


# Innovation: From Art to Science

*A Delphi Group White Paper on the  
Topic of Innovation*



*In February of 2006 Delphi Group undertook a survey on the topic of innovation. We collected 200 responses to a series of 30 questions on a variety of issues relating to innovation across the following categories:*

March 2006

- *The Definition of Innovation*
- *Tools and Methods for Innovation*
- *Methods for Learning Innovation*
- *Investment in Innovation*
- *The Lifecycle of Innovation*

*Respondents consisted of a cross industry sample of organizations evenly split between those of less than \$500 million in revenues and those greater than \$500 million in revenues.*

*This multipart white paper reviews insights from that study and some of the highlights of specific questions asked in that survey.*



A Perot Systems Company

111 Huntington Avenue, Suite 2750  
Boston, MA 02199

***We take innovation for granted as something that naturally happens when we apply ourselves to the task of creatively thinking about a market challenge to deliver a new product or service. That is far from the truth.***

## The Process of Innovation

Imagine the simplest product possible, something that has only a single ingredient, ideally a pure commodity, abundantly available, utterly bland and indistinguishable in its appearance, form, and taste. To make this even more interesting, imagine that this product can also be obtained for free.

What latitude could there possibly be to innovate with that sort of a product? It's hard to imagine a bigger challenge. Yet our lack of imagination here is only a testament to our lack of creativity in how well we can innovate the process of innovation itself.

We take innovation for granted as something that naturally happens when we apply ourselves to the task of creatively thinking about a market challenge to deliver a new product or service. That is far from the truth. Most often innovation ends up involving high measures of serendipity and simple brute force. This is an incredibly inefficient way to operate in an area where the stakes are so high. At a time when so much has been spent on enabling virtually every process with IT, the process of innovation has been left woefully unattended.

While we talk about innovation and the formation of an innovation economy as though it were here today, the ability to innovate has in many industries fallen well below the market's demand for innovation. As quality initiatives such as six sigma have continued to steadily increase and level the playing field for manufacturers and service providers, the differentiators for any product are ultimately cost and innovation.

***The objective is not simply to apply yourself harder to the task of innovation but to change the very nature of how you and your organization innovate.***

## The Innovation Deficit

The perverse nature of this equation however is that while the price we charge for a product may be entirely within our control, the cost of producing that same product may be severely impacted by the R&D dollars spent on its innovation. So while production costs decrease and manufacturing capacity increase, a bottleneck is created in the development of new ideas and products in their journey from concept to market. Our most critical process suffer when we need them most.

Take, for example, the high stakes market of pharmacology. In the case of cancer research, and the resulting drugs to treat it, an amazing phenomenon has occurred during the past 15 years. While the pool of knowledge that includes papers on cancer research, DNA, and protein sequences, and R&D has increased at an astounding rate of 300% across all categories, the number of new cancer drugs introduced annually has not only remained relatively stable but actual declined by 50% from its high in 1996!

In our own research of R&D and innovation across many industries we have been struck by the degree to which this is purely a manual task – a numbers game if you will – where many intelligent people are thrown at a problem until discovery occurs. This applies to almost every industry regardless of its complexity.

The objective is not simply to apply yourself harder to the task of innovation but to change the very nature of how you and your organization innovate.

While businesses typically focus on only the most obvious form of innovation, new product innovation, in every organization there are three fundamental types of innovation:

***Innovations are like changes to ecosystems; they have unforeseen implications that may impact the market in ways that create even greater opportunity for yet additional innovations. In the fast pace of today's markets preparing IT systems for these opportunities by anticipating them is a noble but futile effort. You must be ready to rise to the occasion when it is not anticipated.***

- Creating new products, services, or markets
- Extending and improving features to existing products, services, or markets
- also
- Increased efficiencies in existing products or services.

Organizations experience innovation in all three areas but typically have a core competency in only one of these areas. Dell, for example, is not known for innovating new products, but is world-renowned for the efficiencies of its supply chain operation. Apple Computer is known for its innovative product design. Many pharmaceutical companies outsource everything from product development right on through to clinical trials, and innovate solely in marketing and sales.

On the other hand, Coca Cola has made a core competency out of innovating water, with more colors, flavors, and implied lifestyles than anyone could possibly have imagined even a few decades ago. Consider only that in most cases a bottle of Aquafina, (Pepsi's purified water brand) will cost as much or more than a similar soft drink – yet when you put them side by side it is always the Aquafina machines that are sold out first – even with a water fountain a few steps away!

