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Innovation: Turning Aspiration into Action & Impact



Peter J Bryant | *Managing Partner, Clareo
Board Chair, Development Partner Institute*

The global mining sector has seen a comeback in recent years, experiencing improved employment, wages and economic wealth. However, this windfall threatens to be short lived. Even though progress has been made, the bulk of mining companies have missed out on the productivity gains and lower unit cost of production from the technology revolution of the last ten years. If miners want a new era of prosperity, they must upend the traditional approach to the business of mining, translating the aspiration for transformational innovation into sustained action and value creation.

Mining leaders have gradually adopted a more progressive mindset to embrace this reality. Since 2015, a growing number of CEOs and mining companies have recognized the need for innovation and made aspirational pronouncements. Several of them have moved ahead aggressively with their innovation efforts, with companies like Anglo American, BHP, Vale, Goldcorp and Teck explicitly outlining this in their strategies. Paradoxically, miners like Barrick and Agnico Eagle have shuttered their innovation efforts after having made bold public forecasts and pronouncements, built teams and networks/relationships. Rio Tinto, after a significant reduction in its innovation investment, is now reemerging under new leadership.

The hard but simple truth is that in order to achieve the new level of performance to which the industry aspires, mining companies must have a sustained investment in innovation that delivers on both radical improvement and transformation. So what's holding miners back?

SYSTEMIC UNDER-INVESTMENT IN MINING

Mining companies have consistently underinvested in innovation when compared to other industries. Manufacturing spends 2 to 3 percent of its revenue on innovation. Oil and gas companies spend 3 to 5 percent, and that's on the low end of the spectrum. My firm's analysis shows the industry's historical investment in innovation hovers around 0.5 percent of revenue, with only a small clutch of leaders now moving towards 1 percent – clearly mining still lags behind manufacturing and oil and gas. Investment levels remain an impediment to realizing the productivity and margin improvements miners desperately need.

THE NEED FOR A RAPID EXPERIMENTATION-BASED APPROACH

To deliver true value, innovation efforts must move faster. It's critical that companies embrace risk tolerance and allow space for experimentation and learning. This is not out of reach for mining – these are the same characteristics miners display when exploring for new resources, so why not for innovation and disruptive technology? Several companies have made progress thus far, applying principles from lean startup and minimal viable approaches, led and championed by dedicated innovation groups. However, most companies are simply not moving concepts fast enough from the idea stage through rapid investigation; speed is a critical skill in order to determine viability through to adoption and scaling. The problem occurs when innovation is kept too close to the core, so ideas are stifled by the same processes as the operating units. "Procurement is where we send ideas to die." An innovation leader told me this, and it's a stark reminder that companies need to manage the cost of failure, not the rate of failure.

An example of this is evident in how the mining industry struggles to get beyond pronouncements, and to identifying and capturing real value from AI as indicated in the *Wall St. Journal* article of December 26th 2018 titled "Mining lags in using AI".

FIT FOR PURPOSE CAPABILITIES AND APPROACH

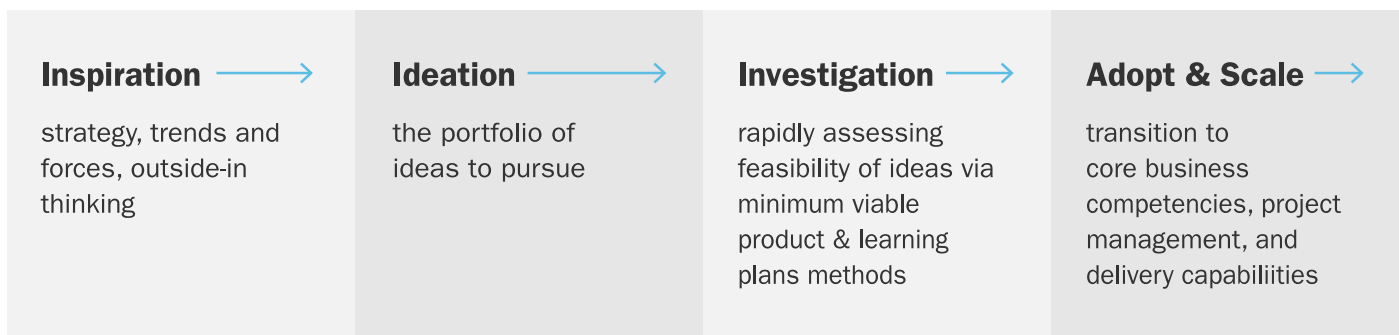
Even if an idea is determined viable, there remain huge obstacles to take this new capability, technology, or approach from an initial pilot in one mine through to widespread adoption. This requires new capabilities, as well as the design and adoption of 'fit for purpose' governance and supporting processes within areas such as procurement and HR. It also requires a patience that is simply not shown by mining executives. Interestingly, most executives show more patience towards capital projects than they do towards innovation efforts – this impatience is underpinned by several factors, including a lack of strategic clarity and poor knowledge of what makes for successful innovation.

