does not cause happiness, neither will the elimination of distrust create solid trust – it just brings everything to "neutral." The lack of ethics will cause distrust, but the presence of honesty and ethics does not necessarily cause trust. Good ethics implies "I won't do something wrong;" it takes the fear out of the picture. But it doesn't mean "I'll be effective," nor "use sound judgment," nor "be collaborative," nor "compassionate," nor "spontaneous." Other things are necessary.

The basis for trusting someone is not simply ethics and honesty, rather it's also how they deal with self-interest. We trust people who we can count on to look out after our interests as well as their own – our "mutual" interests, or put another way, the "greater good." Balancing self-interest with the greater good is the starting point to begin trust.

> **The Golden Rule** is the fundamental first step in building trust because it guides people into the "trust realm" of fairness, security, dignity, and respect.

When each person or organization acts to maximize the amount they get from negotiations, without consideration of another person's or organization's interests, they are working in their self-interest. There is nothing inherently wrong about self-interest, it's part of any capitalistic system. But if every-

one works strictly in their narrow self interest, severe problems can erupt: oceans get over-fished, park lands become developed, unions and management lock horns, air becomes polluted, societies and communities fall apart; economic systems and civilizations break down as each entity is out to maximize for itself.

In this kind of a dog-eat-dog world, trust diminishes as everyone withdraws into their turtle-shells to protect their individual interests. Untethered, self-centered decision-making creates untenable collaborative situations. *The Ladder of Trust*

Traditionally, trust has been rather narrowly defined as *safety, security, reliability,* and *integrity.* This definition should be thought of as the *minimum;* instead think trust as a spectrum or ladder ranging from neutral trust at the bottom to synergistic trust at the top, as illustrated in Figure 3. "Neutral" trust we refer to as "transactions."

The Ladder of Trust is a tool to navigate the journey into a positive world where strong bonds of trust support highly productive collaboration and innovation.

Figure 3: Ladder of Trust

"Below the belt" is the Zone of Distrust laden with negativity, denial, constant judgment, suspicion, coercion, manipulation, protection, deception, aggression, character assassination, and betrayal. Here lie the *trust buster behaviors* such as:

- Acting Inconsistently in what they say and do
- Seeking Personal Gain above Shared Gain
- Withholding Information or Cheating
- Lying or Telling Half Truths
- Being Closed Minded
- Being Disrespectful to Anyone
- Withholding Support or Betraying Confidences or Breaking Promises

The first thing a leader must do is prevent or stop any of these trust buster behaviors from occurring or being rewarded. There must be no tolerance or acceptance of any of these actions which destroy a research team from within.

On the belt-line is neutral trust, which manifests as transactions. Transactions happen every day: at the grocery store, at the mall, at the gas station. When shopping, we put enough trust in the "brand" or the store's reputation to complete the exchange of goods or services for money, but not enough trust to engage in any form of deeper relationship.

While the idea of neutral trust may seem benign, there can be some deep down-sides to transactionary trust, simply because it may be totally inappropriate for a transactionary relationship to be matched to the circumstances where close teamwork and collaboration is required on solving complex problems that require interactive spontaneity; a transactionary relationship would seem too aloof, distant, and formal.

Above the belt is the zone of trust, where teams can prosper and thrive. Rather than defining trust simply as reliability, security, or integrity (as has been the traditional definition), it is far more useful to define trust on a spectrum ranging from minimal trust to the ultimate forms of trust (see Figure 3). Here are the types of trust in the range above the belt. *Relationship*

The trust journey begins simply with building a relationship with other people by ***listening*** -- not judgmental listening -- but connected listening that simply validates the other person's point of view. When we listen with compassion, learning, and constructive inquiry, we begin to build trust. People feel like they are receiving *support* because they are heard.

When building a trusting relationship the minimal boundary conditions must be satisfied – both parties must honored and respected, you can be counted on understand my personal interests, needs, and concerns, which gives the assurance that ultimately I will be better off from having trusted you.

