Viewpoint
The limits of crowds

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The "Wisdom of Crowds" concept has captured the imagination of many product developers in recent years. This concept refers to the value of knowledge gained through a group versus the individual, and was the title and focus of an influential book by James Surowieki published in 2004.[1] However this concept has received its fair share of criticism, as this article by James Euchner points out in this reprinted article from Research Technology Management.[2] It was also the subject of an article by Intel in July Visions *explaining how the company used the "Wisdom of Crowds" to improve technology transfer.[3]*

As of this writing, and after 88 days of concerted effort, the oil spill at the site of the Deepwater Horizon drilling rig in the Gulf of Mexico has been capped, at least temporarily stopping an unprecedented flow of oil into the ocean. Given the damage done to date, there was little celebration and there will be many recriminations.

The Gulf oil spill is the first major technical disaster in the age of social media, and social media have shaped our response to the disaster in several ways. The oil itself is constantly visible, available for anyone to monitor via a webcam at the mouth of the well. And the blogosphere has provided a flow of information and opinion—about BP, about the energy economy, about nature conservation—at times as powerful as the flow of oil.

The response to the disaster has also been shaped by the use of social media, as BP and other interested parties have undertaken several initiatives to leverage the expertise of the general public. These have included a wiki, challenges sponsored by InnoCentive, and sites like WhatShouldBPDo.com. The U.S. government's Deepwater Horizon Unified Command launched a suggestion site that reportedly garnered 20,000 ideas. And various tinkerers, inventors, and entrepreneurs have posted videos on YouTube proposing ways to plug the well or clean up the spill.

These initiatives were broadly applauded. There were stories in the media and blog entries about the innovative ideas of individuals and about BP's resistance to evaluating them, including commentary from visionaries like Don Tapscott, co-author of Wikinomics. Underlying the praise for these efforts is a new set of assumptions about the nature and value of expertise, influenced by the rise of social media and especially by what has come to be called "crowdsourcing." Our trust in the expert appears to be increasingly supplanted by a willingness to rely on the knowledge derived from crowds of amateurs. In this new world, the motives and competence of experts are at best suspect and presumed to be inferior to the wisdom of crowds.

The general approval surrounding crowdsourcing has included little discussion of its limits and the challenges of making it work in practice, on real, complex, ill-defined problems. Crowdsourcing

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is a transformative capability, with wide application in fields ranging from software development to parasail design. But it will not work for all problems and it will not work without a concerted, planned effort.

Effective crowdsourcing requires a number of conditions:

1. The problem (and its boundary conditions) must be well defined,
2. The population of potential solvers with relevant expertise must be large,
3. Feedback must be provided to the crowd (not just to individual contributors) so that ideas can evolve,
4. Mechanisms for managing intellectual property must be in place, and
5. Someone needs to filter the ideas (and develop them).

For the Deepwater Horizon well, the problem can be stated simply ("stop the flow of oil"), but the boundary conditions are manifold and complex. What is the tubing made of? What does it take to cut through or drill into the

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tubing? What are the actual flow rates and pressures? What chemical reactions might interfere? What are the capabilities of the robotic vehicles? What might the consequences of plugging the well be below the surface? Any solution must be cognizant of these and many other factors. Solutions that work on paper might have significant difficulties in practice.

There are, in this instance, many problem solvers willing to contribute their ideas, so at first blush it may seem that the second criterion is satisfied. A large percentage of the contributors, however, have limited relevant expertise. Their ideas may include the kernel of a solution, and they come from the heart, but the solutions themselves are often obvious or naïve, and may even be counterproductive. In any event, the proposed solutions tend to be underdeveloped, more notion than idea.

This tendency of crowdsourced solutions to be incomplete leads to a third requirement: the crowd needs to have access to the collection of partial ideas so that different parties can contribute unique expertise. In other words, the platform needs to be open.

This openness has been achieved in the open-source software world and in a few online communities. But these examples are more the exception than the rule. For a variety of reasons, it remains difficult to create the dynamism and clarity that enables people to build productively on the ideas of others.

The requirement for ideas to evolve through processes of refinement, combination, and elaboration creates issues for the management of intellectual property. People engaged in a crowdsourcing effort need to be willing to share their ideas and add their contributions to the ideas of others. In instances where a culture of openness has not been established, the management of the IP produced by the crowd remains a distinct challenge.

Finally, crowd-generated ideas must be processed, filtered, and developed into workable solutions. Several years ago, before crowdsourcing had developed to the scale it has achieved today, I applied open innovation approaches to creating solutions to address the risk of anthrax attacks via the U.S. mail. We collected about 100 distinct ideas. Reviewing them required a team of technical professionals from various disciplines; it was a time-consuming and resource-intensive process. I can only imagine the difficulty of analyzing the 20,000 ideas, or more, reportedly offered in the Deepwater Horizon incident. And once the best ideas are identified, once they are morphed, combined, and redefined to fit the problem, they must still be implemented. They must move from notion to concept to well-developed solution . . . and thence to practice. This takes more resources and more time.

Bill Nye (the Science Guy) provides some useful perspective on both the limits of crowdsourcing and the nature of expertise as revealed in the oil spill disaster. He produced a brief but informative YouTube video in which he described the most promising ideas suggested by amateurs to solve a piece of the oil spill problem. Then he provided some technical perspective on the ideas, in a gentle but helpful way. He also gave a little advice:

The people working on these problems are engineers. They are people who, nominally, can do calculus, people who are very good at physics, people who studied chemistry, people who have dedicated their lives to learning about nature, about science, about the processes by which we understand the world. So I hope that, along with all the concern, we do get respect for how complicated it is to provide everyone with all of this energy that we all use all of the time.

Crowdsourcing can be great, and it offers a wonderful complement to engineered solutions in some situations. But it is not a panacea.

For more information about The Industrial Research Institute and its journal, *Research-Technology Management*, please visit www.iriweb.org Ⅴ

Endnote

1. James Surowieki, *The wisom of Crowds*, Doubleday, (2004).
2. James Euchner, *Research Technology Management*, Vol. 53, No. 5, September-October 2010 P. 7-8.
3. Russ Martinelli and C.R. "Chris" Galluzo, "Using the 'Wisdom of Crowds' concept to improve innovation transfer through the Valley of Death," *Visions*, July, 2010. Vol XXIV, No. 2.