Q&A with Barrick's Head of Digital Planning

by Michael McCrae

Q&A

With his background in special forces, Ed Humphries applies the data skills he used to fight terrorism to make data more meaningful and essential at Barrick Gold.

Humphries, Head of Digital Planning at the world's number two gold miner by market cap, was interviewed on December 2017. Humphries says data management is key.

"We regard data as key and a fundamental driver of our company," says Humphries.

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Humphries says the challenges faced at Barrick were akin to the same challenges he faced when he was serving as a British Special Forces Officer.

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Q&A

Since being hired by Barrick, Humphries has embarked on a series of strategies for making data more useful. The IT infrastructure has been strengthened to enable a migration to better analysis. Data is no longer siloed but put in the cloud and given a structure that makes it more widely shareable and can be more easily modeled. Barrick has made data custodianship a key performance indicator.

To make the digital transformation real to its employees, Barrick has embarked on an on-site program at its Cortez Mine to take ongoing operational challenges faced by its workers and innovate using IT and agile computing.

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Interview has been edited for clarity.

Q: Who are you?

A: I am Ed Humphries. I am the head of our digital planning. As part of our digital transformation, we have brought together IT and parts of our digital division under one banner. We have significantly expanded our manpower that's available for the transformation. To facilitate, we brought on a new chief digital officer who sits up in Toronto and is from GE. His name is Sham Chotai. He is bringing all his experience to bear on how we fundamentally re-imagine the data and hardware architecture that the whole company runs on.

As you can imagine, if you really start innovating at the leading-edge, your IT has to be absolutely solid. If you look at mining, we tend to lag behind other sectors. There are lot of old systems and legacy applications. Part of the realization that Barrick had was the need to reimagine every component of the business.

Q: Are there industries that Barrick has benchmarked against?

A: Absolutely. We've looked at airlines and how they monitor engines. We've looked at other heavy industries. We've also looked at banking and retail, so I'd like to think that we've taken a pretty good look across the board to try and draw feedback. We regard data as key and a fundamental driver of our business: mining for gold.

Q: What is the general plan for rolling up these disparate software systems?

A: I come from a special forces background and served in all sorts of places overseas. As you can imagine, I liken my work at Barrick to how we approached data in the Cold War. We used very deliberate operational cycles. When we embarked on the global war on terror, data rose to the top of the primacy of operations. We needed to understand the data, shorten the flows of collecting data, bring it to a location where it could be analyzed, and then spin it back out quickly for insights where it could drive decision-making.

That became the prime model and involved a couple of big infrastructure steps. We've had to look at how we upgrade our networks for bandwidth. If you can imagine, most mining companies are full of engineers, and they like to collect everything, but what is the minimum amount of data needed to run a business effectively both in the short-term and long-term? You obviously need to build infrastructure that collects the right data.

We are seeing what we can do using modern technology be it a Microsoft Azure or Amazon AWS. These platforms are radically changing how we collect data. We will put these platforms into places where we can transform data into usable information centered around our fixed plant or our mobile plant.

The strategy that existed previously under the consolidated data platform sounded like we were centralizing data. We really weren't. We were just collecting data straight from source systems and bypassing a lot of the servers. We were taking data straight into an environment where we could conduct data science and effectively report real-time straight from the source systems. It's very tricky to do because you have people and a lot of spreadsheets in the way.

We've embarked on that journey to fundamentally transform, consolidate the data platform that we call the Barrick Data Fabric, which is going to be largely based on the Amazon Web Services platform. It is really going to take us from here to a sort of cloud computing infrastructure. We are putting data custodianship, data verification, and cleanliness into the heart of our key performance indicators.

Q: What is the general plan for rolling up these disparate software systems? (continued)

A: Technology is getting simpler and simpler for us to utilize. Ninety percent of the problem is about enabling most people in that environment. How do we better prepare our people to operate in that environment? I wouldn't say we're clogging bureaucracy but any corporation will struggle with lots of emails, lots of spreadsheets, lots of presentations. What we're trying to do is get to the heart of data: what is the most important data and how can we automate as much of that as possible so that the engineer is not reworking a spreadsheet or tailoring a spreadsheet to the financial model? Rather, they're getting that information automatically so that he actually has more time to think about his job and think about the effect they're having on the ground. Innovation is about data transparency for our team and breaking out of those silos and disparate systems. Once you get the transparency out of the data, that allows you to make decisions about how you innovate on process. Once you innovate on process, that allows you to future-proof the technology. It's really about freeing up our people and allowing them time to innovate.

Q: What skills do you want to develop and how do you help people transition?

