

BHP Billiton chief executive Andrew Mackenzie: diversity will help fuel innovation

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Andrew Mackenzie

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BHP chief executive Andrew Mackenzie. The BHP Billiton Foundation recently committed \$50 million to help address the under-representation of girls and Aboriginal and Torres Strait Islander students in STEM. Photo: Philip Gostelow

As someone who has been fortunate to have a career in both industry and university scientific research, it is hugely gratifying to see innovation squarely on Australia's agenda. With the government's "Ideas Boom" announcement last week, there is recognition that innovation and productivity are key to our future prosperity – we all have to be able to do more with the resources available to us. Australia is a nation that relies on international trade for its prosperity. We have the opportunity and economic imperative to position ourselves as a country of innovators – but we need to tackle the challenge from every angle: the right policies, more collaboration between universities and industry and a focus on the importance of science, technology, engineering and mathematics (STEM) education from an early age – for girls and boys.



Iranian mathematician Maryam Mirzakhani was the first woman to win the Fields Medal Photo: Song Eun-seok

It's hard to remember a time when I didn't "choose maths", I've always been drawn to STEM subjects and was encouraged by my teachers. But it's not like that for everyone, and especially for girls.

Last year, Maryam Mirzakhani, an Iranian woman, became the first woman to win the Fields Medal – the highest honour in mathematics. She said when she was young, she was far more interested in reading and writing fiction than mathematics. Thankfully, as she grew up she discovered a love for maths. We have to ask ourselves how many girls choose a different path and never realise their potential in STEM?

With this in mind, The BHP Billiton Foundation recently made a commitment of A\$50 million to help address the under-representation of girls and Aboriginal and Torres Strait Islander students in STEM. Partnering with the Australian Mathematical Sciences Institute (AMSI) and CSIRO, the projects focus on teacher professional development, mentoring and student support and changing stereotypes and behaviours of parents, teachers and the community to recognise the importance of STEM subjects and professions – and to help ensure we uncover and develop the next generation of innovators.

With female representation in manager and senior roles doubling over the past four years in our company, and with women now making up nearly half of our Australian graduate intake, I do have hope for the future. We continue to work to improve diversity and inclusion and to fill a pipeline of STEM capability, but it is critical to attract more scientists into industry for Australia to succeed.

Productivity must be seen as a key enabler of success in a challenging environment.

At BHP Billiton we promote an inclusive environment where employees are encouraged to contribute collaboratively to the creation of ideas that have direct commercial applications.

We estimate that the US\$4 billion (\$5.55 billion) of productivity gains entrenched in our business over the last few years was the result of more than 4000 good ideas by employees at every level of the organisation, innovative thinking on everything from drilling to drones.

One example was the need to reduce costs associated with our exploration drilling program used to predict the characteristics of our ore bodies.

The team wanted to eliminate the need to drill expensive diamond core drillholes for validation of data. Through three-way collaboration with BHP Billiton, CSIRO and cutting-edge technology developer Sodern, we created a neutron generator tool for real-time component analysis saving BHP Billiton more than US\$10 million last financial year.

As part of our program of future mining methods, autonomous truck and drilling programs are under way in our WA iron ore mines to improve both safety and productivity. But as the



Illustration: John Spooner.

nature of work shifts from manual equipment operation and maintenance to increased use of automation and emerging technologies, we also have to be able to transition employees into roles with skills in areas like IT and robotics.

For the resources industry to grow in periods of low commodity prices we must innovate, promote cross-industry collaboration and drive more business partnering in research.

The best ways for government to increase commercial outcomes from Australian research is to first ensure Australian institutions can become more competitive with their international peers and also to increase the opportunities for university and industry partnering. Australia comes in at 29 out of 30 in the OECD's ranking of business-university collaboration, according to the 2015 Global Innovation Index. This has to change.

Australian universities need greater incentives for academics to engage with industry, and it was encouraging to see this included as a priority in the government's innovation package. This isn't about universities moving away from high-quality research, it is about breaking down silos.

Mining companies have a key role to play in leading the drive for better engineering standards, open sourcing of research, funding of universities and bursaries for work directly related to industry and society needs to close the gap between academic research and commercial outcomes.

BHP Billiton's recent global collaborative project with Cambridge University into rock fragmentation is a good example of this. Cambridge is working with leading global researchers, including Monash University, the University of California, Imperial College London and the University of Minnesota to develop a way of drilling and blasting rock in a way that breaks it into the optimal size – the "Goldilocks zone" of not too big (which slows down our diggers) and not too small (wasting resources and risking damage to pit walls).

Partnerships are about shared energy, vision, talent and responsibility – and this is a big shift for mining companies who have previously held transactional agreements with research organisations and suppliers.

As the resources industry changes and evolves, the way in which we interact also needs to mature into a more collaborative and inclusive approach. Sometimes an "open lab door" can help an innovative idea spread across the industry – creating a step-change in productivity that benefits all.

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