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## The Fourth Industrial Revolution Serie: The internet of things

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### **The Internet of Things Remains a Fantasy**

“Imagine a world”, I would say, “where your bathroom scale speaks to your fridge. Your fridge then speaks to your supermarket, and they all decide to put you on diet. And all of this happened without you even being consulted!” This little scenario always raised a laugh, combined with some uncomfortable squirming in seats.

It was one of my favourite introductions whenever I spoke about the future of digital technology. It struck a chord with school kids, university students and business executives. It was just futuristic enough to seem amazing, and feasible enough to seem imminent. I started using this example in about 2010. I genuinely thought it would be part of our daily reality within 5 to 10 years. But here we are in 2020, and is this scenario part of your daily life? Did your bathroom scale, fridge and supermarket meet up on Zoom this morning to discuss your eating habits? I’ve now stopped using this example because in 2020 it still feels futuristic and imminent.

The interaction I described is part of something called the “Internet of Things”, or IoT. Over the past decade a great deal of enthusiasm has developed around the vision that just as the world of humans has been drawn together by the Internet, so will the world of “things”. Technology gurus postulated an IoT that would connect the trillions of “things” that make up our modern world. This IoT would make it possible for each of these “things” to provide, share and consume data between one another. Some futurists went even further to suggest that both the human Internet and the IoT would be combined to form the “Internet of Everything”.

Many exciting, and scary, possibilities flow from this. We started to add the prefix “smart” to almost everything that would make up our future world. We heard about “smart classrooms”, “smart grids”, “smart cities” and “smart cars”. When we combine this super-connected and smart world with artificial intelligence (AI), machine learning (ML) and robotics the promise of the “4th Industrial Revolution”, or 4IR, emerges.

Why has the potential of the IoT, as illustrated in my bathroom scale example, not become commonplace in 2020?

In terms of feasibility, everything I suggested is technically possible. Devices and programming languages are readily available, and sufficiently cheap and easy to use, to make it possible for anyone with the right skillset to enable a bathroom scale, a fridge and a supermarket’s IT system to communicate and share information via the Internet. If it is not about technology, what are the inhibitors to the widespread adoption of IoT? The consensus among experts is that there are five critical barriers.

The first inhibitor is about market demand. While tech enthusiasts like me would happily accept IoT in my environment, most “normal” people can’t really see the point of it. How many people do you know who have shelled out money on a home automation system like Amazon’s Echo? In the US consumer market, for example, such systems are readily available in stores and online. In South Africa demand has yet to warrant shelf space at your local tech retailer. Creating market demand also requires systems to be extremely simple and easy to install. This limits functionality.

The second inhibitor has to do with standards. Devices connected on the IoT are of limited use if they are unable to communicate with other devices. It’s analogous to humans who speak different languages trying to share information via the Internet. Successful IoT adoption requires one agreed standard. What we have are multiple standards each supported by different device manufacturers. In any emerging technology there is tremendous commercial advantage in having “your” standard becoming “the” standard. IBM’s Andy Stanford-Clark, one of the developers of the popular MQTT protocol, has

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said “even if existing [standards] are imperfect [developers] may be better working within their constraints rather than trying to build support for yet another option.”

For businesses, “cost saving” has been the most cited business case for IoT adoption. Having a compelling business case is seen as the third inhibitor. In many instances cost saving as a reason for bringing IoT into a business has failed to convince executives, mostly because it comes with many risks and uncertainties. Other business drivers, such as “improved customer satisfaction” or “generating new revenue streams” may be more convincing, but more actual case-studies of such benefits need to be documented. This has yet to happen.

The fourth major barrier is privacy and security. Both individuals and business are justifiably concerned that connecting all “things” in your environment to an open and ubiquitous network exposes you to hackers and eavesdroppers. For example, the recent debate around tracking and tracing during the COVID-19 pandemic has opened an important debate around who has access to the sensors we carry around in our mobile devices. These include a camera, GPS tracker and microphone. If these can be commandeered and hacked by government agencies who else can access them?

The fifth, and final, inhibitor is around access to data sources. While, in principle, IoT gives each connected device access to a plethora of data sources, such as weather conditions, or share prices, or whatever else might be needed, in practice this access is far from easy. Some data sources are in proprietary formats, or are private, or only available at a high cost. Ideas have been floated to set up marketplaces where IoT devices can discover and shop for data sources. This has still to be implemented in a practically viable way. Paul Egan, an IoT company executive in the UK, has said “the first company to come up with a data exchange for IoT will probably be the next Google.”

Until all of the inhibitors listed above, and others that I have not listed, are removed, my dream – or nightmare – of a bathroom scale, fridge and supermarket ganging up to ensure that every overweight university professor eats better food, will remain just a fantasy.