Guardianship

The next level of trust provides *safety* and *security* to the other person. A guardianship can be one-way, much like a parent provides to a child, or a mutual guardianship like soldiers on a battlefield.

Those who don't feel safe in a leader's presence will be protective or fearful. As human beings, we aren't wired to trust what we fear. A Guardianship means more than knowing that you won't intentionally hurt me, I must be emotionally safe and physically safe. But at a deeper higher level, it's *reliance* -knowing that you will be there to protect me from harm; you will be there when I need you; you won't sacrifice me for your self-interest; you can be counted on to protect my best interests as well as your own; you won't be negligent and we can count on each other to protect each other's safety.

In a business relationship, a *mutual* Guardianship means *honor*: we stand guard over each other to defend each other against attacks, lies, dishonesty, and manipulations. Honor and honesty are from the same root meaning, thus we will be mutually honest, forthright, and truthful, giving the other person the assurance

that their need for safety can rest assured, and their need for control is empowered enough to know they can make a difference in the outcome.

Companionship

Being a companion means I trust you enough to be in your presence a significant part of my time. In business, this takes the form of working well together in teams – "teamship." Each individual must feel safe and secure, but also know that we can work together productively, our breakdowns will not be destructive, we can share our thoughts, workspace, and concerns without fear of retribution, disrespect, or dishonor. Our group truly acts, thinks, and sees itself as a team. In a companionship or team, we contribute to each other's well-being by keeping the business successful, thus preserving my job, my employer's business, my security, and my family's future.

To create confidence in one another, the idea of mutual interests becomes paramount and win-win is essential. Every decision considers what is in the interests not just of the individual, but in the greater good of the company, the team, and the future of the business.

We begin to see the world through a common vision and aligned interests. We expect there will be reciprocity: we share ideas, build together, and give at least as much if not more than we expect to take back. When everyone begins to give more than they expect in return, the symbiosis of an organization is taking its first step to transforming into a synergistic organization. Individuals come to the realization, sometimes painfully, that they win or lose together, that they are on the same team -- in the same boat, facing the same storm together. *Fellowship*

This means much more than "membership" to an organization, company, or club; it's more than a company picnic or sales rally. Fellowship implies a powerful attraction, commitment, and buy-in to the values, hearts, and minds of the other members of the community (common-unity). You might think of fellowship as "belongingship." It's the group you connect with that feels like your extended home. You feel nurtured, a sense of comradeship – this is my place, my people, my "tribe," my family away from home where we have a shared dedication to common interests.

Because of the weakening of the family structure, for many their workplace becomes a surrogate family, thus the workplace carries with it an additional desire for *fellowship*. Fellowship implies a powerful attraction, commitment, and buy-in to the values, hearts, and minds of the other members. Having a powerful set of common values, a sense of purpose, and a unique frame of reference to view the world generates a dedication and energy that is difficult to defeat.

Friendship

A great friend is always there for me … always happy to see me … listens to me … is loyal, faithful, protective … never carries a grudge or the baggage of unfulfilled expectations. When we build trust at the level of friendship, we embrace all the prior levels of trust, but add some very energizing and revitalizing forces.

First is deep compassion. We are never judgmental nor distant. For a friend, we are always present and always committed to their best interests. When they're in difficulty, we help them; when hurting, we offer succor; when in doubt, counsel; when confused, clarity; when self-deceived, honesty.

Next is protection. When our friend is attacked or harm comes their way, we respond with aid. If they have done something wrong, we stand by them to help them right the wrong. When unfairly accused, we defend them. This is what loyalty is all about.

In a friendship, trust enables our goals and addresses our fears, our deepest yearnings and our personal limits/failures to be put out in the open with no sense of diminishment. We are willing to be open and transparent with no hidden agendas because the trust is firm and strong. The power of friendship lies not just in the bond of familiarity, but also in the mutual commitment to each other's well-being.

