



Siyabonga Gama

GAMA, IMMELT AND INDUSTRY 4.0

Words Chris Gibbons

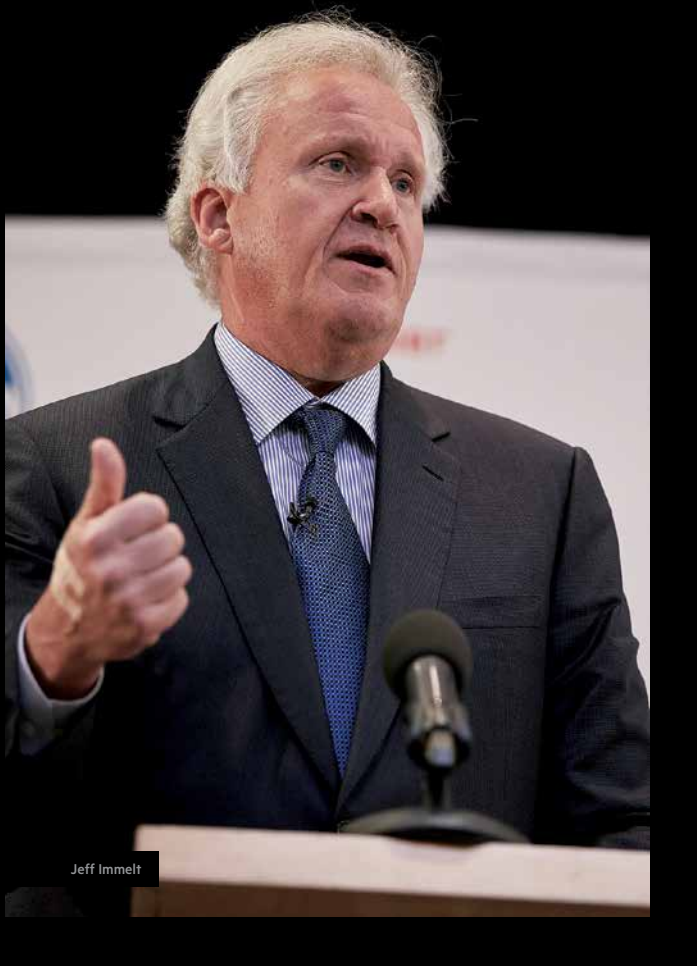
Watched by Public Enterprises Minister Lynne Brown and members of the Transnet board, the giant parastatal's CEO, Siyabonga Gama, and his counterpart at GE, Jeff Immelt, shared their plan to digitise Africa's transport sector. A standing-room-only crowd packed into GIBS' auditorium to hear details of what Gama called "a digital solution that will seamlessly connect shippers and transport operators" and place Transnet at the very heart of "the Fourth Industrial Revolution", or, as Immelt called it, "the industrial internet – Industry 4.0".

Jeff Immelt, President and CEO of GE, says he "gets lost on fancy words" and "the way to think about the industrial internet is not in a fancy way." Instead he prefers descriptions like "no unplanned downtime, fuel efficiency, optimisation of fleet...How do you make assets work better? How do you make enterprise work better?"

For Siyabonga Gama, CEO of South Africa's largest state-owned enterprise, it's about "enabling the efficient movement of goods.

This digital platform will enable the industry to be more efficient and competitive, enabling transporters to bring products to market faster and for less cost, across the vast African landscape."

That's a landscape notorious for its decaying or non-existent infrastructure, infamous border blockages and delays. Gama understands this and says the platform will take "laborious processes, like payment, customs and inspection, from paper



Jeff Immelt

to digital, and create an on-demand solution for transporting freight inspired by consumer on-demand transportation models like Uber and Lyft.

“This will ultimately increase the opportunity for cross-border trade, divisive transportation and logistics across rail, trucks and ships, encouraging seamless integration throughout the supply chain.”

Warning the GIBS audience that industrial companies “need a digital strategy today, it won’t wait,” Immelt made the case in even more basic terms.

“Industrial companies need productivity. It’s really been lagging globally in the last five or six years. It’s really critical in a region like Africa, where there’s only a finite amount of infrastructure, that we find ways to get the maximum amount of productivity out of the infrastructure that we have and the next wave of productivity really has to be found in the digital space,” said Immelt.

He explained that happening concurrently with this craving for productivity was the fact that “the world of technology is changing. The ability to get data off machines, new controls technology, the ability to model that data, is now significant in ways that have never been present before.”

THE INDUSTRIAL INTERNET

These two – “the need and the technology” – have come together at the same time and according to Immelt this is what’s called

“HOW DO YOU MAKE ASSETS WORK BETTER?”

