

Rio Tinto: mining for future talent in Africa

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Mining Indaba, Cape Town, South Africa**

5 February 2018

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Good morning Your Excellencies, Honourable Ministers, ladies and gentlemen.

It is a pleasure to be back in South Africa.

Today I would like to cover our purpose, reputation and focus on the future of mining.

First on purpose – since the time of our ancestors here in Africa, in the cradle of humankind, three and a half million years ago, human progress has been interlinked with mining.

In fact the oldest known mine - around 43,000 years old - was here in Africa, in Lion Cave in Swaziland, where ancestors of the San people mined red pigment, used for rock painting. This continues even today.

In East Africa, people produced steel more than 2500 years ago, a development that only happened in the 1700s in Europe.

Mining has been essential to human activity since the dawn of time.

It is the same purpose for Rio Tinto – we supply minerals and materials essential for human progress.

Everything around us either mined or grown. The iPhones, buildings, houses, trains and the boom of electric vehicles is only possible with mining.

This role of mining is well understood in many countries including Chile and Australia, where it is an economic bedrock, providing employment, technological advancement and underpins GDP and tax revenues.

Africa has its own success story. Botswana being one of them, which transformed itself in the last 50 years from one of the poorest countries to this continent's success story. Today, the Pula Fund is accumulating savings from mining revenues for the benefit of future generations as well as investing in education and infrastructure.

Mining can be inclusive and bring on the sustainable development to the host communities, countries and change lives for the better. Depleting mineral resources can be transformed into renewable human resources creating a better quality of life – through improved healthcare, education, the list goes on.

Good governance, prudent resource management, rule of law and high capabilities of the governments are common attributes of successful governments not only in Africa but also in the US, UK and any country. So they are not unique drivers of success.

However, a key attribute that can make a difference is the level of transparency, accountability, understanding and trust that are required for the partnership to thrive between the resource sector and governments.

Now let me switch to the industry's reputation. The challenge is our sector is misunderstood or expectations are misaligned between the various stakeholders.

Firstly, the mining industry comprises of many different groups;

- Small scale and artisanal mining that does have a role to play with creating employment but with certain consequences
- Entrepreneurs that pursue high risk investment in the short term
- Junior mining companies that have the role of funding and discovering the next generation of resources
- And then "operator" miners which are small to large, and that bring on the operations.

If any of these players don't behave responsibly it casts a dark cloud over the whole sector.

But perhaps the key challenge to our sector's reputation is the misalignment of expectations.

Let me give you few examples.

It starts with just a basic term, mineral wealth.

I often see a common approach of calculating the scale of mineral wealth by multiplying the resource size by current price.

Let's use copper for example, which for a million tonne at \$7,000 could translate into \$7 billion of so called mineral wealth.

The flaw of this analysis is that the investment and cost component are completely ignored. It doesn't take into account the billions of dollars of upfront capital and on-going costs for fuel, equipment, people and taxes. It is not uncommon for us to see a limited return on capital for a number of years.

Take a look at this truck in the copper process, let's say it's carrying 250 tonnes of material with a copper grade of one per cent. This load will only result in two and a half tonnes of copper. To put it another way, 99 per cent of what is on that truck contains no mineral wealth, assuming no by-products.

And why? This material needs to go through significant steps before it becomes copper.

It is crushed and ground into fine dust, which at times is more refined than flour, using large amounts of energy.

The copper in this fine dust is then separated through soap like bubbles flowing out of the flotation plants, like those used in the beer brewing industry.

There is more re-grinding. Dewatering. And thickening. And only then do we see the 2.5 tonnes of copper concentrate. So we go from this (larger) to this (small). And this means that not only do we need truck drivers but also flotation scientists, mill operators, and the list goes on.

This is a simple example, but it shows the central truth about mining: it costs a lot of money to extract minerals, it involves significant financial and execution risk and it is technically difficult work – particularly when done responsibly.

Another example of a challenge involves the impact on the environment, which we at Rio Tinto take very seriously. Now let me give you an example from right here in South Africa.

At our Richards Bay Minerals, this commitment to the future has seen us plant around two million trees and we grow a similar number in indigenous forests. That's over four million trees.

To give you an idea of the scale of this, Johannesburg, which is one of the largest man-made forests, has roughly 1.2 million trees.

This is important not just in terms of conservation impact, but because of the secondary industries that thrive from it, such as the paper industry.

Now let's take a more forward look where the future of mining will be very different from the mining of today.

The biggest challenge and opportunity is only ahead of us as we look at automation and the advent of artificial intelligence.

Ernst and Young, and Deloitte, both rank the 'digital revolution' and 'digital effectiveness' among the top risks facing the global mining sector. But at Rio Tinto we see it as an opportunity.