Partnership

A partnership is much more than a friendship, it's an alliance designed to respect and cherish the differentials in thinking and capabilities between two or more people or organizations. It's the synergy between differing strengths and the alignment of common purpose that makes a partnership most alluring. For example, one person does is better at research, another at analysis of data, another at recordkeeping, and another at building relationships with other researchers. For example, Walt Disney's creative capacity was complemented by Roy Disney's business acumen, resulting in a wildly successful enterprise.

While a friendship is founded on loyalty, frank and intimate communications, interpersonal commitment, and mutual security, a partnership goes further. Great partnerships rely also on complementary competence and skills, character and integrity, and collaborative behavior. Great partnering relationships require a number of things to make them work effectively:

***Beyond the Contract**:* No legal agreement can make a partnership or alliance work. It functions because people trust at the highest levels of integrity. Diminish the trust, and the relationship rapidly deteriorates.

Shared Vision: Trust is built by the power of the commitment to a shared view of the unfolding future. Martin Luther King forged his civil rights alliance based on: "a dream that my four children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character" – a nation where blacks could trust the world they lived in.

***Shared Values*:** The winds and tides of change will challenge any business venture. Leaders that build their relationships on strong values can endure the ephemeral forces of a rapidly changing world.

Joint Planning: People support what they help create. This builds trust because those thus engaged are consulted and their ideas are valued, which, in turn builds even stronger commitment to the future.

Shared Resources, Risks and Rewards: Partnerships and alliances leverage their capabilities by sharing key assets such as technology, customer base, plant facilities, sales forces, and research, thus gaining major leverage of precious resources. By sharing risk and reward, people have "skin in the game." The more everyone shares risks and rewards, the more powerful the level of commitment.

Creationship

For this level of trust a new word is needed: a "creationship" implies that we can do something extraordinary – we can co-create together. It is at this level that the very best scientific work is done. You don't have to look too far to find wonderful examples of this level of experience. Some of the names are very familiar: Watson & Crick cracking the DNA code, the Wright Brothers cracking the flight code, the Manhattan Project cracking the atomic code, or the Genomics Project cracking the DNA map code.

A creationship embraces prior elements of trust-building, and then, secure in the absence of fear, unleashes a connection between the hearts and minds of the co-creators – new ideas generate like spontaneous combustion.

How does the leader foster creationships? What unleashes creativity and innovation? Here are some ways:

1. ***Purpose and Destiny:*** Some of the most co-creative people on the planet are those with a deep central sense of personal purpose or destiny. Purpose gives meaning and value to whatever we do – there is a reason for *being* and *doing* in our daily lives. Destiny means we aim our purpose higher, to achieve something worthy of our collective effort, something our children and we would be proud of. To accomplish this mission, we must engage others. If you have one or more of these rare people in your organization, nurture them.
2. ***Honorable Cause:*** People are turned-on by dedicating themselves to a cause larger than themselves. It can be as simple as breaking a time record or cutting out waste. Or it can be greater, like finding a cancer cure.
3. ***Contributing to and Building on Ideas:*** Encourage everyone to offer at least an idea-a-day. Ideas are the fuel of the creationship engine. When someone offers an idea, reinforce a culture that builds on the idea. If everyone builds on other people's ideas, refraining from being negatively judgmental, joint imagination light bulbs are turned on like spontaneous combustion. It's not nearly as important who originates an idea as how many people contribute to its evolution into action.
4. ***Synchronicity:*** Coordinated *timing* creates a sense of unity, teamwork, and synergy. This is *synchronistic trust*. When synchronicity occurs, people's energy jumps higher as they sense confidence in themselves and in their team. Synchronistic timing is an enervating flow and inspiring unity.
5. ***Synergizing Differences:*** It's been said that we build communities with people who are similar, but learn from people who are different. The leader's challenge is to join these two forces together – build a fellowship that thrives on honorable differential in thinking. Remember, if everyone thinks alike, there is no innovation.
6. ***Using Conflict to Advantage:*** Whenever there's change, conflict is inevitable as systems, strategies, roles, and perspectives shift, even in a trusting environment. Don't shove *conflict* under the rug, but use it as a learning mechanism. Focus on shifting perspectives; prevent people from becoming entrenched in one point of view.
7. ***Laughter!*** *C*reationship teams are not all grinding labor; it's having fun with what they do and laughing a lot, spontaneously creating in the moment – that's magical. Research shows that laughter releases endorphins that trigger creativity.

