RTT TECHNOLOGY TOPIC
January 2021

5G IOT

In 2010 operators were romanced by the vision of a new world in which wireless IOT would transform the economics of 4G networks. We were told that within ten years there would be an installed base of 50 billion M2M devices delivering satisfyingly large returns on LTE network investment.

A decade earlier GPRS had been hailed as the beginning of a new era of data connectivity. Ten years before that FSK modems were the Big White Hope. In parallel, specialist wireless data networks such as Mobitex and Cognito failed to achieve sustainable scale. Altogether these add up to thirty years of disappointed market expectation.

We are now being told that 5G IOT revenues will grow by 1400% over the next five years creating an additional $8 billion dollars of annual revenue by 2025.

Market forecasts are a useful way for consultancies to earn money and help operators raise capital for network investment but they are too often based on false assumptions and a lack of historic analysis. A forecast that is out by an order of magnitude is embarrassing. A forecast that is out by two orders of magnitude suggests a misreading of a market that was supposed to be well understood.

There are many reasons why it has proved hard to make money out of machine to machine and IOT connectivity. From a technical perspective, hardware costs have been high and standards have been over complex. From a commercial perspective, sales and marketing costs have been high. Faced with too many technical and commercial choices, potential customers choose not to choose. Turning off GSM networks has also been unhelpful.

But to really understand why wireless IOT is commercially problematic we need to consider the difference between **emotional value** and **efficiency value**. Emotional value is realised by human interaction. We phone people to chat to them. We engage in social media to socialize and share and entertain or be entertained. We may also use the phone and social media to organise and coordinate activities, gather information and improve social and business efficiency but it is emotional value that has built consumer scale and consumer value in the telecoms industry.

Device to device, machine to machine communication does not have emotional value and must therefore be based on efficiency value alone. Efficiency value implies a gain in productivity which needs to be measurable and sufficient to justify the cost and risk of investment and implementation.

All we know for sure from the past thirty years is that the gain in efficiency value has not been enough to support a sustainable scale economic market in M2M device to device connectivity. The question is whether 5G IOT can finally make the model work. To date, this has involved another blizzard of standards including the Release 16 enhancements for industrial IoT and URLLC (Ultra Reliable Low latency Communication).

Making industrial manufacturing more efficient is a laudable ambition but it is unclear why wIreless has specific added value given that the aim of this particular part of the standards process is to replicate IEEE 1588 Ethernet standards that work perfectly well over a secure and low cost power efficient secure cable network.

The radio standards address a 'typical' 100 metre by 100 metre site with machines that need to communicate with an accuracy of better than one microsecond which means that a substitute radio system needs to have a network accuracy of better than 0.5 microseconds which includes delay and delay variability (Jitter) in the radio device. Add in concerns about radio security and it hard to avoid the conclusion that the factory of the future may remain as a cable play.

Connecting factories together is an altogether different ball game and one where wireless can be efficient and effective but it is important to realise potential efficiency gains are not a function of connectivity but a function of coordination. It is not connectivity that adds value to supply chains but synchronisation. Digital twinning is one example. These are therefore time sensitive networks but most importantly they are Global Time Sensitive Networks.

This introduces us to our next three technology topics (February, March and April 2021) looking at how synchronisation adds value to next generation global IOT networks and the role of space based networks in delivering Smart (Synchronised) Cities from Space, Smart (Synchronised) Seas from Space and Smart (Synchronised) Supply Chains from Space.

All three topics are of direct interest to 5G standards specialists, satellite and 5G strategy teams and global regulatory and competition policy specialists.

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RTT Technology Topics reflect areas of research that we are presently working on. We aim to introduce new terminology and new ideas to help inform present and future technology, engineering, market and business decisions.

The first technology topic (on GPRS design) was produced in August 1998. 22 years on there are over 240 technology topics **archived on the RTT web site.**

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RTT and **Niche Markets Asia** are presently working on research and forecasting projects in the mobile broadband, public safety radio, satellite and broadcasting industry and related copper, cable and fibre delivery options.

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