

An Inovo Group Whitepaper

# THE ROLE OF THE EXPERT IN INNOVATION

## Using Knowledge and Expertise for Strategic Innovation



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# THE ROLE OF THE EXPERT IN INNOVATION

## Using Knowledge and Expertise for Strategic Innovation

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*The fundamental truth about expertise is that it is spectacularly narrow.*

*– James Surowiecki*

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*All experts are experts for things that did happen. There are no experts for things that may happen.*

*– David Ben Gurion*

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**T**he explicit exploration of the unknown is a defining characteristic of innovation. This is especially true when a company is pursuing strategic innovation,<sup>i</sup> which by definition pushes into new-to-company and new-to-world territory.

With so many unknowns, knowledge acquisition is -- must be -- a fundamental part of the innovation process. But the innovation community widely shares, and research<sup>ii,iii</sup> supports, the perspective that key repositories of knowledge, i.e. "the experts," and their expertise can stymie innovation if used in the wrong way. As various entrepreneurs and thought leaders have noted over the years, "Expertise is the intrinsic enemy of innovation."<sup>iv,v</sup>

What is it about expertise that makes it especially problematic for innovators? Since access to experts, or more importantly access to experts' knowledge, is critical to innovation,<sup>vi</sup> how should we as innovators bring experts into our process so that they enhance, rather than hinder, innovation? Any company wanting to explore new areas must face, and answer, these questions.

### The Downside of Expertise

A number of years ago, a large Geographic Information System (GIS) company with a very strong technology base and dominant market positions in several segments, including site selection for commercial construction, asked itself this question: "In what other markets can our technology and capabilities be applied to create new business?" This is an excellent question and one that innovative companies should ask often.

The GIS company leaders set about answering the question by drawing up a list of markets they thought would have potential, picking one of the markets they believed was most interesting, hiring an expert (actually a consulting company that specialized in the new market) and asking, "Should we enter this new market with our technology?"

Guess what. The answer was an enthusiastic "Yes."

The company followed the advice of the (expert) consultants and made sizeable investments to enter the new market. After a few years and many millions of dollars, the geospatial company was acquired, and the new division the company had created to go after this new market was shut down.

What happened?

Several things were at play:

1. **History Bias** - Company leaders let the current knowledge taxonomy (i.e. the currently defined industry segments, the current areas of relevant knowledge) constrain their ideas about what knowledge needed to be discovered and hence constrained the thinking and creativity around opportunities.
2. **Attention Bias** - The Company in effect made an a priori selection of a new domain and focused on that one domain to the exclusion of others. As a result it forfeited an opportunity to look across all possibilities and potentially discover new connections and synergies.
3. **Confirmation Bias** – Paying for knowledge access, i.e. hiring the domain expert consultant, created a conflict of interest that biased new knowledge discovery toward affirming the initial decision about what to focus on.
4. **Solution Bias** – The company and consultant showed a predisposition to problem solving (i.e. [what was the specific problem? How to enter the new market?]), rather than problem discovery. The expert consultant knew the industry and its problems so well that it immediately jumped into problem-solving mode rather than make a serious attempt at discovering the real issues.

Relying on experts to lead you to a genuine innovation is a recipe for disaster. Experts are absolutely critical in knowledge acquisition; they can be detrimental to concept creation. An expert, by definition, has deep, specific and important knowledge that naturally has direct influence on a company's ability to come up with new concepts. The issue is not whether to tap into the knowledge of the expert, but *how* to use that knowledge.

### How and When to use Experts for Innovation

Many individuals think a subject matter expert or “SME” is the only way to innovate in a specific domain. A common refrain, echoed in the geospatial company example, may go something like this: "How can we expect to innovate in (pick an area) if we don't have expertise in that area? We need to hire an expert to guide us."

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*Experts themselves should not be relied upon to create the unique concepts that can emerge from their own knowledge.*

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Others believe that experts, by the very nature of their expertise, are wearing blinders that constrain the diversity of ideas they can come up with. The objection is generally not to using experts but rather to having experts define what questions are important to address. The common refrain among this camp typically goes something like this: "We have enough experts already; what we need is an outside party to give us a different perspective."

