

Thank you Bill for the introduction.

Good morning delegates.

I am used to just putting up a few slides and talking to them while I wave my hands around - in the interests of the translators I'm going to try and stick to my script. Forgive me if it is a little stilted.

I'd like to start by expanding a little on Bill's introduction.

I first started working in and about the mining industry about two decades ago, as a junior management consultant, when I spent some time working on the deep level gold mines to the west of Johannesburg in the Carltonville / Westonaria region.

I remember spending 6-months working on an underground productivity improvement project at Number 4 Shaft, East Driefontein mine - I think it was 2,400 metres below surface. I'm not sure that my efforts actually improved productivity, but it certainly was a fascinating time.

I then moved into investment banking where I was involved in equity capital raising and mergers and acquisitions, largely in the junior mining sector.

There was tremendous regulatory change happening in the South African industry at the time that had opened up opportunities for new entrants to the industry; and which fortunately happened at the same time as the commodity super cycle, which we all know came to crashing to a halt with the global financial crisis in 2008.

We had a lot of success prior to the crash:

- listing new companies on the Johannesburg stock exchange;
- seeing new mines being financed by both local and international investors and then being developed.

It was a great time to be involved in the industry.

By the time the global financial crisis hit I had moved on to become founding Managing Director of a start-up coal exploration and development company - where, fortuitously, we had listed on the stock exchange and raised capital 5-months before the crisis hit.

The team I lead was able to go from 1st exploration borehole into full production within 3-years - raising bank project finance along the way.

We eventually developed an open pit coal mine, 3 washing plants and took over a distressed underground anthracite mine. We went from 6 employees to 1,400 in those 3-years and I really saw the positive impact that developing a mine can have, especially if it is in a remote region.

After 5-years I returned to banking to work in the origination of mining project finance deals in South Africa and on the rest of the continent - it was effectively a business development role which involved a lot of travel to Perth, Toronto and London - although the trips I enjoyed most were those to remote mine sites across the continent.

The team I was involved with financed mines in places as diverse as Liberia, Kenya, Tanzania, Malawi, Botswana, and Namibia with the greatest part of our business being in South Africa.

I spent a lot of that time reflecting on

- what it took for a country to have a successful, thriving mining industry
- why certain countries were better at it than others;
- why money flowed into some countries and not others; and
- what policymakers needed to do to make it happen

I have collected my thoughts in to a couple of concepts or ideas which I'd like to share with you now.

I believe that there are three absolute, or obligatory, requirements that any aspirant mining country needs to have in place - in order to have a growing, thriving mining industry

These are

- Ongoing Investment in the country's geological endowment;
- A functional regulatory regime; and
- The ability to attract investment capital

It helps of course to also have available

- mining skills;
- infrastructure like ports, airports, roads and railways - and of course
- power and water

These help, but without the three obligatory, or essential requirements, you will have no new projects and your mining industry will be in decline.

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So to illustrate this concept I have drawn it like a Venn diagram. It is only if you have all three overlapping circles that you can have a growing mining industry.

All three must be in place - if one is missing there will be no growth in your industry. Supporting the Venn diagram are the three "nice-to-haves" of skills, infrastructure, power and water.

If a project is rich enough, by that I mean the grade of the targeted commodity is high enough, then that project can carry the costs of

- solving a skills problem,
- or an infrastructure problem
- or the provision of power and water.
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Of course the project will unlikely to ever be discovered if

- there has been no primary research investment into a countries geological endowment
- or if a regulatory environment is dysfunctional
- and of course no project can be built without any money.

An example I like to use of a project that is rich enough to overcome its infrastructure challenges is that of Alphamin Resources in North Kivu in the DRC. Here the mine, which happens to be a tin mine, is particularly rich with grades an excess of 4 and 1/2 percent contained tin, making it many times richer than the next richest tin mine in the world.

As a consequence Alphamin Resources was able to overcome the fact that the logistics and infrastructure were particularly poor. That mine could probably not have been built at lower tin grades unless it was in a different part of the world.

Another project is the Danakali potash project in the Danakal depression in Eritrea - the project appears rich enough to support the building of a 70km long pipeline to bring water from the Red Sea to the project.

I am going to come back to my three obligatory circles later in the presentation, but now I would like to introduce a new concept.

When I was working on that underground productivity improvement project at the East Driefontein mine, a deep level gold mine, I was introduced to the concept of a “Pay Limit”; what this referred to was the amount of contained gold required to be present in the unmined ore in order to cover the costs of mining that ore.

It was used by the mine planners to avoid losing money by mining unprofitable ounces of gold. The mine planners knew the costs of mining ore in a particular workplace, or stope, and they knew the expected grade of gold contained in the remaining unmined ore. Depending on the prevailing gold price, the mine planners could then optimise the mine plan.

So in one area of the mine you would need at least 4g per tonne, or in an area further from the shaft with longer distances to tram the ore you would need 4.5g per tonne. If the gold price changed you would have to review all your planning.

Now I believe this “Pay Limit” concept can be extrapolated to a country's undeveloped mineral resources.