This is not an isolated phenomenon. One of fastest growing items in the produce section of your local supermarket is not a new genetically altered vegetable but rather mixed greens in a bag, priced at a substantial premium over the same ingredients sold separately.

There is also a mathematics to innovation that consistently evades us. Like the unseen quantum forces of uncertainty at play in physics, there are forces at play in highly innovative markets that defy prediction. One of these is the tendency of innovation to act as its own accelerant – often wreaking havoc on exiting systems and

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processes not ready to take on higher volumes of transactions and work.

Innovations are like changes to ecosystems, they have unforeseen implications that may impact the market in ways that create even greater opportunity for yet additional innovations. In the fast pace of today's markets preparing IT systems for these opportunities by anticipating them is a noble but futile effort. You must be ready to rise to the occasion when it is not anticipated. The cascading effect is usually beyond anyone's ability to plan. Cascading innovation is reminiscent of the classic scene from *I Love Lucy*. Lucy is stationed at the end of an assembly line for cakes, boxing them as they come off. As the assembly line starts to speed up she tries to keep pace, ultimately making a mess of monumental proportions in classic slapstick style that may be all too familiar to many CIOs.

The automobile industry found itself in a similar situation during the past few decades. With production techniques and computer aided design and engineering accelerating, new models of automobiles were also running wild. Manufacturers such as Chrysler seemed to be coming out with new models at a rate to rival the variety in a five-year old's matchbox collection. But as automobile costs rose, the industry responded by moving quickly to begin pushing leasing as an alternative for non-corporate buyers.

The leasing trend caught on quickly, and for a few years it sparked a boom in new auto sales. But then the aftermath set in. As leased cars reached their term and new models tempted buyers there was a flood of used cars (albeit barely used in many cases) on the market. In the genius of one innovation the manufacturers had planted the potential seeds of its demise. The solution was yet another rapid move to create certified or pre-owned car programs that would

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warranty the *used* cars for periods that were in some cases better than the expectations for most new car warranties. Interestingly, the genesis of this innovation was with the dealerships who were being buried under mountains of slightly used vehicles that were saddled with a *used* label but were in fact far from the role model of a used car.

In each of these cases entirely new systems had to be put in place to handle the nuances of each new business model. From marketing to financing the status quo was rocked repeatedly with each new set of problems and opportunities. It may seem to be an impossible situation. It is not. There are some fundamental precepts that we can follow to build organizations that can withstand and even thrive in this sort of buffeting.

## **Pulling Back the Curtain**

The richness of innovation in an industry is often directly related to the transparency of all the pieces of its value chain. This is one of the reasons we've already made the case (in an Optimize column for 2004. BSP) about the role of universal industry platforms for IT and Business Service Providers (BSPs) as a necessary feature of any sufficiently advanced technology infrastructure for sustained innovation.

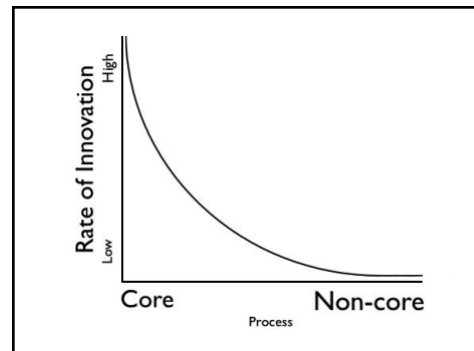
While we will freely admit that this sort of accelerated innovation climate can also result in rampant and sometimes irrational behavior on the part of investors and buyers – as is vividly demonstrated in boom periods such as the Dot Com bubble in the late 1990s - we should not confuse the increased rate of failure in a fertile innovative climate with the value of those innovations that do survive. A higher rate of experimentation and failure is a natural part of higher rates of innovation. If we are in fact shifting from a service-based economy to an innovation-based economy then we

***In a classic case of the Pareto Principle, the non-core areas consume the majority of your resources and starve your company of its innovative capacity, ultimately being responsible for shrinking or stunting bottom-line growth – these are the factors of risk that often cloud assessments of the rate at which innovation should happen.***

will need to adjust our view of failure and align it within the context of the financial constraints and growth ambitions of our organizations. Certainly nobody would claim that a zero rate of innovation would equal zero rate of failure. The question most business people ask themselves is “at what rate of innovation am I balancing risk and reward?”