In reality, how experts can contribute to -- and also hinder -- the innovation process is more complex than either of the two attitudes expressed above. The truth is, for different phases and types of innovation, you need to use the right types of experts at the right times and in the right ways. And the key to figuring out who the right experts are and when and how to use them lies in the nature of how knowledge is distributed and structured and in the type of innovation you are seeking.

The following diagram presents a matrix showing four quadrants defined by sustaining vs. strategic innovations and innovation discovery vs. pursuit activities. Sustaining innovations are those that are well within a company's existing businesses and core competencies, while strategic innovations push the company's boundaries. The discovery phase is what is commonly called the "front-end" and refers to the period when a company is exploring for opportunities to invest in. Opportunity pursuit is the phase in which a company has identified an opportunity and is actively investing to see if it is viable and significant.



**Figure 1 – Use of expertise in innovation activities**

Each of these quadrants merits a different approach to using experts and their knowledge and expertise.

1. **Quadrant 1** – The discovery of sustaining innovations involves knowledge that is very close to current technologies and markets and therefore can be readily addressed with internal experts and contractors. Activities such as voice-of-the-customer and technology road-mapping are typically used in these situations and may require outside expertise to help with the process.
2. **Quadrant 2** – Pursuing sustaining innovations falls squarely within most company's new product development (NPD) capabilities but can involve branding, design and technology aspects that warrant the use of outside experts with specific knowledge and expertise.
3. **Quadrant 3** – Discovering strategic opportunities involves exploring areas where the company has little or no existing knowledge, expertise or competency. It often involves emerging technologies, latent or emerging needs & desires, and market forces and trends that are difficult to see and predict. This is the situation in which a diverse community of experts is best utilized.
4. **Quadrant 4** – Pursuing strategic innovations often involves taking on significant uncertainty and risk due to the 'competency' gaps that exists between what the company is good at and what the opportunity requires to be successful. These gaps can be successfully filled by finding a complementary partner who can fill in the gaps and mitigate the uncertainty and risk.

The biggest problem most companies have is in the upper left Quadrant 3, when they are trying to identify new, strategic innovations. This is the time when it is most tempting to hire an expert to help guide the effort, but it is also the time when doing so is most likely to lead you astray. That's because the right problems have not yet been identified. This is where, and why, the proper use of communities of experts is so important.

The key to using expertise in upper-left-quadrant activities lies in the following principles:

- A. Context - Use experts to inform your knowledge of the way the world works today, not to predict or anticipate the way the world should or will work tomorrow.
- B. Diversity - Don't use one expert, use many. Create a purpose-built knowledge community consisting of many, diverse experts to learn from.

### **The Nature and Use of Domain Knowledge and Expertise in the Discovery of Strategic Innovations**

Experts, through their work, define how knowledge is organized. An expert is someone who has deep, specific knowledge in a well-defined branch of the knowledge taxonomy. With the explosion of information today, these branches are becoming increasingly narrow and more specialized. Moreover, the knowledge taxonomy changes slowly and with much difficulty, since changes must be accepted by the leading SMEs in the knowledge community.

If the knowledge you seek is new to you but exists in the world (i.e. it already has a branch in the existing knowledge taxonomy), then experts are the ones to turn to. If the knowledge you seek is new to the world (i.e. does not have an existing branch in the knowledge taxonomy), then experts' specific knowledge is not going to be of much help, and may even be a hindrance (since they often will ignore or dismiss the new knowledge).

Innovation initiatives are almost always a combination of these two situations – the acquiring of knowledge that exists in the world but is new to you, and the creation of new knowledge that is new to the world (and special to you). But the balance of these two types of knowledge differs whether one is pursuing sustaining innovations or strategic innovations.

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*One of the key differences between a sustaining innovation and a strategic innovation is this lack of codified knowledge. In other words, there can be no experts!*

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Strategic innovation, as opposed to sustaining innovation, often emerges from cross-category convergence of knowledge sources as well as the discovery of new information and knowledge that usually does not fit well within existing knowledge taxonomies. One of the key differences between a sustaining innovation and a strategic innovation is this lack of codified knowledge. In other words, there can be no experts! This is precisely because the future you are seeking need not be bound by the established taxonomy of domain expertise.

