

**A PEOPLE VIEW OF BREAKTHROUGH INNOVATION:
For technical executives (CTOs, VPs of engineering and R&D),
technical managers, and Serial Innovators**

Bruce A. Vojak

“As I listen to technical executives, managers, and domain experts respond to these insights on Breakthrough Innovation, I regularly hear, ‘We recognize the patterns you’re talking about. We have (at most) a handful of people who are doing just that; we just didn’t realize that others do!’”

Executive summary

Breakthrough Innovation delights customers, returns sizeable and sustainable financial returns to investors, stuns competitors by abruptly changing the rules of the game, and allows companies that successfully practice it to survive and thrive.

The commonly-held view of contemporary innovation accepts that two, very different, complementary processes exist in series, a creative, divergent “front end” followed by an implementation, convergent “back end”. Unfortunately, this view is insufficient to describe how Breakthrough Innovation occurs in practice and, thus, to yield Breakthrough Innovation success.

A third, yet more powerful understanding is that Breakthrough Innovation is the very human act of discovery – an act requiring a company to acquire and establish new perspectives, insights, cultural values, and business practices in order to achieve and sustain it. The implications of this view are significant in that proven Serial Innovators:

- Know what to do today in order to have significant future impact on their company and
- Effectively navigate their organization to bring these new concepts to market.

Technical executives and managers must hire, develop, and support those who are uniquely skilled to become Serial Innovators.

Those who rise to meet these expectations and face the associated challenges will have served customer, investor, employees, colleagues, and self alike.

1.0 What we mean by Breakthrough Innovation

With so many innovation-related definitions in circulation, it seems appropriate to begin by clarifying what we mean by Breakthrough Innovation.

Breakthrough Innovation occurs when a new product, process, or business model both is entirely unanticipated and has significant, ongoing impact in the marketplace. Breakthrough Innovation changes the paradigm within which competition occurs. In contrast, incremental innovation optimizes within the existing paradigm.

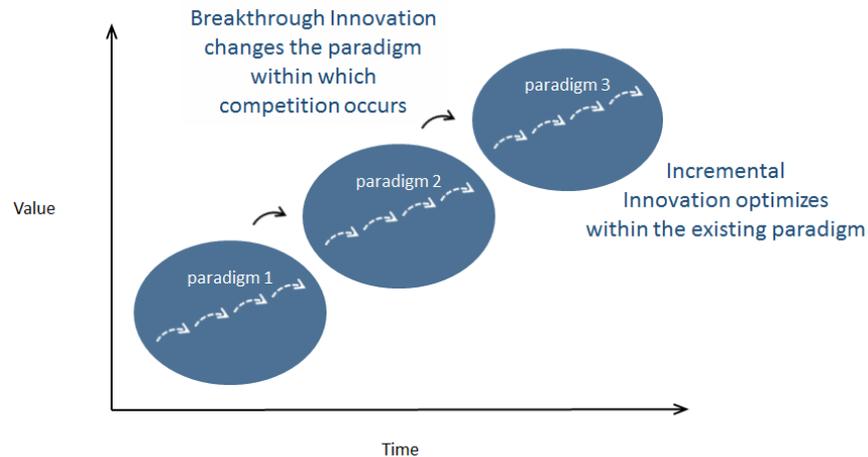


Figure 1: The distinction between Breakthrough and Incremental Innovation

Breakthrough Innovation:

- Delights **customers**, often providing them what even they did not know they desired,
- Returns sizeable and sustainable financial returns to **investors**,
- Stuns **competitors** by abruptly changing the rules of the game,
- Is **not limited to physical products or processes**, but also can include business models and other significant changes in how an industry operates,
- Is **inherently strategic** as it takes the form of **changing the paradigm within which competition occurs**, and
- Allows **companies that successfully practice it to survive and thrive** a volatile, complex and increasingly ambiguous world.

