



# Creating the future of mining

Michelle Ash, Chief Innovation Officer of Barrick Gold, says the mining industry can't afford to wait for change

NICOLE MADIGAN

*'Disruption is coming. We can't stop it, but we can embrace it. The best way to know the future is to create it. This is the challenge for our industry. Let's create the future, let's drive it and let's not be disrupted.'*

**T**hese were the closing words from Michelle Ash at her Austmine 2017 presentation earlier this year. Michelle's talk proved to be one of the event's most popular.

There's no mistaking Ash's passion when it comes to the impending disruption of the mining industry, and the vast possibilities she believes could be brought to life through innovative change.

But the Chief Innovation Officer of Barrick Gold says embracing disruption is more than just a desirable maneuver. She says it's necessary for the industry to survive, let alone thrive.

'The mining industry is ripe for disruption and will not exist into the future in the way it is now,' says Ash.

'So we *have* to change.'

While innovative developments are taking shape within the industry, the current rate of change is simply not quick enough, says Ash.

'There has been some advancements in automation and predictive analytics but not enough yet in humanistic design.'

'This is mainly due to the thinking of senior people and those who have been in the industry for a long time.'

Ash says there's a common attitude that the mining industry is unsuitable for disruption or simply unable to utilise ever-changing technology as it becomes available.

But if the resistance continues, Ash says the industry is at risk of becoming redundant, with unrelated industries

already beginning to dip their proverbial toes into mining waters.

'If we don't disrupt ourselves, others will disrupt us,' says Ash.

'Google is already doing car automation, which is not far from truck automation and logistics within our industry.'

'Amazon could run our warehouses better than us.'

'And Apple has entered into recycling with the Liam robot.'

The technology dismantles an iPhone, breaking it down into its metals in just 19 seconds.

Extracted gold, copper, cobalt and other precious minerals are then reused to create a new iPhone, with Apple now claiming the company will not use any freshly mined minerals in their products.

'There is so much we can do to use the information we have available,' says Ash.

'Predictive analytics to improve geological understanding, mine planning, process plant operation and customer demand; let alone develop robotics, automation, improve processing techniques and so forth.'

More than that, Ash believes the mining industry also requires fresh thinking in terms of sustainability.

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Ash presenting at IMARC 2017 in Melbourne.

'Carbon neutral mining is important for so many reasons – community acceptance, consumer pressure,' she says.

'It is the right thing to do, to use renewables and stop burning fuel. It's also cheaper.

'Solar is \$0.04 per kWh versus fuel at \$0.32 per kWh, especially when you take the engine efficiency into account.'

Moving into carbon neutral mining isn't without its challenges though, with many project managers unwilling to take on the technical risk, on top of the financial and project risks already being undertaken.

'We need fresh thinking about how we can mine carbon neutral, with no waste, working with the government and community.'

### The human side of mining

Ash's belief that there is more to mining, than mining, goes back to her university days, when she elected to study both engineering and psychology.

'I felt that if I had the best solution but wasn't able to get the team to implement it, then there was no point,' she says.

'So I felt ill-equipped to lead or understand people, which is why I studied psychology. Economics came later, so that I could understand how business worked.'

But her entry into the world of mining almost didn't happen at all, with Ash initially considering studying veterinary science or medicine.

'In the end, my mum pushed too hard for me to be a doctor so, being 15, I chose engineering.'

Upon graduation, having completed her thesis on

methane extraction from coal beds following the collapse of the construction industry, Rio Tinto offered Ash a position within its research company, ATD.

Soon after, the company required a blasting engineer and invited Ash to the site.

'Once you see the mountains blown apart due to your work, you get all of your anarchistic tendencies out and are hooked on the mining industry from then on.'

When Ash first entered the industry in 1992, women had only recently been permitted to go underground in Australia and even then were required to wear white overalls so others could see them approaching.

But entering an industry dominated by men was of no consequence to Ash, having worked in the rural industry during her schooling years, and grown up with brothers.

