INNOVATION IN MINING

Deploying different technologies allows for common goal of increasing safety, productivity and efficiency

	TECHNOLOGIES	EXAMPLES	RESULTS
HARDWARE	Automation and/or robotic hardware	▪ **Automated drill/haul:** one worker can control several drills remotely, automated machine can operate 24/7 ▪ **Drones** are used to survey areas where previously inaccessible	▪ Increase safety ▪ Increase productivity ▪ Increase profitability and company's image
HARDWARE	3D Imaging	▪ **3D imaging** provides the highest value within underground mining by helping miners identify bottom of mines and rock surfaces	▪ Increase safety for underground miners ▪ Increase efficiency by allowing for better mining plan
HARDWARE	Smart sensors	▪ **Smart caps** utilizes **both hardware** (sensor+ caps) angle **and software** (data analytics) to predict fatigue level in mine workers	▪ Increase safety by allowing mining companies to monitor fatigue level, understanding fatigue patterns and improve workplace design
SOFTWARE	Data analytics	▪ **Big data** utilizes historical data of equipment and/or company to predict e.g. energy cost saving, breakdown schedule	▪ Increase efficiency by enabling better decision making and planning process
SOFTWARE	Internet of things(IoT)/ Virtual reality (VR)	▪ **Remote operation centers** enable employees to monitor and control aspects of operations simultaneously.	▪ Increase safety ▪ Increase productivity ▪ Increase efficiency

Source: Accenture, 2017