Paradigm shifts often, but not always are tied to technological advances. A few simple illustrations of technological advances leading to Breakthrough Innovation and a changing the paradigm include:

- Computer memory: paper punch card → magnetic disc → optical disc → semiconductor
- Diaper: cloth washable → paper disposable
- Audio distribution: physical (LP records, CDs) → electronic (mp3 files)
- Interpersonal communication: letter writing → phone calls → email → social media

However, technology-driven paradigm shifts need not be the case. Drawing from the examples shared in my related message to business executives,¹ one need only consider:

- Apple’s relentless progression of new product concepts (driven on the design side)
- P&G’s “billion dollar brands” (often combinations of technology and market insight)
- Uber’s re-framing of the taxi business model (merely enabled by a technological advance)

Breakthrough Innovation requires both discerning insight and hard work on the part of you and your colleagues. If it were easy, someone else already would have done it. Yet, when Breakthrough Innovation strikes, the success or survival of firms and the lives of individuals are forever changed as both fortunes and jobs are created and lost.

2.0 The prevailing view of innovation

The commonly-held view of contemporary innovation accepts that two, very different, complementary processes exist in series, a creative, divergent “front end” followed by an implementation, convergent “back end” (Figure 2).

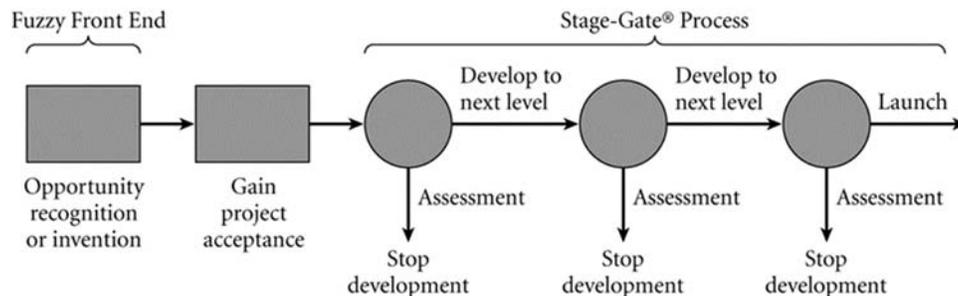


Figure 2: The commonly-held view of contemporary innovation

The front end of innovation carries with it the unarticulated assumption that we cannot fully grasp how innovation really occurs; the “Fuzzy Front End” (FFE) is an example of such a perspective. Such a “fuzzy” view of innovation appropriately opens up possibilities for the volatility, uncertainty, complexity and ambiguity that characterize Breakthrough Innovation. It acknowledges the intuitive, creative aspects of innovation and does not attempt to over-control it. Thus, the front end emphasizes the apparently random nature of innovation.

The back end of innovation carries with it the unarticulated assumption that we can systematically evaluate and develop promising innovative concepts, that is, that we can reasonably grasp how to proceed with innovation; the “Stage-Gate® Process” (SGP) is an example of such a perspective. Such a “process” view of innovation appropriately systematizes innovation activities in ways that characterize how most other, non-innovation processes in the firm work. It ensures that critical information and thinking is not missing or ignored, it brings the customer’s “voice” to innovation, it trains less experienced people in the innovation process, and it helps those who have mastered it to recall the details. Such processes are disciplined, not chaotic. It makes innovation more uniform, more

¹ B.A. Vojak (2017 revised). AN EXECUTIVE BRIEFING ON BREAKTHROUGH INNOVATION: For CEOs, presidents, and general managers. This white paper is available for download at: <http://www.breakthrough-innovation-advisors.com/publications>

predictable, minimizing variation in the innovation process. And, finally, it reduces risk of failure / loss of investment due to innovation process mistakes. Thus, the back end emphasizes the apparently recipe-like nature of innovation.

Collectively, the front end and back end span the breadth of what many believe is required for Breakthrough Innovation.

Having said this, and not surprisingly, each of these two views carries with it limitations. First and foremost, both regularly fail. Failure in the FFE often is characterized by a heroically technical success that finds no place in the market. Failure in the SGP often is characterized by incremental, rather than a breakthrough success. Perhaps most importantly, the combination has the appearance of an inefficient production line – generating large amounts of product (generating potentially breakthrough ideas in the FFE) followed by filtering out the defects (filtering of ideas in the SGP). In the ridiculous extreme with this perspective, we close our eyes, grit our teeth, and throw ourselves in a direction (FFE), after which we are told whether or not it's the right direction (SGP) – an endeavor that is exhausting and infrequently fully satisfying.

