

Supporting Canada to Become a Leader in Global Mining Innovation

Mineral and metal deposits are becoming increasingly more difficult to locate, requiring new tools and techniques. Innovation has allowed Canadian companies to maintain their competitive edge and has helped Canada become a safer, more cost-effective and environmentally-sound mining jurisdiction.

The 2013 Conference Board of Canada's Innovation Index rates Canada as 13th out of 15 of its peers. Although Canada is a leader in mining innovation, there currently exists an innovation gap which is preventing Canada from becoming the global leader in innovation. Strengthened coordination, improved funding flows and ratios as well as a broader vision of innovation are all elements that will help propel Canada to the top of the list of global innovators.

Three national mining organizations, the Canadian Mineral Industry Federation (CMIF), the Canadian Mining Innovation Council (CMIC) and the Centre for Excellence in Mining Innovation (CEMI) have identified the lack of national scale coordination of government and industry research, development and innovation (RDI) funding as a barrier to advancing mining innovation. There are over 4,000 different and uncoordinated sources of RDI funding in Canada, carried out and supported by a myriad of academic, government and industry entities. There are also over 40 different mining research organizations that at times operate in silos.¹

Because the development of new mining technologies and practices is capital intensive, collaboration has become increasingly necessary. Individual firms are hesitant to make standalone investments in innovation because of the risky and uncertain environment and are turning to partnerships with suppliers and academia to advance their initiatives. The Canadian Chamber's 2013 Mining Capital report states that due to the collaborative nature of the natural resource sector, a systematic and coordinated approach that enhances linkages between the various stakeholders is vital to propelling mining innovation.² Gains are being made in addressing the coordination gap, such as the establishment of CMIC by government, industry and academic researchers to lobby for mining innovation.

Key to their efforts was the identification for innovation through coordination of industry-led RDI. CEMI, an active participant in the mining innovation space, is closing the co-ordination gap by working collaboratively with the mining industry, academia, mining service & supply sector, SMEs and cross-sector industries (oil & gas, space technology). However, to catapult Canada as a leader in mining innovation, there is an increased need for more co-ordination and co-operation in terms funding (government, industry) and between research and implementing organizations.

Further, for innovation to work, it must be adopted. For this, mining innovations need to be demonstrated and implemented as workable beyond the theoretical, but also show commercial viability. The lack of commercialization is one of the reasons why so little of the funding for mining research has impacted mine operations. The majority of funding in Canada is targeted at research in academia that may not necessarily translate into industry-relevant innovation or commercialization. While university-based research is essential, research in operating mines and with suppliers is equally important. The Research, Demonstration and Implementation (RD +I) approach to focus on practical applications, distinct from academic research was developed by CEMI in 2011 and is aimed at addressing this very important issue. Closing the loop by driving commercialization activities for mining innovations should be strongly supported by government, which will have direct and dramatic economic impact to Canada and in bringing these Canadian mining innovations to the world stage. Mining service and supply firms also make significant contributions to the commercialization process and their efforts should be supported in an integrated manner. Funding and programming in such areas will further help to encourage commercialization and industry adoption of important mining innovations.

Although funding is vital to mining innovation, it is also impacted by: the time it takes for funding to flow; and the government to industry ratio of funding.

¹ The Canadian Chamber of Commerce, "Mining Capital: How Canada Has Transformed Its Resource Endowment Into a Global Competitive Advantage," 2013.

² Ibid.

In some jurisdictions proposals can take over a year to be processed and it can take another year before approved funding begins to flow. The time required impacts the momentum of the project as a whole, available talent and resources, as well as the delay in the potential economic impact and adoption. It also impacts the willingness of management within industry to commit to funds. Most managers and business heads are willing to commit to funds for projects that accrue benefits within their “lifetime” within a particular position, generally between 1-3 years. This incents shorter-term thinking, unless the commitments are approved at the highest levels.

Generally, Canadian mining companies and government contribute research and innovation funds on a 1:1 ratio. In a national perspective, this makes sense as both are vested in developing and building the infrastructure, knowledge base and economy within Canada. However, the global consolidation of the mining industry has impacted the financial commitment for mining innovation in Canada. The Canadian portion of these mining conglomerates accounts for a small percentage of the whole and the evaluation for investment in Canada is measured against the consolidated global view. The interests of these mining conglomerates for their Canada-based companies can diverge significantly from that of Canadian government’s economic interest and development. For near-term (1-2 years) smaller projects, the 1:1 ratio is still valid. In order to attract funds and partnership with these global mining companies, the Canadian government needs to consider adjusting its funding ratios and consider options such as increasing ratios to 4:1 or 5:1 to provide incentives to support larger-scale, longer-term, visionary Canadian mining innovation projects to stay the course.

The Federal Government has recognized the issue of funding flows, but support is required. In 2014 the Federal Government, Business-led Networked Centres of Excellence (BL-NCE), in recognition of its RD +I&C (commercialization) approach, awarded CEMI \$15M over five years to CEMI’s Ultra-Deep Mining Network (UDMN). The total program is \$46M, funded roughly equally by government, mining companies and service and supply companies in the resources industries (mining and oil and gas). It focuses on reducing geotechnical risk, improving productivity, reducing energy consumption and improving human performance – all critical issues for mines at 2.5 km below surface and deeper – becoming common in many mining jurisdictions around the world. The UDMN is an example of co-operation, collaboration and that takes into account the time flow of funding and exemplifies how best to move forward.

In face of growing competition from nations with lower wages and less stringent environmental regulations, Canada has little choice but to innovate. Governments at all levels in Canada have to recognize that Canada is just one player in the globalized mining business. Given the relative strength and coherence of mining industry, research and innovation organizations and our mining service and supply sector, we have a tremendous opportunity to become a global powerhouse in this field – so long as all the factors for success are in place in which mining innovators can thrive. Conventional approaches are failing to deliver new mines at greater depths and in more remote locations; innovation is essential if we are to sustain our strength in the mining industry.

Recommendations

That the federal government:

1. Provide funding for mining innovation projects that go beyond academic research exclusively and include those aspects that incorporate mining industry, supply & service companies and cross-sector industries to support implementation and commercialization requirements.
2. Increase funding ratios and manage funding flows as appropriate based on the size and timeframe of innovation projects.
3. Facilitate and support co-ordination and collaboration between research and innovation organizations, funding bodies and business organizations to meet Canadian and global mining innovation needs.