A: My aspiration for us here at Barrick is that we should be turning out high-grade, digital, world-class operators. As we move forward as a business, I would love to be seen as a place where we actually give people those skills. Those skills really extend from the basics, such as maintaining your iPad and how do you reboot your software. We actually teach people how to use email in the underground environment. Giving people these basic life-skills around tools and hardware is a starting point.

We have a lot of consultants, a lot of external vendors. At Barrick we have embraced partnerships. Part of that partnership is that it's got to be equitable, so if we are engaged in an autonomous vehicle trial and we're setting up and maintaining LIDAR systems or maintaining teleremote stations, what we really want to be doing is training our staff in doing that work as well, so we're really taking a step to make sure that our relationships are beneficial.

The layer on top is data. It is in our DNA. It's now starting to appear in people's KPIs. It's really giving them a basic understanding of how we need to treat data, how that data is then used, and how vital data is in the decision-making cycle. We've actually started a process with a lot of workshops and a lot of training to qualify people as data custodians. We've got within the business extremely bright people who have taken to writing their own applications and code. It's really giving them a framework, so they can land safely and code in a way that is going to enrich the innovation spirit at Barrick.

Q: What is C0deM1ne?

A: When we started this transformation, I came down to Barrick's operations on a reconnaissance and it became very clear to me that there was a broken link between our people and the technology that we use across the industry. It's not just a Barrick problem. So C0deM1ne became the conceptual heart of the Barrick transformation.

C0deM1ne is a place where anybody can come to share an idea. It's a classless society. We don't care who you are, or where you come from, or what's your background. When you walk through that door, you are going to play a role in putting ideas on the board and solve a problem. No question is a stupid question and no idea is too wacky. We use an agile methodology. That's not to say that we're building processing plants in an agile manner, but we're bringing the spirit of an agile mindset to our innovation. C0deM1ne has become a symbolic part of that.

I think where people really lose it is where you break that link with the user. These tools ought to be intuitive and easy to use. C0deM1ne has become sort of the conceptual heart of user-centered design. We started off with a physical location here in Nevada. It evolved and we have development teams throughout the U.S., also in Mumbai, Indonesia, and South America.

Q: Can you take me through an example of some work at C0deM1ne?

A: One of our workers with a maintenance background came to us with a problem. We have a very paper-based process. We wanted to make the task intuitive, take paper out of it, and give workers more time to fix vehicles. The worker then became the product owner, and we talked him through agile work methodologies. We surrounded him with a UX designer, a scrum master, and a development team. We basically threw him off the deep end. Over the course of the last year we rolled out a product which is called Forge. It's an iPad-based platform for maintenance which takes paper out of maintenance. It's been hugely well-received and adopted at our test site. It's a shining example of someone with a great idea, the desire, and the will to make a change using the C0deM1ne approach.

Q: Why did you pick Barrick's Cortez Mine for your digital pilot site?

A: We picked Cortez for a reason. We're an international company, and we really wanted to get to the heart of Barrick. It's easier to operate in an English-speaking environment. Cortez also brought together a unique cross-section of what we do at Barrick as a whole: you have an open pit, you have an underground operation, you have leach pads, and you have a whole processing plant. You get a good mix of environments. It's a great place to build a proof-of-concept.

We felt it is very important to actually have IT people on the ground so they really understand mining and they understand the unique pressures that the team faces. It's important to understand that every mine is slightly different. The best way to do that is to get users' feedback and to really test what it is we're doing in a very brutal up-front and honest way. You know if it doesn't work because a miner will tell you straight away no holds barred, and that's quite important to us.

Q: What skill set will miners need in the future?

A: The range of jobs seems to be increasing. Roles are now becoming more blurred. You need to have some analytical skills. You need just the general ability to be able to question. You've got to be able to ask second- and third-order deductions regarding a piece of information. How do you join up complex internal systems that run an underground mine? You need to get teams of workers to think collaboratively and in a unified way and work towards a common purpose. We are also hiring very bespoke roles in the business. We now have data scientists. We didn't have any data scientists at the start of the year. We now have a whole team of them now at our operations center here in Nevada. It's interesting to drive that culture of data through the business. When our workforce sees what is possible with data, they very quickly get a hunger for it and actually want those skills themselves.

Q: How do you prioritize projects?

A: We prioritize based on the best rate of return we get on those projects.

As I mentioned before, we've got to fix our infrastructure. You might not see the value for those things immediately but they're critical to enable yourself for the future. We drive a very clear planning process around our life of mines, which set our yearly objectives. If you try to imagine safeguarding your core free cash-flow, we then prioritize projects on what we can we do to protect our cash-flow. What projects can enhance our cash-flow? What you do then is monitor and try for a payback for a project of around a year. Some paybacks are quicker or there may be a delay. It's a pretty tight rule internally and makes sure we are focused the right way.

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