3.0 How Breakthrough Innovation is achieved

While broadly implemented, this serial combination of the FFE and the SGP described in the previous section is insufficient to describe how Breakthrough Innovation actually occurs and, thus, to yield Breakthrough Innovation success.

The drive to understand Breakthrough Innovation as either random or recipe has gone too far; so far as to limit many mature firms' ability to create Breakthrough Innovations. In today's economy, with the future of so many firms on the line, these findings represent a call to businesses to rethink how to pursue Breakthrough Innovation.

In sharp contrast to the perspectives that Breakthrough Innovation is merely random or that it can be managed like any other process, my colleagues and I instead re-framed the problem by exploring a “people” view of Breakthrough Innovation.² We understand this as a third, yet more powerful perspective. ***At its core, Breakthrough Innovation is the very human act of discovery – an act requiring a company to acquire and establish new perspectives, insights, cultural values, and business practices in order to achieve and sustain it.***

This research zeroed in on the rare, cutting-edge thinkers who repeatedly create and deliver breakthrough innovations in mature companies. These employees are organizational powerhouses who solve consumer problems and substantially contribute to the financial value to their firms. We refer to them in our book as “Serial Innovators”.

We discovered in detail who these Serial Innovators are and how they develop novel products and processes, ranging from earth-moving equipment to improved electronics to personal care products in companies such as Caterpillar, Hewlett-Packard, and Procter & Gamble. Based on interviews with over

² This research is summarized in:

- B.A. Vojak, R.L. Price and A. Griffin (2012). Serial Innovators: How Individuals Create and Deliver Breakthrough Innovations in Mature Firms. *Research-Technology Management* 55 42.
- Griffin, R.L. Price and B.A. Vojak (2012). [Serial Innovators: How Individuals Create and Deliver Breakthrough Innovations in Mature Firms](#) (Stanford University Press).

50 Serial Innovators and an even larger pool of their co-workers, managers and human resource managers,³ we have revealed key insights about who they are, how they know what to do today in order to have significant future impact, and how they navigate their companies. Further, we understand how to identify, recruit, develop, enable, support, and manage these unique and important individuals for long-term corporate success.

And equally important, while these are rare individuals in any company, our findings have significant aspirational and inspirational implications for all employees.

4.0 Key insights associated with implementing a people view of Breakthrough Innovation

While a complete discussion of Serial Innovators and a people view of Breakthrough Innovation can be found in the two references of footnote 2, I provide here a brief summary of a few of the key insights as a means of introducing the reader to the uniqueness of this approach.

Roles. Those with responsibility for leading innovation commonly organize around three silos of expertise: inventors (those with deep technical expertise), champions (those with intimate market insight), and implementers (those who carry projects from concept to commercial reality). In contrast, Breakthrough Innovation is successfully implemented by those who transcend these roles (Serial Innovators; Figure 3), those with holistic insight.