Because of their deep knowledge and intimate understanding of the current state of the world, experts are very good at contributing to sustaining innovation. The knowledge an expert has typically constrains his or her thinking to linear projections of change, which, in the near future, are usually quite accurate. In the long run, however, linear projections of past trends almost always fail to anticipate the non-obvious, disruptive forces at work.

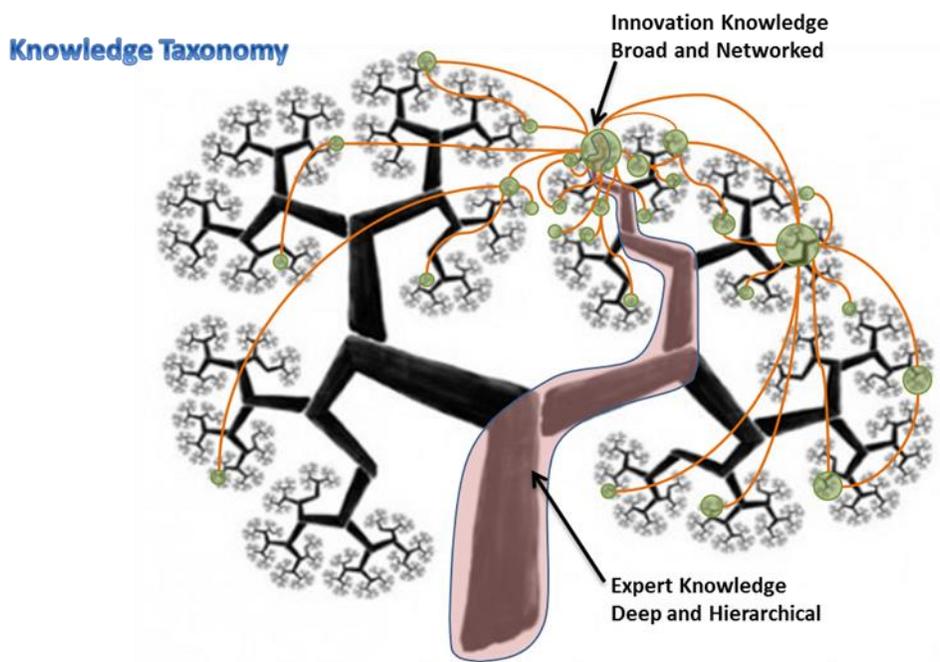
An apt metaphor for a knowledge taxonomy is a fractally-branching tree as shown in figure 1. As knowledge becomes more specialized and detailed, the branches of the tree become refined and focused sets of knowledge categories, each of which will have its own collection of experts who specialize in that area. An expert's knowledge can be viewed as extending from the base of the tree, through higher and more specialized branches out to a specific twig and leaf at the top of the tree.

The innovator, on the other hand, needs to see branches, twigs and leaves at many, dispersed places on the tree when exploring new strategic opportunities, but -- and here is the key -- the innovator does not need to be expert in all of these areas. Instead, the innovator needs to understand the implications of each twig and leaf – the *what*, not the *how*. The expert must be able to understand the details of how something works, the underlying mechanisms and why they work the way they do; the innovator needs to understand the *effects* of these mechanisms. It is the effects that matter to adopters of products and services, not the means of achieving them. It also is incumbent on the innovator to understand multiple, alternative and competing effects that only can be discovered by connecting with and understanding widely separated twigs and leaves on different branches of the knowledge taxonomy.

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*In the long run linear projections of past trends almost always fail to anticipate the disruptive forces that change the game.*

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**Figure 2 – Deep and hierarchical vs. broad and networked knowledge**

Of course, the fact that experts do have deep, specific and detailed knowledge about underlying mechanisms and causes makes them extremely valuable when it comes time to pursue a specific opportunity that requires foundational scientific research, complex technology, or integration into existing systems. In these situations, it is absolutely critical to understand the *how* in addition to the

*what*. But for finding new opportunities that depend on unconventional thinking, it is these positive attributes of the expert that can get in the way.

