A Proven New Approach to Breakthrough Innovations

Your company relies constantly on innovation. You must innovate to be first to claim a patent, get ahead of your competitors, improve efficiencies, lower costs, or advance your products with new technologies. Innovation is the wave of the future... and you must ride it without fail.

Until now, there have been four basic approaches to innovation: using your internal R&D experts; acquiring/buying the innovation; collaborating Keiretsu-style; and of recent note, crowdsourcing. Now *Disrupting Innovation Through Collaborative Competitions* introduces you to an entirely new, proven methodology to innovate.

Collaborative competitions organize teams of academic or professional experts who both collaborate and compete to solve an innovation challenge within six months. The approach literally disrupts all the barriers to innovation that companies typically encounter: siloed researchers, ego-driven solutions that don't work, lack of ideation and cross-fertilization, unawareness of what you don't know, failure to harness the impact of external innovation partners, arrogance, and never-ending costs. In their place, collaborative competitions tap into the strong forces of co-creation, serious play, and rapidly bridge the exploration-exploitation gap.

We pioneered collaborative competitions two decades ago, achieving extreme breakthroughs in more than 25 challenges for companies including Nestlé, Philips, Porsche, AkzoNobel, Bombardier, Tetra Pak, Straumann Dental, Bang & Olufsen, and more.

Disrupting Innovation Through Collaborative Competitions explains in detail how to organize and conduct your own collaborative competitions. We walk you through the entire approach, step-by-step, from writing the brief, to finding the "best-suited" teams, to running the meetings, setting deadlines, using the appropriate venues, and rewarding two winners: the team that solves the challenge and the team that collaborated the most. If your company is stuck on an innovation challenge and/or needs an extreme breakthrough to gain or maintain a premier position, this book is a must-read.

Sigvald Harryson is the founder and CEO of iKNOW-WHO – co-creating extreme breakthroughs – and of InnoVentum – bringing smart and beautiful design to renewable energy. He also serves as Professor at HULT International Business School teaching disruptive innovation in San Francisco, London and Dubai, after 8 years as Associate Professor of Ecopreneurship at Copenhagen Business School. After his first PhD in the early 1990s, Sigvald worked as Manager at BCG and partner at ADL. In the 1980s, Sigvald worked in R&D with Tetra Pak across 5 countries.

Johan Roos is Chief Academic Officer & Professor of General Management and Strategy at HULT International Business School. Over the last 25 years, his research has focused on leadership processes, especially innovative ways to strategize. He has published many articles and books, and he is the co-inventor of LEGO© Serious Play© and the Mosaic© serious game.

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Editorial Direction and Editing: Rick Benzel
Creative Services, Los Angeles, rickbenzel@msn.com
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PROLOGUE

"We have the best eggs, oil, lime and mustard in the world, but we are unable to move rapidly from science to actually do the mayonnaise. In today's world of disruption, we need new operational models to move faster from science to sales."

– Denis Aba, Head of the SBU, Nestlé Petcare

When Nestlé CEO Peter Brabeck-Letmathe launched an innovation competition among its five largest Strategic Business Units (SBUs), the Global Head of the Petcare SBU, Denis Aba, relied on Sigvald Harryson and his team to use a special methodology to co-create new concepts. Denis was determined to win with a breakthrough innovation for his SBU – creating the first dogfood (and later also cat food) in the world based on natural functional food ingredients.

Nestlé was clearly in a lead position to do this – having already been the first company to launch natural functional food ingredients in a yoghurt brand called Lc1. They had 600 food researchers in Vallorbe near Vevey, Switzerland who understood nearly everything about food ingredients, whether for humans or animals. In addition, Nestlé was already #1 in the world in pet food sales through its acquisition of Ralston Purina.

But a singular force was preventing the Petcare unit from being first in making this breakthrough—its own Head of Research. She claimed that this innovation was very complex and was certain it would take at least two years to develop the product at the cost of US$3 million. She left her meeting with Denis Aba, remarking: "And by the way, it will never work."