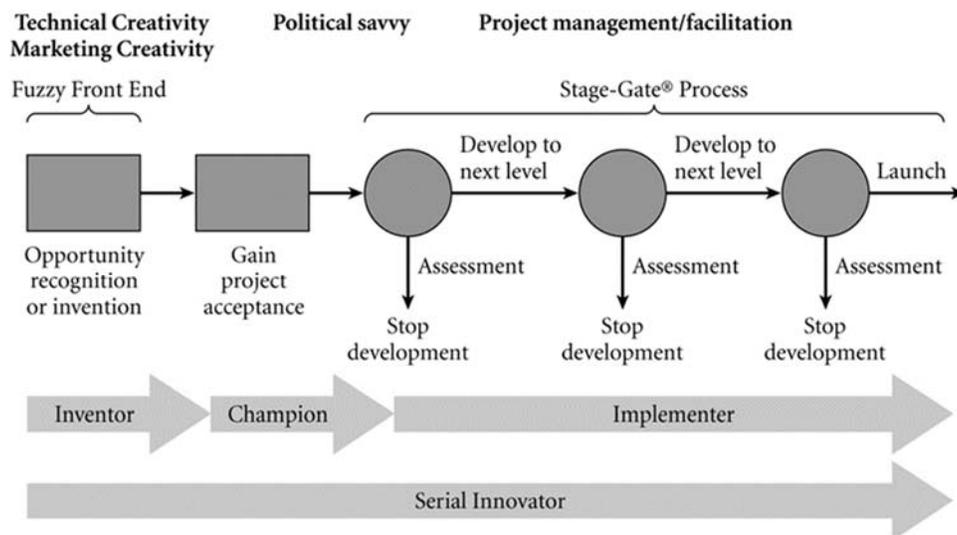


Figure 3: The commonly-found roles in contemporary innovation (Inventor, Champion, and Implementer) in contrast with the role of Serial Innovator

³ This research, conducted over the course of more than a decade, involved a total of ~175 in-depth interviews, as well as a large-sample survey that yielded 418 responses. It covered a broad range of industries (including: aerospace, automotive, computer, consumer products, electronics, engineering services, food products, heavy equipment, materials, medical equipment, and semiconductor) and often multiple companies within an industry.

Characteristics. Recurring patterns of characteristics are observed in proven Serial Innovators, including:

- Motivation – What drives them?
 - Self-motivated to solve customer problems
- Personality – How are they hard-wired?
 - Curious, systems thinking, creative
 - Tenacious, see it through to completion
- Perspective – How do they view the world?
 - Technology is the means to an end
 - In business to create value (profit)
 - Value people
- Preparation – How did they get ready to innovate?
 - Agile learners – broad and deep

Path. In contrast to the very linear process followed in contemporary, conventional innovation systems (Figure 2), Serial Innovators follow a much more non-linear, fluid, and contingent path to success as illustrated by the Hourglass Model depicted in Figure 4.

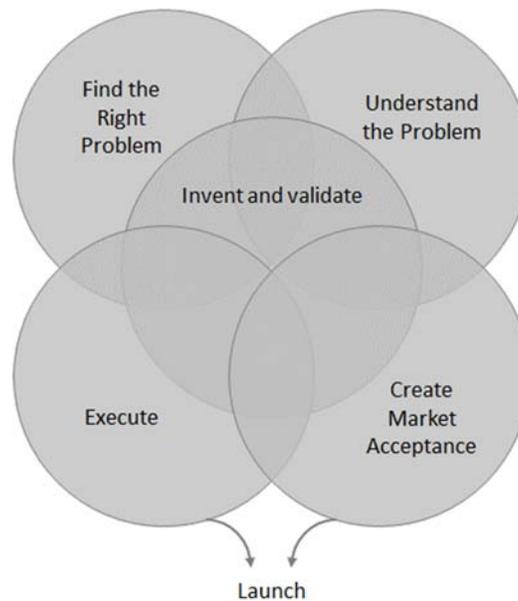


Figure 4: The Hourglass Model of Breakthrough Innovation

Serial Innovators essentially traverse a path starting from “Find the Right Problem” to “Understand the Problem” to “Invent and Validate” to “Execute” to “Create Market Acceptance” and ending with “Launch”. I say ‘essentially’ because at any one of these steps, Serial Innovators may realize that they need to revisit an earlier step.

They may learn, for example, while in “Invent and Validate” that the problem they are looking to solve is not the best for all involved. In that case they would revisit “Find the Right Problem”. In fact, Breakthrough Innovation more often than not involves reframing the problem definition, after which new technologies can be applied to addressing the newly-defined problem.

Most important is that this model illustrates powerfully the non-linear nature of Breakthrough Innovation. It is this feature that makes it impossible to reduce to a recipe, yet enables it to be the source of new and exciting products, processes and business models.