'I was used to being with men.'

That said, much change was required. Some has taken place, but not enough, says Ash.

'[Mining] is still male dominated, though it is getting better in some countries where women are being employed as engineers, geologists and operators.

'We still don't have enough women on boards or in executive roles.

'There is still much to do to ensure true diversity of thought.'

For Ash though, she believes being female has had a positive influence on her career, enabling her to be more collaborative and develop more effective partnerships.

One thing is for certain – it hasn't held her back. Ash was

named in last year's list of 100 Global Inspirational Women in Mining.

Her current role as Barrick's first Chief Innovation Officer is the culmination of a range of diverse roles at numerous organisations, including Leighton Contractors, Minerals and Metals Group and BHP Mitsubishi Alliance.

Following those roles, Ash took one of her most memorable positions, as Chief Operating Officer with Acacia Mining plc in Tanzania.

Accountable for the Bulyanhulu operation, Ash worked with the management team as well as support teams from the central functions to turn around the operation and deliver long-term value for all the stakeholders.

During this time, she also found herself playing a mentoring role to others – a role she welcomed, having understood the value of such relationships through personal experience.

'I've had some wonderful mentors,' says Ash.

'Dave Sandy, my first manager, taught me the importance of understanding my team members and what they do.

'Murray Winstanley taught me about the management of companies and Megan Clark helped me learn to translate technical information for non-technical people.'

Ash says while each of her unique roles have contributed to her professional development, with memorable moments peppered throughout, working in Tanzania to help the Bulyanhulu team transform the business is a clear career highlight.

'As is (my current position) working as the CIO for Barrick and pushing the boundaries of thinking in mining.'

## Change is coming

Though there's still a way to go, under Ash's guidance, Barrick's innovation team is considering a number of initiatives, which she outlined in an article for Barrick Beyond Borders.

Innovative themes include designing an autonomous extraction process, primarily for underground operations and mines that operate at more than 4500 metres above sea level.

Ash also discussed plans to develop new and affordable ways to extract minerals from very low-grade ore bodies, as well as developing intelligent systems that facilitate real-time data analysis, increased transparency, faster planning and greater agility at every stage of the mining process.

'[This raises] the already high bar on our ability to pinpoint the size, location and characteristics of gold ore bodies.'

Such innovations could reduce costs by about a third.

'We also want to create additional shareholder value by leveraging our intellectual property,' she wrote.

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'To that end, we've established a standalone company called Barrick Technologies to monetise patented technology that underpins novel processes such as our air-metabisulfate copper flotation process or thiosulfate-based gold processing technology.

'This will generate new revenue streams and spur faster development of these emerging technologies.'

Ash describes her current role as one that's designed to energise people, create action plans and help develop the themes that will drive innovation strategy.

But she can't do it alone. Nor does she want to.

As Ash and her innovation team build their strategic roadmap, she says they're also identifying the key areas where expertise is lacking, and seeking to source those skills externally.

'We know, for example, that we're going to need some form of artificial intelligence and that capability doesn't currently exist within our business or really across the mining industry,' writes Ash.

'So we're looking to the technology sector, finding out what's cutting edge and approaching potential partners to see if they're a good cultural and technological fit.

'There are opportunities for us to build relationships with great companies, and we are moving quickly.'

Recently Barrick partnered with technology corporation Cisco to implement a range of innovative changes.

It's still early days yet, but small changes are beginning to take place, such as bringing wi-fi into mines, enabling workers to call operation headquarters if they encounter issues on site – a potentially life-saving development.

It's these ground-breaking innovations and future possibilities that maintain the allure of the mining industry for Ash.

But while she has no plans to jump ship anytime soon, she does have other plans down the track.

'I told my son that he needs to be self-supportive by 30 because when I turn 60 I am going back to university and doing medicine.'

Until then, the mining industry should brace itself. Disruption is coming – Ash intends to make sure of it. 