

# Key technology indicators that will influence mining method selection for future mines

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## ABSTRACT

In recent years, the mining industry has undergone a transformative shift driven by the rapid advancement of emerging technologies such as automation and electrification. These technological innovations have not only revolutionized operational efficiency but have also introduced an imperative need for new forms of conducting mining. Specifically, the mines of the future come along a series of challenges to take into consideration when planning a new mine, e.g. greater operational depths, higher seismicity levels, higher rock temperature, increased environmental constraints, higher degree in interoperability and integration of technological systems and automation, lack of suitable professionals and decreasing workforce, stricter regulations, etc. Therefore, the essential need in formulating novel strategies that re-evaluate how mines are planned, executed, and managed since early exploration stages up to a post-mining era that consequent uses mine sites. Australia plays a major role in this change as one of the leading countries in technological implementations within the mining industry, as identified by a global research developed at CUT by the authors. To explain the current technology situation in the mining industry, this paper provides an overview of the current technological trends in mining, the current automation market, discusses the technology readiness level of the industry and defines the challenges identified for technology implementation from a global point of view. Later, to prepare the industry for a new era of mining, this paper introduces and defines the key technology indicators (KTI) that will influence mining method selection for future mines, which harmoniously incorporates the constraints and requirements of the emerging technologies as automation and electrification while maintaining an unwavering commitment to safety, environmental responsibility, and sustainable resource extraction. Finally, this article gives a summary of the key advantages and disadvantages associated with each KTI in selected mining methods and defines the working areas for future developments.