Digital Transformation in the Golden Age of Mining Technology: The Great Skills Evolution

In this third segment of a three-part series exclusive to* NAM, *Aspen Technology discusses the digital transformation, adaptations needed by mining's workforce, and what's to come during this unprecedented time.

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While not a panacea for everything, technology can be a great enabler to address many of the mining industry's challenges. The more mining companies embrace technology, the more profitable they will become, the safer they will operate and the more sustainably they will meet growing demand. Profitable operations will grow and continue to employ staff, support a move to a green economy, and deliver value to shareholders.

Mining companies that partner closely with software vendors whose solutions have market leading user interfaces, and are easy to implement, learn and use, will see increased competitiveness. Similarly, the vendors of those solutions will see adoption of their products rise above the alternatives in the market.

Solutions that technical staff can learn quickly and easily will grant them new skillsets to expertly use industry standard tools. Mining companies will be able to visibly show their investment in their people by training existing staff to be able to apply those talents to safety, sustainability and technological principles in future endeavors. This will also ensure they continue to affect safety and sustainability wherever they progress in their careers.

When properly executed through appropriate change management, implementing new technologies will allow mining companies to bring their staff on the journey to the fully digital mine by opening opportunity to learn and grow within their organizations. Mining companies should choose software vendors that deliver ongoing and permanent support and ensure positive outcomes at the companies that bring them their commercial success: their customers.

Impact on the mining workforce

When automating certain parts of the mining value chain, it's clear that there will be impacts to the existing workforce and the range of skillsets required, but implementation of technology can breed opportunity. An automated truck fleet will still need the entirety of the maintenance support staff, and an automated and optimized fleet may even suggest the need for more trucks, or an operation scaled to a different level.

An automated truck fleet isn't simply a set-and-forget solution. Real-time GPS and local positioning hardware needs to be implemented, maintained, modified and moved as the site develops. So, too, do the software systems pulling information from this hardware, processing it, and sending it to the range of solutions that require it. Implementation of technologies may require a different type of local or international skillsets sourced either internally from existing staff or externally from partners and consultants.

In a small industry where specialized knowledge is rare, the challenge for mining companies becomes retaining incumbent staff and their knowledge, while building on the expertise and expanding the skillset of incumbents to include technological solutions that make them inherently safer and more effective in their roles.

In the same way that geologists who today insist on completing geological cross sections with pen and paper are now a rare breed, mining industry staff that don't adapt and learn new skills will also see less demand for their services. While most geologists retain the ability to work with pen and paper, very few exercise those skills because they're no longer congruent with how business is conducted within that space. Geological modeling tools have been able to create cross sections at the click of a button for more than 30 years and the vast majority of geologists have become proficient users of some kind of geological modelling solution.

The same shift in work practices is occurring in many different parts of the mining industry and must be embraced at the leadership level as it is by the staff they employ. This is necessary to stay as competitive and as relevant as possible in a dynamic commercial and employment market.

In practical terms, there is no actual end point to technological development or automation, and the trend towards technological solutions is currently at its strongest. An equipment operator with even the most minor experience

in mining will know more about the industry than most other civilians. The knowledge incumbent staff carry with them daily from a purely practical standpoint holds substantial value. Therefore, it's a far better investment to build on that knowledge while offering that employee career growth opportunities, than it is to simply try to replace that employee.

If a mining company is visibly investing in its people by offering career growth, training and bringing their staff on the journey to full digitalization, employees will respond in kind with loyalty, retention and commitment to the ongoing objectives of companies that are valuing them and the contributions they make daily. When working in close partnership with technology vendors that are similarly linked in the process, the trifecta of profitability, safety and sustainability can be achieved while ensuring a win-win for all stakeholders involved.

First mover advantage

Mining companies will need to review internal processes to be more conducive to adopting new technologies. Current software selection and implementation cycles are between three months to two years depending on how committed a given mining company is to their profitability, safety and sustainability goals. To have material impact on business targets, firms need to implement and scale technology solutions rapidly and progress on the technology adoption curve as quickly as possible.

Every day that a processing plant is run in a suboptimal way is a day that economic material is sent to a tailings dam which reduces the potential life of the mine, damages the environment more than it needs to, and reduces the short and long-term profitability of the operation. When operations take years to implement new solutions, the champions of those advanced processes and technologies may not even be with the company anymore to push efficiency, safety and sustainability forward.

Additionally, frustration regarding the red tape surrounding testing or implementing a new solution could contribute to retention issues. If tech savvy employees are trying to implement solutions that affect safety, sustainability or profitability and encounter too strong of a resistance, they may simply move onto other organizations that value those pursuits. This further delays the impact any solution can have on optimizing mining operations, as well as slowing the progress of the industry as a whole.

A path forward

Given the vast range of mining technology now available, mining companies need to leverage the existing knowledge they have in place, develop and expand on that knowledge base, retain staff and their experience, and collaborate with vendors to develop strong partnerships with their technology providers. It's time to push forward in adopting solutions available on the market to ensure they stay profitable, competitive, safe and sustainable to the greatest degree possible. Late majorities and laggards will fall behind in a competitive market that is rapidly expanding to meet demand.

The time is now to pursue rapidly scalable technological solutions to meet the challenges that exist in mining. The landscape of the mining industry is only becoming substantially more competitive given the robust demand that underpins the green economies of the future. Mining companies must introduce staff KPIs that measure the level of technological adoption to ensure that they remain on the cutting edge of the industry and stay profitable in the years ahead.