Posture. In many respects, Serial Innovators engage in what can be metaphorically described as a “dance with reality”. They don’t merely impose their will. Neither are they entirely passive, waiting for a Eureka moment to descend upon them. Instead, their act of discovery involves a give-and-take with reality.

Their approach includes great skill in the standard posture of knowing that characterizes modern thought. They appropriately detach themselves from the problem, they break it into its component elements, and they analyze it in a way that assumes negligible interaction among the elements.

Yet, they possess unmatched skill in the rare posture of knowing that is the antithesis to modern thought. They immerse themselves in the problem (becoming almost one with it), they view it holistically, and they not only accept but embrace non-linear interactions among the elements.

The holistic aspect of the Serial Innovator’s posture is illustrated schematically in Figure 5a. They do not focus excessively on any subdomain of information, instead they grasp it simultaneously as a whole. Only by doing so are they able to envision new, unexpected and significant innovative concepts.

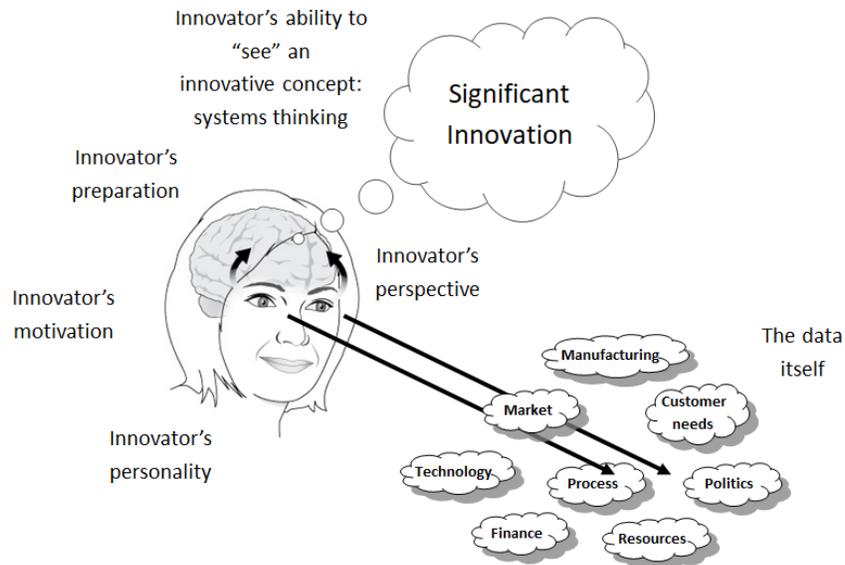


Figure 5a: The Serial Innovator’s posture: Holistic discovery

This posture is remarkably similar to that used by a viewer of child’s Magic Eye® image, as illustrated schematically in Figure 5b. Only by not focusing on the surface of such an image, but instead adjusting one’s gaze so that the viewer’s focus is aimed beyond, to an infinitely distant point, can one “see” the three-dimensional image embedded in what otherwise appears as a random, two-dimensional pattern on the surface.