Building a creationship can be one of the most rewarding experiences in life. It can happen between two people, or within a team or an alliance. When people engage in a creationship, they seem to abound with an endless source of regenerative energy. Some people describe this as *entering a fourth dimension* – it's invisible but quite real.

Creationships: Synergistic Trust

Synergy is the result of powerful forces within the human spirit that can be unleashed and replicated regularly by building a systematic organizational culture of trust that supports, reinforces, and maintains synergistic interaction.

High trust can manifest as either "harmony" (at the Friendship level) or "synergy"(at the Partnership/Creationship level). *Harmonious trust* is blissful, sometimes even complacent, but not necessarily innovative*; Synergistic trust* is energetic, filled with tension, constantly pushing the edges of possibility.

Synergistic trust exists in an environment of co-creation where the partners interact in a perpetual state of enlightened dissatisfaction. Conflict is absent in harmonious trust, yet very evident in synergistic trust, where ideas are being challenged daily. The conflict of ideas is used only to spur the mind to higher orders of thinking, while the challengers judiciously honor each other's intellects.

The greater the tension between differentials in thinking,
in a trust-filled environment: the greater the potential for explosive innovation (or
the converse in distrust: implosive destruction).

➢ Principle #3: Spirit of Inquiry

The "Critical Paradox"

The basis of scientific research is to uncover new insights into the functioning of systems, natural or physical. Inquiry – posing questions – is the essential beginning point of discovery. Scientific research uses a framework of "critical" questions to enhance discovery, much like a trial lawyer or a crime detective, which embrace a strong sense of doubt and skepticism which challenges conventional thinking. To prove one's thesis, it must stand up to a barrage of skepticism, supported heavily by evidence. Such is the nature of scientific inquiry.

This sounds rather simple, but there is a "catch," often unexpectedly ensnaring research teams, which are the realm of "human" systems.

The paradox is that scientific analysis and human behavior do not exactly abide by the same operational rules of engagement. The same "critical" and "logical" analysis that facilitates scientific research can destroy human relationships and the ability to co-create, generate synergies, and speed the ability to produce breakthrough thinking.

The way we ask scientific questions, when applied to people, can be accusatory, threatening, distrusting, or even insulting. Seldom are scientists made aware of this important distinction and its corollary, the need to appreciate people while never lowering scientific standards.

In Figure 3, the different types of questions are charted to help illustrate the distinct differences.

Quadrant I describes questions that qualify as "Open Inquiry." Questions of this sort tend to let people explore opportunity, possibility, and joint creativity. (A version of this type of question is called "Appreciative Inquiry.") Human interaction tends to be very positive when faced with questions in this context. Many of these types of questions can be used from a scientific perspective to break deadlocks in thinking or shift paradigms.