At the time, there was a certain amount of ambiguity within Nestlé as to whether pet-owners were ready for functional foods for dogs and cats. Moreover, the pet food market was full of uncertainty and volatility – who would be first in launching functional ingredients and how might legislation about pet foods develop.

Denis Aba had the money the Head of Research needed, but neither the time nor the tolerance for an internal conflict within research. For Nestlé to remain number one, speed of innovation was key, but the Ralston Purina merger added complexity to the already large and rigid R&D organization.[1]

> "For Nestlé to remain number one, speed of innovation was key.

His solution was to tap into our company, iKnow-Who, to provide external research and support, using an innovation approach we pioneered called "collaborative competitions." Our methodology employs several teams of researchers composed of professors, PhD candidates, and post-doctoral students who simultaneously collaborate and compete to solve an innovation challenge within a very short amount of time. The winning team in this case came from TNO Voeding, a research institute in the Netherlands. They developed the product in nine months at the total cost of US $900,000 – less than a third of the predicted internal development cost and in less than half the development lead-time initially estimated.

The new approach made such a strong impression on Peter Brabeck that

the head of the winning team, Peter Van-Bladeren, was asked to take over the position as Head of Research. Nestlé went on to launch their new product – a nutritional enrichment consisting of fish oil and antioxidants. The product, called Brain Protection Blend, helps dogs and cats maintain cognitive functions so as to keep them as sharp as they can be as they age. Van-Bladeren made it his mission from then on to run all future breakthrough innovation projects using the same approach. Dr. Van-Bladeren commented that: "I tried to use crowd-sourcing a few times, but without meaningful results. Breakthroughs mainly happen when people with complementary skills and networks meet in person over an extended period of time."

This case illustrates the most critical dilemma that large organizations face when it comes to innovation. The larger the organization, the harder it is to mobilize its R&D resources and transform their efforts into breakthrough innovations. Within large organizations, processes and routines very clearly defined and most employees prefer to stay within their comfort zones. As Denis Aba's quote in the opening of the chapter suggests, they simply can't go from the best raw ingredients to the best-selling mayonnaise.

The Critical Role of Co-Creation in Successful Innovation

How were we able to accomplish this innovation breakthrough for Nestlé? We did it by radically revisioning the usual way that corporations manage solving their R&D challenges. We call our method "Collaborative Competitions" because it is based on using multiple teams of talent and expertise *who both collaborate and compete at the same time*.

In our work, we use teams comprised of PhD students, post-doctoral students, and professors from certain universities and research institutes in the world where the intellectual property (IP) rights remain with the corporation that funded the research. This is not the case for corporate-funded university research in the United States, Canada, and England, where the IP rights belong

to the university, despite the corporation having paid for the research. But you can use our methodology of collaborative competitions with any set of teams you prefer to work with, even with your own internal R&D people. The key element to the success of our methodology is in the combination of simultaneous collaboration and competition, which drive "co-creation." Effectively, we disrupt the process of innovation through a fundamentally new approach.

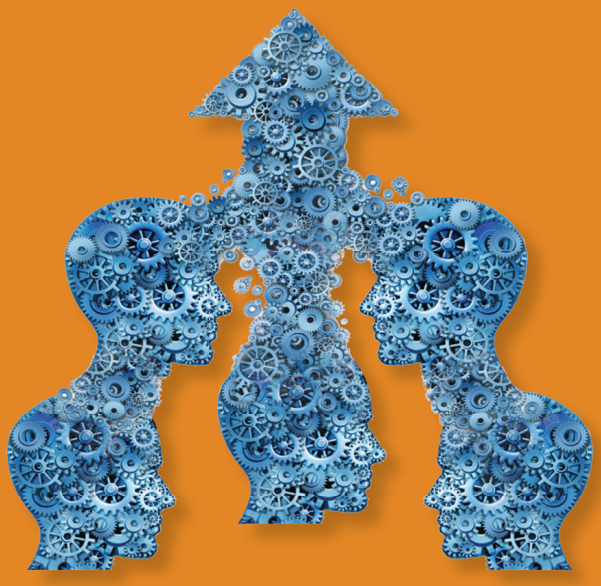
In our experience, co-creation is pivotal to generating new ideas and achieving breakthrough innovations. It is this co-creation that drives extreme breakthroughs.

