‘People fusion’ is changing the world by creating self-organizing networks of human beings capable of helping companies tackle their toughest technical problems through information technology, the Web and collaborative work models.
HOUSTON—Imagine for a moment that you are the chief executive officer of a struggling independent company with a declining 55,000-acre asset. The company is in serious debt, production costs are higher than average, and the business could fold if more reserves cannot be found on property the company already owns. After investing a chunk of money to gather new data—which identifies very promising potential—staff geoscientists spend years trying to nail the exact location and value of those reserves, without success. Now desperate, what do you do?

You take some time off to think, and find yourself at a technology conference for corporate executives. Someone is talking about Linus Torvalds, the Linux® operating system and the global open-source software community. You suddenly are struck with an outrageous idea and rush home. You call together your company’s top scientists and tell them to gather all the geological data on the property and post it on the Internet to ask the world where to find those new reserves. Your staff, of course, thinks you are out of your mind. In this industry, nothing is more guarded than proprietary data. But you cannot afford to think in conventional terms; you are trying to save the company.

So you put up $575,000 in prize money, post every scrap of data you own on your Web site, and invite anyone interested to solve your exploration challenge. Within weeks, a virtual workforce of more than 1,400 geologists, engineers and scientists from 50 countries are submitting shockingly creative ideas. But that is not all. Graduate students, college professors, consultants, mathematicians and even retired military personnel are vying for the prize. All told, you receive 110 prospects, 50 percent of which your own staff never identified.

The winning entry comes from a consulting partnership on the other side of the world: Australia. The winners have never seen your asset, never even set foot in North America. More than 80 percent of the targets yield substantial reserves. In fact, you dramatically exceed your original production goals. Your company skyrockets from $100 million to more than $20 billion in market cap, and you become one of the wealthiest executives in the nation.
A fairy tale? Not at all. It actually happened a couple years ago. But not in the oil and gas industry. The industry was mining, and the reserves were gold. The idea was conceived by Goldcorp CEO Rob McEwen, a former investment banker who was not hamstrung by conventional wisdoms. Because of McEwen’s bold initiative, Goldcorp’s 50-year-old mine at Red Lake, Ontario, coughed up 8 million ounces of new gold worth more than $3 billion–all for a $500,000 investment. Unbelievable!

This true story offers a glimpse of the future of oil and gas in America. By 2020, I am convinced that we will no longer find a story like this hard to believe at all. The industry will be making money producing affordable energy in environmentally sustainable ways, through remarkable networks of intelligent and highly motivated individuals who live and work far beyond the traditional boundaries of our present corporations. And U.S. independents could be the first to adopt new models of collaboration, which I call “people fusion.”

Fusing More Than Data

People fusion is related to the more familiar concept of data fusion, which originally came out of the military. The purpose of data fusion is to combine data from many different sources and sensors to generate new forms of information and improve the overall performance of a particular system—for example, the remote identification of targets.

In military parlance, there are three levels of fusion. The lowest level, data fusion, combines multiple sources of data to produce new raw data ready for interpretation. The second level, feature level fusion, begins to extract specific details such as edges, corners, lines and geometrical patterns from the new raw data, and attempts to relate those shapes to known objects. The highest level, known as decision fusion, requires the use of artificial intelligence to return a “confidence score” on the identification of a particular object or set of objects.

This is not much different from the oil and gas industry. We are fusing data from multiple sources, often in three-dimensional models, and applying advanced technologies to extract and identify edges and geometrical objects. And we are at least beginning to apply expert algorithms and simple forms of artificial intelligence to give confidence scores—or “uncertainty analyses”—to objects extracted from the data.

The challenge of data fusion lies in integrating information from traditionally isolated domains. For example, even before the creation of the U.S. Department of Homeland Security, various government agencies began trying to integrate information across the boundaries of jurisdictions—city-to-city, county-to-county, state-to-state, etc. Numerous advancements in data fusion now enable the government to track individuals, cell phones, cars and even bank accounts and spending patterns in ways no one could imagine only a decade ago.

In the business world, multinational corporations are struggling with other fusion challenges. The acquisitions and mergers of separate brands, each of which originally operated a geographically-demarcated fiefdom, cost multinational companies billions of dollars a year in duplication of effort. With offices, manufacturing plants and other facilities scattered across continents, data fusion and even “process fusion” are essential. But the single toughest challenge is people fusion, creating a seamless global network of human beings all working toward a common goal.

The problem is strict hierarchical organizations such as the management structures typical of oil and gas companies—also derived from the military in an era prior to modern information technology—are proving incapable of fusing people effectively enough to innovate and compete in an age of global interconnectivity.

Technology, complexity, sensor proliferation, changing demographics and the global economy are driving new models of human connection and interaction. In contrast with command-and-control organizations, virtual online communities based on self-organization and collaboration are appearing everywhere. They are fusing people in new ways, creating new relationships and new opportunities. People want to join these online commu-
nities. Consider MySpace.com. In August 2006, MySpace had 100 million registered users. One year later, it had doubled in size to 200 million users.