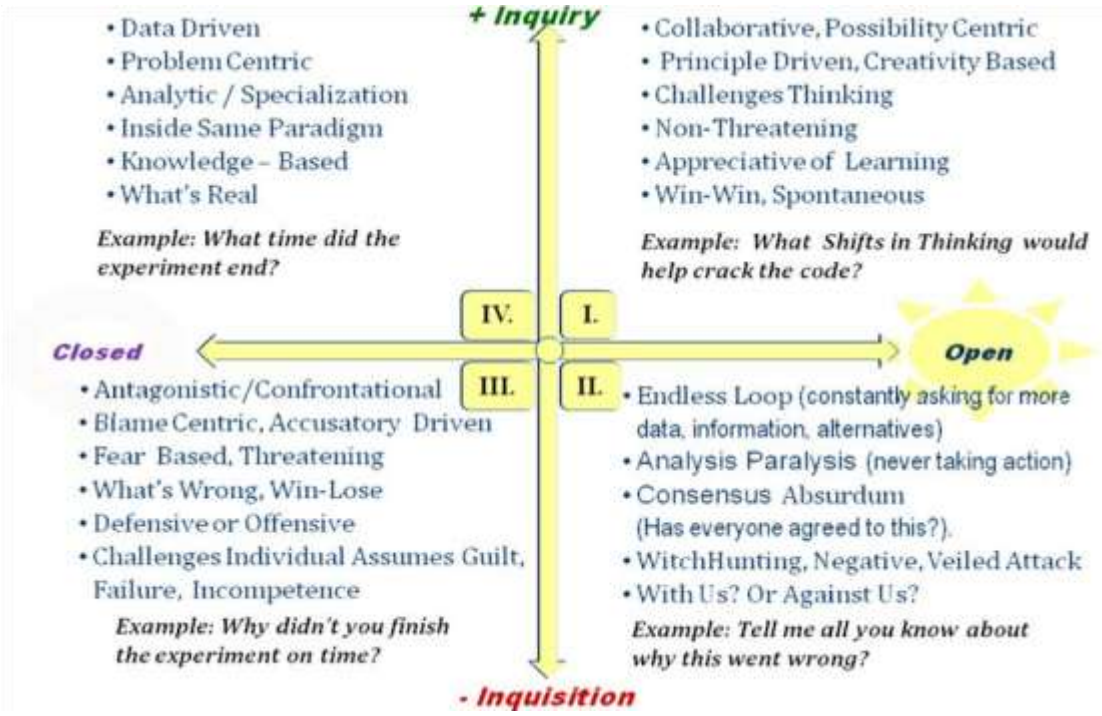

Figure 4: Inquiry verses Inquisition -- Open & Closed Questions

Quadrant II works well in forensic work, but it is accusatory in nature. The questioner is not an "inquirer" but rather an "inquisitor." Something's wrong, someone has run afoul, and the inquisitor will find out who is at fault. Similarly Quadrant III carries the same inquisitorial context, just asking closed ended questions that only need a yes or no answer. Any inquisitorial questions will evoke fear, defensiveness, and oftentimes anger and reprisal by the listener. Many research teams have errantly travelled down this path, with less than stellar results as human energy was wasted on protection of status, ego, or honor, instead of focusing on the larger, nobler cause which the research team was trying to achieve.

Quadrant IV describes the types of questions that typically constitute much of scientific research. They tend to be tightly bound, based on evidence, focusing on generating knowledge.

While these types of questions can work wonders in the scientific context, they can be very limiting in the human context.

Being aware of these differences can help the leader of any clinical research team shift the content and style of their dialogue to generate a much higher esprit de corps, inspire curiosity, and gain much deeper insight, with an attendant shift in the results produced.

When inquiring, listen to the response with both head and heart, seek solutions, not blame, and attack issues and problems, not people. If people engage in whining, complaining, or criticism of others, focus on solutions, while stopping the negative from destroying trust.

The most transformative creativity results when a group either thinks of a new way to frame a problem or finds a new problem that no one had noticed before. When teams work this way, ideas are often transformed into questions and problems. That's critical, because creativity researchers have discovered that the most creative groups are good at finding new problems rather than simply solving old ones. [17]

➢ Principle #4: Eliminate the word: FAILURE

One paramount fear in all scientists, researchers, and technicians is the fear of failure. Studies have shown it to be common to nearly all college graduates. This fear, if used mildly, can motivate people to great heights and long hours of work. But over-used or used as a threat, it can paralyze people, causing them to shut down or avoid the possibility of failure, because fear of failure immediately attacks the ego, which never wants to accept the stigma of tragic disappointment.

The word "failure" carries the connotations: "loser," "unsuccessful," "stupid," "inadequate," "unworthy," and "incompetent." Brand people with this stigma, and they will behave accordingly.

In the development of the electric light, Thomas Edison and his R&D team provide a superb example of how to deal with the issue of failure versus learning. Edison did not invent the light bulb, it had been created thirty five years earlier. His development team in Menlo Park, New Jersey worked tirelessly to perfect the design of a commercially successful light bulb. It required new technolo-

Advice from Senior Leaders about "Failure:"

"You only get the ten percent of innovations that succeed if you are ready to accept the ninety percent that fail."