Experts, by the very fact of their being experts, tend to be so deeply immersed in the existing paradigms of their domain of expertise that it is virtually impossible for them to break out of those paradigms and imagine new ones. It is rare for an expert to have the perspective necessary to suggest radical change to the system in which he or she is expert. Experts are human, like the rest of us, and as Kuhn showed in his seminal book,<sup>vii</sup> they may also be more interested in preserving their place in the established order than creating a new order for reasons of prestige and influence. Indeed, research<sup>viii</sup> has shown that experts, like the rest of us, are motivated by loyalty to their "affinity groups," which in this case include other experts in the community. They can be extremely effective at fighting paradigm change through the recitation of seemingly fact-based, expert explanations for why it cannot happen.

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Take, for example, the electric vehicle movement. In 2011 and 2012, a number of battery and vehicle experts painted a widely varying picture of the future of all forms of electric vehicles (XEVs, where X represents hybrid; partial hybrid; range extended and fully electric). None of the industry experts felt that XEVs were ever going to be more than a niche market. The experts produced

at least 15 major, reputable market research reports about EV, HEV, PHEV and REEV adoption, and the authors differed by two orders of magnitude in their estimation of the number of XEVs that would be on the road in 10 years. Not one prediction had a non-linearity or exponential inflection point in it. Yet if one looks at the historical adoption patterns of virtually any successful, widely adopted new technology, there is *always* a non-linear inflection point in the adoption curve.

This is not to say that there are not experts who can contribute greatly to an innovation initiative as a creative force that breaks with conventional wisdom. Some experts can indeed set aside the constraints that are built up during the process of acquiring their deep knowledge. They, like many others, can participate in the breaking down of established paradigms and hierarchies and in the integration and convergence across multiple disciplines. But these are *individual* traits, not ones that are inherent to being an expert and perhaps even negatively correlated with expertise.

### **The Practical Use of Experts**

As innovators, we must have the skills, mindset, knowledge and expertise necessary to find the unexpected and to make connections that are unusual and serendipitous. It is our job to explicitly and purposefully manage the knowledge discovery and learning process so that we take full advantage of all the relevant experts, and their expertise, in the right ways for front-end exploration and in the discovery of new strategic opportunities.

The following are some guidelines for engaging experts on a strategic innovation journey:

- There are different types of experts; know which type you are looking for and are dealing with.

- Science and technology experts – those with a deep understanding of the underlying science and mechanisms by which the material and informational world works. Experts on atoms and bits.
  - Engineering and design experts – those with a deep understanding of the solutions and offerings that exist. The functions and specifications and use of these solutions and how they work.
  - System and industry experts – those with a deep understanding of the system dynamics -- the players, how they interact with each other, the current rules of interaction (i.e. the business models).
  - Adopter experts – those who are knowledgeable about the demand side of the innovation equation. These can include not just experts who study markets and trends, but expert consumers and customers themselves.<sup>ix</sup>
- Use experts to inform your knowledge of the way the world works today and in the immediate future, not to predict or anticipate the way the world should or will work tomorrow. Experts tend to be good at short-term, linear projections of trends – the type of projections that are important for sustaining innovations. They tend to be less good predicting longer term, non-linear futures typical of disruptive and strategic innovations. Experts can tell you in precise detail how the current system works (very important) but not how it will be or should be transformed.
  - Don't rely on one expert, use many; form a purpose-built network of experts for acquiring innovation knowledge and learning. Tapping into a diverse community of experts provides a breadth of knowledge without it being co-opted by any one particular expert. The key here is in the term experts (plural), not expert, (singular). The mistake many companies make is hiring an expert (singular) for the innovation initiative and relying on this expert (an individual or a company) as the primary source of knowledge. Deep domain knowledge is valuable to the innovator, but no one expert knows everything you need to know. A critical component of building the diverse community of knowledge experts is to find the people who can connect you to them. Connectors are often the most valuable people in your network.<sup>x</sup>
  - Realize that experts also have opinions and beliefs, not just facts and knowledge. Be able to distinguish between the two sides and don't be surprised when experts differ. This is not surprising given that experts are human and subject to the same cognitive deficits under which we all labor. Experts in the same field do not (or should not) differ on the facts about fundamental science, technology or system dynamics. It is on what these facts imply and how they will play out in the future where perspective, opinion and belief enter.
  - Put your wallet away -- knowledge is free (or at least doesn't require cash). In building your own expert knowledge network for innovation, you typically do not need to pay for the knowledge you need in the early stages of opportunity discovery. In fact, oftentimes, paying for knowledge at this stage is counterproductive. Proprietary knowledge is not needed for opportunity discovery. Instead, it is important to focus on problem *discovery*, not problem solving. Virtually any expert, even the most notable, is usually more than willing to share his or her thoughts on what the problems are, how the system works and the issues and possibilities that exist today.