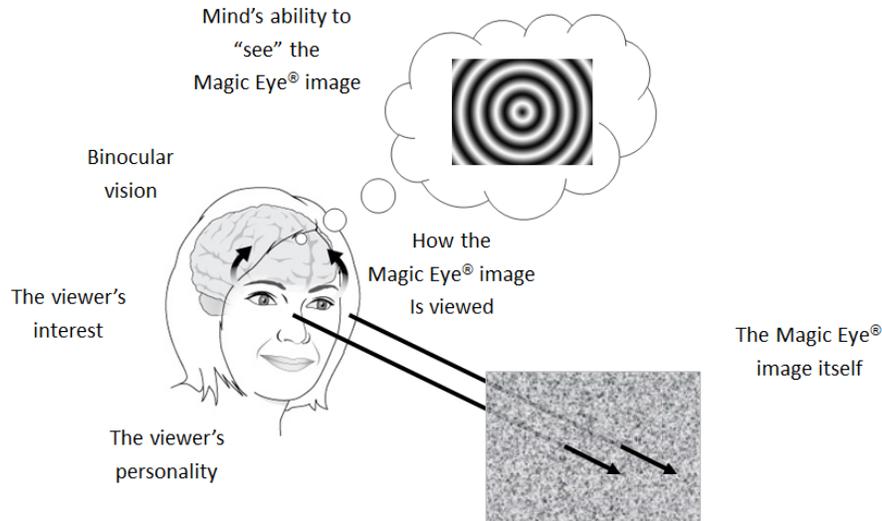


Figure 5b: The Magic Eye® viewer's posture: Holistic discovery

It is only through accepting such insight into how Serial Innovators gain their perspective can technical executives and managers begin to learn how to effectively manage such remarkable contributors in their organization.

Politics. Without exception, the Serial Innovators we met with during our research spoke of having a naïve view of organizational politics at the outset of their career. As technical experts (Inventors in the language of our research), they believed that their technical contributions were sufficient and that others were responsible to carry their ideas to commercialization.

However, as time went on, each of these successful Serial Innovators realized that they had to metaphorically “cross the bridge” to accept responsibility for commercialization if they were to have any hope of impacting the organization with their insights. It was at this point that they became willing to engage with the organization and develop the skills necessary to influence others in the pursuit of simultaneously serving customers, shareholders, colleagues, and management alike.

Each learned, over time, how to earn the trust and respect of their colleagues and management. Each flexibly applied influence techniques as the situation required. Each understood when to push and when to hold back. And, as a result of such a conscious approach toward understanding and navigating their organization, each had a significant impact on it to the benefit of all.

Culture. As I’ve spoken with Serial Innovators, their managers, CTOs, and CEOs, presidents and general managers over the past decade, a clear consensus emerges that making a place for Breakthrough Innovation initiatives has become increasingly difficult.

Serial Innovators themselves see their companies losing those with the skill, neither hiring nor intentionally developing those with the potential, and losing what was left of an “innovator-friendly” culture. In essence, many companies are insufficiently investing in Breakthrough Innovation, becoming more and more incremental and short term in their focus. And to make matters worse, improved, enterprise-wide accounting systems and efficiency initiatives make it nearly impossible to “hide” or “bootleg” even small projects until they reach a point of sufficient readiness to share with those outside of engineering and research organizations.

Yet, executive business leaders face their own set of difficulties, especially the near-term, financial focus so pervasive in publicly-traded firms, leading to their time and attention being in short supply. Layer onto this the often-unarticulated, commonly-held assumption that the most important elements of business are both operational and measurable, and it's not surprising that some business executives feel that they just don't have the time to understand Breakthrough Innovation sufficiently even to decide whether or how to invest in it.

So, where does this leave us?

Executive business leaders increasingly emphasize and rely on an optimization culture, one that delivers short-term results and focuses on: cost reduction, predictability, stability, and reliability. Meanwhile Serial Innovators and their managers are tasked with a charge that can only be accomplished in an innovator-friendly culture, one that focuses on: revenue growth, surprise, volatility, uncertainty, complexity, and agility. The challenge, then, is to establish and maintain a healthy tension between these two conflicting cultures. Unfortunately, it is easier, cleaner, but deadly to not deal with the tension, at which point the optimization culture will overcome and drive out the innovation-friendly culture.

Although this represents a very serious state of affairs, hope remains.

5.0 Your critical roles in Breakthrough Innovation

For technical executives. Your two primary Breakthrough Innovation roles are to ensure your company has the right people and culture to encourage and sustain Breakthrough Innovation.

Ensuring that you have the right people means playing an executive-appropriate role in identifying, hiring, developing, encouraging, and supporting both Serial Innovators and their managers. It also means that you are managing a pipeline of people, ranging from the proven to the aspiring. Ensuring that you have the right culture means creating and sustaining the “space” (and that not necessarily, nor even preferably a separate physical or organizational space) in your organization where Serial Innovators can exist, and are encouraged and supported.