The reality is that many organizations often make the mistake of asking that question outside of the sphere of the organization’s core competency. As they move outside of those areas that represent their core competency their ability to innovate dramatically decreases, yet the need to innovate is equally spread across all of these functions.

**Rate of Innovation: Figure 1**



One of the first mandates for any organization attempting to achieve innovative excellence is to clearly identify which of the three types of innovation described best

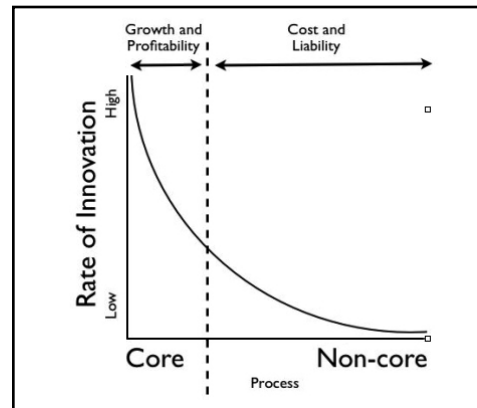
represents their core competency (i.e. separate the core innovative differentiators of the business from those that are the operational outliers).

An interesting outcome of this analysis for most organizations is that while the areas of core innovative competency may be the source of top-line growth, it is often the non-core areas that consume the largest percentage of an organization’s IT budget, precious human resources and management time. In a classic case of the Pareto Principle, the non-core areas consume the majority of your resources and starve your company of its innovative capacity,

***Short-term differentiation along the periphery of your business does not create long-term preeminence at its core.***

ultimately being responsible for shrinking or stunting bottom-line growth – these are the factors of risk that often cloud assessments of the rate at which innovation should happen.

#### Rate of Innovation: Figure 2



Take the case of health care. While diagnostics and patient care may be the core competency of most health care providers, it is the support and maintenance of facilities and administrative

functions that are often the linchpin for holding down costs and achieving near-term profitability and process excellence. The challenge for a health care provider is knowing how to leverage innovation in their area of core competency (diagnostics and patient care) while also being best-of-class in the support of their patient facilities and processes.

This is apparent even at the level of the individual physician who is encumbered by administrative processes that typically limit their ability to deliver quality health care and focus on their personal core competencies. The level of triage that is performed results in longer wait times for treatment, shorter face time with patients, and ultimately greater risk for the physician and the patient.

Organizations need to focus on core competency while sourcing partners take responsibility for innovating change and cost control in non-core operations. For example, at Harvard Pilgrim Health Care, Inc., a not-for-profit New England health plan with 800,000 members and 22,000 physicians, this approach was used to create innovations in how claims were processed. In addition, creative IT

initiatives were used to develop a secure Web application that allows members to enroll, select physicians, view benefits and eligibility information, update family information, and order ID cards online.

By focusing the service partnership specifically on core strategies and processes, the result was an overhaul of Harvard Pilgrim's claims processing systems as well as its overall IT operations. While traditional outsourcing may emphasize replacing systems and bodies, this new wave of sourcing focuses on the core areas of innovation in which an organization must excel to differentiate itself. Harvard Pilgrim achieved excellence across its entire spectrum of innovation. If you take this idea of focusing on the core areas of innovation and apply it broadly some interesting trends emerge.

Most importantly you refocus your business on its core mission and competencies, objectives which may have been long obscured by the fog of technology, but which have always been the essence of what separates the leaders from the laggards in any industry.

You may have built new enterprise systems, optimized your supply chain, and invested in Six Sigma and ISO operational excellence, but chances are most of your competitors have as well. So any potential advantage from these strategies has been fleeting. Short-term differentiation along the periphery of your business does not create long-term preeminence at its core.