New Forms Of Information

Collaborative, self-organizing communities are also creating new forms of information. Wikipedia is a prime example. It is the fastest growing repository of information in the world, adding approximately 2,000 new articles every day. Like the open-source community that created Linux, the Wikipedia community has literally tens of thousands of global contributors. None of them are paid to research or write for the online encyclopedia. They do it out of passion for the subject, whatever that subject may be. Wikipedia employs only five people, whose jobs are simply to monitor and referee the creative chaos of the collaborative community.

In a test of Wikipedia’s ability to find and correct facts, obscenities were randomly inserted into numerous articles. Without notification of any kind, the owners of those articles typically removed the offending material in less than two minutes. Astonishing! How can encyclopedias compete with that?

People fusion is already changing the world. It turns out that a self-organizing network of human beings with a passion for what they are doing (even if it is not their “job”) can often create far more value than employees on the payroll. Smart companies like Goldcorp are learning to harness information technology, the Web and new collaborative models to solve some of their toughest technical problems.

One way they are doing so is through virtual online exchanges fueled by both passion and monetary incentives. InnoCentive.com, launched as an independent e-business in 2001 by U.S. pharmaceutical giant Eli Lilly, is a good example. InnoCentive matches unsolved research problems with the brainpower of more than 140,000 registered problem solvers from 175 countries, who compete for cash rewards. Companies such as Boeing, Dow, DuPont and Proctor & Gamble use InnoCentive to expand their workforces without hiring more employees.

Anyone who registers with InnoCentive and signs the proper nondisclosure agreements can log on, gain access to all the relevant data, and work on a problem. If one’s solution is chosen by the client, he wins a reward ranging between $5,000 and $1 million. And these are extremely complex problems in fields such as business, engineering, chemistry, physics and physical science.

Interestingly, people who find themselves attracted to challenges posted on virtual scientific exchanges include retired experts in the field. These are people with decades of experience who still love using their minds, but simply no longer want to work full time. So they self-select a particular challenge where they have both expertise and interest. In many cases, they are motivated more by meaning than by money.

Enormous Benefits

The oil and gas industry could benefit enormously from the growing momentum of global online people fusion. After all, the industry is suffering from a people shortage. As the workforce ages and the big crew change continues, many of the most seasoned veterans are retiring. As an industry, we need to retain their knowledge as long as possible without constraining them as employees.

How? By taking advantage of these new models of collaboration. The most serious oil field challenges—those technical problems that have a direct impact on the bottom line—could be posted online to allow people with passion and expertise to self-select what they would like to work on. In most cases, I suspect they would produce better solutions than people merely “assigned” to the task.

Even the smallest independent could have access to a network of hundreds, maybe even thousands, of technical experts the company could never dream of hiring. Goldcorp had a few dozen geologists on the payroll. After posting its challenge on the Internet, with a cash incentive, it had more than 1,000 people panning for gold. Like Wikipedia, all it really would take is a handful of highly focused employees to monitor, evaluate and identify the best solutions to the problem at hand.

What sort of oil and gas problems would be appropriate? Almost anything. But practically speaking, the greatest initial value of the new collaborative models will come from locating untapped reserves and increasing production on properties that companies already lease and operate. Since some 90 percent of the money spent on exploration and production today is directed toward production and 50 percent of exploration is in mature fields, why not go for the low-hanging fruit? Goldcorp succeeded because it already owned the property and a comprehensive set of data.

Imagine the case of a small independent with an underperforming field in West Texas, where the water cuts are really high. Given all the data it owns on this field,
the company would like to know how to shrink water production by, say, 15 percent because that would increase profits by X amount. The independent could try to solve the problem with its own, rather miniscule staff, or it could post it online with an attractive cash reward and tap the collective genius of the industry at large.

**Outside The Box**

The beauty of the new collaborative model is that the company may just attract a retired expert in that particular West Texas formation who happens to have a few hours a day to tinker with the problem—after working on a novel, or playing with the grandkids. It may also get the interest of experts of a different sort, people who do not know a thing about geology and are not biased by conventional wisdom, but who think so far outside the box they may come up with a solution no one in the industry ever would have dreamed of. Remember, Rob McEwen was not a miner.

Cross-pollination from other, seemingly unrelated fields could reap surprising rewards. For example, could brain imaging technology meant to identify the subtle transitions between tumors and healthy tissue help image the boundaries of subtle oil or gas accumulations? Could robotic systems used to guide delicate surgical operations help solve directional drilling challenges?

Goldcorp had mathematicians, military officers and college professors working on its gold mining problem. What value would there be in attracting people outside of oil and gas to collaborate on solving the industry’s most urgent problems? We could post the U.S. industry’s “top 10” technical/political/environmental challenges, and put up substantial monetary incentives to spark the imaginations of thousands of ordinary people who may already have a stake in the outcome. Imagine, for example, inviting the collective genius of the American public to help us lower the cost of gasoline at the pump, or drill for oil in the Arctic National Wildlife Refuge without doing damage.

Other industries are way ahead of oil and gas. There are only seven petroleum-related problems posted on InnoCentive. Two have to do with cleaning up and removing oil from sediments and water bodies without causing harm to wildlife or the environment. None are related to oil and gas exploration, development or production, or analyzing and interpreting of oil field data.

