

INDIMIN

INTELLIGENT MINING OPERATIONS





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Five years ago, INDIMIN pioneered introducing AI's practical use in mining operations through its Smart Mining Coach platform. The platform was the first intelligent mining assistant whose objective is to motivate and empower decisions on the ground and remotely. It also improves productivity, safety, and collaboration between people who are in mining operations. INDIMIN has collaborated with companies like Anglo American, Collahuasi, CMP, ENAEX, and MOLYCOP Australia.

Business Excellence spoke with Álvaro Díaz, co-founder of INDIMIN. We asked him about the platform's relevance and how it enables mining companies to adapt to fluctuating demand, control operating costs, and address growing safety and environmental concerns. He explained that "in operational mining processes, although there are excellent professionals and technology, the industry still faces tremendous losses. This has structural causes that originate from the reliability of the equipment, coordination of processes, among other important factors".

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Problems solved by Smart Mining Coach

Álvaro Díaz explained that a medium site could have safety challenges related to poor equipment maintenance and operational efficiency. The latter equals nearly 2,000 hours of lost production. Especially due to time cycles that are outside the parameters and objectives set by the mining companies. This equals close to 6 million tons wasted in production and more than MM USD \$5,0 in annual losses. Other events related to security and equipment maintenance are also



part of the whole landscape. Specifically, in some cases, equipment velocity exceeded security limits more than 12000 times. And on top of that, there were more than 17000 cases of equipment overload, generating further damages to these assets and higher maintenance costs.

The Smart Mining Coach platform addresses this entirely. The approach is different since it begins with people helping to empower and improve the operation changing and sustaining new behaviours. The latter motivates human teams to collaborate and empower themselves. The platform, a digital mining assistant, provides predictive and straightforward recommendations to avoid losses, achieve production goals and operate in a reliable, safe, and sustainable way.

Implementation is easy and swift since it doesn't require operations to stop. It uses existing data in the mine available on mobile and desktop equipment. In Diaz's own words: "We are experts in turning data into empowerment and making it actionable. To this, we add several years of experience in Artificial Intelligence so that predictive advice is unique. It achieves optimal results, with personalized feedback available for different roles, such as operator, shift bosses, superintendent, and others, you can imagine Smart Mining Coach as your 'coach and personal navigator' that will follow you avoiding operational losses and increasing your productivity proactively".

Clients and past projects

The company had its first experience in 2017 with CMP, the largest iron exporter on

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South America's Pacific Coast. The experience was fulfilling since they achieved more than up to 7% improvement in truck shovel productivity. The best operators achieved up to 25% improvement. Since then, clients have asked to expand the product. The company works in AMSA groups (the most significant copper district in LATAM) for the Drilling and Blasting process. "We have also integrated work with large suppliers such as ENAEX, adding their factory trucks online," states Díaz.

They have also carried out Artificial Intelligence projects for Planning, Drill & Blast, Mineral Recovery, and grinding. In the process, they have collaborated with companies such as Collahuasi and Molycop Australia. Today the company delivers all that knowledge through the platform and specific projects.

Did you know?

The best operators achieved up to **25%** improvement

Beginnings and institutional support

The whole project was conceived at Adolfo Ibáñez University, where Loreto Acevedo and Álvaro Díaz (both founders of INDIMIN) were studying a master's degree in Innovation. Afterward came the crucial support from Fundación Chile, an incubator for entrepreneurs' Latin American ecosystem. Today the

company has continued with the help of their clients and by creating new alliances with Microsoft. Also, by actively collaborating with companies such as ENAEX to achieve differentiated services in the market.

The support of the Chilean national innovation agency, CORFO, has also been necessary to develop different stages. Nevertheless, Díaz emphasized that "without a doubt, our best allies are our clients. We

work to achieve virtuous mining with a triple digital impact, by empowering people”.