These are the obstacles that conspire to cause aspirational innovation efforts to regress into a focus on incremental improvement, and then finally get shut down under the auspices of financial rationalization.

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You can think of innovation as having four phases. Each of the phases has different needs in terms of capabilities and process, and if you misalign these, you risk ending up with underperformance and disappointment.

FOUR PHASES OF INNOVATION



The first three phases of *Inspiration* (strategy, trends and forces, outside-in thinking, etc.); *Ideation* (the portfolio of ideas to pursue) and *Investigation* (rapidly assessing feasibility of ideas via minimum viable product and learning plan methods) need to be led by an organization that is insulated from but still connected to the core. This organization needs to have a much more entrepreneurial and speed-based approach, a culture of experimentation and learning, a high tolerance for risk and failure, and a focus on the cost of failure and not the rate of failure. The final phase of innovation is when you move from Investigation, where you have prototyped and piloted to Adopt & Scale, where you transition to the competencies of the core business and its capabilities of project management and delivery.

To muddle these phases and capabilities will be catastrophic, and this transition is often mishandled, becoming an impediment to widespread adoption. Treating the first three phases of innovation as you would project delivery, for example, stifles innovation by forcing it to move at the same incremental speeds and producing deterministic outcomes. This is also impacted by how the work done in the Investigation phase is integrated with the TRL approach. This rapid, efficient, and nimble transition is a huge challenge across all industries, and no great examples exist yet in mining. Anglo American and BHP are in process, and Rio Tinto has seen success in areas like autonomy, but still the boxes for rapid, efficient and nimble cannot be ticked. The defense and mining industries were early movers in Autonomy, but 15 years later, less than 2% of the mobile equipment in the entire mining industry is autonomous and the OEM solutions are closed proprietary systems that by nature are expensive.

The Innovation organization driving and owning the first three phases needs to be supported by ‘fit for purpose’ processes from procurement (rapid and easy); HR (positive career track and right skills); financial (risk tolerance and acceptance of ambiguity and uncertain returns) and above all be insulated from the core. There will also be different metrics for this.

Companies like Exelon, the largest US utility, have been very deliberate in establishing metrics around how Innovation efforts are balanced, targeted, and aligned.

ENGAGING EXTERNALLY AND WITH STARTUPS

Finally, miners need to cultivate a vibrant startup ecosystem, supported by either a robust venture capital, corporate venture capital base or both. In “The Global Brain,” Prof. Mohan Sawney of the Kellogg School of Management and Satish Nambisan stated, “A company can only be as innovative as the collective capacity of the people who make up its ecosystem.” The pipeline of innovative solutions for radical improvement and transformation is proportional to the health of these ecosystems. Yet, there are only a handful of active VC funds: Chrysalix in Canada, Aurus in Chile and Jolimont in Australia.

As for corporate venture capital funds, until 2018 none of the major miners had this type of funding, which is in stark contrast to all other industries. Even now, only Anglo American has established a CVC Fund, called AP Ventures, to invest in startups that drive the demand for platinum – this follows the Intel model. Teck has also invested as an LP in the Chrysalix RoboValley Fund, but again, this isn’t representative of the industry at large. The lack of venture funds (i.e., risk capital) deters entrepreneurs, stunts innovation and tends to strand technology in research groups or in small companies that never scale. As of now, internal funding approvals too often use net present value and other large project approval mechanisms, which leaves innovation competing with funding of the mines. In turn, the cycle of underinvestment persists. It becomes a self-fulfilling cycle.

The bottom line is mining companies need to turbocharge their investment in innovation – and, for once, disconnect the cost of production from the market price of commodities. This shift will unleash the kind of sustained value, returns and free cash flow miners and the markets expect.



About Clareo

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We help leaders adapt their businesses and create new ways to grow in rapidly changing markets. Together, we build the plans and capabilities that deliver results. We assist clients in improving strategy execution, finding radical improvements, developing entrepreneurial capabilities, rapidly taking new ideas to market, exploring plausible futures, and enhancing their competitive innovation capabilities.

Our clients choose Clareo when they want bold new ideas that get to market faster. Working alongside our clients, we create compelling strategies that lead to action.

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Contact the Author

Peter Bryant - pbryant@clareo.com