I believe the time has come for this industry to test the collaborative power of people fusion. To that end, my company plans to post on InnoCentive a critical research and development problem related to automating interpretation, along with a complete data set (to which we own the rights). We are offering an incentive of at least six digits for substantially better solutions. Who knows who may take up the challenge?

**Quantifying Problems**

One major barrier to adopting innovative models of global online collaboration is that, as an industry, we are still not very good at identifying and describing specific problems that have, or could have, real impacts on the bottom line. To do that, companies need to know which problems matter, and be able to articulate them with sufficient clarity that someone other than their employees or colleagues can understand what it is they are trying to accomplish. We all have corporate objectives, but they are not measurable. We also have strategies and tactics. Ultimately, we need to get down to quantifiable problems.

For example, increasing production by 3.0 percent in this field would be worth X amount of dollars. That is a problem that could be posted on InnoCentive, because we have the data, we know precisely what we need to measure, and we know what the value is. We also know how much prize money the solution would be worth. For someone to win the cash award, of course, they would have to carefully document the method and the predicted outcome.

To leverage the collective genius of the world, oil and gas companies would actually improve the corporate genius within their own walls by clearly defining what it is that creates real value. Many organizations never quite articulate how a particular employee’s job adds value to the bottom line. Some jobs do not. We could transform **“Affordable means more than the cost of gasoline to the consumer. It includes the cost of hydrocarbon extraction to the environment and to all the people who come after us–our children, grandchildren and great-grandchildren.”**
the way we do business simply by posting—even interna-

tly—the top five or 10 problems we need to solve in order
to compete and thrive. What would happen if a compa-
ny’s own employees were free to self-select the corporate
challenges they were most passionate about, and self-or-
ganize around finding solutions? If they could solve those
well-defined problems, would it really matter what their
job descriptions were?

The biggest challenge in collaborative models of peo-
ple fusion, of course, will be in changing the entrenched
mind-sets and cultures of our hierarchical organizations
to accommodate this radically new way of solving prob-
lems. That is why I believe U.S. independents are likely
to lead the way. Because of their size, they are much more
flexible than larger upstream organizations. Many small
operators already know how to leverage outside consult-
ants, evaluate business opportunities quickly, and take
appropriate action. Extending that model to accommo-
date a global network of problem-solvers would not nec-
essarily be a huge change.

Turning Data Loose

Another barrier to this way of working is the whole
concept of “proprietary” data. Goldcorp hung out its dirty
laundry for all to see. The mining industry—one of the
world’s oldest, most conservative and secretive indus-
tries—was literally stunned. No one had ever done such
a thing, yet it proved to be the key that unlocked almost
unimaginable wealth. After all, it was not merely own-
ing the data or even processing, imaging or analyzing
the data that finally put money in the bank for Goldcorp.
It was turning that data loose to huge numbers of peo-
ple who had no “right” to see it, people with radically dif-
ferent ideas, methods, tools and technologies.

By the way, the breakthrough for Goldcorp came from a
clever group of entrepreneurs on the other side of the plan-
et that had developed a new approach to 3-D imaging.

There is really no danger in exposing proprietary
data, as long as we choose carefully what to share and
make sure we actually own the data. Given all the le-
gal safeguards surrounding access and authorization
on InnoCentive and other online scientific exchanges,
we are not risking the family jewels by opening our
data to the collective genius of the world. We are tak-
ing a bold new step toward our own competitive advan-

tage while also ensuring that the world will have ac-

tess to more affordable energy, which is what the oil
and gas industry is all about.

Why do I think the upstream energy industry is ripe
for people fusion? Why does it even matter? Because even
though I suspect commodity prices will remain high for
a long time, I do not think that is in the best interest of
either the industry or the public. As an industry, our pur-
pose is not simply to supply energy to the world. We need
to supply affordable energy to the world.

Solving our own problems at everyone else’s expense
is simply unsustainable. Ultimately we need to opti-
mize more than just the parts; we need to optimize the
whole system of energy discovery and delivery. That
means we cannot afford to solve our complex problems
in isolation. We need everyone’s help. After all, they are
in this, too. “Affordable” means more than the cost of
gasoline to the consumer. It includes the cost of hydro-
carbon extraction to the environment and to all the peo-
ples who come after us—our children, grandchildren and
great-grandchildren.

The younger generation coming into the oil and gas
industry already thinks and interacts differently than
the generation that is running most of our corporations.
They have grown up with the Internet. They are less mo-

JOHN W.
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John W. Gibson is chief executive officer of Paradigm. He has 25 years of experience
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in geology from the University of Houston.
tivated by money alone; they want to do something sig-
nificant. They want to work together collaboratively to
make the world a better place.

Information technology and exploding online commu-
nities are rapidly harmonizing cultures, standards of liv-
ing and quality of life. Affordable energy is critical to the
future. Isn’t it time the industry began to harness the
passion and collective intelligence of the world to achieve
new breakthroughs in global energy efficiency and sus-
tainability?

Editor's Note: The author would like to recognize the following sources:


