Welcome to Insights into Mining, a periodic e-newsletter focused on current topics relevant to the Mining Industry.

KPMG’s mining practice is committed to the industry and will periodically publish a series of insightful articles authored by leading KPMG Mining professionals and advisors. The articles are designed to inform and stimulate debate amongst those involved in the industry. If you have any questions, please contact your local KPMG representative or click here for a list of KPMG’s Mining leaders across the country.

Incremental innovation

Is it the right approach for mining?

Innovation in business is generally associated with sectors such as technology and health care, and industries like pharmaceuticals and aerospace. These are businesses that trade on innovation, and set aside large budgets for research and development. But what about a traditional heavy industry like mining? Has mining embraced innovation as a way of improving its business performance?

Not according to several presenters and commentators from the industry at the KPMG Mining Executive Forum, held September 15 in Vancouver. They suggested that mining companies have typically taken a haphazard approach to innovation, and do little to foster a culture that supports it. Few companies have established processes for addressing innovation directly. R&D budgets at mining companies are generally insignificant. Compare this to KPMG’s Global Metals Outlook 2015 which reported that 32 percent of metals companies surveyed will spend more than 6 percent of revenues on R&D over the next year. It was stated that suppliers contribute much of the technology innovation that comes into the industry, and even then, many mining companies underutilize this value-added “gift.”
These comments must be viewed in context. For instance, many of the remarks were made in reference to technological innovation where the industry does not excel. However, the industry has led the way in some other areas of innovation. Corporate social responsibility (CSR) and the “social license to mine” are policy innovations that the mining industry created, developed, and embraced. Certain of the major mining companies have looked to automation as an important way to optimize production and reduce costs in today’s environment of low commodity prices. As well, there have been major advances in environmental management prompted by CSR and escalating compliance standards.

So, there are examples to suggest that the mining industry can innovate when it needs to, in response to particular opportunities and risk factors. When innovation doesn’t meet short- to medium-term goals, however, the industry has not embraced innovation as a driver of growth. Faced with today’s challenges that can threaten survival, many companies must focus to a large degree on the short term. Not many would count “lack of innovation” among their top ten issues, or even their top twenty.

Few, if any, would want to devote time and resources to creating formal structures and processes that encourage innovation. Even fewer would want to allocate scarce capital to a substantial R&D budget unless the outcome was assured, substantial and measurable. Some of this restraint is forced on the industry by investors who do not want management to layer another risk on top of an already risky business. Citing a lack of funding for research among mining companies, one speaker at the Forum remarked, “Shareholders don’t like research. There isn’t much ROI in it.”

Where does that leave innovation in mining? Companies could certainly benefit from the right kinds of innovation, especially to drive operational efficiencies and agility as the commodities cycle begins to turn back up. However, at a time when many companies are in crisis mode, an innovation strategy cannot be disruptive to other goals or too hungry for time and resources.
In present circumstances, perhaps the risk-appropriate innovation strategy isn’t a big formal undertaking that competes with other initiatives in the company such as cost optimization, enterprise risk management, project management and supply chain efficiency. Instead, one of the best approaches could be a strategy where incremental innovation is encouraged to flourish within those other initiatives. Here are four possible dimensions of such a strategy:

1. **Collaborate with suppliers**

As mentioned, one of the primary ways that innovation is impacting the industry is through suppliers. As suppliers continually upgrade their products and services, they become more integrated with the latest digital technologies, including wireless and mobile. For example, various pieces of mining equipment can interact online, creating an end-to-end data picture of mining operations. Equipment makers are using GPS to help identify the locations of all vehicles (often driverless) in real time, and data-streaming sensors to measure wear and tear on various components, such as tires, for optimal service efficiency. Mine workers can carry wearable technologies that can track their locations and service hours, optimizing their efficiency and protecting their safety. New high-tech scanners can help grade, sort and select ore for greater efficiency in processing metals. Many of these technologies feed into automation, improving existing automated systems and enabling new ones.