If you can suspend disbelief for a moment and imagine that the totality of a country's mineral resources could be known. And these mineral resources could be divided up into individual projects; and these projects could be ranked and rated by how good they were - how much value they had.

So you can imagine a column chart showing each project, with the most valuable one on the right going all the way down to the lowest value one on the left. You would have thousands of potential projects all at different valuations. Of course you would have to have normalised all the projects into “gold equivalents” so that they were directly comparable.

Once you had this you could conceptualise the country “Pay Limit” at that particular point in time.

Now of course these are undeveloped projects so the country “Pay Limit” does not consist only of the direct cost of extracting the underlying mineral, but it would also include a risk premium for the perceived or actual risks of the country concerned. This risk premium is required to be paid to attract investment and is different for every country.

If the risk is high that a country may default on its external debt; run out of foreign exchange reserves; expropriate assets; dramatically change its tax regime; or that social unrest could break out at any point, then this premium goes up. If the opposite happens it goes down.

Risk is a COST that is added to a “Pay Limit” for a project when an investment decision is being made.

Now I have tried to represent this idea, conceptually in a diagram.

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You can see the left vertical axis represents the normalised “Pay Limit” for the country and the right vertical axis represents the project “Value”. All the projects are ranked along the horizontal axis.

Now if we go back to the concept of the Venn diagram model we will see that if a country invests in its geological endowment it can start to attract explorers; and if it can develop its regulatory regime into a world-class regulatory environment with transparency, predictability and corruption free then it can begin to drive down the risk premium and thus the pay limit.

It can also drive actual costs by providing the “nice-to-haves” of skills, infrastructure, power and water.

Surprisingly this idea that there are projects that could be built, but will not be, because the government is the direct cause of both a high risk premium and the loading a project with costs like additional taxes and social obligations - does not seem to have taken root in countries like South Africa, Zimbabwe or more recently Zambia and Tanzania. Your existing mines have no choice but to buckle to the demands - but the mines of the future will simply not be built as the government imposed “Pay Limit” is too high.

So I think it is the duty of a policy maker and regulator is to actually drive down the country “Pay Limit” thus attracting investment into more and more projects and leading more and more economic development.

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So here we have it - more and more projects becoming economic as the risk premium and actual costs of business are reduced. For many of you who have implemented Landfolio, I believe that is what you are contributing to. Driving down the risk premium portion of the pay limit, making more and more projects possible and contributing to a growing mining industry.

I want to now go back and explore the three circles of my earlier model in more detail.

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Firstly I think it is important to understand where the money that is invested in African mining comes from and which are the countries that most benefit from it.

A few years ago my team and I examined 5000 global public market equity capital raisings by mining companies with the earliest being in February 2013 – we were able to categorise 98.9% of the amounts raised – with 9.5% being deployed globally by globally diversified majors, with the rest categorised by estimated destination region and destination country.

We wanted to get an idea of where the mining money comes from and where it goes to...

There were some limitations to the exercise. This was only new equity capital raised by publicly listed companies – it did not include

- Equity raised and deployed by Private Equity funds
- Self generated investment from cash flows
- Debt
- State owned entities – especially from China

The data reviewed covered 123bn US\$ in capital raised on stock exchanges in 36 countries and deployed in 105 countries (inclusive of the 36 source countries). The data was biased towards juniors and mid-tier companies because they are generally the companies that raise equity most often.

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You can see from the first slide that the vast majority of public market capital has been raised in China and the US and invested in China and the US. This is not surprising or that useful for our purposes. If we limit it to just African countries the picture changes.

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Almost all the money raised on public markets that can be separately identified as being destined for Africa was raised in only 4 markets - Australia, Canada, UK and South Africa. If you look at where the money went in Africa, the most significant portion went to South Africa.

However, if you know the time period, it turns out a lot of South Africa's existing operating companies had got into a degree of trouble and had to repair their balance sheets by raising additional capital. This money was NOT raised to fund new investment. So I think to get a clearer picture you need to exclude SA.

And it turns out on closer examination that money raised on South Africa's Johannesburg stock exchange was exclusively invested in South Africa anyway, when it was invested in Africa at all.

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So if you exclude South Africa, which I think you should, from this analysis, you can see that basically all money raised from public markets and then invested in African projects came from Australia, Canada and the UK.

These are undoubtedly the greatest markets for early stage mining finance. It isn't always available from those markets, but it is never available from anywhere else.

If you look where the money went you can see Mozambique did well, with money raised to build a minerals sands project and a large graphite project in the period - note this was development capital not exploration capital. The time period also captures uranium and gold investment in Namibia and then we also see money raised for gold projects in Burkina Faso, Tanzania and Ghana.

So what can we conclude? Early stage investment in African mining comes from essentially only three places - Australia, Canada and the UK. It is more difficult to draw conclusions on where the money is being invested, but there appear to be 8 countries that that received over 75% of this investment in the period (excluding SA)

- Mozambique
- Namibia
- Burkina Faso
- Tanzania
- Ghana
- DR Congo
- Mali
- Mauritania

Obviously this data can be distorted when there are lumpy investments into large projects like the two projects in Mozambique.

