

Just not bad enough

In 2000 five mobile operators paid £22bn for access to radio spectrum for 3G communications. They did so on the premise that this would enable mobile data – the use of mobile phones to access the Internet. But some seven years later the use of mobile data was a pale reflection of what had been anticipated. We now know why. In 2008 Apple launched the iPhone resulting in an explosion of mobile data usage so much greater than even the operators had anticipated that they have been scrambling to keep up since. The key innovation of the iPhone was the use of a touch screen making browsing and selection of Internet content so much simpler than the previous approach of using a keyboard. But why had this innovation taken eight years? Touchscreens had been available since well before the launch of 3G. Perhaps it was because the previous approach – the keyboard – wasn't bad enough. It was possible to browse with the keyboard, using arrow keys or numeric keys to make selections and this fitted the mindset of telephone use as well as being helpful when dialling phone numbers. The phone manufacturers were used to producing phones with keyboards and saw little reason to change the iconic form factors that resulted. The keyboard was sufficiently good enough that a replacement wasn't obviously needed but insufficiently good to enable a revolution.

A decade later and similar forecasts of new markets were being made for the Internet of Things (IoT). Many foresaw explosive growth to a world where everything would be connected from smart meters to cars even to dustbins. And yet by 2014 growth had been sluggish, well below the trend needed to hit target – exactly had been the case four years into the 3G revolution. Is there a touchscreen equivalent for the IoT?

The key problem with IoT is wireless connectivity. It is simple to put appropriate sensors into devices such as a depth sensor in a dustbin to measure how full it is. But it is much harder to send that information back to the Council for them to change the collection schedule. The wireless system needs to be very cheap – perhaps £2 or less – run off batteries for about 10 years and have sufficient range that it will work wherever the bin is located, not relying on any home network deployed. We do not have this, instead we have approaches that are like the keyboard, workable but sub-optimal. Cellular solutions are a little too expensive and have much too short a battery life. Short range systems like WiFi rely on home networks that may not be working, have the range or be readily accessible (imagine trying to tell your dustbin the password to your WiFi network!). So as a result we have some IoT. We have patchy smart meter networks based on cellular solutions. We have a handful of smart cities expensively using thousands of short range WiFi like receivers deployed on lampposts. But we don't have an IoT. We also have entrenched self-interest in the form of mobile operators determined to try to use the networks that they have already deployed for cellular communications rather than make additional investment. We have standards bodies seeking to repurpose solutions they have previously developed for other markets. Our wireless networks are bad, but just not bad enough.

Just like the touchscreen, the right answer – the solution needed to enable explosive growth – is readily available. It comes in the form of a custom-designed wireless standard for IoT called Weightless developed by a not-for-profit industry standards body called the Weightless SIG. This solution achieves £2 radio costs, 10 year battery life and a range sufficient that only a handful of

base stations are needed to cover most cities. It delivers the functionality needed by machines rather than people and can be deployed quickly in freely-available unlicensed radio spectrum. Supported by ARM, CSR, Accenture and over 1,500 members of the standard body it is ready for adoption. But with “not quite good enough” solutions available from entrenched operators with massive reach and influence it is awaiting its “Apple-like disruptor”. Who might that be?

One of the key problems in introducing a new wireless technology is the “two ends” issue – no wireless chip is of any use until it has another one to talk to. So building a Weightless chip into a dustbin makes no sense until there is a network of base stations for it to communicate with. But building a network will not generate revenue until there are devices out there to use it. That makes it hard for a single company to disrupt (this wasn't the case with Apple since data-enabled networks already existed). The disruptor is unlikely to be an existing mobile network player – as Apple showed it takes an outsider to introduce a new approach, but just as with Apple it could well be a well-established IT company. Perhaps a fixed operator such as BT, Virgin or Comcast? Or a mast provider like Arqiva or Crown Castle. Or an IT solutions player like Cisco or SAP. The presence of an industry standards body at least gives them a forum to build an eco-system of interested parties to overcome the two-ends problem.

It took eight years from the first 3G activity to the iPhone. The IoT started to be widely discussed around 2010. Hopefully, we can learn the lesson a little sooner this time and not have to await 2018 before an optimal wireless network triggers explosive growth, enabling a better society where cities, energy network and all our devices are smart. To do so we need to actively seek out the Apples rather than lazily listening to what the incumbents are telling us and to be alert to those situations where existing approaches just are not bad enough.

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