The common feature with most of these technologies is a rich and growing pool of data that companies can use to help optimize performance and drive efficiencies. The existence of this data is not in dispute, even among mining companies. Yet, at the Mining Executive Forum, one major supplier mentioned that only 10 percent of customers even use the data that the company’s equipment produces. From an innovation point of view, supplier technologies appear to be “low hanging fruit” that mining companies can access with relative ease and thrift. Moving towards a more collaborative business model with suppliers is a lower-risk proposition for many mining companies than taking on huge business transformation projects.
2 **Take steps toward an innovation-friendly corporate culture**

One important part of an informal innovation strategy would be shifting the organization’s culture to make it clear that innovation ideas are desired and valued. Depending on the culture of the organization, employees may keep creative ideas to themselves because they could be perceived as “overstepping” or do not believe higher management will take them seriously. An information campaign sponsored by a firm-wide group such as HR and endorsed by senior management and the board could be helpful. A direct pipeline to a designated innovation “champion” could speed the flow of ideas, and feedback about ideas adopted could close the loop and encourage more grassroots innovation.

3 **Learn lessons from the oil & gas industry**

In many ways, oil & gas is a true cousin of mining, sharing many of the same commodity-driven challenges as well as the need to explore and develop new reserves.

Oil & gas also has a better track record at technological innovation than mining. According to a June 2013 article in the Globe & Mail, “…real-time changes in the way oil and gas is being found, developed and produced is stunning, with potential consequences to society as profound as the introduction of the smartphone.” The article goes on to say that a typical North American oil and gas well has become at least four times more productive and can be drilled in less than half the time than it could even seven years ago.

One of the most interesting oil & gas technologies helping to enable these gains is sideways drilling. Petroleum companies are now able to drill long distances laterally, meaning that one surface “pad” can now service up to 20 or more wells. The technology is expensive, but it is also driving down operating costs by at least 20 percent.
Oil & gas exploration companies are able to “X-ray” underground terrain to map the size and scope of petroleum reserves, while mining has needed to rely on traditional drilling and analysis of core samples. Now, a machine under development is using cosmic ray muons to isolate different densities in underground rock formations. This is definitely a technology for the industry to follow.

4 Share innovations with other mining companies

Another area where oil & gas is breaking through is industry co-operation. In a commodities-based industry that does not produce branded products, certain types of innovations can be shared without compromising the truly important aspects of competition, such as investors and projects. For example, the Oil & Gas Innovation Center specifically profiles technologies developed in other industries having crossover applicability in the petroleum industry.

Mining is beginning to realize the same thing. In 2007, The Centre for Excellence in Mining Innovation (CEMI) was established in Sudbury, Ontario, collaboratively funded by the private sector and government. CEMI conducts research projects and shares the results in exploration, deep rock mining, mine engineering, construction and environment. Other research institutes, universities and innovation centres, such as the BC Innovation Council, also address mining issues and incubate new technology-based suppliers to the industry. Using an incremental innovation strategy, it is important for mining companies to track the activities and findings of these organizations as they apply to mining, oil & gas, and other industries with crossover potential.

However, companies can also encounter innovative ideas and practices in the course of normal business. Situations like joint ventures and post-merger integrations can provide excellent opportunities to share innovative practices and create synergies while working toward common goals.
Summary and conclusions

Innovation will be critical to the mining industry over the long term. There are also more immediate wins that can be gained through targeted innovation; for example, better approaches to data management and process optimization. However, it is difficult for mining companies to place innovation high on the short-term agenda when they are dealing with other fundamental risks and adversities. In today’s environment, it is even less likely that companies will devote significant time, money and other resources to creating a formal innovation strategy.

However, that does not mean that mining companies cannot engage in a robust and deliberate approach to incremental innovation. Some keys to success are:

- Collaborate with suppliers and other mining companies at every opportunity
- Stay abreast of mining projects and findings at industry associations, research institutes, universities and innovation centres
- Learn lessons from other industries, especially oil & gas and other resource industries
- Take steps to develop an innovation-friendly corporate culture in your own organization

Using these keys and others, an incremental innovation strategy can be continuous, positive, and non-disruptive to critical short-term goals.
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