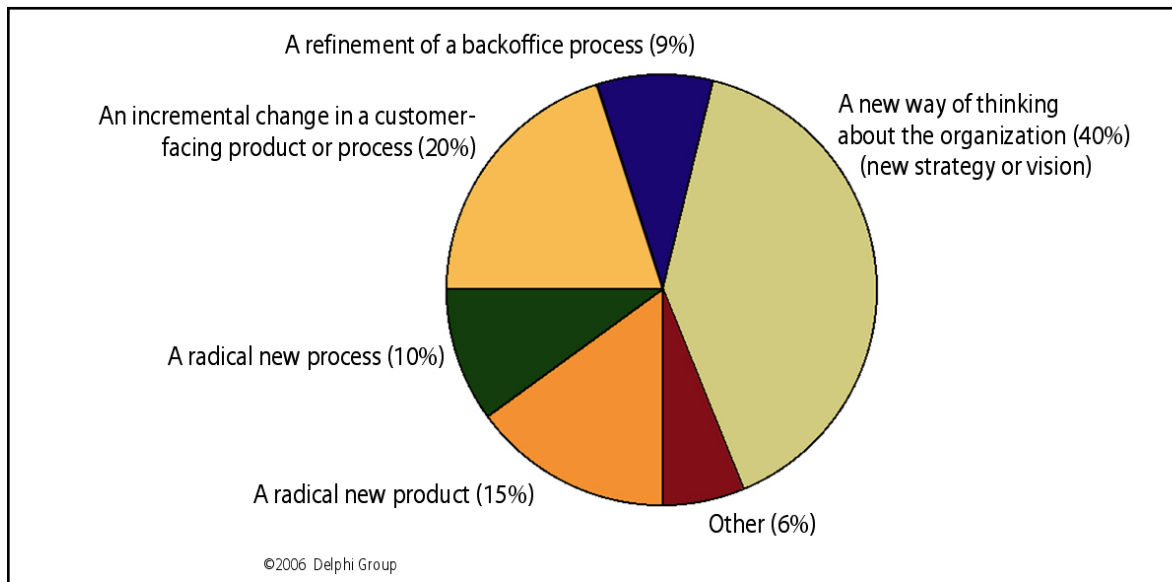
You are now at a turning point. It is time to reinvest in those areas that make your organization not just better but those core competencies that make you great.

## Survey Highlights

### Innovation is...

Part of the difficulty in understanding innovation is in pinning down its definition. For the purpose of this survey we approached the challenge of defining innovation from the standpoint of “I’ll know it when I see it,” by asking respondents what sort of innovation they had most often been involved with personally.

### Common Kinds of Innovation Projects



Interestingly respondents were split on whether innovation is a product/process or an organizational experience. 40% of survey respondents

indicated that innovation reflects a new vision or strategy for the entire organization as opposed to a product or process improvement, while 35% indicated that innovation is part of creating radical new products or processes. Another 29% had experienced innovation as incremental change to a process.

The findings point to a broad application of innovation across nearly all aspects of an enterprise’s product, processes, and vision. The key here is that innovation is not just a lofty ambition for the next great product, but also plays a continuous role in all aspects of a business. This reflects an attitude towards innovation as a systemic approach rather than as a periodic or cyclical phenomenon.

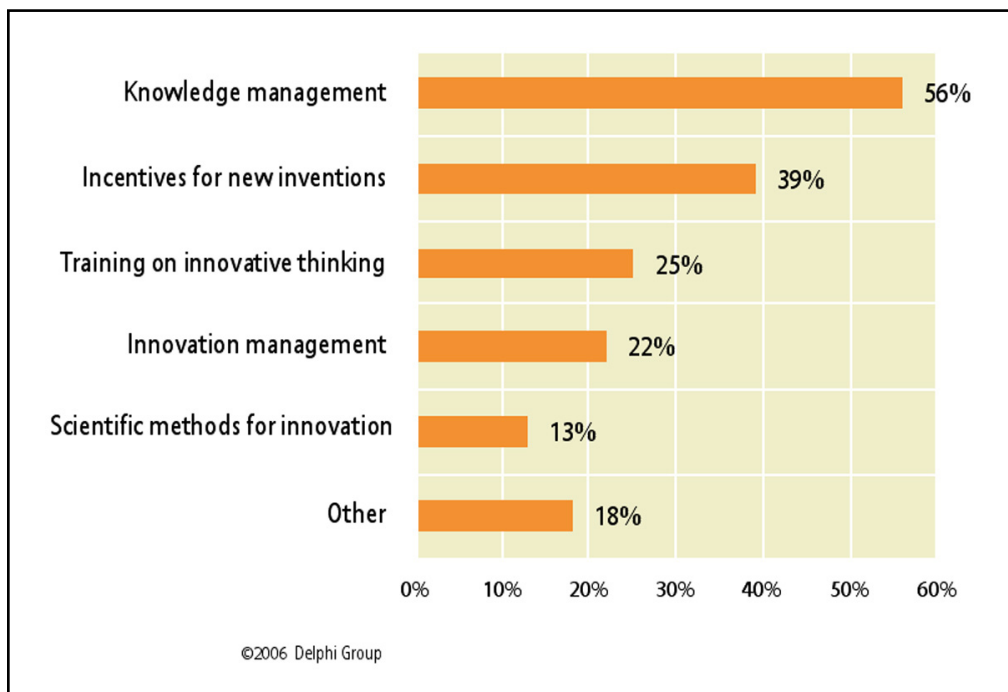
## Innovation and Knowledge Management

While there may be disparity in how innovation is defined and applied there is much less disparity in the tools respondents associated with the promotion of innovation.

