As new technologies are being introduced to the mining industry, the challenges related to their safe assimilation and the potential changes they bring to mining techniques necessitate adjustments to the current operations. Predictive simulations are critical to understanding unforeseen scenarios and shifting costly changes from the operational stage to the design. The Digital Twin methodology has gained a lot of attention in recent years. Many industries, from manufacturing to engineering and even social sciences, are adopting this approach to understand better the complex systems they are working with. By considering the enormous expenses and risks related to a pilot project, DT could replace that by acting as a prototype in which realistic tests and simulations are carried out with close to zero cost. DT includes a data hub, simulation and analysis tools, and visualization platforms to enable appropriate designs and monitoring plans focusing on unknown areas. A few examples of DT’s application in mining include fleet management, Mine-to-Mill optimization (especially D&B), geotechnical digital twin (gDT), etc.

When developing regulations, testing the efficiency of the mine layout, design and magnitude of the restricted area and its access points, human-machine interactions, risk identification, and management processes, examining the efficacy of control systems, and monitoring, DT could help speed up (or completely replace) the process in the physical world.