"If you never failed, you never dared."

"Relieve failures of their negative aura by calling them 'lessons learned' or 'learning opportunities.'"

"It's a mistake to punish innovative people for failures, particularly in industries with very short product cycles, where decision-making is invariably faster and often based on incomplete knowledge."

gies to create a vacuum in the bulb, a totally new approach to filaments, and a structure to secure the filament. Edison's team examined and created experiments based on over 3,000 theses, and conducted over 10,000 experiments.

> "I would construct a theory and work on its lines until I found it was untenable. Then it would be discarded at once and another theory evolved. This was the only possible way for me to work out the problem. ... I speak without exaggeration when I say that I have constructed *3,000* different theories in connection with the electric light, each one of them reasonable and apparently likely to be true. Yet only in two cases did my experiments prove the truth of my theory."[18]

Reputedly a reporter asked Edison, "What does it feel like to have failed 10,000 times?" Edison's answer is quite intriguing, and very revealing. He said, "Why man, I haven't failed 10,000 times; I now know 10,000 ways *not* to invent a light bulb!"

Unlike the average human, whose ego would probably have given up after experiencing unrelenting "failure," Edison took his ego out of the game, and made learning his central focus. But the question remains, "how did he get his ego out of the way?" Perhaps the answer is best revealed in his philosophy of life's work: "Bringing out the secrets of nature and applying them for the happiness of man. I know of no better service to render during the short time we are in this world." He kept his focus on destiny's dream, not fame nor fortune (which were secondary outcomes).

> "Edison designed all his experiments to 'surprise Nature into a betrayal of her secrets by asking the same question a hundred different ways.' Edison created a formidable database of knowledge. This database, coupled with his [diverse] reading, fueled Edison's extraordinary creativity in generating a broad range of hypotheses."[19]

Remember, high performance teams fail more often than low performance teams; the difference is how they learn -- then innovate from what they learned.

➢ Principle # 5: Empower Champions

The Nature of Champions

Scientific research is not easy work. It entails long hours, multiple unknowns, and endless complexity. In the final analysis of success, those who prevail to the end are not the most intelligent (although intelligent doesn't hurt), nor are they the most famous, nor the most endowed with resources.

Rather, success is bestowed upon the most creative, connected, and committed; those who can move from ideas, through strategy, into action. This is the domain of the spirited champion.

Role of Champions

Without champions, the ordinary inertia that plagues most organizations will stifle most innovation, because innovation, by its nature, is change, and change, by its nature, is threatening to most people because it destabilizes the status quo.

To make any innovation occur, three underlying issues must be understood and addressed according to Stanford's Kathleen Eisenhardt:[20]

> First, innovation is the result of synthesizing, or "bridging" ideas from different domains… extraordinary innovations are the result of simultaneously thinking in multiple boxes, not of the oft-prescribed "thinking outside the box." In short, extraordinary innovations are often the result of recombinant invention….while it may be appealing to focus on the future, breakthrough innovation depends upon exploiting the *past*. Combining often well-known insights from diverse settings creates novel ideas that can, in turn, evolve into innovations (for example, the Apple iPod used no new technology. Its meteoric sales were due to using existing technology in new ways that improved the user interface.)
>
> Second, the organizing *structure* can dominate creativity…. Years of academic research suggest that, beyond some fairly low threshold, successful innovators are not really more gifted or creative than the rest of us. Rather, they simply exploit the networked structure of ideas within unique organizational frameworks.
>
> Third, breakthrough innovations depend on "building' communities. Of course, the substance of the innovation has to be there. But the ideas that go on to become breakthrough innovations rely on fundamentally rearranging established networks of suppliers, buyers, and complementors into new networks and ecosystems [alliances]. Otherwise, hoped for innovations never develop. The initial innovation is the starting line of the race, not the finish…Innovation is as much *social* as it is technical. Resistance must be met, and alliances forged, because people often cannot understand innovations, or cannot see how they would benefit if the innovations were adopted.