The Origin of Our Methodology

We landed on the idea of Collaborative Competitions by observing how slow and inefficient the usual corporate R&D departments are to innovate. In decades of working with companies, we saw that when companies try to rely solely on their own in-house experts to solve an innovation challenge, they often end up with years of wasted time while spending millions of dollars for little result. The reason for this is that internal experts often become myopic, if not truly arrogant, about their own talent and capabilities. In fact, the more highly successful an in-house R&D team has been in the past, the more likely they are to get stuck in their own thinking, unable to extend their solution-finding capabilities beyond the knowledge, experience, and innovation mindset they have built up and relied upon in their prior years of their work. In the worst cases, they are simply closed to new thinking, new technologies, or new approaches.

We also saw that when companies give grants to universities or pay some "top" or "famous" academic researchers to help them research and solve a problem, their innovation challenges often languish. The work is often added to other research going on, or dumped to the bottom of the priorities list—and the research lags on for years. What is also disconcerting is that if a traditional company-sponsored university research project does lead to a breakthrough,

Co-creation means SIMULTANEOUS collaboration among at least three people having DIFFERENT experience, expertise, and frames of reference but a SHARED FATE.



The outcome of co-creation is GREATER IN VALUE THAN THE SUM OF THE INDIVIDUAL CONTRIBUTIONS that each of the parties would have been able to make in isolation.

most universities in the West would claim full ownership of the resulting patents and give only a non-exclusive license back to the company that paid for the whole project. This has become increasingly unacceptable to many companies.

Recently, we have seen some companies turn to "crowdsourcing" their challenge to a wider universe of unknown external experts. They write up a brief describing the challenge and hire a crowdsourcing vendor that blasts it out to hundreds if not thousands of volunteer researchers and experts who compete to solve it. But here too, there are problems. Companies may get hundreds of responses, but many are worthless, half-baked, or not consolidated enough into a solution that can be implemented as the final innovation.

As we examined this horizon of innovation methodologies, a new idea of combining collaboration and competition took hold. We began conducting collaborative competitions around 2005 and today, two decades of working with companies on innovation challenges have proven to us that the most effective way to tackle seemingly unsolvable problems is by incorporating two seemingly opposite natural human impulses: to *compete* and to *collaborate*. Combining a dynamic fusion of intellectual firepower from many researchers along with juxtaposing motivational drivers, and then lighting a match under them with tight deadlines, has produced amazing innovation solutions for our clients every time. We have worked with more than 25 companies to solve deep innovation challenges, often producing what we call *extreme breakthroughs,* i.e., problems that have seemed unsolvable in the past

EXTREME BREAKTHROUGHS

> "Problems that were unsolvable in the past that, once solved, boost your company into a new domain of innovation and patent rights.

that we helped solve and which boosted the company into a new domain of innovation and patent rights.

Using Collaborative Competitions in Your Innovation Challenges

We wrote this book to help companies that are struggling with innovation challenges. Using our approach to co-creating breakthroughs will enable you to eliminate blockages and barriers that hold back your efforts at creating major innovations. Collaborative competitions are most valuable when the challenge requires an "extreme" breakthrough, i.e., one which significantly advances the value, quality, durability, lifespan, or cost of a product's components, design, functionality, or manufacturing process.