Experts and expertise are critical to the innovation process, but only when used correctly. An innovator must build a diverse community of experts who have knowledge of the ecosystem dynamics, the market, the technologies, the players, the rules of engagement. The innovator must use these experts wisely and, above all, know the difference between the breadth of knowledge of the fox and the defined focus of the hedgehog.<sup>xi</sup>

One might detect a note of irony in what is being advocated here since all of us are, in a sense, experts. What makes our expertise in innovation different than the expertise we discuss above? Don't the deficiencies of experts we describe here apply to us? The answer to this is yes, and yes! Within our domain of expertise in the process of innovation, we too have our blinders and constraints. There are many of us with deep knowledge of innovation, but who differ in our interpretation, perspective and prescriptions. Our expertise, however, is about *process*, not content (whereas the expertise we are trying to manage is about content not process). We are probably just as blind to aspects of the innovation expertise we claim to have as those who have the other types of expertise we have described. But as long as we acknowledge both the benefits and constraints of all types of experts, and work to reap the benefits and mitigate the downsides, we will all be better innovators.

## Notes

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- <sup>i</sup> Schmitt, L. [Strategic Innovation](#), May 2012.
- <sup>ii</sup> Surowiecki, J. [The Wisdom of Crowds \(reprint edition\)](#), Anchor, 2005.
- <sup>iii</sup> Tetlock, P. [What's Wrong with Expert Predictions](#), Cato Institute, July 11, 2011.
- <sup>iv</sup> Shapiro, S. [Best Practices are Stupid](#), Portfolio Hardcover, 2011.
- <sup>v</sup> Kamen, D. [Front-End of Innovation conference keynote address](#), Boston, May 2004.
- <sup>vi</sup> The expertise and knowledge we are discussing here is that which is needed to identify new opportunities. There is no question that, for a specific opportunity that requires solving specific problems, the role of the expert is clear and compelling.
- <sup>vii</sup> Kuhn, T. [The Structure of Scientific Revolutions \(third edition\)](#), The University of Chicago Press, 1996.
- <sup>viii</sup> Kahan, D. "[Ideology, motivated reasoning, and cognitive reflection](#)," *Judgment and Decision Making*, Vol. 8, No. 4, July 2013, pp. 407–424.
- <sup>ix</sup> Von Hippel, E. [Innovation by Users and Lead Users](#), collected papers 1986 - 2014, MIT Sloan School of Management
- <sup>x</sup> Gladwell, M., [The Tipping Point](#), Back Bay Books, 2002.
- <sup>xi</sup> Archilochus, a Greek poet/philosopher, wrote, "The fox knows many things, but the hedgehog knows one big thing." More recently [Philip Tetlock](#) has written and spoken about the different types of predictive failures these two categories of experts make.

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### **About The Inovo Group**

The Inovo Group was established in 2009 with the merger of Inovo Technologies, founded in 2001 by Larry and his partner Steve Schwartz and Daso Consulting, founded in 2006 by Brian Christian. They are an innovation consulting firm based in Ann Arbor, MI, that helps the world's top organizations succeed at strategic innovation.

### **About the Author**



Larry Schmitt, PH.D. is Co-Founder and CEO of The Inovo Group. He is the lead architect of Inovo's theory-based framework and tools, which Inovo uses with its Global 1000 clients to identify significant strategic opportunities and develop compelling new-to-the-world products, services, and business models.

Larry has taught innovation at the University of Michigan's Business School and Medical Innovation Center and has speaks frequently on innovation. In addition, he serves as a subject matter expert for various Industrial Research Institute (IRI)'s Research-on-Research Working Groups.

Larry previously served in technical roles at General Electric and Unisys, as well as in executive roles at two successful tech start-ups, Applied Intelligent Systems (acquired by Electro-Scientific Industries) and Intelligent Reasoning Systems (acquired by Photon Dynamics).