56% of survey responses indicated that innovation is most likely to be promoted by Tools for Knowledge Management (KM). This majority perception is important in understanding much of the foundation already in place for innovation as science. Tools for Knowledge Management have become much more prevalent over

the past decade. This has provided a platform for the sharing of practices and experience in ways that accelerate the process of innovation. Concurrently, organizations have put in place incentives and training programs to promote innovation. However, there is little in the way of platforms, technology and methods to support

### Tools to Promote Innovation



Innovation Management. KM is a bright light on this horizon. While technologies for innovation management are sure to be a Greenfield opportunity for many software vendors, we expect to see KM continue to be a key element of Innovation Management and ultimately a core competency for any organization which intends to excel in its efforts to innovate.

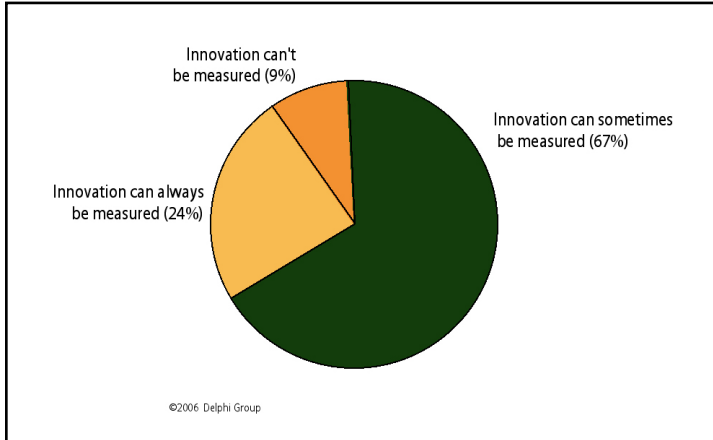
## ROI on Innovation – Possible But Difficult

One of the most powerful insights of the survey had to do with

### How Well Can You Measure Innovation?

measuring innovation. An overwhelming 91% of respondents

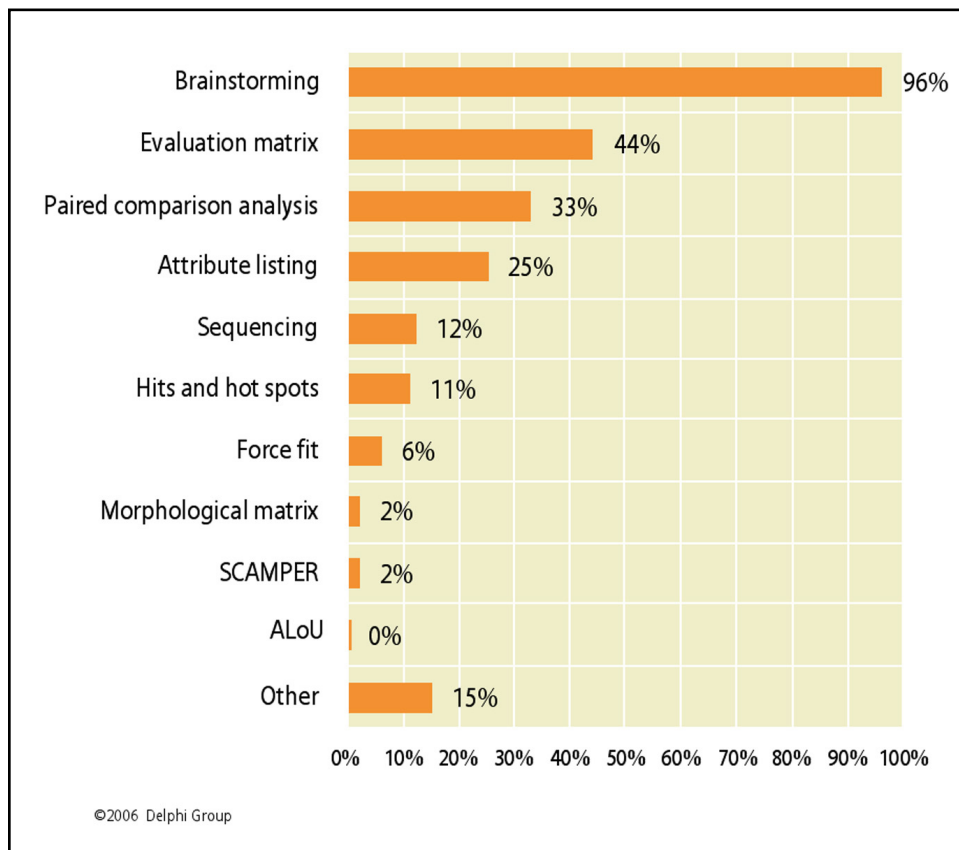
indicated that innovation could be measured at least sometimes. 24% said that innovation could always be measured. This is an encouraging finding since it counters the positive perception that innovation is not something for which investment can be justified. We expect that this more positive actual perception will fuel the move towards innovation as specific projects and initiatives within organizations.