Our experience with clients is that our collaborative competition approach is far superior at achieving rapid results than any other methodology of innovation management. The simultaneous competition and collaboration, as well as the "doing-good-by-doing-well" co-creation and sharing experiences that occur between teams of highly-driven researchers who have the most up-to-date scientific or technical know-how makes for an unbeatable combination of intellectual firepower to throw at a problem. Our approach effectively closes the wide gap between traditional academic exploration without practical application, and industry exploitation that increasingly requires research-based innovation.

This book will walk you through our entire methodology, step by step, so that you can implement the process yourself.

- In chapter 1, we will review the four most common types of innovation management approaches and contrast their pros and cons, to establish a baseline context for understanding how we perceive the current problems in innovation management. We capture the distinct characteristics for each of the four most commonly used innovation methodologies, and our

analysis provides insight into how specific companies consistently exploit a single innovation style with great success.

- In chapter 2, we present our collaborative competition approach in detail, explaining how it differs from those four other approaches, and detailing its pros and cons in light of the different degrees of innovation that may be desired.

- Chapters 3 and 4 will go into the actual nuts and bolts of how we implement a collaborative competition. We present, step-by-step, how to write a brief to help the problem-solving teams grasp the challenge; how to select the right researchers for your teams; and how to run the steps of the solution finding process, from the kickoff meeting to final meeting when you select a solution and name the reward winners.

Along the way, we provide "sidebar" insights into several important ancillary issues that underpin the benefits of implementing our approach, including:

- How Serious Play supports innovation (chapter 2)
- The research on intrinsic vs. extrinsic motivation (chapter 2)
- The advantage of our approach to close the gap between academic exploration and industry exploitation (chapter 2)
- How to work with universities where IP may not be protected (chapter 3)
- Dealing with creative blocks in teams (chapter 4)
- The critical role of tacit knowledge sharing in innovation (chapter 4)
- The smartest timing for filing patent applications (chapter 4)

Following these first four chapters of Part 1, we will walk through the details of four case studies and six vignettes from different industries focused on different innovation needs in Part 2. They are as follows:

- Chapter 5 - **Philips**: Replacing a highly expensive rare earth mineral used in PET scanners with a new material with less cost and greater effectiveness

- Chapter 6 - **AkzoNobel**: Inventing a new method to manufacture decorative paint with no volatile organic compounds (VOC) to avoid air pollution

- Chapter 7 – **InnoVentum**: Co-creating smart and beautiful designs that set new benchmarks in resource efficiency and energy density for small-scale hybrid wind-solar solutions.

- Chapter 8 – **Herenco**: After acquiring a company from Tetra Pak, Herenco had to invent a new formulation and manufacturing process for cross-linking polymers after the step of injection molding. This allowed for doubling the manufacturing speed with 50% less material usage to manufacture food containers

- Chapter 9 – **Six Vignettes:** We provide one additional chapter describing in shorter "vignette" fashion six additional cases that we have worked on:

    - **Porsche**: Making a breakthrough in brakes (ceramic brake system)
    - **Bombardier**: Extending the lifetime of a key component in tramways and trains X 10
    - **Tetra Pak**: Co-creating a fundamentally new design for a locking-pin that used to break and end up in one of a million possible liquid food packages

- **Straumann**: Bringing a new dental material to the market that beats all previous products for artificial teeth used in implants, bridges, and dentures
- **DSM**: Inventing a way to make drastic reductions in climate-harming emissions (reducing ammonia emissions by 95%)
- **Bang & Olufsen**: Radically expanding the licensing revenues from a new product developed in a university competition.

Each case provides an informative narrative and valuable insights about innovation management that we learned as we were working with our clients and university teams on the cases. The companies had been trying to find their own solutions, but these were too costly, too slow, too weak, having too much wear, too polluting, had poor functionality, or required too much material. As you will see, we assisted these companies to solve innovation challenges faster, better, smarter.