“the industrial internet – Industry 4.0”. In his view, Immelt estimates this to be a market at least as big as either enterprise or consumer IT and worth roughly \$100 billion.

Someone who does make a distinction between Industry 4.0 and the Fourth Industrial Revolution is Jónatan Jacobs, Project Manager in the University of Pretoria’s (UP) Mining Resilience Research Centre. For Jacobs, the former is about the machines and the technology, the latter deals with their impact on people and society and whether or not we have the skills to handle the challenges. Despite alarming predictions about “robotic takeover”, as he puts it, Jacobs says the Fourth Industrial Revolution is not something he fears.

“This is subject to the laws of supply and demand. People are driving this because we want the advancement that comes with this sort of technological implementation. We want the benefits that it will bring to us as a society, in terms of improving productivity and working more efficiently.

Jacobs’ area of expertise – mining – is one sector of South Africa’s economy that’s in desperate need of a technology boost. Gold mining, in particular, suffers from some very simple problems which are proving fiendishly difficult to solve. In basic terms, the mines are too deep, it’s too hot for human beings to work at those depths and the rock formations down there are inherently unstable. In other words, it’s just becoming too dangerous. Add in low commodity prices and labour issues that, according to Jacobs, “are not really seen anywhere else,” and “South Africa has major challenges that the rest of the world does not necessarily have in the same context.”

Chamber of Mines SA Vice-President and Sibanye Gold CEO Neal Froneman has warned that mining has about ten years to find technological solutions to these challenges. He notes that South Africa still has about 400-million tonnes of gold ore in the ground as well as an additional 160-million tonnes of high-grade ore locked in underground support pillars. These could be mined profitably using mechanised techniques, Froneman told a news conference at the Investing in African Mining Indaba earlier this year, but if not, then some 200 000 jobs would be lost in the gold sector alone.

From an Industry 4.0 perspective, Jónatan Jacobs explains that a mine is not a great deal different from a factory: “It’s basically in manufacturing, but you just produce rock”. The key questions for the mining industry, he says, are “how do we modernise in terms of technology in the mining environment? How do we bring in these technologies and also empower and assist the people?”

Mechanisation will involve “putting in robotics, having some sort of human interface to interact with with these things, real-time information systems and the ability to do remote mining from the surface,” according to Jacobs, who adds that the timeline

established by the Chamber of Mines takes the industry to 2025, with an end result of “fully autonomous, remotely operated mines.”

AWASH WITH DATA

One aspect of Industry 4.0 that has only recently started to be understood is that with Jacobs’ “real-time information systems”, also known as “smart controls”, comes a deluge of data.

GE’s Immelt explained to the GIBS audience that “it’s with the controls that are on every locomotive, on every aircraft. If you get on an SAA aircraft and you’re going to fly between Joburg and Cape Town, that engine is going to generate a terabyte of data.”

Those terabytes add up pretty quickly. Head of GE Digital, Bill Ruh, interviewed by *strategy+business* for their Spring 2017 edition, believes that “the underpinnings of our industrial society will be profoundly changed by 2020. Every form of large-scale machinery will be suffused with sensors and software controls, all more and more interoperable. Increasing productivity, raising profits, eliminating waste, ensuring environmental quality, and improving manufacturing processes will all be automated activities.” Machines manufactured by GE alone will “generate more than a million terabytes of data per day”.

For PwC Partner/Director and Head of Industry 4.0 in South Africa, Pieter Theron, that requires IT infrastructure to carry the data and to store it.

“This is about using communication networks such as current mobile and fixed line networks. How much data can you push over them and at what cost? It’s very expensive to communicate like that,” says Theron. As a result, companies are establishing their own communication networks for Industry 4.0 projects. “One company that’s doing it for the telcos is Dark Fibre Africa – they put in fibre all across South Africa, which they’re leasing to the likes of MTN, Vodacom, Telkom and other telcos, for example.”

When it comes to storage, Theron says companies like GE will have to have their own infrastructure. “Big companies are investing in cloud infrastructure and somebody like GE will have to build its own data centres. GE’s got a platform called Predix, which is a cloud platform, so GE has to provide the storage and functionality for that platform for companies to be able to use it.”

Theron says of South Africa’s IT infrastructure, “I don’t think we’re there yet, but it’s definitely happening as we speak.”

PREDIX

Predix is the operating system for GE’s industrial internet, and it’s at the heart of the partnership with Transnet. Once all the data from all the machines and their smart controls has been transmitted and stored, “it can now be modelled to think about fuel performance, wear of the engine, emissions and many different parameters are now coming real-time because of the controls,” according to Jeff Immelt.