Accomplishing the tasks associated with these three issues is no job for the mundane manager or outsourced technician. It requires energy, insight, commitment, and enormous resilience – the essential need for and role of the spirited champion. Building support, breaking down barriers, creating implementation networks, bridging differentials in organizations and culture, connecting researchers to marketers, sticking to the goal in the face of adversity, encouraging people in dark times, negotiating deals, discovering resources otherwise unexploited, linking people with resources, finding new ways to address persistent problems, operationalizing untested ideas, and forming lasting alliances requires qualities beyond the ordinary.

Qualities of Champions

Champions are not first designated by higher authority (although they may be anointed later by senior management). Typically, champions self-select themselves because of their passionate commitment to a cause nobler than their own personal self-interest. Nor are champions necessarily determined by rank or seniority, although most are Earlier, in the realm of selecting the right team qualities, the idea of courage – commitment, persistence, resilience – was highlighted as a crucial element of success. Champions are "wired" differently from many others; in particular, they will place the greater good of the team or organization or society at large on a much higher plane than their own self-interest. The issue of "what's in it for me" becomes trivial or irrelevant (for this reason, many people who prize self-interest above all else become suspicious, and perceive selfish motives where none exist.)

Here are some of the qualities that are found in great champions:

○ Passionate Visionary who believes there is an innovative or better way ○ Seeker and Supporter of New Ideas, no matter where they come from ○ Builder of Networks of Teams with strong collaborative skills, ethics and values ○ Preserver of Trust with unyielding integrity and ethics ○ Articulate Advocate willing to challenge established thinking ○ Persistent Networker linking together other supporters and advocates ○ Action-oriented shaker and mover intolerant of bureaucratic barriers ○ Crusader who will defend an idea or ideal against attack ○ Win-Win Negotiator who sees opportunity in most problem ○ Energizer willing to be Accountable for Reaching Powerful Objectives

"Give champions the support and resources they need to be successful. Give them clear boundaries, but let them range broadly within these boundaries. Make them catalysts for change. Push them to behold a breakthrough value proposition powerful enough to break the stranglehold of inertial resistance that stifles most organizations. And always remember: they will ask forgiveness after the fact rather than seek permission before the fact. Consider –

> A true champion without a cause is entrapped energy.
> A great cause without a champion is but an elusive dream. But a great cause with a true champion is the realization of a vision!"[21]

In the end, a culture of innovation is more important than any other factor to keep people creative and energized to move ideas and knowledge through discovery, trials, and product development. But a culture of innovation does not imply harmonious stability. As a Cornell University study on innovation reported:

People may be happy, but nobody is satisfied with how things are.

Nothing is ever truly finished--only in stages, because in the process of building and using what we create, we are already seeing ways to make it better.

The culture, from top down, has to support and encourage and embrace constant questioning, exploration and experimentation.

Leveraging Resources

If you ask any business, from the largest multi-billion dollar global corporation to the smallest local sole proprietorship,
about resources, they will all say they don't have enough resources – money, people, time, or whatever.
However, studies have shown that, in fact, companies with too many resources usually squander them – it's the resource constrained companies that tend to be most successful. (just look at how the lack of resources forced Apple Computer or Toyota to be resourceful). Companies, from large to small are now learning to cooperate to compete, thus leveraging their resources enormously.

Avoiding the Traps

Creating a great collaboration in science does require both discipline and good judgment. Here are a few other things that will contribute to supporting and sustaining synergies within the research and development team:

- Vision & Value Proposition: All members of the initial team should outline a shared vision that will help align their work, and the value they believe this will contribute.
- Roles & Responsibilities: Clarity of knowing who will do what is essential to utilize people's strengths in the most complementary way. It also prevents territoriality from interfering with real work.
- Use of Research Data: There should be no ambiguity about: How will Data be shared? Who Owns the output? What Publication is expected? What is the Authorship Sequence? Who Owns the Patents? What happens to Derivative Ideas & Knowledge? What are the Protocols for new people joining?
- Joint Operating Principles: Bringing diverse groups together means creating a new, hybrid culture based on the norms and values of the many new people that will be engaged. Together they should create a Charter or Covenant that outlines (on one page) their rules of engagement and operations.
- Distant Collaborations: Unlike decades past, today many joint investigations occur among scientists stretched far across the globe. Oftentimes people have not actually met each other face to face. While social networking technology is getting better and better, it is strongly recommended by the

most experienced collaborative innovators to spend some one-on-one time in person with each of the collaborators. (If this can't be done, personal telephone call is the next best approach.) During this encounter, be sure to discuss and come to an accord about personal objectives, concerns, trust builders and trust busters, personal mission and style, and quirks. This should be a soulful conversation, not to impress but to express.

- Misuse of Transactional emails: In an age when electronic communications is fast and pervasive, it is tempting to handle every interaction with an email. Be cautious, as this is only half true. Ordinary transactions, such as setting up meeting times, sending reports, and exchanging information are perfectly suited for emails. However, emails are a terrible means of interpersonal breakdowns, such as conflict, anger, frustration, or disappointment. Do not use emails for this purpose, else you run the risk of massive escalation without resolution. If there is a personal problem, the best method for resolution is a face-to-face conversation where non-verbal communication can be discerned. If this is not possible, using the old-fashioned telephone is far superior to emails.

- Poisoning the Well of Trust: During negotiations to set up the collaboration, very often lawyers, deal makers, and contract managers will be involved in the negotiations. Beware of those who use adversarial methods to wrangle the best terms and conditions for their client. All-too-often their techniques will "poison the well of trust" for those who later have to make the collaboration work. If you see win-lose techniques being used during the negotiations process, call a halt to that type of action immediately, else a large barrier be erected between the prospective partners that may never be hurdled later.

Conclusion

The Collaborative Imperative is destined to become the foundational force for future breakthroughs in innovation.

Most of these breakthroughs will happen not within specialties but across boundaries; not always "outside the box," but also "connecting between boxes."

At the heart of this foundation is a system of trust that enables creationships to flourish.

Without a powerful commitment that fully embraces collaborative innovation, a research, discovery, or development team risks:

- Challenge without inspiration
- Desire without a Dream
- Drive without Destiny
- Falling into the Abyss between what's real and what's possible

Using the principles outlined in this chapter will unlock the joint genius in your team.

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[18] Lathrop, George Parsons, *Talks with Edison*" in Harpers magazine, Vol. 80 (February 1890), p. 434

[19] Gelb & Caldicott, Ibid, p 73

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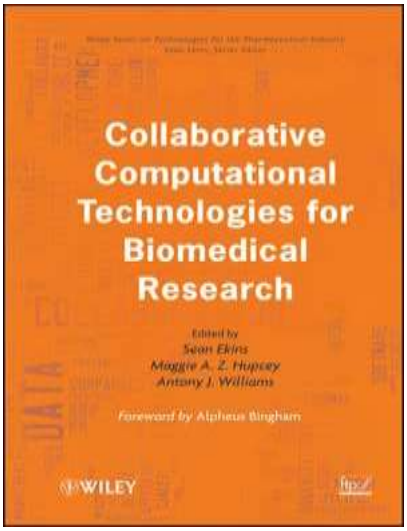
[21] Lynch, Robert Porter, *How to Foster Champions*, in Drucker Foundation *Leading Beyond the Walls*, Josey-Bass, 1999, p 188



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Reviews

"The book is of interest to researchers developing IT systems in the pharmaceutical industry, and for those participating in drug discovery collaborations." (Book News, 1 October 2011)

"What unveiled itself as I turned the pages was ... a truthful, meaningful accounting of an evolving social science, perhaps a hope that the pure thrill of crowdsourcing may accelerate the process of discovery while preserving a free market economy.... The book contains... [contributions from a] multi-national task force if you will of some of the world's finest minds in life and physical science and ‘cloud-native' knowledge-sharing." (Untangled Health, 11 August 2011)