CASE EXEMPLES:	Give Me a Brake	Let There be Light	No Shit	Keep Running	Pin Up	Eat Your Own Dog Food	50/50 Lean & Fast	Naturally Artificial	ICE Cool Power	Zero Waste
CHALLENGES: Too costly		●				●	●	●		
Too slow						●	●			
Too weak	●			●	●			●		
Too much wear	●			●	●					
Too polluting			●				●			●
Too poor functionality	●	●		●		●			●	
Too much material			●				●		●	●

Through these chapters, you will effectively have a complete handbook on how to implement collaborative competitions in your organization. Our goal is to provide you with "how-to knowledge" of the entire process so you will have confidence and step-by-step instructions to begin using our methodology for your own challenges that require an extreme breakthrough for a seemingly unsolvable problem.

While this book is oriented as a general business book for CEOs, C-suite executives, and innovation practitioners, it is grounded in theories on networking, organization, innovation and co-creation to explain why and how the combination of collaboration and competition has such high impact on innovation. We see this as a significant theoretical contribution of the book that thereby offers both rigor and relevance.

Our motivation for writing this book is that we are convinced that the best way forward for civilization on this planet (or any other planet in the future) is to help humankind make progress as fast and as innovatively as possible. Given our collective human intelligence and resources, progress requires that we maximize our capabilities to create a culture of vast innovation to advance our living habitats, our medicine, our modes of transportation and communication, and our methods of educating future generations. As innovators ourselves, we offer our thinking to other innovators and hope you will use our collaborative competition approach to achieve the breakthroughs your organization seeks and the planet needs.

The book incorporates ideas and techniques developed independently or jointly by both of us during more than two decades or research, teaching, consulting and practicing leadership. It represents in our eyes a fresh and accessible synthesis of a view of innovation that we have come to share, starting from the early intuitions of Sigvald some 25 years ago.

"We like to bring together people from radically different fields and wait for the friction to produce heat, light and magic. Sometimes it takes a while."

PART 1

THE COLLABORATIVE COMPETITION APPROACH TO INNOVATION

CHAPTER 1

The Usual Approaches to Innovation Management

Before we explain Collaborative Competitions and how this approach compares to the usual methods by which companies manage innovation, let's clarify an important issue—the goals of innovation. Companies innovate for many reasons, and in that process, they set innovation goals aimed at different purposes. In our twenty years of consulting, teaching, and working with companies, we have encountered and examined four purposes of innovation that companies are interested in doing -- incremental, radical, disruptive, and extreme breakthrough.

There is strong debate in some circles about the exact meaning of these terms, but for purposes of this book, we view these four degrees of innovation as being sequentially ordered according to increasing levels of complexity, research time, and cost to solve.

Incremental – These are important, yet minor changes to a product or process that makes it more effective, faster, less expensive to produce, or more appealing to the consumer, but the innovation does not change the basic technological or scientific functioning of the product. For example, the famous

Degrees of Innovation

Incremental

Small innovations that add features or design enhancements to an existing product.

Radical

A significant innovation, often in technology, such as analog to digital (e.g., cassette players vs. mp3 digital players)

Disruptive

An innovation that alters the industry, often through a disruptive form of production or distribution. E.g., the iPod altered music industry distribution; Airbnd the hotel industry; Uber the taxi industry

Extreme Breakthrough

An innovation that solves a previously unsolvable problem through a new discovery of materials, process, methodology, or technology. Often solves a problem that is critical, life threatening, cost saving, or climate saving. Brings licensing revenues and Brand Equity, plus profitable revenues.

3M Post-It Notes did not change the basic structure of handwriting a note and pinning it to a wall or message board. It did, however, make it incrementally far easier because the note contained a glue-strip on the back, eliminating the need for the pin.