Each of these efforts means that you must make the appropriate investments and engage personally with the Serial Innovators and their managers. Further, they mean that you must take a long-term view, holding the perspective that providing a place for Serial Innovators helps you build an organization that is capable of true innovation. Finally, they mean that you must work with your CEO, president, and / or general manager to ensure that they develop a business-executive-appropriate understanding of Breakthrough Innovation and commit the resources necessary for Breakthrough Innovation success.

For technical managers. Your primary Breakthrough Innovation role is to personally support the Serial Innovator reporting to you.

Personal support means many things in this context, beginning with providing the resources, time, and appropriate access to those more senior to you, each of which are required by Serial Innovators to succeed. It means that you must learn how to effectively identify, recruit, develop, and retain both aspiring and proven Serial Innovators – a not insignificant set of responsibilities. At times it means that you must appropriately fight the political fight on their behalf, while always building for the long term.

It also means that you must learn to and demonstrate sufficient empathy to personally discern the needs of your Serial Innovator colleague and appropriately address them. An insightful challenge may be necessary at times for some Serial Innovators, while at other times the needs of Serial Innovators demand that you must “let the birds fly.”

When done well, the relationship can lead to company success beyond your wildest imagination. When done poorly, you will have wasted your and their time. Without you doing your job well, there can be no Breakthrough Innovation in an organization.

For Serial Innovators. Your role is simple to define, but by no means easy to work. You must come up with the Breakthrough Innovation insights and convince the rest of the company to come along with you to success.

You must deeply understand the subtleties of current and potential customer needs by immersing yourself with your customer base. Additionally, you must simultaneously and holistically grasp a wide range of information beyond this, including possessing relevant manufacturing, market, technology, product, shareholder, organizational politics, and financial insights. You must also understand how small changes in one or more of these insights can disproportionately yield significant financial return. But it doesn't stop there.

You must “cross the bridge” of accepting responsibility to overcome internal obstacles to commercialization. You must persist, doing all you can politically as you navigate the firm's politics. You must demonstrate courage in serving customer and company alike.

When done with insight and discernment, the rewards can be enormous.

In closing

If you rise to these expectations and challenges, you will have served all. You will have brought important new products to customers or processes to life, or reframed your company's business model. You will have fulfilled the most challenging investor expectations. You will have demonstrated to others how to navigate your organization, paving the way for others. You will be known and remembered as those who accomplished some amazing things.

My hope is that you will succeed. That you will take up the challenge, learning to operate in your industry and organization in a manner not often witnessed.



Breakthrough Innovation Advisors, LLC was founded by **Bruce Vojak** to help companies survive and thrive in a volatile, complex and increasingly ambiguous world. As a leading authority on Breakthrough Innovation, Bruce brings a unique and powerful combination of deep and broad expertise, as well as a rich network of other experts, to guide his clients in harnessing its benefits.

Spanning a career at the intersection of business and technology, Bruce has experienced and explored Breakthrough Innovation purposefully and variously. Having first established himself as a successful technology executive in industry, he understands first-hand the business need for and benefits of Breakthrough Innovation. Having later transitioned to academia, he followed his passion by conducting groundbreaking research on the practice of Breakthrough Innovation across a wide cross-section of mature companies and industries.

Bruce is co-author of [Serial Innovators: How Individuals Create and Deliver Breakthrough Innovations in Mature Firms](#) (Palo Alto: Stanford University Press, 2012) and five book chapters on innovation. He serves on the Board of Directors of Midtronics, Inc. and the Advisory Board of JVA Partners, periodically consults on the topic of innovation for Procter & Gamble, and regularly presents to, leads workshops for, and advises various other companies.

Prior to founding Breakthrough Innovation Advisors Bruce served as Associate Dean and Adjunct Professor in the top-ranked College of Engineering at the University of Illinois at Urbana-Champaign. Earlier in his career he was Director of Advanced Technology for Motorola's non-semiconductor components business, held research and business development positions of increasing responsibility at Amoco Corporation, and was on the research staff at MIT Lincoln Laboratory. He holds BS (with Highest Honors), MS and PhD degrees in Electrical Engineering from the University of Illinois at Urbana-Champaign and an MBA, with concentrations in finance and marketing, from the University of Chicago's Booth School of Business.