He repeats: “This is all about no unplanned downtime, fuel efficiency, optimisation of fleet. How do you make assets work better, how do you make enterprise work better?”

Immelt emphasises that small changes matter: “If you took every locomotive in the world and could save 10% on fuel, that small change is probably worth \$20, \$30, \$40 billion of savings to our customers. Small changes drive big outcomes.”

Nor is this a theoretical figure. GE’s Bill Ruh confirms that “for a North American railroad, we enabled a one mile per hour average increase in locomotive performance. For the railroad, that was equal to \$200 million in added profit each year.”

In the Transnet context, PwC’s Pieter Theron explains that a system like Predix can monitor locomotives remotely. “So wherever a locomotive is operating in South Africa, all that information is posted into the Predix cloud. There are applications in that cloud that can predict certain component failures for the locomotive. So instead of having it breakdown between Nowhere and Nothing, Transnet can actually schedule it for repairs or maintenance at the nearest repair centre.”

MACHINES VS. MAN

One thing is clear. Industry 4.0 is going to require a workforce with very different skills.

During the GIBS event, Transnet’s Siyabonga Gama said that at his company, “...we have an environment that is ripe for change in the digital sphere; equally important, we have the people to do so.”

Let’s hope that’s true. Jeff Immelt told the same audience that in the last six or seven years, GE had recruited probably five or ten thousand people – “talent from the tech industry. The leader of our organisation [Bill Ruh] came from Cisco, we’ve got leaders from Oracle, salesforce.com, and we’ve been building what we would call a blended culture where we’re recruiting the best IT talent.”

“**SMALL CHANGES
DRIVE BIG OUTCOMES**”



Richard Seleka, Lynne Brown, Linda Mabaso

It's certainly a problem of which the Chamber of Mines is aware. UP's Jónatan Jacobs says the mining modernisation process has government backing, with R150 million committed over the next three years, but "one of the themes in terms of successfully transitioning to a more technologically advanced industry is called 'human factors'. There's a strong people-centred focus here. How can we, through beneficiation, or the upskilling of the people, use them in other work areas if the existing job specifications are disrupted through Industry 4.0-type applications? Can we for example employ them in manufacturing in order to manufacture the new equipment, components or other devices that will become necessary? Or, how can we beneficiate the rock from gold to jewellery, or electronics and circuit boards? So there is a massive cross-industry systems implication that needs to be assessed when Industry 4.0 comes into play, in any industry."

As an example of the new skills that are going to be needed, Jacobs cites a fully mechanised platinum mine in the Rustenburg area, which "has a much better skilled and educated labour force...and they are getting some of the best results in the platinum environment due to the mechanisation going on."

He also points to coal mining, "which has been mechanised for years now, and there are still people working there, still operating the equipment."

A DELICATE BALANCE

The people problem is one that's also taxing minds at the Manufacturing Circle, the confederation of South Africa's largest manufacturers. Its Executive Director, Philippa Rodseth explains that while advanced manufacturing is taking place, "South Africa has a very specific social structure, so the first thing that often arises, or where concern is registered, is what does it do in terms of job creation. Are we going to lose our workforce to robots?"

Rodseth gives two examples of where she thinks manufacturers are using hi-tech appropriately.

"The first is shoe manufacture. There's some interesting work being done with the dti and the Vaal University of Technology, where they're looking at the leather and footwear cluster. That's a very traditional sector, with low-tech products. But what they're

“... INSTEAD OF HAVING IT BREAKDOWN BETWEEN NOWHERE AND NOTHING, TRANSNET CAN ACTUALLY SCHEDULE IT FOR REPAIRS...”

doing there is shortening the product development cycle because what takes a long time is making and testing the prototypes. The prototypes are then used to make shoes in the traditional way. So there, the system of digitisation – using computer-aided design and 3D printing – means that the prototypes can be made more quickly, so that design and development, which is usually quite laborious, can be shortened. Then the job-rich endeavour in terms of actually making the shoes still takes place.”

Her second example involves machining centres. “In a machining operation, to be able to get the parts out from the machining centre involves a lot of operational health and safety requirements: doors have to be closed, opened, get the parts going, bring them out, make sure you've got the right parts, and so on. Using robots in that part of the process, to get the parts out of the machining centre, helps to make production and output more efficient, but you still have labour involved.”

Perhaps the last word should go to GE's Jeff Immelt, who says “the neat thing” is that software people from both Transnet and GE will work “shoulder-to-shoulder” to develop applications. He also hopes that Transnet develops applications that can be used around the world, “travelling on Predix, so there might be railroads in the rest of Africa or Latin America using an application that's going to be developed by Transnet.”

And that, says Imelt, “is the way the industrial internet is going to go.” ●