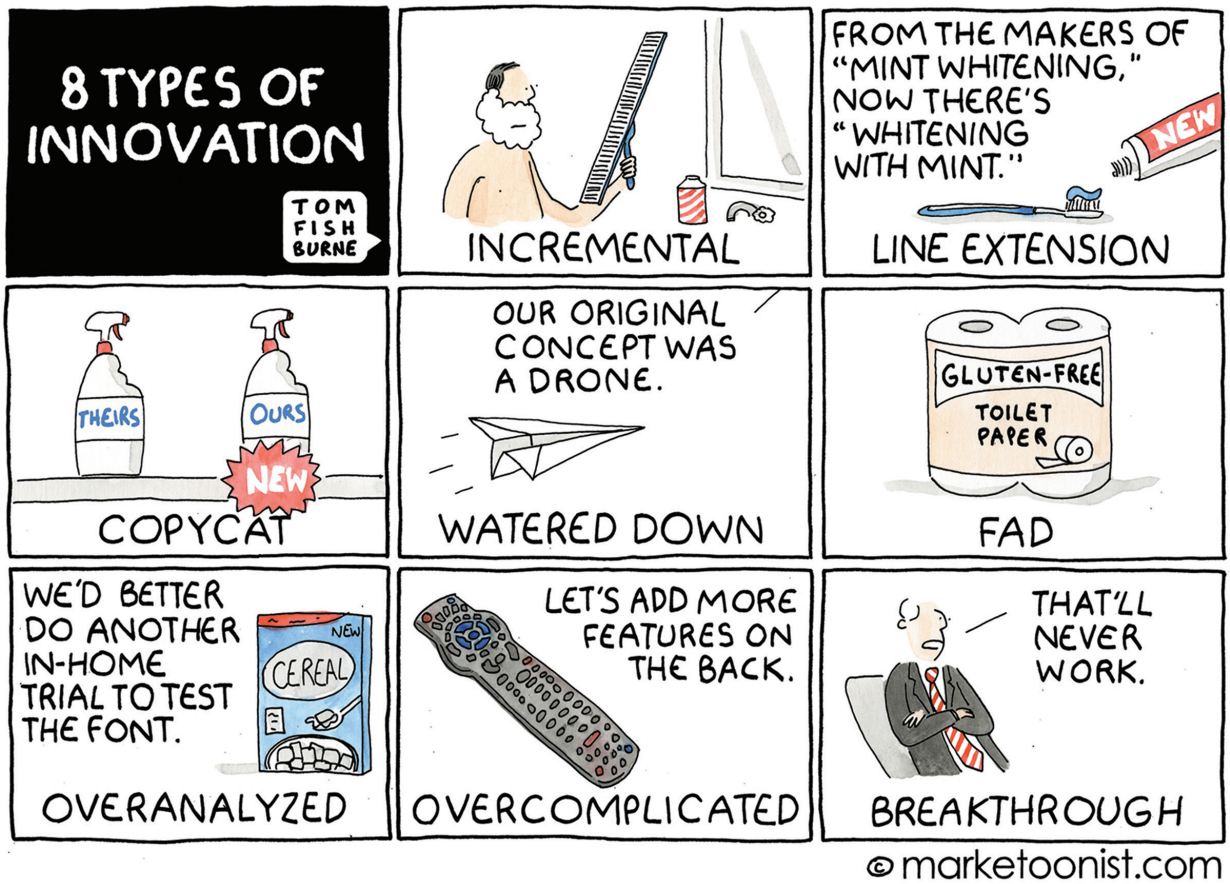
Radical – This type of innovation creates a higher level of change than an incremental innovation. It is substantial and significant in altering the way a product functions. It advances the technology or science of that field, and perhaps others as well. A radical innovation effectively creates a new generation of a product or process. A good example of this is the medicine Valium, invented by Roche. Prior to Valium, no medicines provided the degree of calmness needed for people suffering from anxiety disorders. Valium took anxiety curing into a new generation of drugs. Launched in 1963, it was the highest selling medication in the United States between 1968 and 1982. Competitors could only enter the market in 1985 when the patent expired.