Implementing digital mining technology

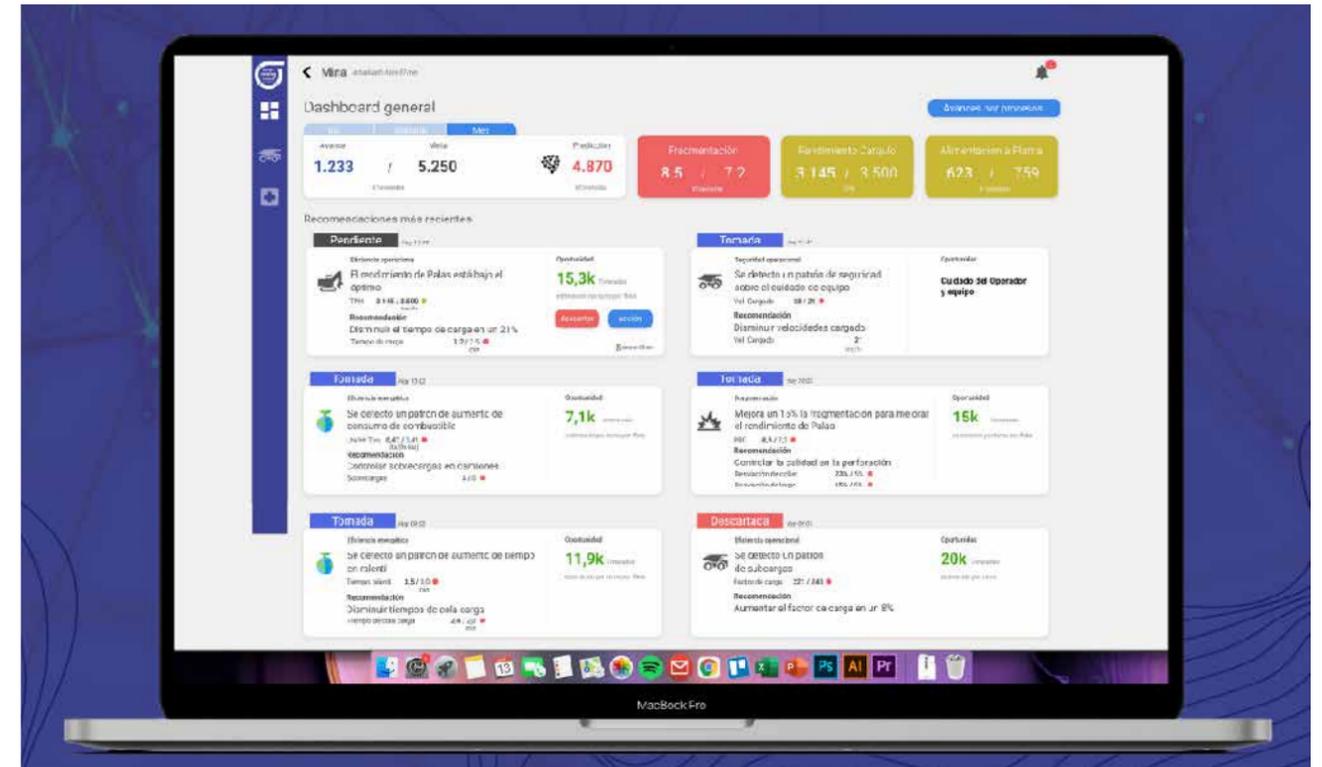
Regarding digital mining technology, Díaz says, “what is happening is very positive. Five years ago, when we asked miners to develop projects using Artificial Intelligence, this was uncharted territory for them. Today we have covered the mining value chain together. In the last three years, many analytics and technology companies have emerged, which

will undoubtedly change the way things we do things in mining”.

INDIMIN believes this change will occur in an accelerated way in the next five years. “We will see miners, contractors, and people increasingly surrounded by technology from different fronts. But the underlying question is not about technology, but about the speed of cultural adaptation and a diverse mindset to transform”.

According to Díaz, the company “remains firm in their purpose” to empower people for sustainable mining. Those values continue

“The importance of guiding this change and digital transformation. Especially with new ethical codes for Artificial Intelligence which, as we integrate various processes and data, can help us make better decisions”



beyond an automation scenario since they have been evolving and learning systemically and making Smart Mining Coach more powerful.

COVID-19 effects

In the beginning, there was a lot of uncertainty. In general, in Latin America, there was a decrease in operations, and some even stopped. Although operations in the short term decreased in Chile’s case, the country reacted very quickly. The whole situation helped INDIMIN to demonstrate that the technology allows in these remote operation and management contexts.

They also adapted and added proactive modules of self-care and two-way communication to use within mining sites. “We add models of traceability of actions, not only of security and self-care but also of how to operate integrally,” says Díaz.

Looking ahead

INDIMIN is working intelligently on its growth in Latin America. Also, the company continues

to grow in AI capabilities to support the digitization of mining. “We will continue to link and learn to support mining companies in this route of automation and transition of work and new ways of operating.”

On a final note, Díaz stressed “the importance of guiding this change and digital transformation. Especially with new ethical codes for Artificial Intelligence which, as we integrate various processes and data, can help us make better decisions”. Can an AI with a more comprehensive ethic benefit the mining company, communities, and the environment at the same time? INDIMIN firmly believes it is possible. **BE**

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