Our industries' needs are changing. And, in fact, they are changing for the better, for all of us. The composition of our workforce and the skills we need will be transformed irrevocably.

Currently, the mining industry employs hundreds of thousands of people. For the large part, this will not change.

However, we will move from thousands of haul truck drivers, to software engineers, and data analysts. We will create sophisticated technical jobs, which will require investment in re-skilling. This will also make people safer. This will also make operations safer.

Currently around two-thirds of our engineers are mining engineers and one-third are data engineers or telecoms experts. In a decade that will have flipped and the mining engineers will account for around one-third.

That means we need to persuade skilled graduates to join Rio Tinto instead of Facebook, Google or Uber.

Let me give you a real example of this based on the video I showed you in the beginning.

In the video earlier, we saw standard mining truck but it's driverless – essentially a super-sized robot.

We are now using fully remote-controlled trucks at our mines in Western Australia, controlled from a central state-of-the-art operations centre in Perth, 1,500 kilometers away from the operations.

With almost 100 of these mammoth machines operating at our Pilbara mines, we are the world's largest owner and operator of autonomous trucks, with over 10 years of experience.

The 24/7 demands of our operations can be tiring and the night shift workers driving these large machines can be exhausted. The automated trucks reduce fatigue and most importantly prevent and reduce injuries and improve safety.

These large robots have so far moved one billion tons of material since we started ten years ago. We have also introduced driverless drill rigs and trains.

We bring this new technology responsibly with our employees and communities in mind. The transition of skills will require retraining and time. Mining jobs are difficult and often in remote locations away from families and this transition will improve work-life balance.

With this automation, our data usage is increasing rapidly and is measured in terrabytes per day;

- Each one of our large automated trucks have 45 sensors which transmit data every few seconds thousands of kilometers away
- We track our drilling data, real time, covering millions of metres of earth.

So, what do we do with all this data? We have created the Mine Automation System (known as MAS) which is a world class fusion database with artificial intelligence and machine learning. And it's in place at 98 per cent of our sites today.

So the mine of the future will produce differently, it will look different, and it will need a different type of human input.

So what does this future mean for Africa?

Africa is the largest untapped source for growth in mining, which will enable a low carbon future.

And yet, Africa's greatest resource is its people.

With 200 million people aged 15 to 24, Africa has the youngest population in the world. These bright young 'digital natives' are perfectly poised to take advantage of the opportunities.

The skills that drove Africa's telecoms boom, will drive tomorrow's mining industry.

We need African engineers. We need African technicians. We need African brains. That is the future.

Telecoms engineers can become engineers within our industry and we can all benefit by merging these high tech skills.

Africa today, is the source of some of the world's best copper specialists, and yet talent is growing globally, with deep expertise in South America and also emerging in Mongolia.

At Rio Tinto, we pay immense focus on developing local talent and local capabilities.

In my home country, Mongolia, we are developing one of the largest underground block cave copper mines with a workforce of nearly 14,000 employees and contractors. 94 per cent of the workforce are Mongolians, with locals in about 75 per cent of management positions.

Back here in Africa, our operations in Namibia, Madagascar and South Africa are all managed by local leaders. And we have African leaders managing our global businesses;

1. Biro Diallo a Guinean, civil engineer, 10+ years with Rio Tinto across iron ore in Australia, Simandou and now General Manager for our Dampier Salt Operation in Perth. He was part of our management team during the Ebola crisis in Guinea, which saw every one of the 3,000 workforce - including local families - return home safe.
2. Melissa Shanjengange, from Namibia, with over 20 years of experience, she is GM of Human Resources in our Copper business based in US.
3. Patrick Boitumelo. A Motswana who worked for us in Palabora and now is the President of our Diamond mine in Canada, near the Arctic circle.
4. Here today in the audience we have Lawrence Dechambenoit. Our vice president corporate relations, Africa. A francophone African who has made South Africa his home after many years of advocating for Africa's future while at the UN.
5. And let me finish off by telling you about Liezl Davies from Namibia. Who three days ago took up the role of GM operations at Rossing. She is the first female to hold this operational role.

This year, you will have a chance to meet our top African talent at our exhibition stand. Stop by, but no poaching.

We invest in our people as they are our greatest asset. We are very proud of our African leaders and employees.

Our company is benefiting hugely from their skills. A successful business is about people.

We have to continue this conversation in Africa about the need for stable, predictable and equitable regulatory environments as we look at the future.

We are at a turning point in our industry. Technology, society and markets are moving dramatically at rapid pace demanding a fundamental shift in the way we think. We have never before seen such a coming together of trends and challenges.

If the mining industry is to succeed in this new era, we must grasp these opportunities and turn them into positives so we can continue to supply minerals and materials essential for human progress.

We, Rio Tinto, will be part of Africa's future. We want to draw our future talent from Africa. And shape the future together.

Thank you.

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