Disruptive – A disruptive innovation is a sideways movement that changes the industry. It disregards the traditional product or process in that it doesn't bother to innovate it, but rather it goes around it to create an entirely new approach to fulfill the same need. Here, the iPod was one of the most significant disruptive innovations that altered the entire music business because it changed how people purchased and consumed music. It is often considered to be the initiator of a globally new approach to the entire digital entertainment industry. More recently, companies like Uber and Airbnb have disrupted the taxi and hotel businesses, respectively.

Extreme breakthrough – This is the highest level of innovation, in that it solves a previously unsolved problem through the discovery of a new material, process, or approach to the innovation. It often concerns a challenge that is critical, life-threatening, hugely cost or time saving, climate saving, or extends the purpose or life a product by a substantial amount. This breakthrough goes beyond a radical innovation in terms of the level of advancement that it contributes to the science or technology in a product or process. An extreme breakthrough

often requires a multidisciplinary approach, merging several technologies or sciences into the solution-finding and final invention. As such, it often takes the longest time to innovate, requiring more research, testing, prototyping, and change to production or manufacturing processes.

Out of the many forms and types of innovations that can be distinguished, it is clearly the breakthrough that seems to meet the greatest challenges. Not only is it hard to actually make a breakthrough, it usually runs into significant internal resistance by people who have been around a long time and simply think they know how things work.



We already saw the common reaction "It will never work" in the Nestlé case. We have worked with many clients on innovation challenges that resulted in extreme breakthroughs. With Nestlé, making pet foods out of natural ingredients may seem completely logical today, but at the time, it was perceived as an extreme breakthrough in terms of being able to ensure freshness, nutritional quality, and consumer interest. With Philips, our collaborative competition approach helped them solve a challenge their engineers had been working on for ten years, spending more than $100 million in R&D, yet not solving it. They were trying to replace a rare earth mineral in Positron Emission Tomography (PET) scanners that are used to detect cancer. Our methodology achieved a breakthrough within six months that completely eliminated the need for rare earth materials, creating a new generation of PET scanners at lower cost with faster and quieter operation.

Porsche is another company we assisted in developing an extreme breakthrough. Its competitors such as Ferrari and Mercedes Benz had been trying for years to invent a ceramic brake that could withstand higher temperatures and have a greater lifespan than standard cast iron brakes. We worked with Porsche to invent a new ceramic brake that is now an option on its cars and which the firm licenses to many other car manufacturers. Whereas standard brake systems will fail if pressured too hard, this technology will never fail, thus saving lives.