## Putting All Your Innovation Eggs in One Basket

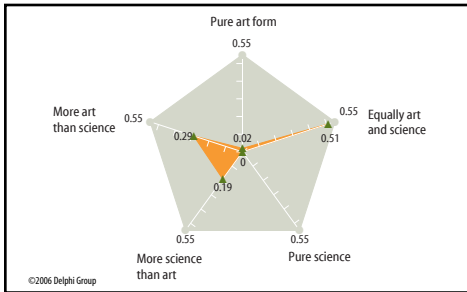
In response to a question about the tools that respondents use to

### Innovation Tools In Use

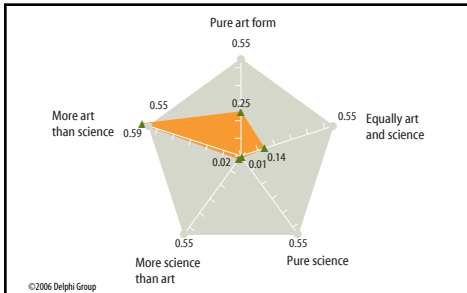


facilitate innovation an overwhelming 96% selected Brainstorming. Other methods reported trailed off dramatically with the next most popular, Evaluation Matrices, garnering only 44%. The responses further illustrate the degree to which innovation is still limited by the lack of a well developed and broadly understood science. Simply put, we are not being innovative about innovation. In another of the survey questions, less than half of respondents indicated

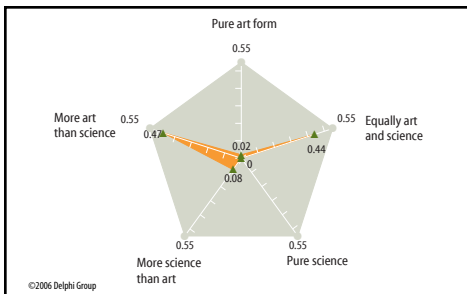
**Collaboration**



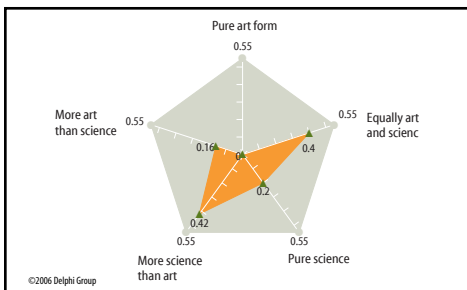
**Creativity**



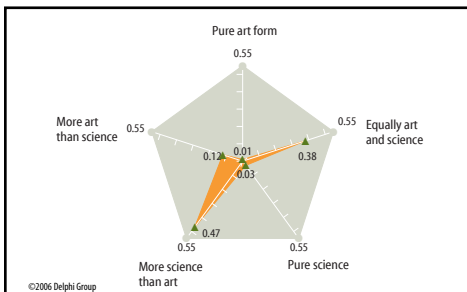
**Innovation**



**Invention**



**Knowledge Management**



that they had taken any formal training on the topic of innovation. Yet, over 80% indicated that innovation could be taught! These contrasting viewpoints provide an excellent view into the contrast between the history and future of innovation.

At the same time at least 10% of all respondents were aware of at least four separate methods for innovation. The bottom line is that there are a fair number of techniques and methodologies that can be used to drive innovation, organizations with no one approach being best in all cases. To maximize the potential for successful innovation in organizations need to equip their people with several tools and the insight to know when to apply which tool and methodology.

**From Art to Science**

One of the more interesting aspects of any discussion on the topic of innovation has to do with the shift of innovation from an art form to a science. Much of this has to do with the increasing precision required of organizations in meeting fast moving markets. The window of opportunity and the band of error are both closing, and like the re-entry of a spacecraft into the earth’s atmosphere, the band of tolerance is limited to a few degrees. You may be a great pilot but without the aid of some sophisticated technology, your chances of re-entry are slim at best.

To better understand these perceptions, we asked a series of question regarding the attitude towards Innovation, Invention, Creativity, Collaboration, and Knowledge Management as art or science. The results shed insight as to the role of each in its evolution towards being a more tangible and controllable process.

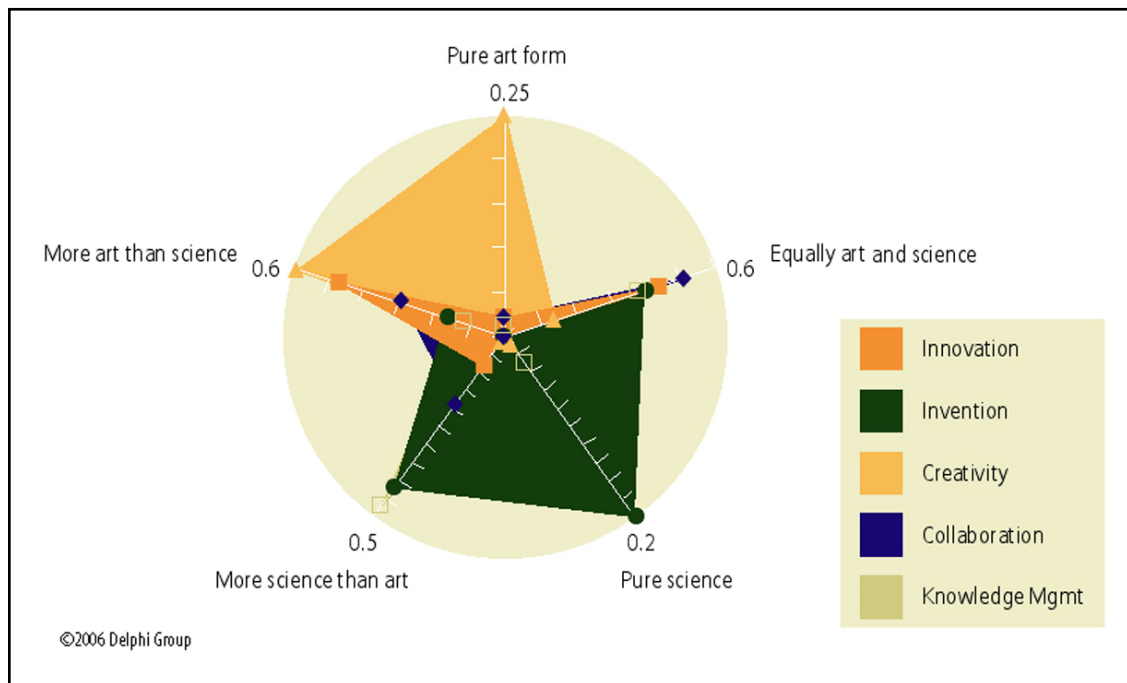
The most interesting results had to do with the categorization of innovation versus that of invention. Respondents indicated that

invention was the most scientific of the processes, while innovation much more like an art form. Not surprisingly, creativity was the process most likened to a Pure Art form.

However, Knowledge Management, a topic of much debate as somewhat of an oxymoron, was considered to be more of a science than art.

These findings demonstrate an interesting trend that should be much more insightful as we look at responses evolve over time. In other words, KM would have likely been considered much more of an art form 10-20 years ago than it is today.

### Perspectives on Innovation Management



Our expectation is that the same can be said of Innovation, which is fast taking center stage as a core differentiator. With this emphasis and attention it will also draw interest from the software,

consulting and academic community to develop applications, solutions and methods that make innovation a more manageable process.

*To be continued in the next installment of this white paper.*



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## About Delphi Group

*Delphi Group is a leading provider of business and technology advisory services to Global 2000 organizations. With offices established around the world, Delphi Group has assisted professionals across disciplines and industries at nearly every major national and global organization and branch of government. Its clients and subscribers include more than half of the Global 2000.*