I believe Mozambique was the first country to implement Landfolio - or Flexicadastre, as it was then called. Bill perhaps you had just a little role to play in driving down the Mozambican pay limit and attracting that investment?

The point here is that any country that wants to improve their ability to raise capital need only to look at which countries are being favoured by the Canadian, Australian and UK investors - it is those mining finance ecosystems that provide the risk money.. You can simply phone up the many stockbrokers, private equity managers and financial advisors in Perth, Toronto and London and ask them what the successful countries are doing right and then try to emulate them.

Now returning to our two remaining obligatory requirements.

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**Back to investment in the geological endowment.** Great mining countries invest extensively in primary geological research and make the information publicly available, to all comers, in the most convenient and accessible way possible.

They recognise that this primary data can be a significant competitive advantage in the game of attracting mining investment.

This involves regional surveys, mapping, primary academic research and the collection and curation of historical data. Importantly it also involves enforcing requirements for exploration

companies to submit all exploration data, compiled to an appropriate standard, to the authorities when they relinquish an exploration programme.

Botswana does this very well. South Africa did not for about 20-years and is now trying to play catch up.

Poorer countries have to do what they can to get multilateral organisations and donors to pay for things like airborne geophysical surveys. They should also actively recruit and encourage wealthy international universities to come and do field research and publish papers in international journals.

The important thing is that there must be no gatekeeper preventing access to the data that is in the various government repositories. Unfortunately in South Africa it appears that this data is either deliberately, or through neglect, difficult to access.

When I mean accessible - I mean a potential foreign investor should be able to access the data and review it at no cost - from their computer in Perth, Toronto or London. Like it or not, that is where the early stage speculative investment comes from. And this is how they already access data from your competitor countries.

**A functional regulatory regime:** In the simplest terms this means that a country should offer an efficient and transparent regulatory service, with clear and predictable rules, where tenure is protected and explorers and developers have clear performance obligations. It must be free of corruption, rent seeking and self dealing.

My experience is that this is increasingly the case across many African countries, with some obvious exceptions. South Africa being the most obvious.

I can tell you many stories I have heard - but our saving grace is that the courts have repeatedly found against our department of mineral resources and energy. Sadly no investor willingly invests if they expect to have to defend their rights at great expense and over years in the courts of a foreign country. This is not something a country should be proud of.

Although things have improved under the new Minister, the department is generally opposed to all forms of transparency and has been plagued by rampant corruption and self dealing in recent years. It is the only major mining country in Africa that still does not have a transparent, efficient online cadastral system where any citizen or interested party can see who has what licence where.

The South African mineral titles deeds office is still a paper-based registry and formal application has to be made, on an official form, in person, in Pretoria, at a price and separately for each cadastral unit if you want to try and find out who has what licence where. It is

embarrassing when most other African mining jurisdictions now offer that as a free, online and immediate service.

So I hope I have made my case for why you need all three circles - and if just one is missing you will have no growth in your mining industry.

So how can you see the results? S&P Intelligence's data on exploration budgets for exploration companies operating in Africa provides a rough scoreboard to see which countries are making progress and which are not

This data is from 2000 to 2018 and I believe the 2019 data has just been released but it is not included here.

Global exploration spending is very volatile as it depends on a huge range of global factors like investor sentiment, commodity prices, performance of other investment classes etc. It is always a speculative investment and this type of investment can come and go like the wind.

Note: S&P's data does not include exploration budgets for coal, aluminium, iron ore and industrial minerals.

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I separated out African exploration budgets from the rest of the world - and this is what it looks like in aggregate.

You can see the steady growth to 2008, where the Global Financial Crisis sees it drop off dramatically and recovers equally dramatically to a high of just short of USD2 billion before dropping off again. It is my feeling that the first collapse was largely global factors, whereas there was a lot more country specific issues in the second drop off.

Attracting mining investment is a competitive endeavour. African countries are competing against each other for a share in this pot of speculative exploration money.

Not only must African countries compete for this investment against each other, they must also compete against renowned mining investment destinations like Australia and Canada, and also emerging mining countries elsewhere in the world. Both Australia and Canada individually attract more exploration money than all 54 countries of Africa collectively - and that is not because they have better geology!

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I think it is useful to compare exploration spending between African countries in percentage terms.

Here are the current top 10 countries, over the last 18 years. With the The Rest representing all the other countries in Africa.

Notable changes are South Africa's decline from 35% of all exploration spend to less than 8%. Tanzania had a dramatic decline between 2017 and 2018. Ghana is a perennial steady performer. Let us go through the current TOP 10.

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Without being able to attract early stage investment - which is generally only available from Canada, Australia and the UK your mining industry cannot grow - and you have lots of competitors.

I hope that has emphasised the point that the game of attracting mining investment is a highly competitive sport! There are definite winners and losers - and what it takes to increase performance is not rocket science. Do the best you possibly can with the obligatory elements in my Venn diagram and you will serve your country well.

Thank you