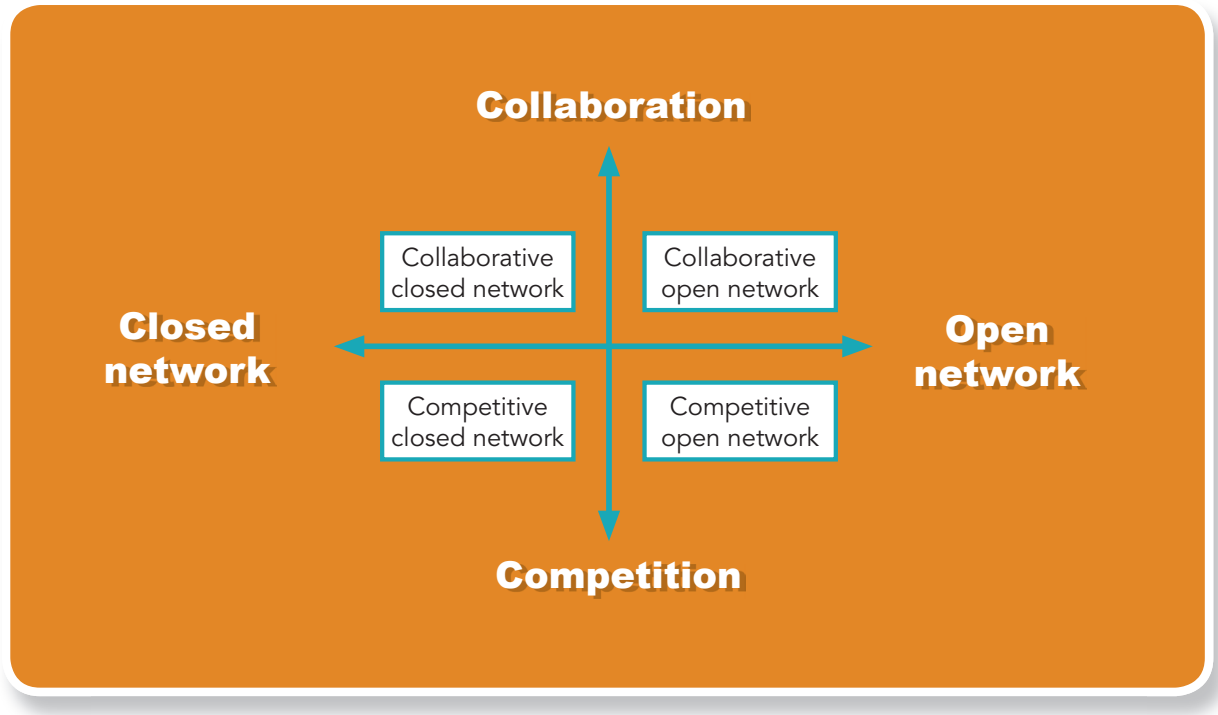
As we go through this book, we will use these terms about the types of innovation in the context provided here. And to be sure, we suggest that our collaborative competitions are the most effective approach to take when an organization seeks a breakthrough innovation in a short period of time. Frankly, our approach may also be the one you need in many other circumstances because you may not know upfront what degree of innovation you actually need. You may start out thinking that you are looking for just an incremental innovation but then realize that, due to changing technologies or new competition, you actually need a breakthrough innovation to take your product to a higher level.

The four traditional paradigms of innovation

In our years of being in the innovation field, we have encountered a wide range of approaches to innovation among vastly different companies. Our work has effectively forced us to step back to gain perspective so that we could analyze the many styles we have either witnessed or been actively involved in using while working with different firms on their challenges. What we found is that these diverse innovation approaches fall into four common approaches, or what we might call "paradigms" about how to structure one's efforts to solve innovation challenges.

We arrived at four paradigms by examining the fundamental distinctions we saw among the approaches. Many companies that we analyzed from afar or directly consulted utilized either a highly *closed* or fully *open* approach in terms of how people worked with each other and shared information and ideas. At the same time, we remarked that companies would either foster a *competitive* environment among different people or teams approaching the same challenge, or they would encourage a far more *collaborative* environment. Our conclusion was that these juxtapositions form an insightful framework by which one could look at, categorize, and compare the essential differences in innovation management.

Reflecting on this grid, the distinctions between approaches become easily identifiable and meaningful. One can walk through the quadrants and recognize that each innovation paradigm is correlated to a specific mindset. Each has its own set of pros and cons that help explain why that method of innovation is successful for some organizations, but not for others. As a result, it also becomes easy to identify which specific companies are well-known to use a certain paradigm as their primary method of innovation. The comparisons are so clearly demarcated that, in the spirit of coming up with memorable mnemonics to distinguish among the four quadrants, we named them. The following sections share our analysis.



The Edison Paradigm -- The Competitive Closed Network

The greatest inventors in the history of the world were pioneers, working alone or with just a small team of accomplices in their private lab. Since the Industrial Revolution, the most well-known innovations (whether they were called innovation, invention, or any other term) have occurred in a rather closed network, as inventors competed with one another to be the first. From Benjamin Franklin and Alexander Graham Bell to Thomas Edison, Nicolas Tesla, Stephanie Kwolek, Grace Hopper, and Steve Jobs, the most innovative ideas came from the mind of a single individual who applied imagination and creative thought to develop a new technology that changed the world in some significant way.

It is not surprising that the leading paradigm of corporate innovation that took root in the 20th century has been largely based on the model of Thomas Edison's lab, led usually by one great mind and a team of assistants. Following