IMIDRO drives digital transformation in mining sector

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OPINION

Smartization has been recognized as the cornerstone of progress for Iran's mineral industries, with an official for planning and empowerment management of the Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) declaring its transformative potential to accelerate sector-wide modernization. This strategic focus drives IMIDRO's sweeping efforts to deploy secure 5G networks, AI-powered logistics systems, and nationwide data-sharing platforms — initiatives designed to overcome legacy inefficiencies, enhance decision-making transparency, and position Iran's mining sector as a globally competitive player.

Acting Head of the Innovation, Smartization, and Security Center at the IMIDRO has emphasized the pivotal role of smartization in advancing mineral industries and detailed the organization's extensive efforts to establish digital and security infrastructure.

Bahareh Khazani stated during a recent press conference on the sidelines of the Iran Expo 2025 exhibition, "The smartization of mines and mineral industries can enhance the speed and precision of managerial decision-making by leveraging transparent data."

"To ensure the secure and unrestricted flow of data, a reliable communication infrastructure is essential. Over the past year, in collaboration with the Ministry of Communications, the organization has begun implementing dedicated optical fiber networks and 5G connectivity for mines," she said.

Also, according to Ahmad Fatah, IMIDRO's Exploration Manager, long-term plans for mining and mineral industries prioritize safety and sustainable development.

Launching intelligent system

Among the IMIDRO's key initiatives are the launch of an intelligent distribution system and the creation of a database for companies active in mine smartization.

Registration for qualified firms opened on IMIDRO's smartization platform in March, with competency assessments now in their final stages. The imminent release of this vetted registry will empower mining operators to identify and collaborate with certified partners, ensuring seamless integration of advanced technologies across the sector.

Digital Skills Development Center

A Digital Skills Development Center has been established as a critical infrastructure component for smartization. The organization's goal is to train skilled personnel aligned with global standards.

Smart logistics in mines — a key ongoing project — will significantly boost productivity.

IMIDRO has selected the Tabas Coal Mine (underground), Zarshuran Gold Mine (open-pit), and Sangan Iron Ore Mine (open-pit) as pilot sites for testing its initiatives in critical mining sectors.

Additionally, three Energy Management System (EMS) pilot projects are underway at the Qaenat Steel, Sangan Steel, and Jajarm Alumina facilities.

Digital Transformation Document for Mines

A Digital Transformation Document for Mines and Mineral Industries has been drafted, which will soon be officially ratified. This five-year document outlines a national roadmap for smartizing Iran's mines and encompasses large-scale strategic actions.

In this regard, cybersecurity is a priority and all communications adhere to security protocols.

Additionally, resistance from legacy systems and the need for cultural shifts to foster data transparency are among the key challenges highlighted in this sector.

Collaboration with security, international entities

In cases where required technologies are unavailable domestically, international collaborations will be pursued in coordination with security agencies and relevant organizations.

IMIDRO's current and future initiatives represent significant strides toward Iran's mining sector's digital transformation. Smartization not only enhances productivity and security but also fosters transparency and efficient management.

Safety, sustainable development

Long-term plans for mining and mineral industries prioritize safety and sustainable development.

Under the Seventh Development Plan of Iran, annual projections are made for a five-year horizon. Over the past five years, targets have consistently been exceeded — last year's goal of 600,000 meters [of exploration] reached 670,000 meters.

For this Iranian calendar year (began on March 20, 2025), the target is 650,000 meters, but current trends suggest achieving 670,000 meters is likely.

Smart software in exploration

IMIDRO, in partnership with knowledge-based companies, is prioritizing the use of smart software in exploration.

With the gradual shift from government-led programs to collaborative models, private sector involvement has reduced the need for direct government intervention — a major achievement. However, alignment between investment conditions and production goals remains a consideration."

Currently, 250 exploration permits at various stages are held by IMIDRO, IMPASCO, and the National Iranian Copper Industries Company. These will be auctioned to attract private investment once the results are finalized.

IMPASCO is the Iranian Mineral Production and Supply Company, a key mining company associated with IMIDRO and the Ministry of Industries, Mines and Trade. IMPASCO's vision, as of 2025, is to become a leading and innovative mining company.

IMIDRO and its subsidiaries invested over 40 trillion Rials [$50 million] in exploration last year — the highest in the organization's history.

Under Article 24 of the Mines Law, IMIDRO emphasized that securing permits requires obtaining clearances from multiple regulatory bodies. These include the Natural Resources Department (for genetic reserves of flora and fauna), the Department of the Environment (for protected areas categorized under four tiers), and the Atomic Energy Organization (for zones containing radioactive materials) — all cited as persistent hurdles in the licensing process.

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Permitting challenges, safety certification requirements

Regarding safety issues in mines, it should be noted that over the past year, the country has witnessed multiple mining-related incidents resulting in worker fatalities. However, within the Health, Safety, and Environment (HSE) domain, several measures have been implemented. These include:

Formulating safety protocols for exploration missions,

Mandating the use of all-terrain vehicles in high-risk zones,

Developing safety checklists for all operational phases, and

Requiring safety competency certification for all contractors.

In the exploration sector, where personnel enter high-risk environments, safety is paramount. Consequently, mandatory health certification for exploration teams has been incorporated into operational protocols. This means compliance with safety guidelines is required, particularly for those holding valid IMIDRO safety competency certifications.

Regarding development programs in border regions, since 2012/2013, exploration activities have been conducted in underdeveloped and border areas such as Sistan and Baluchestan, South Khorasan, Kurdestan, and Ilam.

Safety certifications for exploration personnel are now mandatory. Compliance with IMIDRO's safety standards is non-negotiable.

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Lithium exploration

Regarding lithium exploration, while Iran's first lithium exploration permit was issued in 2015, the economic grade for lithium in brines must exceed 500 ppm. Current reserves, such as those in Nahavand at 80 ppm, remain subeconomic.

Collaboration with Geological Survey of Iran

In 2015/2016 (the Persian year 1394), the first lithium exploration license was issued. The economic grade for lithium in brines must be at least 500 ppm; however, in Iran, brine grades are typically below 200 ppm, and deposits with grades as low as 80 ppm have been identified in Nahavand. Consequently, given the current conditions, exploiting lithium reserves in Iran is not economically viable.

Regarding collaboration with the Geological Survey of Iran, an agreement was signed in 2021/2022 (Persian year 1400) between the Ministry of Industry, Mine, and Trade and the Geological Survey of Iran. Under this agreement, the ministry bears the financial responsibility, while technical and expert execution is delegated to the Geological Survey. The objective of this initiative is to generate baseline geological data to support the expansion of mining activities.

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